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Gamification and motivation in education: A systematic literature review

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Abstract: Gamification has been a significant topic in the field of education for a decade, and in the educational context, gamification tends to look at learners' motivation, motivational learning behavior, or engagement in activities. To motivate students in the classroom and keep them engaged in activities, students' motivation is a crucial factor that must be addressed. This study is a systematic literature review of scientific papers on gamification and motivation research published between 2017 and 2024, including review papers and original research papers. It analyses these papers to find the status of current research and if gamification can be considered an effective tool to increase student motivation. Also, this study attempts to answer the question of whether there is some consent on how scholars usually define motivation. The findings indicate that gamification might have an impact on students' motivation, but there is still a lack of understanding about what makes gamification more effective in an educational context. The findings also indicate that there is one definition that scholars generally use to define motivation. The review concludes that since students learn in different ways, educators need to find the most motivating tools to support students through digital innovations.

Introduction

Gamification has been a significant topic in the field of education for some time. Over the last decade, it has been increasingly employed in learning environments as a way to enhance students' motivation (Nieto-Escamez & Roldán-Tapia 2021, Karimov et al. 2023). Gamification and its employment in education became even more significant after the start of the COVID-19 pandemic. Although social distancing was accompanied by online interactions, it was only possible thanks to the continuous advances in digital technologies (Zhidkikh et al. 2023). In addition to facilitating online learning and interactions amidst lockdown situations, digital technologies afford students abundant access to information and foster the generation and dissemination of knowledge (Karimov et al. 2023). However, this necessitates educators to actively seek methods for enhancing students' motivation and engagement levels (Nieto-Escamez & Roldán-Tapia 2021). Thus, more research about the connection between learning, gaming, and motivating students is needed. The symbiosis between gaming and learning can be evidenced by the progressive development of best practices for course gamification and game design (Nieto-Escamez & Roldán-Tapia 2021). According to Bozkurt & Durak, the majority of gamification research is generally found to relate to the field of education (Bozkurt & Durak 2018).

The purpose of this paper is to find if gamification has a positive effect on motivation through a systematic literature review. We present different ways gamification and motivation have been defined in the literature and also present how the level of motivation is measured commonly in articles included in this paper. In this research, we attempt to answer the following research questions (RQ):

- RQ1: Is there some consent in how scholars usually define motivation?
- RQ2: Can gamification be considered a good tool to increase learner motivation?
- RQ3: Is there some consent on how the level of motivation is measured in literature?

Gamification and Motivation

Gamification

The term "gamification" entered the mainstream vocabulary in 2010 and only a year later it became a viable trend (Dichev & Dicheva 2017). Gamification consists of the transfer and integration of game design elements to a non-game scenario (Deterding et al. 2011) and in the context of education, gamification refers to the introduction of game design elements and gameful experiences in the design of learning processes (Dichev & Dicheva 2017). Also in the field of education, game thinking means solving problems with game-like concepts, looking at how learners can be motivated to create engaging learning environments, and supporting students in their learning process (Bovermann & Bastiaens 2020).

Table 1: Definitions of Gamification from Various Sources

Article	Origin	Definition
Antonaci et al. (2019), Bouchrika et al. (2021), Bovermann & Bastiaens (2020), Bozkurt & Durak (2018), Chapman & Rich (2018), Dichev & Dicheva (2017), Ferriz-Valero et al. (2020), Fuster-Guilló et al. (2019), Hallifax et al. (2020), Laine & Lindberg (2020), Park & Kim (2021), Sailer et al. (2017), Topîrceanu (2017), van Roy & Zaman (2018), van Roy & Zaman (2019)	Deterding et al. (2011)	Gamification consists of the transfer and integration of game design elements to a non-game scenario.
Bovermann & Bastiaens (2020)	Kapp (2012)	The use of game-based mechanics, aesthetics, and game-thinking to engage people, motivate action, promote learning, and solve problems.
Bozkurt & Durak (2018), Sailer et al. (2017)	Zichermann & Cunningham (2011)	The process of game-thinking and game mechanics to engage users and solve problems.
Dichev & Dicheva (2017)	Hamari, Koivisto & Sarsa (2014)	The phenomenon of creating gameful experiences.
Dichev & Dicheva (2017)	Werbach (2014)	The process of making activities more game-like.
Koivisto & Hamari (2019)	Huotari and Hamari (2017)	A design approach of employing game elements into different types of systems and services, to afford gameful experiences.
Nieto-Escamez & Roldán-Tapia (2021)	Nieto-Escamez & Roldán-Tapia (2021)	The use of game elements in non-entertainment contexts to promote learning.
Nieto-Escamez & Roldán-Tapia (2021)	Huang & Hew (2018)	The flow theory, where an optimal psychological and physical state maximizes enjoyment and engagement. According to this theory, gamification requires specific and understandable goals, immediate feedback,

		achievement indicators, and an adequate balance between challenges, student's skills, and the perceived value of the activity.

Gamification in educational contexts tends to look at learners' motivation, motivational learning behavior, or engagement in activities. In educational settings, students' motivation is always a crucial factor that must be addressed (Dichev & Dicheva 2017). Motivating students in the classroom and keeping them engaged in the planned activities is a hard task that every teacher has to face at some point in their career. Well-grounded knowledge about students' preferred learning behaviors to foster learning motivation is necessary to keep in mind when planning activities and amplifying gamification (Bovermann & Bastiaens 2020). As previously mentioned, gamification as a concept is still fairly new and it has been determined in various ways. While reading through the articles included in this paper, different definitions for gamification surfaced from the studies. In Table 1, we have compiled the different definitions for gamification from the articles.

As seen in Table 1, gamification has been defined in multiple ways, but one definition was used significantly more often in literature than others. The definition by Deterding et al. (2011) "Gamification consists of the transfer and integration of game design elements to a non-game scenario" was used by far the most, and for example in the article by Sailer et al. (2017), the popularity of the definition by Deterding et al. (2011) was noted. In their study Deterding et al. (2011) investigated "gamification" and the historical origins of the term in relation to pre-cursors and similar concepts. Based on their research they proposed a new definition for gamification, and that definition is now widely used in the field of gamification. Other definitions found in the articles were also accurate in describing the main idea of gamification, and some articles even introduced multiple definitions for gamification.

The goal of gameful design is to create motivating learning experiences to promote the same feelings and the same commitment that people experience when playing a game, even when the main objective is not pure entertainment (Laine & Lindberg 2020). Chapman and Rich (2018) summarize, that gamification does not mean turning assignments into games; rather, gamification seeks to distill from games the principles of how and why they motivate, and then apply those principles as a layer of interaction to nongame environments. In their research, they state that the intent of gamification is to influence motivation, ability, attitudes, and performance. Gamification has been adapted into education in many ways, mostly because it is believed to enhance motivation in students. Because gamification has elements that keep students engaged and motivated in their spare time, it is also used to help enhance student motivation in educational contexts. Ferris-Valero et al. (2020) state that gamification can be an innovative pedagogical tool to address problems related to motivation.

Some advantages of using gamification according to Topîrceanu (2017) is that students receive instant feedback, it builds engagement, and students are more loyal and attend classes more frequently. Gamification can also boost productivity, give more influence/control over student actions with rewards, increase learning retention, increase the time students spend learning, and make learning seem fun. Thoughtfully designed gamified systems can offer continual opportunities for learners to improve their knowledge with spontaneous feedback whilst academic tasks are inculcated throughout the playing experience (Bouchrika et al. 2021).

Motivation

In the field of motivational research, motivation is assessed through different theories and definitions, depending on the context. Table 2 presents the different ways motivation has been defined in the articles included in this paper. As seen in Table 2, motivation has been presented through different theories and definitions in the articles included in this paper. From Table 2, it can be noted that the self-determination theory (SDT) by Deci & Ryan (2000) is used widely as a framework to examine students' learning motivation and engagement. Other definitions were also used to define motivation, but no other definition was as popular as the one by Deci & Ryan (2000).

Table 2: Definitions of Motivation from Various Sources

Article	Origin	Definition
Bovermann & Bastiaens	Deci & Ryan	Self-determination theory (SDT), where motivation

(2020), Bozkurt & Durak (2018), Chapman & Rich (2018), Dichev & Dicheva (2017), Ferriz-Valero et al. (2020), Fuster-Guilló et al. (2019), Laine & Lindberg (2020), Nieto-Escamez (2021), Sailer et al. (2017), van Roy & Zaman (2018), van Roy & Zaman (2019)	(2000, 2015)	means that people feel energized, activated, or inclined to engage. The theory considers three essential psychological needs of human motivation: (1) autonomy, (2) competence, and (3) relatedness. The basic distinction in SDT is between intrinsic and extrinsic motivation.
Laine & Lindberg (2020)	Laine & Lindberg (2020)	In the context of the article, engagement is defined as the level of involvement that the learner exhibits toward the learning process, whereas motivation is defined as the reason for the learner to become and remain engaged in a learning activity.
Nieto-Escamez & Roldán-Tapia (2021)	Locke & Latham (2002)	Goal-setting theory, where there are four factors linked to students' performance: their commitment toward the goal, the feedback they receive, the complexity of the activity, and the situational constraints.
Topîrceanu (2017)	Broughton et al. (2002)	Teacher-dominated interaction is the methodology to represent motivation. This methodology puts the responsibility for teaching and learning mainly on the teacher, and it is considered that students who are present in the classroom during lessons and listen to the explanations and examples, will later be able to use that knowledge.

To analyze and investigate the motivational power of something, in this case, gamification, researchers must take a closer look into motivation research. Motivation research has six principal perspectives that become relevant in the context of gamification (Sailer et al. 2017). The self-determination perspective, being one of the six principal perspectives, encompasses a broad range of motivational mechanisms that partly overlap with several other perspectives, and has been widely used in gamification research (Sailer et al. 2017). The SDT by Deci & Ryan (2000) contains the three basic psychological and intrinsic needs: the need for competence, the need for autonomy, and the need for social relatedness. Sailer et al. (2017) define the three basic needs in the SDT as follows: The need for competence refers to feelings of efficiency and success while interacting with the environment, the need for autonomy refers to psychological freedom and to volition to fulfill a certain task and the need for social relatedness refers to one's feelings of belonging, attachment, and care in relation to a group of significant others.

In their research, Laine & Lindberg (2020) recognize a challenge in the process of motivating people. The challenge is to find a way to raise and maintain motivation in people towards activities that they are not necessarily passionate about. Gamification has been used as a tool to keep people interested by adding elements from their spare time to stay interested and motivated in activities. Since the world of short content on TikTok, Instagram Reels, and YouTube Shorts has become more popular, people tend to lose interest even faster than before. Therefore, when planning activities, the way of raising and maintaining motivation must be carefully planned.

Methodology

This paper employs a systematic literature review to gain a view of previous research. The systematic research was documented by using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guideline. Two databases, Scopus, and Eric (ProQuest) were used to identify relevant articles. Before the search for eligible literature, predefined keywords were set: gamification, motivat*, and educat*. The keywords

motivat* and educat* were displayed in this way so that any results would not be excluded due to wording.

The following search term was set: [(TITLE-ABS-KEY (gamification) AND TITLE-ABS-KEY (motivat*) AND TITLE-ABS-KEY (educat*)) AND PUBYEAR > 2016 AND PUBYEAR < 2025]. The search for literature with the search term above was conducted in November of 2023. The search was limited to articles published only in English between the years 2017 and 2024 to ensure that only recent research was included. In Scopus, 2,260 documents were found with the search term above and in Eric, the same search term yielded 364 results. Since the number of documents found with predefined keywords in the databases had a significant difference, mostly Scopus was used to screen for literature due to the higher volume of articles in the database. The articles were sorted by the highest number of citations. To identify eligible publications, articles were hand-searched and selected. Irrelevant articles and articles that did not have online full-text access were excluded from the research. Also, articles that were supposed to have online full-text access with the University of Jyvaskyla proxy but did not end up opening, were excluded from this paper. In total 130 research papers were screened, 50 articles were first excluded because they did not focus on gamification and motivation, then 70 research papers were screened for eligibility. Another 50 articles were excluded due to not being open access or not focusing on gamification and motivation. Eventually, 20 research papers were included in this paper. When the suitable 20 articles were found, the screening was ended. The selection process is documented in Figure 1 below by using the PRISMA flowchart.

Figure 1: Study review PRISMA chart

After a detailed reading of the study abstracts and excluding the articles that did not fully focus on the topic of this paper, 20 articles were eligible for full-text reviews. The articles were screened based on the following inclusion criteria: (1) the focus is on gamification and motivation and the connection they might have, and (2) the article had a full-text option that was accessible with the University of Jyvaskyla proxy. The articles in the final sample had to meet both of these criteria. In the end, 20 articles were chosen, read thoroughly, and screened once more to make sure they were relevant to the study. Chosen articles were stored in Zotero, an easy-to-use tool where all the articles stay in order and are easily accessible.

Results and Discussion

A systematic literature review was conducted to answer the research questions set in this paper. The use of gamification in education as a means to increase students' motivation has increased over the years, particularly following the onset of the COVID-19 pandemic, where online learning environments became more prevalent due to social distancing measures. The use of educational technologies not only facilitates online learning but also provides students with abundant access to information, fostering the creation and sharing of knowledge. However, educators must actively seek methods to enhance students' motivation and engagement in education.

To answer RQ1, as seen in Table 2 the findings indicate that most scholars have consented to use the SDT by Deci & Ryan (2000, 2015) to define motivation. From the 20 articles included in this paper, 12 articles used the SDT by Deci & Ryan (2000, 2015) to define motivation. Four other definitions were found in the articles, but they were not used in more than one article. As previously mentioned, the self-determination perspective is one of the six principal perspectives of motivational research, and it is widely used in gamification research (Sailer et al. 2017). Despite the SDT being used widely, Dichev and Dicheva (2017) state in their research that while it provides a good theoretical starting point for studying the motivational dynamics of ‘gamified’ educational activities, further research is still needed to bridge motivation to a more granular level of game elements and learners’ personalities.

To answer RQ2, findings on current literature reviews have highlighted that game mechanics have a positive impact on students' motivation in learning (Sailer et al. 2017). The findings also indicate that the integration of game-based student response systems, like Kahoot, into the teaching process increased students' active participation in lessons, and motivated them towards learning in a more interactive and stimulating environment (Fuster-Guilló et al. 2019).The usage of gamified platforms also increases students’ engagement and motivation to

learn, and their ambitions for success as it creates a stimulating and competitive environment in which students actively participate (Campillo-Ferrer et al. 2020). According to Nieto-Escamez & Roldán-Tapia (2021), quizzes have become one of the simplest ways to gamify teaching, allowing students to test their knowledge on different platforms, such as web-based quizzes or apps. In recent years, educators have developed thousands of electronic quizzes to assist students. Moreover, game elements associated with competition, such as leaderboards and points, have become very common, resulting in higher levels of engagement and learning outcomes (Nieto-Escamez & Roldán-Tapia 2021). Even though the findings mostly indicate that gamification can be considered a good tool to increase student motivation, different studies are suggesting that gamification might or might not work, which shows that there is a lack of understanding about what makes gamification more effective in educational scenarios (Bouchrika et al. 2021).

To answer RQ3, as seen from Table 3, our research indicates that surveys and questionnaires were the most prevalent methods to measure the level of motivation. Additionally, self-report evaluations were used as a way to measure the level of motivation since motivation is an internal, personal perception that is challenging to evaluate at a general level.

Table 3: How the level of motivation is measured

Motivation	Responses
Bouchrika et al. (2021)	Gamified question board that was implemented within the existing online e-learning portal for the University of Souk Ahras
Bovermann & Bastiaens (2020)	Paper-and-pencil and an online questionnaire
Campillo-Ferrer et al. (2020)	Pre- and post-test questionnaires
Chapman & Rich (2018)	Self-report survey with Likert-type questions
Ferriz-Valero et al. (2020)	Questionnaire before and after the intervention
Fuster-Guilló et al. (2019)	Satisfaction survey (in Kahoot)
Gómez-Carrasco et al. (2019)	Perceptions questionnaire with a Likert scale
Hallifax et al. (2020)	The Academic Motivational Scale (AMS)
Mora et al. (2018)	Quantitative data was collected from the users' logs generated by Trello and qualitative data came from an anonymous survey at the end of the course
Park & Kim (2021)	The science motivation questionnaire II (SMQ-II)
Sailer et al. (2017)	Questionnaire after an experimental study in a digital simulation setting
van Roy & Zaman (2018)	Four surveys
van Roy & Zaman (2019)	Multiple surveys and focus group data

Conclusion

Educational gamification is an exciting new approach to addressing student motivation (Chapman & Rich 2018). In this study, we attempted to find if there is some consent on how scholars usually define motivation, if gamification is a good tool to enhance student motivation, and if there is some consent, how the level of motivation is measured according to literature. While researching the different definitions of motivation and gamification, we found it interesting that there was one definition for both motivation and gamification that was the most popular. More research about the popularity of the definitions would be interesting in the future.

Since students learn in different ways, educators must use the most motivating tools to better support students in the classroom and to ensure high-quality teaching that promotes higher student achievement through these digital innovations (Campillo-Ferrer et al. 2020). Creating a game by throwing together, for example, cooperative challenges, points, feedback, and some rules still do not guarantee motivated learner engagement. Designing an educational game that fulfills the potential of intrinsic motivation is a highly demanding task that can be facilitated

by educational game design principles that are grounded in experience and research (Laine & Lindberg 2020). Albeit the rich amount of studies on the benefits of gamification on motivating students, there is still limited research on how such effect and impact would last (Bouchrika et al. 2021).

Technology-enhanced learning initiatives will likely become more prominent as the education landscape is reorganized after COVID-19, and according to their study, Nieto-Escamez & Roldán-Tapia (2021) state that it is possible to infer that gamification can be effectively combined with traditional teaching methods, such as online lectures, to enhance students' engagement and deliver curricula material that usually is taught through face-to-face education. Therefore, it is recommended to take gamification to a whole new level with attractive digital participation platforms to increase motivation and enhance students' learning experience, also in higher education contexts (Campillo-Ferrer et al. 2020). Seems like the potential of gamification lies in the restructuring of tasks and activities with game elements and gameful affordances (Koivisto & Hamari 2019).

This review, like all research papers, has its limitations. Gamification is still a fairly new research subject and the field of gamification is evolving rapidly, with new technologies and approaches constantly emerging, so capturing the most recent studies or trends can be challenging. Studies on gamification and motivation can also vary widely in terms of methodologies, target populations, contexts, and outcomes. This heterogeneity can make it challenging to compare findings across studies. Also, the quality of individual studies included in reviews can vary, affecting the reliability and validity of the overall conclusions. Some studies may suffer from methodological limitations such as small sample sizes, lack of control groups, or inadequate measures of motivation.

First, we suggest that the connection between gamification and motivation should be taken under scrutiny more intensively, as they might offer the needed understanding to bridge motivation to a more granular level of game elements and learners' personalities. The second suggestion is to include a larger sample of articles in literature reviews to get a deeper understanding of current research. The third suggestion is to encourage multi-professional cooperation with a group of individuals who belong to another profession or disciplines that are interested in using gamification as a tool to enhance motivation in education. Multi-professional cooperation, for example, in a school would help teachers learn what kind of gamified tools and activities could be used in education, and how to use them properly. Nevertheless, the future of gamification and motivation research seems to be bright and, of the emerging new technologies, particularly promising is the fact that if properly designed and implemented, gamification can be a great tool to enhance motivation and engagement into planned activities. Well-designed use of gamification could also help to find ways to support the learning process of students with learning difficulties

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