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Literature review on gamification, the driving force behind engagement in studies

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A B S T R A C T
This study presents a systematic literature review on the role of gamification in education and student motivation using the PRISMA methodology. Following the identification and screening phases, a Priority Score evaluation was conducted to ensure the relevance and quality of the selected studies. As a result, 42 publications were retained for detailed content analysis. The findings confirm that gamification remains a rapidly expanding and internationally significant research field, particularly in relation to educational innovation and motivational enhancement. The analysis revealed that the effectiveness of gamification depends not on the quantity of implemented game elements, but on their pedagogical relevance, quality, and alignment with learner characteristics. Concerning the first research question, the review identified several implementation barriers, including substantial time requirements, the need for technological and pedagogical expertise, and insufficient institutional IT infrastructure. Regarding the second research question, the most frequently applied gamification elements were the PBL triad (points, badges, leaderboards), tangible rewards, narratives, and educational escape rooms. Furthermore, emerging trends indicate increasing use of AI-driven adaptive systems that enable personalized learning experiences. Although the review was limited to two databases and predefined inclusion criteria, the rigorous selection process ensured a reliable and methodologically robust corpus. Future research should focus on longitudinal investigations, player typologies, and technology acceptance in educational environments.

1. Introduction

To understand the concept of gamification, it is first necessary to examine the context in which the power of gamification has become particularly significant. Contemporary society is often described as the economy of attention, in which the most valuable resource is no longer information itself, but human attention. Within this economic and sociocultural environment, it becomes particularly important to consider how we allocate this scarce resource.

Generation Z, comprising those born between 1996 and 2012, is increasingly represented in university classrooms. This generation is commonly referred to as digital natives, representing the first generation to spend their entire lives in a fully digitalized environment, thereby facing previously unknown challenges. Members of this generation constitute the world's first truly global generation, as through digitalization and globalization they follow similar trends in terms of preferences, language use, and culture (Juhász, 2017). Young people belonging to generation Z exhibit unique cognitive and motivational patterns, since digital devices have surrounded them from infancy, resulting in fundamentally different ways of processing environmental stimuli compared to previous generations (Prensky, 2001). This phenomenon can also be described at the neurological level, as the brain, wich has socialized in digital environments become conditioned to continuous dopamine feedback, making the absence of immediate feedback likely to result in rapid boredom.

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The structural framework of traditional frontal education is becoming increasingly unsustainable. Conventional educational methods characterized by the passive role of students, extensive theoretical material, and the priorization of lexical knowledge are no longer effective, since both the objectives of education and its target audience have fundamentally changed. Economic growth and automatization have increased the efficiency of work processes, thereby providing improved living conditions and broader opportunities for individuals, with education serving as the primary pathway to these opportunities. While the original objective of education in earlier historical periods was merely the acquisition of basic literacy and general knowledge, contemporary educational expectations extend far beyond this purpose. Several centuries ago, the majority of individuals performed routine or semi-skilled labor; in contrast, modern societies require the completion of complex practical and theoretical tasks. Consequently, lexical knowledge alone is no longer sufficient, while the previously discussed generational differences further intensify the need for educational innovation. Excessive workload, external expectations, and the distinctive characteristics of generation Z may contribute to attention-related difficulties and motivational problems.

The question arises as to why play-based approaches succeed, where traditional, frontal classroom instruction often falls short. A possible explanation lies in the theory of "homo ludens," or the playing human (Huizinga, 1944: 9). As Huizinga describes in his work, play predated culture in human history; therefore, it triggers a much deeper, intrinsic instinct than the majority of overstructured activities in the modern world. The crisis of traditional motivational systems stems directly from this artificiality and homogenization. Play is present in the lives of all living beings, inherently carrying the exact same fundamental characteristics. Rather than being merely self-indulgent, entertaining leisure activities, games act as potential tool for value creation that can be applied across numerous areas of life (Fromann, 2017).

Active learning methods seek to address educational difficulties by keeping contemporary objectives and the needs of today's students at the forefront. One of the most promising active learning approaches is gamification, which has gained significant popularity in international literature. The concept of gamification has become increasingly prevalent in recent years, generating considerable interest across various disciplines, including education, human resources recruitment, and marketing.

Despite the widespread recognition of the potential inherent in gamification, numerous criticisms and misinterpretations can be found in the international literature, which necessitated a more precise and thorough examination of the method. The purpose of the present study is to provide insight into the international discourse on gamification through a systematic literature review, with a particular focus on how the opportunities and challenges of gamified approaches manifest within educational environments.

2. Gamification and underlying motivational drivers

The term gamification first gained prominence in 2011 at the Game Developers Conference in San Francisco. Emerging at the intersection of the rapidly expanding video game industry and the crisis of traditional motivational systems, the concept quickly attracted substantial international attention. The explosive growth of the gaming sector generated an increasing demand for the scientific examination of games from user, developer, and research perspectives alike (Deterding et al., 2011). Consequently, a growing number of conferences, academic articles, and monographs have been dedicated to the analysis and validation of gamification as both a methodology and a process. As a result, researchers across a wide range of disciplines have demonstrated considerable interest in the mechanics of gameplay in recent years, underscoring the inherently multidisciplinary nature of gamification (Fromann, 2017).

Following the emergence of the concept in 2011, the focus of research gradually shifted away from the negative aspects of gaming -such as addiction and aggression- towards the human dimensions of gameplay, including player typologies and their intrinsic motivations. Investigators in the field increasingly began to explore the positive characteristics of games and the causal relationships underlying their effectiveness.

To fully comprehend the methodology of gamification, it is essential to examine the motivational mechanisms embedded within games. Scientific studies conducted during the second half of the

twentieth century had already demonstrated that traditional punishment-reward motivational paradigms are ineffective in the long term. This phenomenon is primarily explained by the fact that both punishment and extrinsic rewards gradually diminish the intrinsic drive required to sustain interest, engage in creative activities, or achieve high levels of performance (Fromann, 2017). Foundational research conducted by Edward Deci further demonstrated that external rewards can undermine individuals' intrinsic interest in the tasks they perform. Experimental findings revealed that although rewards may temporarily enhance motivation in the short term, this drive tends to decline significantly once external recognition is removed (Deci et al, 1999).

According to the self-determination theory (SDT) of motivation, the fundamental question is whether an individual initiates an action or behavior driven by their own interests and values, or as a result of some external pressure (e.g., reward or punishment). When comparing the behavior and actions of individuals guided by intrinsic motivation to those motivated by external factors, it becomes evident that the former exhibit significantly higher levels of confidence, motivation, and creativity than the latter. In the field of psychology, two primary types of motivation are therefore distinguished: intrinsic and extrinsic motivation. Intrinsic motivation refers to an internal drive where the activity itself elicits satisfaction, in a supportive environment, individuals are motivated by the novelty of the task, the inherent challenge, or the presence of aesthetic value. Conversely, extrinsic motivation occurs when the objective of an action is to achieve a result or consequence distinct from the activity itself (e.g., obtaining a good grade, receiving praise) (Katona, 2009). The consideration of these psychological and motivational factors is essential for designing a highly functional gamified system.

Gamification refers to the application of tools, mechanics, and dynamics utilized in games to other areas of life, with the primary objective of enhancing motivation, fostering engagement, and making processes more compelling (Fromann, 2017). In the literature, it is described as a strategic tool or methodology that can assist in making a process more enjoyable. It is consistently implemented to achieve a specific goal (e.g., increasing motivation or academic engagement) by utilizing elements and mechanisms derived from games and integrating them into real-world contexts, such as education.

The key to the successful implementation of gamification lies in the identification of player types. One of the most widely recognized models was developed by Richard Bartle, who distinguished four distinct player types: achievers, explorers, socializers, and killers. A 30-item test is utilized to determine which of these player types an individual corresponds to (Rahman et al, 2025).

Achievers are players primarily motivated by their performance and its continuous improvement; they strive to accumulate as many points as possible and advance to higher levels. The activity becomes even more motivating for them when they can compare their performance with others, making them highly inclined to track their progress on leaderboards.

Explorers encompass players who thrive on discovering and navigating the game world, they enjoy uncovering hidden treasures and solving mysteries. For this group, the number of participating players is irrelevant, but they often experience uncomfortable pressure when constrained by predetermined time limits.

The primary objective of socializers is to establish and maintain relationships with others. Belonging to a group is of utmost importance to them, the emphasis is not necessarily on the game itself, but rather on the cultivation of interpersonal connections. Consequently, they display a clear preference for multiplayer game modes.

The primary motivation of killers is to defeat or destroy others. It can be stated that the competitive aspect of gaming is the most critical element for them, therefore, they strictly favor multiplayer modes and are highly inclined to monitor their performance on leaderboards (Bartle, 2003).

The tools and mechanics to be utilized (e.g., points, badges, leaderboards) must be determined in alignment with these player types and their respective preferences. This is of paramount importance, as the implementation of a leaderboard may serve as a strong motivational driver for achievers, whereas it may fail to elicit any response from explorers.

Therefore, it can be concluded that the process of gamification does not equate to game creation, as games are inherently self-contained activities designed primarily for entertainment purposes. In contrast, gamification is always driven by a non game purpose. Thus, through meticulous planning, gamification yields a structured and revitalized activity that meets the demands of contemporary generations while possessing the potential to drive performance improvements. It serves as an instrument that can bridge the gap between societal shifts, educational and individual goals, and conventionally applied methods. In light of these theoretical considerations and macro-level trends, and to establish the foundation of the systematic literature review, the following specific research questions (RQ) were defined:

RQ1: What are the constraints, challenges around gamification in education and motivation?

RQ2: Which gamification elements and mechanics are mainly used in education to increase motivation?

3. Methodology

3.1 Database search for gamification research in education and motivation

The targeted selection of the Web of Science (WoS) and Scopus databases as the primary sources for the systematic literature review is justified by the fundamental principles of international scientometrics and methodological rigor. These two global platforms provide the most comprehensive and transparent coverage of peer-reviewed, high-impact interdisciplinary literature, thereby minimizing the presence of gray literature or questionable, so-called predatory journals within the sample. While the Web of Science is renowned for its stringent selective indexing criteria (particularly through the Social Sciences Citation Index - SSCI), Scopus complements this with a broader, more extensive repository of technological and educational-methodological journals. The simultaneous utilization of both databases ensures data representativeness and methodological replicability through standardized keyword searches.

For the selection of the final publications to be analyzed within the framework of the literature review, the following inclusion criteria were applied:

- Full-text publications written in English.
- Peer-reviewed publications focusing on gamification applied in educational contexts.
- Research publications that provide detailed descriptions of existing theories, frameworks, models, elements, and mechanics of gamification.
- Research publications addressing the intersection of gamification and motivation.
- Publications that clearly outline their research methodologies.

1. Table Description of the search string and respective database

Database	Target Fields	Operational Search String / Syntax	Initial Results (n)
Web of Science (WoS)	Topic (TS) *(Title, Abstract, Keywords)*	TS= (gamif* AND educat* AND motiv*)	1857
Scopus	Title, Abstract, Keywords (TITLE-ABS-KEY)	TITLE-ABS-KEY (gamif* AND educat* AND motiv*)	2839
TOTAL n	*Gross initial records before duplication removal*		**4696**

Source: Own editing, 2026

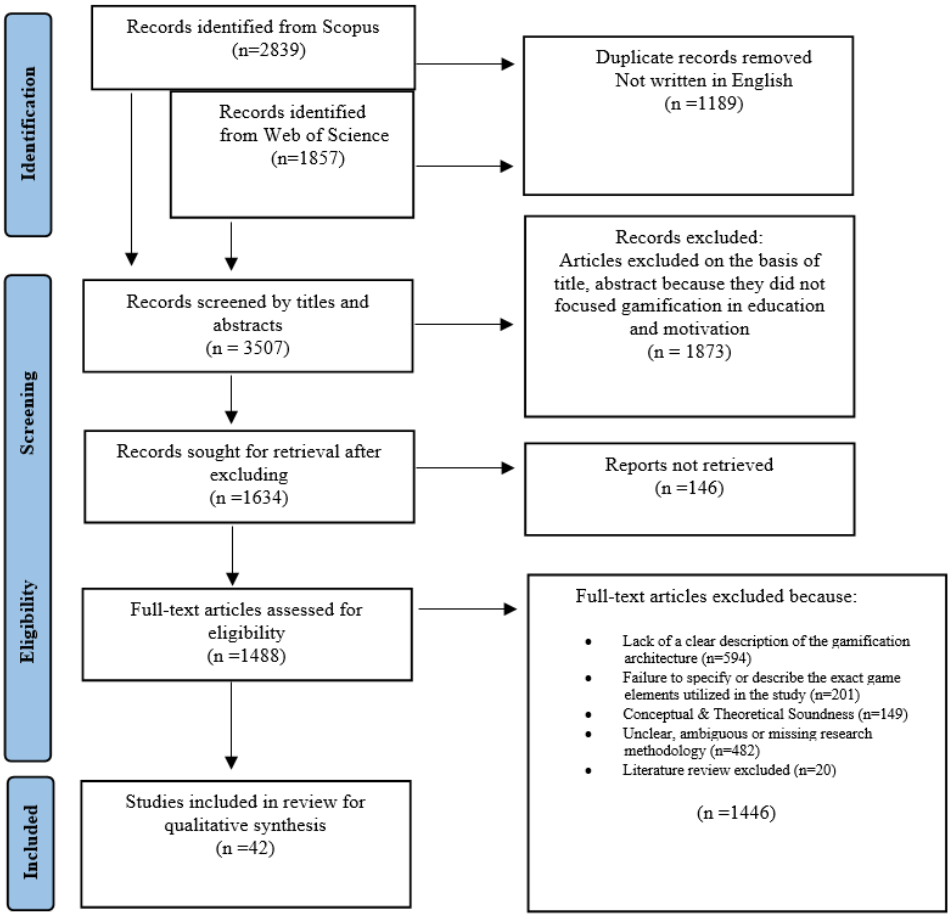
As the first step of the literature search, the identification of relevant publications was conducted utilizing a strictly structured, parameterized search syntax within the two selected databases (Table 1). To cover the interdisciplinary intersection that forms the focus of the research, the three main conceptual pillars -gamification, education, and motivation- were linked using the boolean and logical operator. The methodological rationale for employing a truncation character (the asterisk: *) at the end of the

search terms is its capacity to simultaneously capture all morphological variations and inflected forms of the word stems (e.g., gamify, gamified, gamification, education, educational, motivation, motivating, motivational). This approach ensures that the query provides the broadest possible semantic coverage within the target domain.

Furthermore, a temporal restriction was incorporated into the search strategy, limiting the inclusion exclusively to literature published within the last five years. This specific timeframe was selected because educational technology and gamification frameworks are rapidly evolving fields. Focusing on recent publications ensures that the review captures the most current empirical findings, technological innovations, and contemporary pedagogical trends, thereby maintaining the high relevance of the study.

As a result of restricting the search to specific fields (title, abstract, and keywords), 841 potentially relevant records were retrieved from the Web of Science database, while 647 were obtained from the Scopus platform. Thus, the gross sample size extracted from the two sources totaled 1488 studies. The distribution of the data accurately reflects the more stringent, yet recently significantly expanded, indexing coverage of Web of Science, while the pattern of Scopus provides a stable, complementary scientific corpus. This initial dataset of 1488 records served as the foundational baseline for the subsequent multi-stage content screening and priority-based qualitative selection (priority scoring) conducted in accordance with the PRISMA protocol.

All publications satisfying the predefined inclusion criteria were incorporated into the literature review. In instances where relevance could not be conclusively determined based on the title and abstract alone, a detailed examination of the full text was conducted. Following the completion of the search and screening procedures, a total of 62 studies for the final analysis that best aligned with the overall theme and objectives of the research; ultimately, literature review articles were also excluded, resulting in a final sample size of 42.



1. Figure PRISMA flow diagram's process and outcomes

Source: Own editing, 2026

The literature review was conducted in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. (Moher et al., 2009; Page et al., 2021) Figure 1. illustrates the publication selection process, detailing the consecutive steps of the PRISMA model's application.

The screening of the bibliographic databases was executed in multiple interdependent stages based on the PRISMA recommendations, ensuring that exclusively those studies, that closely aligned with the research objectives were incorporated into the final analysis. The primary focus of the research was to examine the motivational role of gamification within educational environments, with particular emphasis on the applied motivational mechanisms and the identification of player typologies.

The initial dataset comprised publications exported from the Web of Science and Scopus platforms, retrieved through search queries based on the combination of the terms "gamification", "education", and "motivation". Following preliminary data cleaning and the deduplication process, a total of 3507 records remained in the database (n = 3507).

During the initial screening phase, based on the evaluation of titles and abstracts, only those studies were retained that explicitly addressed the issues of motivation, engagement, or learning activity within gamified educational environments. In this stage, the presence of specific key concepts was examined, including "motivation", "engagement", "intrinsic motivation", "extrinsic motivation", "self-determination theory", "autonomy", and "competence". The primary objective of this step was to ensure that the study focused exclusively on research emphasizing motivational aspects, in strict alignment with research questions RQ1 and RQ2. Consequently, these motivation- centered publications constituted the basis for the subsequent level of analysis, given that the preliminary screening had already predominantly isolated studies with a motivational focus.

In the second screening phase, studies focusing on specific gamification elements and mechanics were identified. The inclusion criteria encompassed gamification elements such as points, badges, leaderboards, rewards, challenges, levels, feedback, and avatars. Furthermore, particular attention was devoted to studies addressing player type models, such as the Bartle or Hexad frameworks. The primary objective of this stage was to facilitate the identification of the most frequently utilized gamification mechanics and motivational tools, directly addressing research question RQ2. Consequently, the screening process significantly reduced the size of the dataset, retaining exclusively those articles that were directly pertinent to the analysis of motivators or player typologies.

In the third step, further refinement was conducted based on the educational context. Only studies that explicitly investigated the impact of gamification within an educational environment were included. Accordingly, priority was given to publications addressing higher education, university studies, e-learning systems, LMS platforms, classroom instruction, or digital learning environments. Conversely, research examining gamification in marketing, healthcare, tourism, corporate, or rehabilitation settings was excluded. This stage was particularly crucial for research question RQ1, as the specific challenges and constraints of educational environments differ significantly from the issues encountered in other domains of application (n = 3507 → n = 1634).

In the fourth step, following the full-text screening, an in-depth refinement of the dataset was executed. During this phase, the final elimination of superficial, inadequately documented, or theoretically unfounded studies were conducted based on four transparently defined, mutually exclusive content and structural criteria. Throughout the screening process, one of the most substantial reductions in the sample size was attributed to the superficiality of the applied methodologies and unclear research designs, a total of 482 studies were excluded on the grounds that the description of the research methodology was incomplete, ambiguous, or entirely vague. The removal of these items was an indispensable prerequisite for ensuring scientific replicability, as well as for guaranteeing that the subsequent qualitative synthesis could be founded exclusively on valid and comparable experimental data.

In close correlation with this, the content refinement process also extended to the transparency of the technological and pedagogical environments presented in the studies. Consequently, 594 publications were excluded due to the lack of a transparent description of the gamification architecture, as the authors

failed to present the underlying gamified framework -along with the interplay of operational mechanisms and processes -on a structural and systemic level. Along this same technological- design dimension, an additional 201 studies had to be eliminated from the sample due to a failure to specify or describe the exact game elements utilized in the study. Within these articles, the precise operational mechanisms and rule systems of classic elements (such as points, badges, leaderboards, or progress bars) remained undisclosed, rendering the accurate identification and evaluation of the educational interventions methodologically impossible.

Finally, in order to preserve the conceptual and theoretical soundness of the systematic review, an additional 149 publications were excluded due to severe deficiencies in their theoretical and conceptual foundations. These studies either completely lacked the explicit integration of validated psychological frameworks (such as SDT) or based their conclusions on conceptually ambiguous, scientifically unverified assertions that would have introduced methodological noise into the final sample. Consequently, during the sample refinement executed in the full-text screening phase based on these four criteria, a total of 1446 records were excluded from the analysis. This multi-stage, rigorously documented, and cumulative screening mechanism guarantees that the remaining core studies (n = 42) from the initial broad search provide a methodologically robust and theoretically sound database for reliably addressing the formulated research questions, further complemented by the application of priority scoring.

3.2. The mapping matrix and methodological rationale of the Priority Score

Priority Score: 1 (Basic/ Descriptive Focus): This category comprised studies that examined gamification mechanics within educational contexts in isolation, predominantly on an ad-hoc basis, without the integration of profound theoretical (e.g., psychological) constructs or user profiling.

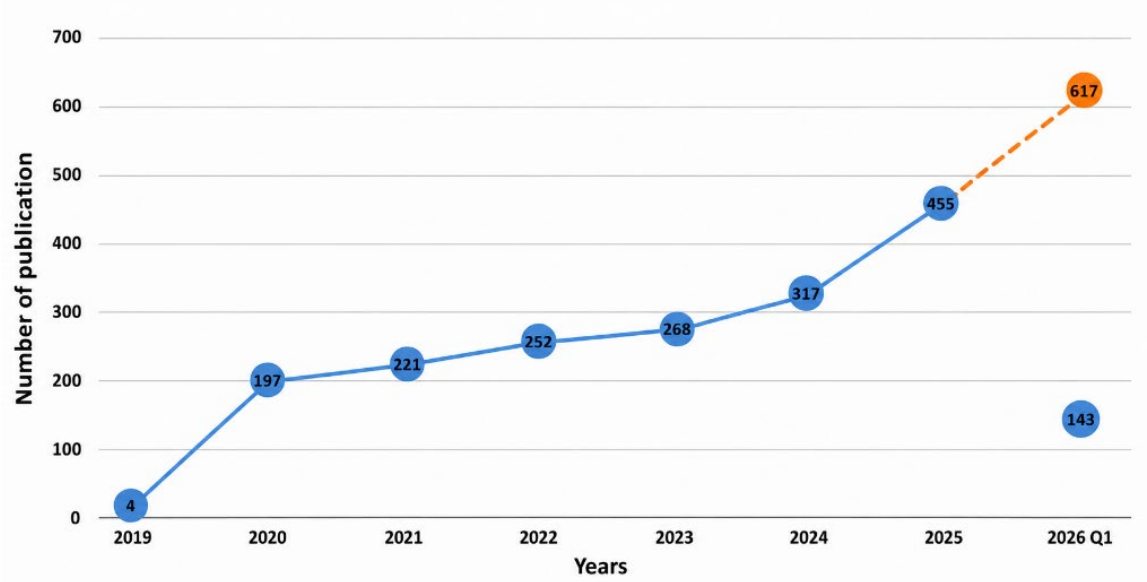
Priority Score: 2 (Intermediate/ Multidimensional Focus): This level encompassed research that successfully linked gamification design with underlying psychological outcomes (e.g., intrinsic and extrinsic motivation, engagement) but continued to overlook user diversity and player typologies.

Priority Score: 3 (High/ "Gold Standard" - Integrated Focus): Representing the apex of the methodological pyramid, these studies simultaneously integrated gamification mechanisms, validated motivational frameworks (e.g., SDT), and user characteristics (such as the Bartle or Marczewski Hexad typologies) within controlled or strictly monitored educational environments.

In alignment with the research objectives, it is concluded that modern curriculum development and future educational research must unequivocally strive for this level of integrated synthesis. Ultimately, only the concurrent integration of technological, psychological, and user-specific dimensions can ensure that gamification transcends being a mere superficial trend, establishing itself instead as an integral and sustainably effective instrument of evidence-based educational methodology.

4. Findings

An analysis of the publication trends over the past five years indicates that since the widespread adoption of gamification, scholarly interest in the subject has remained continuous and steadfast. Furthermore, over the last two years, a significant surge in the field's prominence and a marked intensification of academic discourse can be observed (Figure 2).

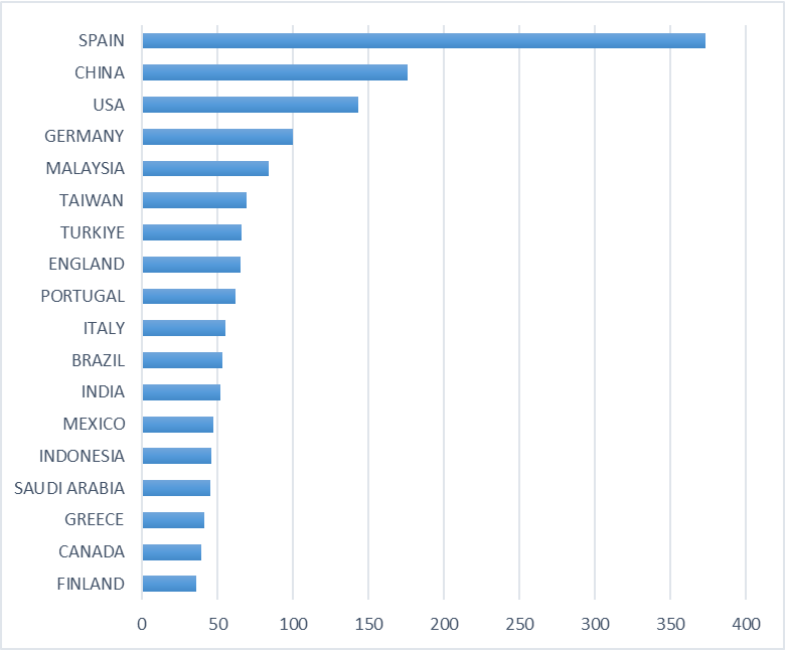


2. Figure Number of publications by year n=1857

Source: Own editing, 2026

The data series highlighted in orange on the diagram represents the projected publication volume for the current year, estimated based on the trends observed in the databases during previous years. This projection is further substantiated by the empirical data presented immediately below it: the number of publications released in the first quarter of the current year has already nearly reached the total annual output of 2020. This extraordinary dynamic unequivocally demonstrates that the research trajectory has not lost its relevance, rather it is experiencing a form of academic renaissance, repositioning the subject matter within the framework of novel theoretical and practical approaches.

An analysis of the geographical distribution of the search results reveals that the research domain garners global academic interest. The highest volume of publications originated from Spain (373 records), establishing the country as a prominent leader in the field of educational gamification research. This is followed by China (176 publications) and the United States (143 publications), both of which can also be regarded as significant research hubs within this discipline (Figure 3).

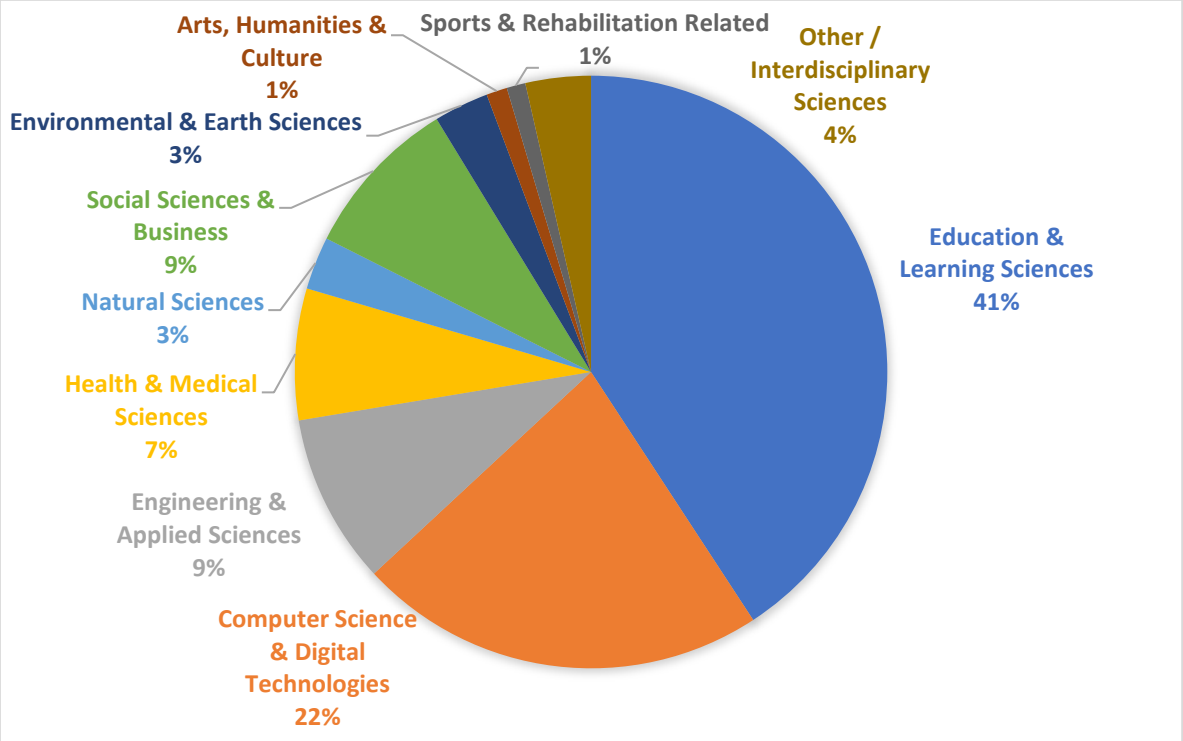


3. Figure Top 18 countries by publication volume n=1552

Source: Own editing, 2026

Based on the findings, Europe plays a dominant role in this scientific domain, as several european countries -such as Germany, Portugal, England, Finland, Greece, and Italy- demonstrate significant publication activity. An emerging presence of the Asian region is also observable, particularly in the cases of Malaysia, Taiwan, India, and Indonesia, which indicates the growing significance of digital educational innovations. Latin America can also be regarded as an active research region, primarily driven by Brazil, Mexico, Ecuador, Colombia, and Chile. Countries in the Middle East -including Saudi Arabia, Iran, and the United Arab Emirates- are increasingly engaging in gamification research. Conversely, the lower publication volumes observed in Africa and smaller developing nations suggest that research capacities remain subject to an unequal geographical distribution.

The results of the search conducted in the Web of Science and Scopus databases using the keywords "education", "gamification", and "motivation" demonstrate the highly interdisciplinary nature of the research domain (Figure 4). The majority of the publications are associated with educational sciences, indicating that the application of gamification within educational environments is predominantly aligned with learning and motivational objectives. Furthermore, computer science and engineering disciplines are significantly represented, reflecting their crucial role in the development of digital learning systems, educational platforms, and technological solutions.



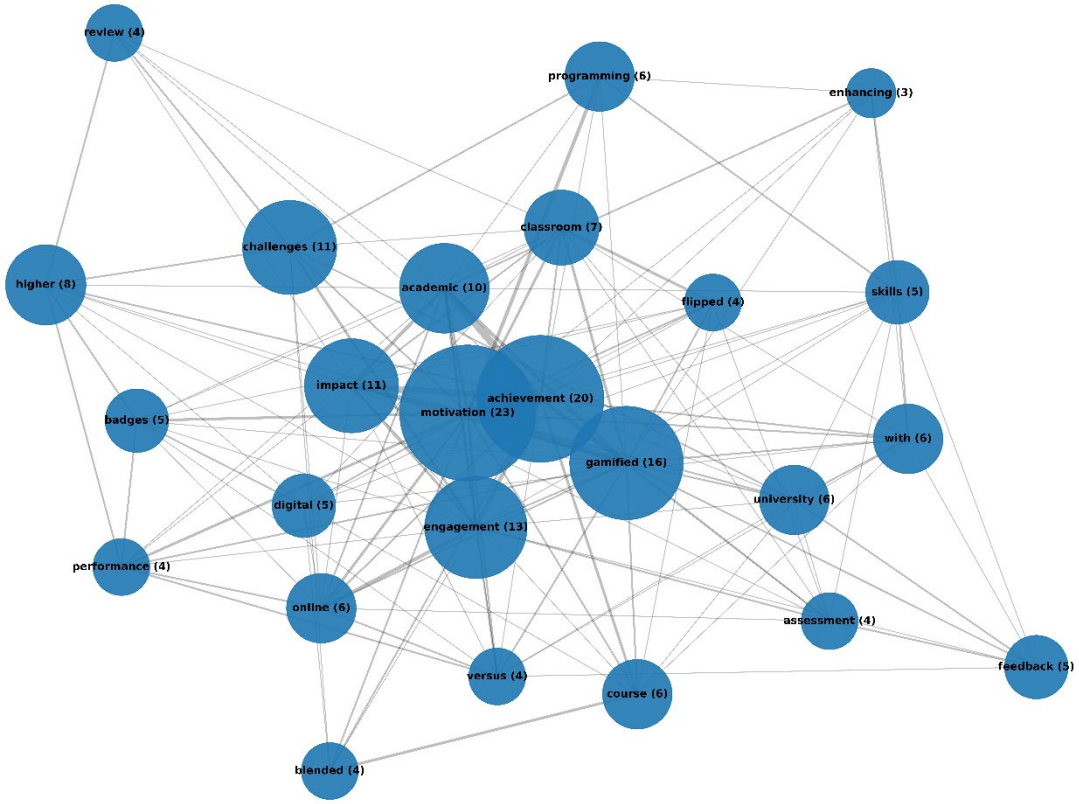
4. Figure Distribution of top academic disciplines among gamificatoin related publications n=2636

Source: Own editing, 2026

Psychology and the social sciences also occupy a prominent position, as research frequently focuses on the investigation of motivation, engagement, and student behavior. The presence of the health sciences and medical fields indicates that gamification is utilized not only within traditional educational settings but also in medical training and rehabilitation processes. Overall, the results demonstrate that gamification research constitutes a dynamically evolving, widely applied, and inherently multidisciplinary field of study.

Based on the keyword co-occurrence network, the research field is characterized by several dominant themes. The most frequently occurring keywords are related to motivation, engagement, and learning performance, which occupy central positions within the network. The strong relationships among these concepts indicate that the literature frequently associates gamification with the enhancement of learner motivation and active participation in educational contexts. A distinct thematic cluster can be observed

around gamification mechanics, including points, badges, leaderboards, reward systems, and feedback elements. The close proximity of these keywords to motivation- and engagement-related concepts suggests that these mechanics represent some of the most widely investigated approaches for supporting learner engagement and motivation (Figure 5). Another prominent thematic area is associated with higher education and digital learning environments. Keywords related to university education, e-learning systems, and online learning platforms demonstrate the growing interest in applying gamification within technology-enhanced learning settings. Overall, the network structure highlights the central role of motivational mechanisms in educational gamification research and reflects the strong interconnections between gamification elements, learner engagement, and educational outcomes.



5. Figure Thematic keyword map

Source: Own editing, 2026

The densely connected network clusters emerging within the structure identify the dominant, contemporary research subfields of the discourse. Around these central nodes, conceptual focal points - that constitute the core of the domain- are clearly distinguishable. These include motivation, student engagement, academic achievement, and the immediate classroom environment. In close correlation with this, the network also reveals prominent patterns related to systems of gamified learning, feedback mechanisms, and digital badges. These elements play a pivotal role within the context of modern digital education and higher education, particularly in the innovation and refinement of assessment methodologies.

2. Table Quantitative distribution of the initial literature sample across analytical categories (n = 1488)

Primary Research Category	Sub-dimension	Frequency (n)	Relative Prevalence (%)
A. Motivational Models	Self-Determination Theory (SDT)	264	17.7%
	Intrinsic / Extrinsic motivation factors	892	59.9%
	Engagement frameworks & behavioral models	412	27.7%
Category Representation	***Studies addressing motivational aspects***	***1024***	***68.8%***
B. Gamification Mechanics	Points (Score systems)	482	32.4%
	Badges (Digital awards)	398	26.7%
	Leaderboards (Rankings)	341	22.9%
	Feedback loops & real-time monitoring	446	30.0%
	Rewards (Tangible/Intangible incentives)	385	25.9%
	Progression systems (Levels, Unlocks)	294	19.8%
Category Representation	***Studies deploying game mechanics***	***1142***	***76.7%***
C. Player/User Typologies	Bartle's Player Types	84	5.6%
	Marczewski's User Types Hexad	112	7.5%
	Specific profiles (e.g., Achiever, Socializer)	165	11.1%
Category Representation	***Studies incorporating user profiling***	***298***	***20.0%***
D. Educational Applications	Higher education settings (Universities)	714	48.0%
	Learning Management Systems (LMS integration)	342	23.0%
	E-learning environments & MOOCs	518	34.8%
	Traditional classroom integration	285	19.2%
Category Representation	***Studies in formal/informal education***	***1215***	***81.7%***

Note: Categories are not mutually exclusive; individual publications from the initial pool of 1488 records frequently map onto multiple sub-dimensions. Total percentages therefore exceed 100%.

Source: Own editing, 2026

In order to structurally map the relevant academic discourse identified in the initial phase of the PRISMA protocol, a macro-level, deductive categorical analysis of the entire baseline dataset (n=1488) was conducted (Table 2). The resulting frequency indicators empirically verify that research situated at the interdisciplinary intersection of gamification, motivation, and education is characterized by a highly heterogeneous conceptual structure. At the level of macro-trends, the presence of educational applications is overwhelmingly dominant (81.7%), within which the higher education context (48.0%) and digital or e-learning environments (34.8%) form the backbone of the literature. This confirms that the validation of gamification designs is predominantly implemented within formal and semi- formal higher education settings.

From a psychological perspective, a significant portion of the studies (68.8%) explicitly reflects on motivational aspects, however, a certain theoretical asymmetry is observable: while the mention of general intrinsic and extrinsic motivational factors is widespread (59.9%), more profound, structured theoretical frameworks -such as SDT- appear as a defining basis for analysis in only 17.7% of the articles. The presence of game mechanics (76.7%) faithfully reflects the technological embeddedness of the field, where classic elements (points: 32.4%, feedback: 30.0%, badges: 26.7%) demonstrate a relatively balanced distribution.

In stark contrast, the integration of user and player typologies (Category C) proved to be the least saturated direction, a mere 20.0% of the total sample (298 articles) attempts a personality- or character-based differentiation of the target audience (e.g., Marczewski's Hexad: 7.5%, Bartle: 5.6%). This quantitative distribution holds dual significance from a methodological standpoint. On the one hand, it highlights that within the broader gamification literature, there is a high proportion of superficial, theoretically ungrounded, or purely descriptive case studies. On the other hand, this structural fragmentation and the evident research gap concerning player typologies directly legitimize the subsequent screening steps of the PRISMA process (Page et al., 2021; Liberati et al., 2009), which were specifically aimed at isolating the more complex, theoretically integrated "Gold Standard" publications.

3. Table Cross-tabulation of Priority Scores and publication years for the final synthesized literature (n=62)

Publication Year	Priority Score: 1 (n)	Priority Score: 2 (n)	Priority Score: 3 (n)	Total Annual Count (n)
2020	1	2	4	**7**
2021	2	2	6	**10**
2022	1	3	7	**11**
2023	2	3	8	**13**
2024	1	2	8	**11**
2025	0	1	5	**6**
2026 *(Q1)*	0	0	4	**4**
TOTAL	**7**	**13**	**42**	**62**
Relative Share (%)	**11.3%**	**21.0%**	**67.7%**	**100.0%**

Source: Own editing, 2026

A primary quality indicator of the final focus group (n=62) in the systematic literature review is the distribution of the Priority Score, which reflects the theoretical embeddedness of the included studies This includes 20 review articles, which were excluded in the case of PRISMA. An in-depth analysis of the data revealed that the research domain is undergoing a structural maturation process, demonstrating a strong correlation with the publication timeline. The category exhibiting the lowest level of theoretical integration (Priority Score 1) accounts for merely 11.3% of the final sample. This substantiates that the

multi-stage, PRISMA-based screening protocol successfully marginalized superficial, anecdotal, or purely descriptive case studies that interpret gamification merely as a technological tool rather than a complex pedagogical and psychological intervention. Conversely, the sample is predominantly composed of studies within the highest rating category (Priority Score 3: 67.7%), representing a remarkable outcome from a methodological perspective. This substantial proportion ensures that the subsequent synthesis is founded on robust research capable of addressing the tripartite question of "what, why, and for whom", by systematically linking specific game mechanics with validated motivational theories and personalized user profiles.

The temporal mapping of the priority scores (Table 3) reveals a definitive paradigm shift. While the presence of lower-scoring articles was still observable in the earlier period of 2020-2022, the proportion of studies achieving the maximum score surged to 80.9% in the most recent research cycle between 2024 and 2026. This shift empirically demonstrates that the international research community has transitioned away from generalized, "one-size fits all" gamification solutions. Contemporary discourse is currently defined by strictly controlled, theory-driven, and adaptive educational designs, which further corroborates the relevance and focus of the present research.

These studies can be considered the "Gold Standard" publications within the examined field, representing the highest echelon of methodological rigor. The true scientific novelty of this refined research corpus lies in its capacity to establish a functional and structural bridge between high-level, abstract theoretical frameworks -such as self-determination theory and complex psychological motivational models- and rigorous empirical practice within educational and clinical settings. The excellence of the selected articles is manifested precisely in the fact that gamification mechanics are not deployed as self-serving technological elements, rather they are transformed into theory-driven interventions capable of directly and measurably optimizing the efficacy of real-world pedagogical and domain-specific training environments.

4.2 Content analysis

Following the large-scale integration of digital tools and technologies into educational settings, gamification has emerged as one of the most promising pedagogical instruments. The present content analysis investigates the motivational role of gamification within educational contexts across the final 42 literature sources, which were systematically selected via the PRISMA method. It demonstrates that the gamification of learning processes currently extends far beyond the traditional PBL triad (points, badges, and leaderboards). Gamification implemented in modern education constitutes more than a mere visual motivational layer (Akgül & Güler, 2025). It represents a complex psychological and technological ecosystem aimed at maximizing cognitive, affective, and behavioral engagement. As articulated by Yie et al., the key to successful implementation lies in "gamification depth", given that superficial extrinsic rewards are inherently insufficient for sustaining long- term motivation. (Yie et al., 2024)

The foundation of gamification applied in education continues to be provided by classical gamification theories, most notably self-determination theory and flow theory. Research indicates that intrinsic motivation can only be sustained if students experience a sense of autonomy and competence. Educational escape rooms serve as an excellent paradigm for this, where control over puzzle-solving and the application of creative thinking unequivocally enhance intrinsic motivation for knowledge acquisition (González-Yubero et al., 2023). Concurrently, it is imperative to note that achieving a state of flow -defined as complete immersion- requires a continuous and dynamic balance among challenges, goals, and individual skill levels. If the gamified system fails to adapt the difficulty of tasks to the students' progression, the process inevitably culminates in either boredom or anxiety (Spil & Hagenaars, 2024). For the optimization of such systems, AI-driven platforms offer the most advanced tools, capable of calibrating the difficulty levels of challenges in real time based on student performance (Yarleque et al., 2025).

Regarding the applied mechanics, the most notable paradigm shift is the convergence of virtual reality (VR) and physical environments. While intangible badges utilized within the digital space frequently lose their motivational efficacy due to overuse (Dicheva et al., 2020; Angsioco et al, 2025), tangible rewards -such as points redeemable for real-world privileges or 3D-printed physical badges-

have been statistically proven to elicit a significantly stronger and more sustainable cognitive engagement (Xiao & Hew, 2024; Lara- Cabrera et al., 2023; Huang et al, 2026; Buenadicha-Mateos et al, 2025). Alongside physical environments, increasingly immersive technologies are also gaining substantial traction. In collaborative virtual reality (CVR) environments, avatars and embodied interactions render the learner an intrinsic component of the mechanics, whereas gamified quizzes assisted by educational humanoid robots (e.g., the Pepper robot) cultivate an unprecedented degree of learning confidence among students (Laine & Lee, 2024; Tutul et al., 2026).

The paramount finding of the content analysis is that individual needs and differences must be explicitly accommodated. The reviewed literature unequivocally rejects universal, "one-size fits all" gamification frameworks. The psychological profiles and individual characteristics of students distinctly determine their underlying motivational drivers. Research by Mädamürk empirically substantiates that students possess divergent achievement goal orientation profiles (e.g., mastery-oriented, success-oriented, indifferent, and avoidance-oriented) consequently, an environment that relies exclusively on competition and the extrinsic motivation of performance fails to effectively stimulate students who seek intrinsic understanding and mastery, highlighting the inevitability of psychologically grounded, profile-specific, and differentiated instructional design (Mädamürk, 2021). The critical importance of this psychological foundation is further underscored by an empirical experiment which demonstrated that the implementation of purely competitive leaderboards among female psychology students specifically induced anxiety and diminished social interactions, given that these students were not primarily performance-oriented (Michinov & Michinov, 2026). This evidence indicates that the incautious application of gamification can not only be demotivating but may also engender digital inequalities or even adverse health outcomes, such as screen fatigue, cognitive overload, and social isolation (Yerunkar et al., 2026). Therefore, future educational systems must be inherently adaptive, continuously calibrating to accommodate the performance and individual learning styles of students (Bennani et al., 2022). Of course, according to several studies, this is influenced by the type of player the user is (Altmeyer et al., 2025; Hooda et al, 2022; Rahman et al, 2025).

Irrespective of technological advancements, the teacher remains the fundamental driving force of the educational process. One of the most significant barriers to the implementation of gamified systems is teacher overload, coupled with a deficiency in appropriate technological pedagogical content knowledge (TPACK) and the absence of adequate institutional infrastructural support (Kabilan et al., 2023). However, when this expertise is present, gamification exhibits exceptional efficacy. In programming education, for instance, it functions as a "psychological safety net" that transforms continuous experiences of syntactic failure into a penalty-free, interactive game, thereby mitigating failure-induced attrition (Figueiredo & García-Peñalvo, 2020). Consequently, it is of paramount importance that pre-service teachers -while still students- during their university years, personally experience the impact and efficacy of innovative, active pedagogy - for instance, by being motivated through digital badges within flipped classroom environments (Borrás-Gené & Díez, 2025; Husain et al, 2023, Chen et al, 2023; Durrani et al, 2022; Schürmann & Quaiser-Pohl, 2022, Li et al, 2024).

Based on the reviewed literature, it can be concluded that the practical integration of gamification into STEM (science, technology, engineering, and mathematics) higher education unequivocally constitutes one of the most effective strategies for mitigating student dropout rates (Lara-Cabrera et al., 2023). Simultaneously, it is observable that within distance learning and hybrid educational frameworks, gamified challenge systems guarantee academic progression while continuously sustaining student motivation (Kaya & Ercag, 2023; Cheng et al., 2023; Oner et al, 2026; Karim et al, 2025; Villanueva et al, 2025; Suryapranata et al, 2021; Karnalim, 2024; Moreno-Medina et al, 2025).

The studies concluding the literature review revert to the robust psychological foundations of gamification, specifically SDT and flow theory. During their investigation of a challenge-based gamification platform, the web-based Educhall program, Kaya and Ercag determined that an educational design grounded in SDT enhances general motivation, self-confidence, and course satisfaction in a statistically significant manner. It is noteworthy, however, that while the system augmented the students' flow experience, the magnitude of this increase was not statistically significant, indicating that achieving flow-state necessitates pedagogical conditions and motivators that are more complex than challenges alone (Kaya & Ercag, 2023).

Conclusion

While the educational and motivational value of gamification is undeniable, its success relies not on the sheer volume of game elements used, but rather on their quality and pedagogical alignment with student profiles. The expanding body of literature highlights that gamification remains a highly relevant and rapidly growing focus of international research. A notable boundary of this study is its reliance on two specific databases and predefined inclusion criteria. Consequently, the review is confined strictly to formally published literature (so-called white papers), meaning some relevant studies may have been inadvertently excluded. Nevertheless, this rigorous selection process was essential to guarantee a robust and highly reliable review corpus. Addressing the first research question -*What are the constraints and challenges around gamification in education and motivation?*- it was found that successful implementation demands significant time investments alongside strong technological and pedagogical expertise, efforts that are often hindered by inadequate institutional IT infrastructure. Regarding the second research question -*Which gamification elements and mechanics are mainly used in education to increase motivation?*- the evidence shows that the PBL triad, tangible rewards, narratives, and educational escape rooms remain the most widely adopted tools. Meanwhile, the most cutting- edge approaches now leverage AI-driven, adaptive systems to deliver fully personalized learning experiences. Based on these findings, future research should prioritize longitudinal studies exploring different player typologies and further investigate the nuances of technology acceptance among students.

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