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REVIEW ARTICLE

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The role of games and gamification in business and training: a systematic review

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ABSTRACT

This review explores the evolving role of gamification and games in business over the previous decade, focusing on organizational learning, training, employee engagement, and collaboration. Following PRISMA guidelines, 56 studies met the inclusion criteria, offering a theoretical and empirical perspective across diverse business sectors, including HR, IT, management, marketing, the industrial, public, and NGOs. The Mixed Methods Appraisal Tool (MMAT) was used to assess study quality. The study discusses key theories and analyzes how different sectors applied games and gamification, reporting their results. We highlight recent contributions, showing how tools and designs for incorporating game elements in the workplace have evolved to engage employees in training and daily activities. The results offer original insights into interactive learning environments, including the growing use of game-based programmes to enhance intergenerational communication, decision-making, skill acquisition, and engagement. Managers and trainers can apply practical strategies discussed in this research to overcome challenges, especially when dealing with complex organizational issues and ethical concerns. The review concludes by outlining future research directions, including more empirical evidence on the long-term effects, personalization, and ethical considerations related to workplace applications.

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Gamification; business games; training; organizational learning; collaborative work; interactive learning

1. Introduction

The integration of gamification and serious games has increased exponentially within organizational and training contexts, effectively enhancing employee engagement, optimizing training outcomes, and improving organizational performance. These tools utilize game elements, such as rewards, challenges, and feedback, to foster immersive and motivating learning environments (Shahri et al., 2019). Driven by the need for dynamic and adaptive training methods suited to a digitally fluent workforce, the corporate world has embraced games, which first gained popularity in educational settings (Zichella & Reichstein, 2023). Research has shown that the implementation of gamification and serious games positively impacts several key performance indicators, including learning retention and skill acquisition (Leite et al., 2023; Nivedhitha, 2023; Zhao et al., 2024).

The concepts of gamification and serious games can be ambiguous and often get confused. In online games, gamification employs interactive elements, such as rewards and recognition. In contrast, developers intentionally design serious games and game-based learning or training experiences to achieve specific educational objectives. If both are implemented correctly and aligned with the company's business goals, they can enhance engagement, interactivity, and participation and, ultimately, achieve organizational outcomes (Bayuk & Altobello, 2019; Nadolny et al., 2019).

New approaches to implementing these activities in the workplace are continually emerging, including management systems, digital platforms, and virtual reality (Haj-Bolouri et al., 2024). Gamified simulations can help managers in strategic decision-making by training leaders in controlled environments.

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Furthermore, games are increasingly used to enhance knowledge across various sectors, such as industry, construction, healthcare, and management (Dahalan et al., 2023). Research has demonstrated that training incorporating game-based elements, often called gamified training, can yield specific behavioural outcomes among employees compared to conventional training sessions, which do not offer the same gaming experience (Magioli et al., 2024). In addition, organizations can incorporate them into e-learning platforms for distance training to motivate employees to complete their learning programmes.

Despite the growing body of literature on the topic in business, several gaps in understanding persist regarding its long-term effectiveness and broader impact across different industries and employee demographics. Although numerous studies have identified the positive outcomes of gamified programmes, such as enhanced motivation and engagement, few have examined their potential limitations. These include the risks of disengagement, privacy concerns, and the psychological effects of competition-based systems (Ahsan & Faletehan, 2021; Coelho & Abreu, 2023). Furthermore, the influence of cultural, generational, and organizational factors on the efficacy of gamified systems remains underexplored. The extensive research is largely based on case studies or specific contexts, which makes it challenging to generalize findings across diverse companies and employee populations.

For instance, Dale (2014) was among the first to undertake a critical review of the implementation of gamification in business, warning against excessive focus on technology at the expense of human engagement. Larson (2019) conducted a review that examined the demographic and cultural influences affecting the application of gamification in corporate training, identifying the various challenges in adopting such techniques (Larson, 2019). Similarly, Warmelink et al. (2020) examined the application of gamification in industrial operations, identifying positive effects on performance and productivity. Obaid et al. (2020) further expanded the scope of this field by proposing a taxonomy for integrating game elements into recruitment and training processes. Consequently, their work offers developers a more clearly delineated pathway to designing effective gamified systems for businesses. Lastly, Sam-Epelle et al. (2022) examined the nexus of digital transformation and gamification, focusing on integrating Millennials into the workforce and the broader implications of digitalization.

This systematic review builds upon existing research to provide a decade-long analysis of the influence of gamification and serious games applied in a corporate context, aimed at training, performance improvement, sales, and knowledge retention among groups of managers from different companies outside the academic environment. The authors analyzed both gamification and serious games to expand the scope of research in the business environment. The research objective formulated the following research questions to investigate the application of gamification and serious games within the corporate context, focusing on theories, effects, and practical implications.

RQ1. What are the main theories and associated elements from games discussed in the reviewed studies?

RQ2. What are the potential effects of applying gamification and serious games in enterprises?

RQ3. What are the implications for management practice?

Subsequently, the study details the methodology employed and presents the results, which address the three research questions outlined above. The discussion highlights key implications for using gamification and serious games in business. Finally, the study outlines potential opportunities for future research.

2. Methodology

2.1. Search strategy and data extraction

This study followed the recommendations outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. PRISMA is appropriate for this study as it provides a rigorous method for conducting systematic reviews, ensuring reproducibility, minimizing bias, and achieving a comprehensive selection of studies in selecting, analyzing, and synthesizing the literature on games and gamification in business contexts.

The selection of pertinent literature was carried out in three stages, following a systematic approach. The authors selected four databases to ensure a comprehensive and multidisciplinary review: Scopus, Web of

Science, ProQuest, and Dimensions. These databases include those with a stronger focus on business studies and emerging research in the field, as well as high-impact and multidisciplinary sources that provide a broad perspective on the topic. The following search string was employed: (("Gamification" OR "Game-based learning" OR "Serious Games" OR "Gamify" OR "Instructional Games" OR "Business Games") AND ("Business Context" OR "Corporate" OR "Training" OR "Workplace" OR "Enterprise") NOT ("Students" OR "Higher education" OR "University")).

In the initial phase of the process, following the removal of duplicates, the titles and keywords were screened to determine their relevance to the topic under review. In the second step, if the title and keywords were deemed aligned with the research objectives, the abstract was then read. In the final stage of the process, the full texts of the publications identified in the second stage were reviewed to select the relevant studies that met the inclusion criteria. Furthermore, the literature identified through the search string was downloaded in RIS format, thus facilitating the management of the database using the Rayyan software (Ouzzani et al., 2016). A total of 642 (Scopus), 570 (Web of Science), 527 (ProQuest), and 662 (Dimensions) documents published between 2014 and 2024 were found.

The selection of studies followed predefined inclusion and exclusion criteria. Eligible articles were published in English, peer-reviewed, and appeared in academic journals between January 2014 and December 2024. Studies also had to adopt gamification, serious games, game-based learning, or game-based training as a primary methodological approach within business contexts and training. Conversely, studies were excluded if they lacked sufficient information, focused on treatments for patients in the health sector, explored other active learning methods, or centred on university or high school populations. These criteria ensured that the review remained focused on game-based methodologies in corporate training. The final review included 56 scientific studies, as shown in the PRISMA flow diagram (Figure 1).

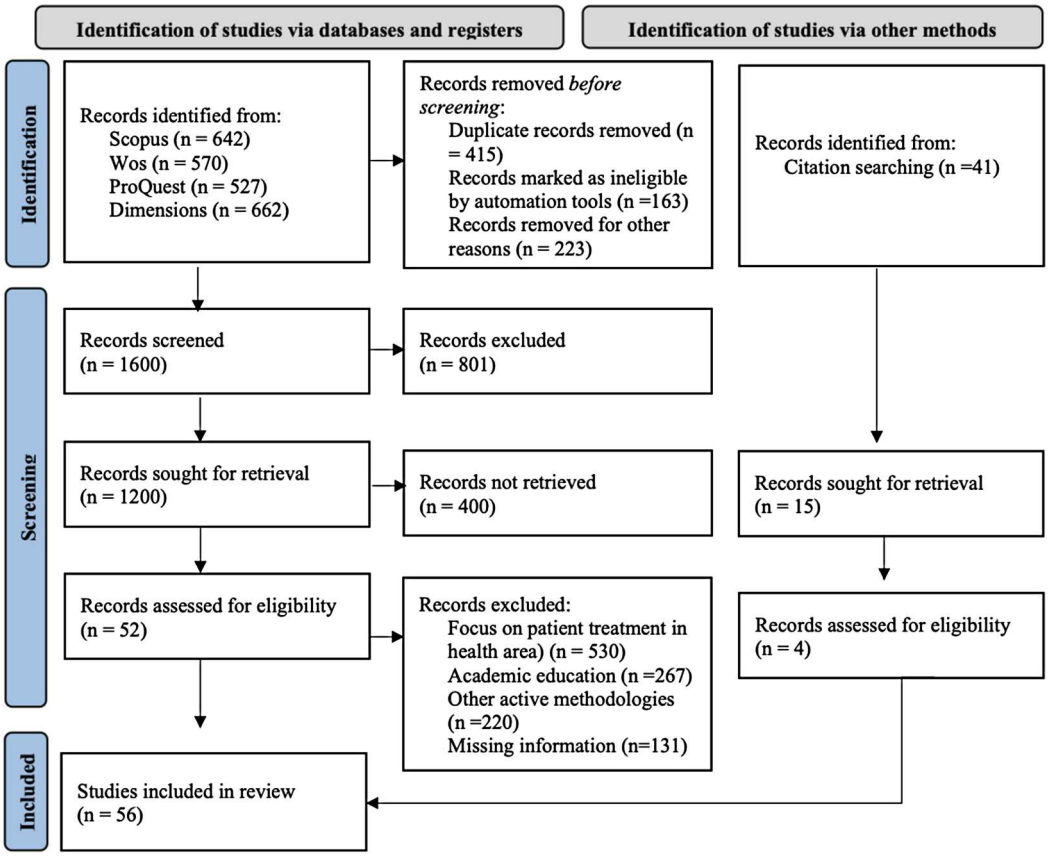


Figure 1. PRISMA flow diagram for the SLR process.
From Page et al. (2021).

2.2. Quality evaluation

The mixed-methods appraisal tool (MMAT; Hong et al., 2018) was utilized to critically evaluate the quality of each study due to the variations in quantitative, qualitative, and mixed methods research design. Researchers frequently use the MMAT to ensure consistency in evaluating studies and to reduce potential bias when comparing different methodological approaches. Different authors in health sciences, education, and social sciences have adopted this tool to address the growing complexity of mixed methods research (Hong et al., 2018). The evaluation considered core methodological principles, such as the appropriateness of measurements, the completeness of outcome data, and the adequacy of the integration between qualitative and quantitative components in mixed methods studies. This structured process ensured a comprehensive and context-sensitive assessment, allowing for a more nuanced understanding of the strengths and limitations within the selected body of research.

The MMAT allows concurrent appraisal of the methodological quality of five research methods: qualitative, randomized controlled trial, non-randomized studies, quantitative descriptive, and mixed methods studies. The first part is a screening checklist that asks, "Are there clear research questions?" and "Do the collected data allow to address the research questions?." The second part outlines five criteria assessing each of the five methodologies with responses of "Yes," "No," or "Can't tell." After applying these criteria, each empirical study receives an overall rating based on the number of criteria it fulfils. Although the MMAT developers do not recommend calculating a single numerical score, reporting the number of criteria met (out of five) offers a clear and transparent overview of the methodological quality. In this review, these scores were used to present a summary of the studies' quality, with higher scores indicating greater methodological rigour.

3. Results

3.1. Synthesis of the empirical studies

While analyzing the selected articles, they were categorized into two distinct types: empirical and theoretical studies. The empirical studies, specifically those investigating gamification, serious games, and game-based training in business contexts reveal a diverse range of sectors represented, including Human Resources (Kulkarni et al., 2022), IT (Caserman et al., 2023; Löffler et al., 2021), consulting (Coelho & Abreu, 2023; Van der Heijden et al., 2020), e-commerce (Angelovska & Josimovski, 2021), healthcare (Brull et al., 2017), finance (Fodor & Barna, 2020), telecommunications (Algashami et al., 2018) and the industrial sector (Jacob et al., 2022; Kim, 2021; Silva et al., 2019). Approximately 70%, focus on gamification, with a strong concentration in technology companies.

Table 1 lists the studies, specifying the target population, sample and the company sector. Additionally, the methodological quality of each included empirical study was critically appraised using the MMAT. A total of 38 studies were identified as empirical, while the remaining works were theoretical. Among the empirical studies, 36.8% ($n = 14$) employed a mixed methods design, 39.5% ($n = 15$) were non-randomized quantitative studies, 13.2% ($n = 5$) were qualitative studies, and 10.5% ($n = 4$) were randomized controlled trials. Regarding the methodological quality assessment, most empirical studies (63.2%, $n = 24$) achieved the highest score (5/5). Additionally, 26.3% ($n = 10$) of the studies scored 4/5, and 10.5% ($n = 4$) received a score of 3/5. For the studies that did not receive the maximum score, the lack of control over confounding variables and issues related to the representativeness of the target population within the sample were identified as critical factors affecting the quality of the research. These limitations directly influenced the overall methodological rigour and, consequently, the final MMAT rating of the studies.

No purely descriptive quantitative studies were identified in this review, as research on serious games and gamification predominantly focuses on examining the effects and outcomes of specific interventions rather than providing descriptive accounts of phenomena. Consequently, the quantitative studies included were either randomized controlled trials or non-randomized designs, both of which aim to establish causal inferences or assess the effectiveness of interventions through experimental or quasi-experimental methodologies. Additional information on both the empirical and theoretical studies included in this systematic review, including the journals in which they were published, study objectives, hypotheses, variables examined, key findings, future research agendas, and the countries where the studies were conducted, is provided in the appendices.

Table 1. Empirical studies: general information and MMAT rating.

Year	Authors	Study type	Unit of analysis (sample)	Company sector	MMAT (rating)	1	2	3	4	5
2024	Zhao et al.	Serious games	Cybersecurity employees (n = 220)	Industrial software engineering	Mixed (5/5)	Y	Y	Y	Y	Y
2024	Richards et al.	Serious games	Employees (n = 60)	Utility Company	Mixed (5/5)	Y	Y	Y	Y	Y
2024	Bitrián et al.	Gamification	Employees (n = 1178)	Engineering and high-tech sector	Mixed (5/5)	Y	Y	Y	Y	Y
2024	Tay et al.	Digital game-based learning (DGBL)	Construction professionals (n = 246)	Construction industry	Mixed (5/5)	Y	Y	Y	Y	Y
2024	Magioli et al.	Gamification	Banking employees (n = 388)	Banking Sector	Non-randomized (5/5)	Y	Y	Y	Y	Y
2023	Caserman et al.	Gamification (minigames)	Employees (n = 367)	Human Resources; IT; Maketing	Mixed (5/5)	Y	Y	Y	Y	Y
2023	Nivedhitha	Gamification	Employees (n = 421)	IT Organizations	Non-randomized (5/5)	Y	Y	Y	Y	Y
2023	Chan et al.	Serious games	Employees (n = 37)	Chemical Company	Mixed (5/5)	Y	Y	Y	Y	Y
2023	Coelho and Abreu	Serious games	Directors (n = 6)	Companies producing serious games/ gamification	Qualitative (5/5)	Y	Y	Y	Y	Y
2023	Bitrián et al.	Gamification	Employees (n = 1178)	Engineering and high-tech sector	Non-randomized (5/5)	Y	Y	Y	Y	Y
2023	Bizzi	Gamification	Employees (n = 268)	Recruiting services	Non-randomized (5/5)	Y	Y	Y	Y	Y
2022	Kulkarni et al.	Game-based training	HR trainers (n = 114)	Software Development	Non-randomized (4/5)	Y	Y	Y	N	Y
2022	Hocine	Serious games	Job seekers (n = 41)	Job interview training	Non-randomized (3/5)	N	Y	Y	N	Y
2022	Ulmer et al.	Gamified VR training	Assembly workers (n = 79)	Industrial VR assembly scenarios	Mixed (4/5)	Y	Y	Y	Y	N
2022	Girdauskienė et al.	Gamification	Employees (n = 94)	Brokerage services company	Non-randomized (4/5)	Y	Y	Y	N	Y
2022	Caserman et al.	Serious games	Police officers (n = 32)	Police and administration	Non-randomized (4/5)	Y	Y	Y	N	Y
2022	Wimmer et al.	Serious games	Managers (n = 734)	Management	Non-randomized (4/5)	Y	Y	Y	N	Y
2022	Allal-Chérif et al.	Serious games	Managers (n = 11)	Insurance Company	Mixed (5/5)	Y	Y	Y	Y	Y
2022	Wang et al.	Gamification	Corporate training experts (n = 14)	Executives of management consulting	Qualitative (5/5)	Y	Y	Y	Y	Y
2022	Colabi et al.	Gamification	Managers (n = 117)	Electronic businesses	Non-randomized (4/5)	Y	Y	Y	N	Y
2022	Jacob et al.	Gamification	Industrial workers (n = 31)	Industrial sector	Mixed (5/5)	Y	Y	Y	Y	Y
2021	Angelovska and Josimovski	Gamification	Customers and sales data (n = 6844)	E-commerce platform	Non-randomized (4/5)	Y	Y	Y	N	Y
2021	Löffler et al.	Serious game	SME employees and owners (n = 81)	IT – Cyber security	Mixed (3/5)	Y	Y	N	N	Y
2021	Nair and Mathew	Gamification	Employees (n = 60)	Management sector	Randomized control trial (4/5)	N	Y	Y	Y	Y
2021	Santos et al.	Gamification	Professionals (n = 56)	Companies where gamification was used for training	Mixed (5/5)	Y	Y	Y	Y	Y
2021	Kim	Gamification	Employees (n = 293)	Automotive retailers	Non-randomized (4/5)	N	Y	Y	Y	Y
2020	Casucci et al.	Serious games (game boards)	Staff and faculty (n = 30)	Health librarians	Non-randomized (3/5)	N	Y	Y	N	Y
2020	Fodor and Barna	Gamification	Employees (n = 6,076)	Consultancy; Financial; Travel services	Non-randomized (4/5)	Y	Y	Y	N	Y
2020	Van der Heijden et al.	Gamification and Serious games	Dutch businesses (n = 12)	Energy; Consultancy	Qualitative (5/5)	Y	Y	Y	Y	Y
2020	Holzer et al.	Gamification	Humanitarian workers (n = 458)	Non-governmental organization	Mixed (5/5)	Y	Y	Y	Y	Y
2020	Rocha et al.	Gamification	Managers (n = 4)	Manufacturer and marketer of footwear	Mixed (5/5)	Y	Y	Y	Y	Y
2020	Silic and Lowry	Gamification	Employees (n = 384)	French international company	Randomized control trial (5/5)	Y	Y	Y	Y	Y
2019	Maltseva et al.	Gamification	Workers (n = 311); (n = 145); (n = 126)	Amazon Mechanical Turk	Randomized (5/5)	Y	Y	Y	Y	Y

(*Continued*)

Table 1. Continued.

Year	Authors	Study type	Unit of analysis (sample)	Company sector	MMAT (rating)	1	2	3	4	5
2019	Silva et al.	Gamification	Managers and entrepreneurs (n = 5)	Cooperation network of construction materials	Qualitative (5/5)	Y	Y	Y	Y	Y
2018	Algashami et al.	Gamification	Call centres (n = 100)	Tourism; Telecommunication	Qualitative (5/5)	Y	Y	Y	Y	Y
2017	Suh et al.	Gamification	Employees (n = 178)	Consulting company	Non-randomized (5/5)	Y	Y	Y	Y	Y
2017	Suh and Wagner	Gamification	Employees (n = 166)	Consulting company	Non-randomized (5/5)	Y	Y	Y	Y	Y
2017	Brull et al.	Gamification	Nursing staff (n = 115)	Healthcare setting	Non-randomized (4/5)	Y	Y	Y	N	Y

Note. Criteria for MMAT (Mixed Methods Appraisal Tool, 2018; Hong et al., 2018). Qualitative: 1. Is the qualitative approach appropriate to answer the research question?; 2. Are the qualitative data collection methods adequate to address the research question?; 3. Are the findings adequately derived from the data?; 4. Is the interpretation of results sufficiently substantiated by data?; 5. Is there coherence between qualitative data sources, collection, analysis and interpretation?; Quantitative randomized controlled trials: 1. Is randomization appropriately performed?; 2. Are the groups comparable at baseline?; 3. Are there complete data?; 4 = Are outcome assessors blinded to the intervention provided?; 5. Did the participants adhere to the assigned interventions?; Quantitative non-randomized: 1. Are the participants representative of the target population?; 2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?; 3. Are there complete outcome data?; 4. Are the confounders accounted for in the design and analysis?; 5. During the study period, is the intervention administered (or exposure occurred) as intended?; Mixed methods: 1. Is there an adequate rationale for using a mixed methods design to address the research question?; 2. Are the different components of the study effectively integrated to answer the research question?; 3. Are the outputs of the integration of qualitative and quantitative components adequately addressed?; 4. Are the divergences and inconsistencies between quantitative and qualitative results adequately addressed?; 5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?

3.2. Bibliometric analysis and research collaboration network

An analysis of the geographical distribution reveals the extensive global scope of the selected studies, encompassing countries across all five continents. In Europe, contributions come from Belgium, Finland, France, Hungary, Italy, Lithuania, the Netherlands, North Macedonia, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. In North America, the United States and Canada are key contributors, while Brazil stands out as a key contributor in South America. Asian studies originate from China, India, Malaysia, Pakistan, Singapore, South Korea, and Taiwan. Oceania includes Australia and New Zealand, and Algeria represents Africa. As illustrated in Figure 2(a), this distribution highlights the global relevance of the topic within the corporate context. The United States, Germany, and the United Kingdom emerge as leading contributors, distinguished both by the volume of publications and by extensive international collaborations.

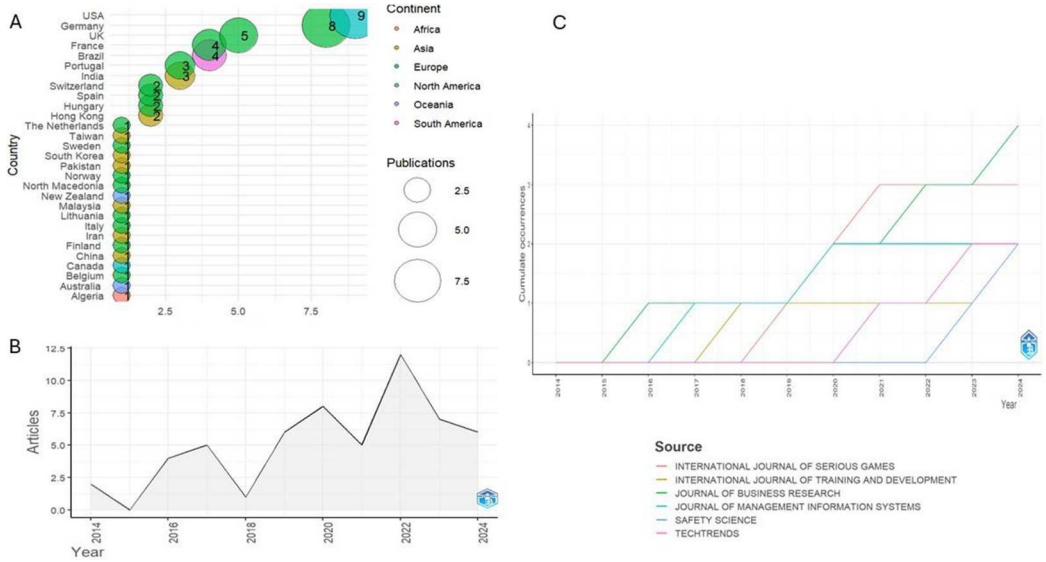


Figure 2. Publications by country and source.
Generated using Biblioshiny (Aria & Cuccurullo, 2017).

These collaborations often reflect regional or linguistic proximity, which facilitates research integration and knowledge exchange across countries. Furthermore, intercontinental cooperation strengthens comparative insights and enhances the global dissemination of research on game-based approaches in business.

Concerning the distribution of studies over the past decade, we observed a notable increase in the number of studies conducted between 2020 and 2022 (see Figure 2(b)). As shown in Figure 2(c), the most relevant sources reveal differences in influence over time. The *Journal of Business Research* has published the highest volume of articles over the period 2014–2024, with a total of four publications, followed by the *International Journal of Serious Games* with three publications. Figure 3 presents the collaboration network, where Robson et al. (2015) stand out with 271 citations and six connections. However, considering both publication volume and citation impact, other authors also emerge, with the top 10 authors ranked in Table 2, based on productivity, cumulative impact, and relevance among their peers. Regarding the contributing institutions, an analysis was also performed that focused on citation impact, as illustrated in Figure 3. Network visualization demonstrates the predominance of specific institutions, including Carnegie Mellon University and the University of Pennsylvania (USA), King's College London and the University of London (UK), Simon Fraser University (Canada), and Erasmus University Rotterdam (The Netherlands). Additionally, the map illustrates the citation-based relationships and network structure connecting these key institutions with others on a global scale.

3.3. Thematic analysis

Although some articles may be a decade old, they can still offer valuable and novel insights, which this analysis aims to clarify. Therefore, a critical examination of the originality of the articles presented and the future directions suggested will be conducted to compare them in terms of periods. This approach allows for an assessment of whether significant changes or shifts have occurred throughout the period under review.

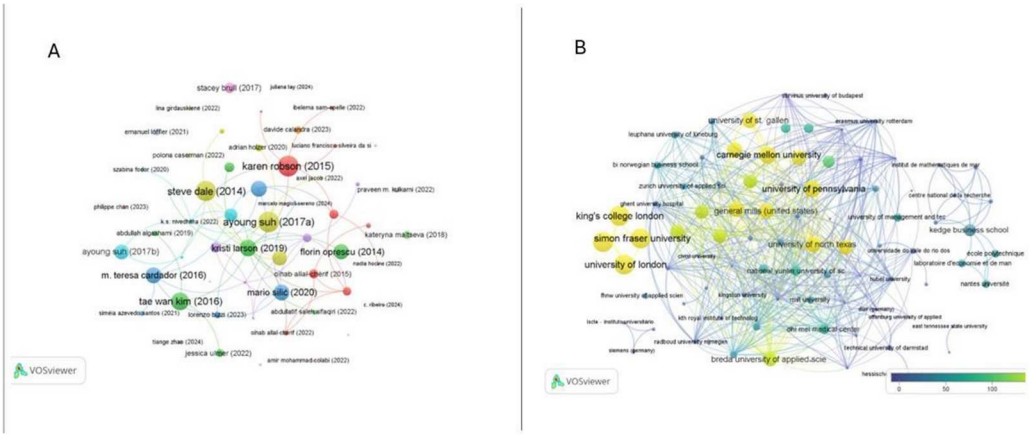


Figure 3. Collaboration network between authors and institutions.
Visualized using VOSviewer (van Eck & Waltman, 2010).

Table 2. Top 10 contributing authors.

Author	Production	Impact
Ayoung Suh & Christian Wagner	2	400
Karen Robson	1	271
Steve Dale	1	248
Richard Landers	2	255
Tae Wan Kim	1	197
Kristi Larson	1	165
M. Teresa Cardador	1	162
Mario Silic	1	158
Allal-Cherif	3	110
Michael B. Armstrong	1	154

Table 3 presents the main contributions and trends investigated by the authors of the selected studies over the past ten years. Collectively, these studies contribute to a deeper understanding of gamification and serious games in organizational contexts.

In 2014, Dale (2014) posited that a significant proportion of failed projects result from an initial focus on technology, with insufficient attention paid to the human element. In contrast, the studies identified from 2015 and 2016 (Kavaliova et al., 2016; Robson et al., 2015; Wan & Kevin, 2016) analyze users of gamified experiences, including both customers and employees. In 2017, Cardador et al. (2017) posited that how gamification is implemented in the workplace can either enhance or diminish its effectiveness. The authors emphasized the importance of visibility, comparability, and immediacy as mechanisms to enhance individual motivation and performance in the workplace. The studies conducted by Suh and Wagner (2017), Suh et al. (2017) in Hong Kong represent the earliest empirical investigations of gamification in the workplace, conducted within the established timeframe and identified in our research. The studies, based on data collected through employee surveys in consulting firms, sought to analyze the contribution of game, flow, and aesthetic elements to employee knowledge and engagement.

In the years 2018 and 2019, one of the earliest reviews on the topic was published, identifying business, demographic, and cultural influences that affect the experience of gamified activities (Larson, 2019). The ethical considerations previously identified in the literature were also discussed with Algashami et al. (2018), highlighting potential risks associated with the use of gamification in organizations, as well as proposing possible strategies to mitigate these risks. In 2020, Warmelink et al. (2020) conducted a critical review of 18 studies focused on industrial operations, concluding that most resources employed were related to goals and objectives, feedback, and performance indicators. The results demonstrated positive outcomes in terms of motivation and workflow. In 2021, there was a notable increase in the number of studies examining the application of gamification and serious games in online formats for different purposes. For example, in India, gamification was applied to employee training programmes (Nair & Mathew, 2021), while in Switzerland, serious games were implemented to enhance awareness among managers and SME owners through a virtual escape room concerning cybersecurity aspects (Löffler et al., 2021).

Nevertheless, most of the studies included in our analysis were published in 2022. A significant increase in the application of serious games was observed (Allal-Chérif et al., 2022; Caserman et al., 2022; Hocine, 2022; Wimmer et al., 2022), along with the use of virtual reality (Ulmer et al., 2022) in corporate training, particularly in online formats (Alfaqiri et al., 2022). In 2023 and 2024, studies by Caserman et al. (2023) and Zhao et al. (2024) indicate that the use of games in companies is a topic worthy of greater attention from researchers, due to the generality of the results found. A significant number of studies published in conference proceedings or book chapters concentrate on game mechanics and the development of frameworks that have not been subjected to empirical testing or applied in practice. According to Caserman et al. (2023), factors such as the industry sector in which a company operates, whether it is more technology-driven or part of the manufacturing sector, the size of the company, as well as the generational and personality traits of individuals, can significantly influence the application and focus of game design.

Table 3. Chronological trends and insights.

Year	Insights	Trends
2014–2015	Gamification fails due to focus on technology rather than humans. Benefits for health and productivity	Focus on theories, alignment of mechanics and first empirical studies
2016	Success depends on aligning game mechanics with player types. Ethical concerns about manipulation and psychological damage	
2017	Visibility and immediacy help motivation. Gamification increases employee knowledge and engagement	
2018–2019	Business and cultural factors influence gamification. Criticism of superficial implementations without psychological engagement	Discussion of ethics, cultural impact and post-pandemic adaptation
2020	Positive impact on motivation and workflow, with applications in recruitment and training	
2021	Increased use of gamification for online training due to remote work. Applications in cybersecurity and marketing	
2022	Serious games and VR are integrated into corporate training, with a focus on sustainability	Expansion into immersive technologies (VR/IA) and criticism of superficiality
2023–2024	Effectiveness depends on the type of industry and size of the company. AI begins to personalize game design	

Figure 4 illustrates the evolution of keywords and timeline clusters from the past decade. In the earlier years, research predominantly focused on gamification mechanics and design principles, emphasizing understanding how organizations could integrate game elements into their processes. Over time, the focus gradually shifted towards exploring the effects of these game-based approaches on employee engagement, motivation, and well-being, reflecting broader organizational concerns related to human resource management and performance outcomes. Subsequently, the rise of technological advancements brought increased attention to themes such as virtual reality and immersive experiences within the corporate context. More recently, the literature has expanded to encompass topics such as age diversity, communication strategies, and information security, reflecting a diversification of research interests and a closer alignment with contemporary organizational challenges. This progression indicates a gradual maturation of the field, moving beyond foundational discussions towards more practical and context-specific applications across different industries.

3.4. Theories and game elements

To address the first research question (RQ1), it was essential to develop a comprehensive understanding of the learning theories most commonly employed in analyzing gamification and serious games within corporate and organizational contexts. These theories are the foundation for interpreting how game elements influence learning processes, motivation, and behavioural change in professional environments. Table 4 provides a detailed summary of the main theories identified across the selected studies, highlighting their core contributions to the field and the specific game elements most frequently associated with each theoretical approach. This analysis highlights how theories influence the design, application, and evaluation of gamification and serious games in corporate settings.

Several learning theories have been applied in existing research in this field. Among these, the most notable are Self-Determination Theory, Flow Theory, and Goal-Setting Theory. For example, Kulkarni et al. (2022) employed the Self-Determination Theory to examine factors such as employee engagement and their inclination to adopt game elements in corporate training. The results indicated a positive relationship between Self-Determination Theory and game design, particularly in terms of improving employee awareness, involvement, and engagement in training. Another study, Nair and Mathew (2021), based on Landers' Gamified Learning Theory (Landers & Landers, 2014), measured employee motivation and found that the motivation levels of participants in the experimental group were higher than those in the control group, demonstrating that the gamified module resulted in greater motivation among participants.

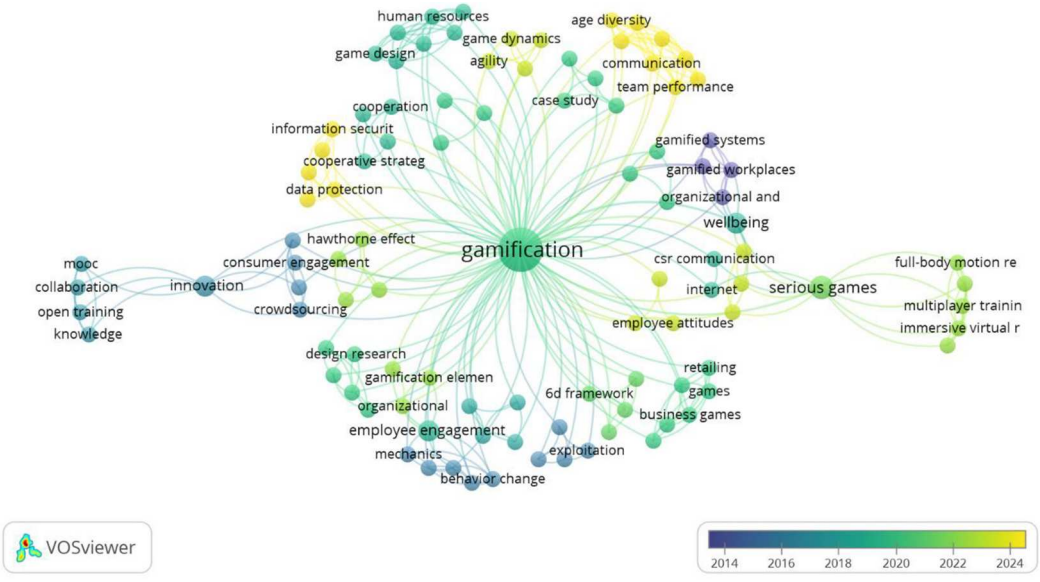


Figure 4. Keyword and timeline clusters (2014–2024).
Visualized using VOSviewer (van Eck & Waltman, 2010).

Table 4. Summary of theories.

Theory	Key contributions	Game elements
Self-Determination Theory (Deci & Ryan, 1985)	Explains how autonomy, competence, and social connection drive motivation	Autonomy, social interactions, rewards, personalization
Flow Theory (Csikszentmihalyi, 1990)	Describes the state of flow as an immersive experience where skills and challenges are balanced	Engagement loops, clear goals, immediate feedback
Goal-Setting Theory (Latham & Locke 1968)	Establishes that specific and challenging goals lead to higher performance	Clear goals, Achievements, leaderboards, reward systems
Gamified Learning Theory (Landers & Landers, 2014)	Proposes that the integration of game elements should be linked to learning objectives to maximize impact on skill development and knowledge retention	Engagement incentives, structured learning paths, progression systems
Technology Acceptance Model (TAM) (Davis, 1989)	The model explains that accepting a new technology depends on the perception of its usefulness and ease of use	User-friendly interface, accessibility, interactive design
Human-Centered Design Theory (Rouse, 1993)	Highlights the importance of designing user-centred systems, considering their needs, capabilities and limitations	Personalization, intuitive design, user autonomy

In addition to the characteristics of gamified applications, considering the individual characteristics of employees, such as competitiveness and performance levels, is critical, as they significantly impact the acceptance of games in the workplace (Cardador et al., 2017). The Technology Acceptance Model (TAM) (Davis, 1989) and the Human-Centered Design Theory (Rouse, 1993) are also referenced and examined in the context of games, given that employees must perceive both the utility and ease of use of these systems. The design of the game or gamified system must be user-centred. As tasks become more enjoyable and performance information becomes more visible using gamified tools, motivation tends to increase (Caserman et al., 2023). The incorporation of achievement elements reflects the ongoing efforts of users, thereby sustaining their motivation. The provision of rewards serves to recognize the time and effort invested by users and thus highlights the interdependence between achievements and rewards. The attainment of rewards is contingent upon the fulfilment of specific milestones, thereby encouraging users to exert greater effort to achieve them (Obaid et al., 2020).

Furthermore, it has been demonstrated that players are more motivated when they have control and mastery over the situation. The option of personalization allows users to select settings according to their preferences, thus providing them with a sense of autonomy (Obaid et al., 2020). To illustrate, Casucci et al. (2020) devised a game designed to reinforce personal resilience and foster a culture of well-being among colleagues by affording employees autonomy over their participation, as preliminary research indicated a lack of control over work and the work environment. The effectiveness of gamification is enhanced when individuals are afforded the autonomy to make decisions within the game, selecting actions according to their preferences rather than merely following instructions (Cardador et al., 2017). These elements are consistent with the principles of Self-Determination Theory (Deci & Ryan, 1985) and Goal-Setting Theory (Latham & Locke 1968) which posit that individuals are driven to engage in tasks that afford them autonomy, competence, and social connection, while simultaneously presenting opportunities for growth through the completion of specific tasks and the attainment of defined goals.

Flow elements are crucial for the maintenance of participant motivation and engagement (Alfaqiri et al., 2022). Flow theory (Csikszentmihalyi, 1990) emphasizes the importance of integrating thoughts, intentions, feelings, and senses, requiring individuals to remain fully focused on a unified objective. Thus, the state of flow can be achieved within the gaming context through the utilization of activity loops. The studies suggest that promoting flow through gamification requires a careful balance between the challenges presented and the skill of the participants (Oprescu et al., 2014). In organizational contexts, the use of mini games has been shown to be particularly effective, as these games are intuitive, require minimal training, and support the achievement of specific objectives (Caserman et al., 2023). Furthermore, studies indicate that competitive mini games appeal to different generations, whereas quizzes and puzzles, whether played individually or collaboratively, are generally considered more suitable for corporate environments (Obaid et al., 2020).

3.5. Impact on businesses

In analyzing the empirical articles, we aimed to understand the variables explored and the outcomes observed, whether positive, negative, or neutral, to address Research Question 2. The variables often explored by the authors highlight that intrinsic motivation and employee engagement tend to improve

with the application of gamification. In addition, serious games not only increase motivation but also add value in terms of cognition, emotion, socialization, and sense of community, which are crucial in collaborative work environments. Studies suggest that game elements give players a sense of control and improve team socialization (Bizzi, 2023; Casucci et al., 2020; Ulmer et al., 2022). Similarly, gamification is widely used to increase productivity and performance (Jacob et al., 2022; Santos et al., 2021), while serious games are primarily used for knowledge retention in training and the development of soft skills (Calandra et al., 2023; Zhao et al., 2024). A summary of the results can be found in Table 5.

However, some studies argue that game-based activities may not address deep-seated problems or complex issues. The results of a study conducted with library workers by Casucci et al. (2020) showed that a game-based intervention may not address the underlying causes of burnout, but it may promote a more social environment. The results were significant in terms of participation and sense of community. Library staff began to eat lunch together, organize walks after work, and participate more actively in meetings. When applied to job interviews, for example, they may have positive results by reducing stress and improving interview preparation (Hocine, 2022). Moreover, the results of employee performance yield conflicting outcomes. Bizzi (2023), in research conducted in the USA, demonstrates that the application of gamification in performance management is associated with favourable outcomes in employee perceptions of such processes. Similarly, a study conducted in Germany, where gamification was applied to the industrial sector, yielded positive results in terms of job performance and workers' attitudes towards their work (Jacob et al., 2022). However, the study Hocine (2022) posits that player performance was adversely affected by the conduct of the virtual character in the gamified activity.

The effects of gamification and games, as observed in numerous studies, are employed to promote the positive aspects of game elements and enhance employee engagement, both in daily work activities and in training (Fodor & Barna, 2020; Suh et al., 2017). To exemplify, Brull et al. (2017) conducted a study with nurses that revealed improvements in knowledge retention, as well as a rise in positive staff satisfaction and engagement. The results of the study by Nivedhitha (2023) also indicated a positive outcome, demonstrating that game dynamics driven by social interactions foster a sense of social cognition and contagion, which are crucial for user engagement in a collective context. In the context of online training, the use of serious games may also confer additional benefits, as evidenced by Zhao et al. (2024), who conducted research with cybersecurity professionals. This study devised a bespoke serious game to enhance the awareness of secure coding guidelines among software developers. The integration of serious games in online training may optimize the efficacy of training while addressing its inherent limitations.

Table 5. Impact of games and gamification in business.

Impact on businesses	Outcomes	Points of attention
Intrinsic motivation & engagement	Game elements such as challenges and achievements have been shown to engage employees' intrinsic motivation, fostering a sense of ownership over their learning and performance	Can result in superficial engagement if not well designed
Knowledge retention & skill development	Integrating games into training programmes has been shown to boost employees' information retention and application of learnt concepts	Game-based activities may not address deeper issues and long-term retention
Team dynamic & socialization	Game mechanics encourage employees to interact, cooperate, and build relationships in a more informal, engaging environment	Competitive elements can generate rivalry
Productivity & performance	The effective implementation of gamification is evidenced by the optimization of task-oriented workflows, the augmentation of efficiency, and the enhancement of workplace performance by leveraging psychological engagement, goal-driven incentives, and interactive learning mechanisms	Demonstrating efficacy to attain objectives and recompense can engender pressure, which can lead to elevated stress and diminished job satisfaction
Business outcomes	Through the integration of gaming elements into marketing campaigns, loyalty programmes, and digital platforms, companies can create immersive experiences that drive customer loyalty and satisfaction	Gamification elements may not be effective if not aligned with business objectives
Corporate training	Studies suggest that incorporating game mechanics into training programmes leads to higher participation rates and improved knowledge retention. In online training environments, gamification is particularly effective in encouraging active learning	Factors such as industry type, employee demographics and job roles influence the extent to which gamification improves training effectiveness

In the field of marketing, the impact of gamification is evidenced by a 318% increase in the number of new customers during the designated game period, a 45% rise in monthly sales, and the generation of awareness for both the company and the event that was promoted (Angelovska & Josimovski, 2021). An additional case study can be found in Threadless (Kavaliova et al., 2016), which engaged its community through a multitude of challenges with infinite game dynamics. Consequently, members demonstrated sustained engagement with the game. The application of game techniques to business processes is a strategy that can be employed by companies in a variety of contexts, including marketing campaigns, product development efforts, and sales activities. The objectives of the game elements being applied must be clearly and meaningfully connected to the business activity to achieve the desired effects and results (Angelovska & Josimovski, 2021).

Conversely, a considerable body of research has highlighted the potential risks associated with the "dark side" of gamification, which, in certain instances, may result in disengagement (Algashami et al., 2018; Landers, 2019). These studies indicate that not all instances of gamification result in positive or significant outcomes (Wan & Kevin, 2016). Nevertheless, there is a consensus among the studies that the incorporation of game elements can enhance the outcomes of corporate training (Oprescu et al., 2014; Ribeiro et al., 2024). Overall, the efficacy of gamified interventions appears contingent upon a design that prioritizes transparent objectives, consistent feedback, and adaptability to different generations (Coelho & Abreu, 2023; Larson, 2019).

3.6. Implications for management and trainers' practices

The introduction of gamification and serious games in professional environments requires careful attention to managerial acceptance, which is often a decisive factor in determining the success or failure of such initiatives. Furthermore, it is anticipated that gamification will not result in the introduction of additional tasks that complicate existing routines but rather will be integrated into existing systems or training programmes, thereby enhancing the value of achieving established objectives (Caserman et al., 2023). The incorporation of gamification should be regarded as a valuable instrument for the administration of worker motivation and efficacy, particularly in instances where supervisors are constrained in their capacity to conduct physical monitoring of progress and facilitate a more enjoyable work environment (Alfaqiri et al., 2022; Cardador et al., 2017).

The authors suggest that to enhance performance management systems through gamification, three fundamental elements must be integrated: visibility, comparability, and immediate feedback on employee performance (Cardador et al., 2017). Nevertheless, organizations should exercise caution when disseminating performance data and feedback. While leaderboards and rankings are ubiquitous in gaming, their implementation in a business setting has also been shown to have adverse effects on employee motivation, performance, and well-being (Caserman et al., 2023). The application of transparency to team performance has the potential to facilitate the resolution of issues such as misunderstandings, conspiracy, and perceived injustice. However, the use of gamification may also introduce risks, including the infringement of autonomy, the creation of negative pressure, and the reduction of self-esteem. These risks, in turn, have the potential to reduce task quality and divert attention from the intended objectives (Algashami et al., 2018).

Furthermore, understanding the desires and motivations of players is fundamental to the development of engaging gamified experiences (Armstrong & Landers, 2018). From an organizational perspective, assigning more experienced players to complex objectives, such as solving complex problems and the development of advanced skills, facilitates a better alignment between tasks and individual competencies (Kornevs et al., 2019). For individuals who prioritize social interaction, introducing new players or tasks progressively is recommended to maintain engagement throughout the process (Robson et al., 2015). However, when modifying the gamified experience, managers must ensure that the established rules are not altered unfairly. Sudden alterations to the mechanics of gamification can evoke a sense of betrayal in players, prompting them to disengage from the experience (Allal-Chérif & Makhlouf, 2016; Allal-Chérif & Bidan, 2017).

The implementation of monitoring strategies, such as peer evaluation, member verification, and self-assessment, can assist in the identification and resolution of potential risks associated with performance measurement and rewards (Rocha et al., 2020). These risks may include errors in performance assessment and a lack of engagement in collective tasks or goals (Algashami et al., 2018; Dale, 2014). Furthermore, the involvement of employees in the decision-making process and the design of game rewards that

Table 6. Summary of challenges and mitigation strategies.

Challenges	Mitigation strategies
Privacy risks from performance data publication	Use data anonymization and provide clear consent mechanisms
Excessive comparison and pressure	Focus on individual progress metrics rather than competitive leaderboards
Transparency leads to ethical concerns	Establish boundaries for information sharing and ensure fairness
Perceived unfairness through reward systems	Set up rewards that recognize both effort and quality, not just output
Individual vs. collective objectives	Encourage open communication to align team and individual interests

promote teamwork and collaboration can also be employed as a strategy for the resolution of social conflicts (Robson et al., 2015). Ultimately, the efficacy of the gamified experience must be evaluated, and managers are instrumental in this process, ensuring that players remain engaged and adhere to the established rules (Sam-Epelle et al., 2022). Table 6 summarizes the key organizational challenges identified and potential mitigation strategies.

4. Discussion

The growing interest in game-based strategies within organizational contexts reflects a broader shift towards innovative approaches in employee development and motivation. Such developments highlight the need for a robust theoretical foundation, which is addressed by the first research question (RQ1). This question explores the extant literature concerning the fundamental theories and game elements to elucidate the theoretical foundations that underpin the utilization of these tools in a business context. The theoretical framework under review encompasses Self-Determination Theory, which emphasizes the role of autonomy, competence, and social connection in motivating individuals; Flow Theory, which describes the state of immersion achieved through the balance of skills and challenges; Goal-Setting Theory, which asserts that specific and challenging goals lead to improved performance; and Gamified Learning Theory, which proposes that the integration of game elements should be aligned with learning objectives to optimize skill development and knowledge retention. Furthermore, the Technology Acceptance Model (TAM) and Human-Centered Design Theory (HCD) offer insights into technological acceptance and system personalization, both of which are crucial for the successful implementation of gamification in organizations.

In addressing the second research question (RQ2), this study examined how the adoption of gamification and serious games within organizations may influence both employee outcomes and overall organizational performance. The application of game-based activities has been demonstrated to have a positive impact on a variety of outcomes, including intrinsic motivation, engagement, knowledge retention, skill development, team dynamics, and socialization. However, to avoid undesirable outcomes such as superficial engagement, excessive rivalry, and increased stress levels these strategies must be thoughtfully planned and aligned with organizational objectives. The research also highlights challenges related to privacy and ethics, including risks associated with the publication of performance data and concerns over reward systems perceived as unfair. The final research question (RQ3) explores the implications of these methods for management practice, suggesting that organizations can integrate gamification into their training and development strategies, provided that game elements are aligned with business objectives and a balanced, healthy learning environment is maintained. To achieve these outcomes, the studies analyzed in this review emphasize the importance of adopting a holistic and strategic approach in organizations, whereby managers utilize gamification techniques and serious games with participatory design, focusing on the users and accommodating multiple perspectives. This approach facilitates the balance between effective risk management and the prevention of the introduction of new risks associated with gamified approaches.

Overall, the studies reviewed indicate that gamification and serious games may be utilized as engagement tools, motivational devices, training resources and performance improvement tools within organizational contexts. The primary objective of these approaches is to promote team involvement and transform business processes and tasks into more enjoyable activities. Nevertheless, any organization contemplating the implementation of a gamification strategy must, as a minimum, possess an understanding of the target audience it intends to reach, recognize the behaviours it seeks to modify, comprehend the motivational factors that influence this audience, and clearly define the objectives of utilizing these tools.

Another important point addressed in the studies relates to the challenges encountered between different generations and how this can impact employee acceptance and engagement with gamified activities. Demographic factors such as age, gender, and length of time in the company influence not only acceptance but also attitudes towards games and interaction in teamwork. Understanding the objectives and benefits of gamified activities for personal development and growth within the organization can influence the acceptance of these activities by all employee groups.

5. Limitations and future research

There are some limitations to the development of this study. Although we utilized four academic databases to search for studies, these databases are exclusively academic. We also applied exclusion criteria, such as the decision to include only articles published in peer-reviewed journals, to ensure the reliability of the results. However, these criteria excluded the inclusion of organizational or technical reports from companies or government agencies involved in public policies related to the implementation of these practices in companies. Another point to note is the heterogeneity of the studies. The authors chose to include both gamification and serious games studies in the review. However, the differences in methods and objectives among the studies analyzed may affect the direct comparison of the results.

The analysis of the presented studies allows for the identification of future directions for further exploration. The quantity of empirical evidence accumulated over the past decade that has been directly applied to business contexts remains relatively limited. Despite the growing body of literature on the topic in business, several gaps in understanding persist regarding its long-term effectiveness and broader impact across different industries and employee demographics. A significant proportion of the evidence base prioritizes education, with a particular focus on learning contexts in universities or schools. Obtaining long-term evidence on the effects of gamification in corporate training, particularly to ascertain whether these effects are sustainable and to determine if positive outcomes can be measured in employees who utilize gamified systems and serious games.

Therefore, further investigation into the influence of culture is warranted, given the growing prevalence of a multigenerational workforce in the modern workplace. In addition to cultural factors, generational differences also have a significant impact on the implementation of gamified environments. Considering the studies, it would be beneficial for future research to analyze disengaged players to understand the reasons behind their abandonment of the games. It would also be advantageous to include data on employees or companies that have ceased using gamified systems due to negative experiences.

Moreover, future research should strategically leverage the expanding capabilities of novel technological advancements, including artificial intelligence (AI) tools, not only to optimize user experience but also to significantly enhance system usability, adaptability, and personalization in diverse organizational contexts. These technologies hold considerable potential for the development of games and gamified activities, offering organizations cost-effective solutions for advancing training initiatives and professional development.

6. Conclusion

This systematic literature review presents an analysis of 56 studies published between 2014 and 2024 that examine the application of gamification and serious games within organizational contexts, specifically in business training and organizational learning. This research employed the PRISMA methodology to ensure transparency and rigour throughout the review process. Of these studies, 38 are empirical and were further appraised using the MMAT tool, with 63.2% achieving the maximum quality score of 5/5, reinforcing the credibility of the evidence analyzed. In addition to the quality appraisal, this review included a bibliometric analysis to identify the most influential authors, institutions, journals, and countries that have contributed to this field.

The collaboration network analysis revealed the global and multidisciplinary nature of this research area, with studies conducted across all five continents. Moreover, the studies were examined across different sectors, providing valuable insights into how gamification and serious games are applied in different fields such as healthcare, IT, human resources, and marketing. This sectoral perspective enriches the

understanding of how these strategies are tailored to distinct organizational environments. The chronological analysis of the literature highlighted how different perspectives, and thematic priorities have emerged over the past decade. Importantly, emphasizes in this review that while gamification and serious games have demonstrated positive effects on engagement, knowledge retention, and employee motivation, their success is contingent upon thoughtful alignment with organizational objectives and user characteristics. Risks such as disengagement, excessive competition, and ethical concerns about performance data and reward systems require careful consideration in future implementations.

This systematic review stands out for its broad scope and comprehensive coverage, combined with the detailed integration of bibliometric and thematic analyses specifically applied to the context of corporate training. Although a substantial body of research has examined game-based approaches, a large share of these studies remains concentrated within the educational domain. Only a limited number of reviews provide a comprehensive and longitudinal analysis, covering an entire decade of studies with a clear emphasis on practical applications within corporate environments. Moreover, by addressing both theoretical and practical outcomes, this review offers valuable insights for both academic and professional audiences.

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Informed consent

The authors declare that informed consent was not required as there were no human participants involved.

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