



DOI: <https://doi.org/10.38035/dijemss.v6i6>
<https://creativecommons.org/licenses/by/4.0/>

Gamification in Digital HR System: A Systematic Literature Review of Trends, Game Elements, and Audiences

Cahyo Prianto¹, Al Novianti Ramadhani Sulaksono²

¹Informatics Engineering, University of Logistics and International Business, Bandung, Indonesia, cahyo@ulbi.ac.id

²Informatics Engineering, University of Logistics and International Business, Bandung, Indonesia, ramadhanialnovianti@gmail.com

Corresponding Author: ramadhanialnovianti@gmail.com²

Abstract: This study presents a Systematic Literature Review (SLR) on the application of gamification in recruitment and job training. Using the PRISMA method and a literature management platform for automated filtering and thematic grouping, 41 Scopus-indexed studies published between 2020 and 2025 were analyzed. The findings show a steady increase in research activity, with notable peaks in 2020 and 2024, and most studies originating from the United States and Europe. Points, Badges, and Leaderboards (PBL) remain the most frequently applied game elements, often combined with feedback, avatars, narrative components, challenges, and progress bars to enhance engagement and learning outcomes. Gamified e-learning platforms were the most common form of implementation, followed by serious games, mobile applications, and generic HR dashboards. Most studies (85.4%) targeted existing employees, while only 7.3% focused on recruitment, indicating a significant opportunity for broader application in this area. As a key contribution, this study proposes a three-dimensional taxonomy of gamification in HR systems, categorized by platform type, game element depth, and user segmentation. This taxonomy provides a structured framework for aligning gamification strategies with organizational objectives and user profiles. The review also identifies an emerging shift toward personalized and narrative-driven gamification designs, moving beyond conventional PBL-focused approaches.

Keywords: Digital Learning, Employee Motivation, Game Mechanics, Human Resource Development, Systematic Review.

INTRODUCTION

Recruitment and employee training are two core functions of human resource management that directly influence organizational performance and competitiveness. Effective recruitment ensures the acquisition of candidates with the right competencies, while structured training supports continuous skill development and long-term employee engagement (Obaid et al., 2020). The integration of these functions contributes to improving productivity, efficiency, and retention rates in an increasingly digitalized workplace (Kapp et al., 2020). However, traditional methods such as classroom-based training, written tests, and structured interviews

often fail to provide engaging learning experiences or meaningful recruitment interactions. These approaches tend to result in low participation rates, limited engagement, and higher operational costs (Iacono et al., 2020). In recruitment contexts, the absence of interactive assessment methods can also reduce candidate enthusiasm and may not accurately measure essential competencies (Leutner et al., 2023).

Gamification, defined as the application of game elements in non-game contexts, offers a promising alternative to address these challenges (Bitrián et al., 2023). Empirical studies have shown that incorporating elements such as points, badges, leaderboards (PBL), feedback, and narratives can improve user motivation, task completion rates, and overall satisfaction (Silic et al., 2020). For instance, a year-long implementation of gamified training in the retail sector increased employee login frequency by nearly 50% and improved voluntary training participation and quiz accuracy (Kapp et al., 2020). In recruitment, large-scale trials of game-based assessments have reported higher predictive validity and candidate satisfaction compared to traditional selection methods (Leutner et al., 2023). Despite these benefits, the application of gamification in recruitment remains limited compared to its adoption in training (Bitrián et al., 2023). Most existing studies focus on enhancing internal workforce capabilities rather than improving candidate selection processes. This imbalance suggests an opportunity for deeper exploration into the design, implementation, and evaluation of gamification in both domains.

Based on this context, the present study conducts a Systematic Literature Review (SLR) of peer-reviewed articles published between 2020 and 2025. Using the PRISMA method and a literature management tool for automated filtering and thematic grouping, the review identifies research trends, common game elements, implementation types, target user groups, and the comparative focus between recruitment and training. The results not only map the current state of gamification in human resource systems but also propose a three dimensional taxonomy structured by platform type, game element depth, and user segmentation that aligns gamification strategies with organizational objectives and user needs.

METHOD

The methodology of this study followed the Systematic Literature Review (SLR) approach with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Fadillah A. R., 2024). The Watase Uake tool was utilized to identify and manage articles indexed in the Scopus database (Q1–Q4), providing automated filtering and thematic grouping relevant to gamification in recruitment and training. Watase Uake was selected due to its proven efficiency in systematic review workflows (Fadlillah et al., 2024). The process of article identification, selection and inclusion is depicted in the PRISMA diagram shown in Figure 1.



Figure 1. Literature Review Methodology

Determination of Research Questions and Objectives

The first step in conducting this SLR was the formulation of research questions (RQs) to ensure that the literature search and data analysis process was purposeful and relevant. Five questions were formulated in this research to address the main aspects of the gamification phenomenon in recruitment and training processes presented in Table 1. The objectives of each question were aligned to provide an in-depth mapping of the trends, design and impact of gamification in the field of human resources.

Table 1. Research Question

Qs	Question	Objective
RQ1	How will gamification research trends in recruitment and job training evolve from 2020-2025?	Identify the annual growth and publication patterns in gamification studies for recruitment and job training.
RQ2	What are the most common game elements used to motivate job candidates in gamification solutions?	Classify the most frequently used game elements in the context of training and recruitment.
RQ3	How are game elements implemented in gamification applications for job recruitment and training?	Analyze the forms of gamification implementation, including platform types.
RQ4	Who are the target users focused on in studies of gamification for recruitment and job training?	Identify the user groups to focus on, such as new employees, permanent company employees, or general audiences.
RQ5	How many studies focus on job training compared to job recruitment in the application of gamification?	Comparing the proportion of studies that look at training and those that look at recruitment, and revealing trends in focus.

Literature Search and Selection Strategy

The initial analysis with Watase Uake yielded five main keywords that reflect the technical and functional dimensions of gamification in human resource management, particularly in the context of employee recruitment and training. Details of the keywords and the number of articles found are presented in Table 2.

Table 2. Article search keywords with Watase Uake Software

No	Keyword	Quantity (Watase Uake)
1	Gamification Recruitment	82 articles
2	Gamification Employee Training	67 articles
3	Gamification Human Resource Development	80 articles
4	Gamification Workplace Learning	44 articles
5	Gamification Employee Engagement	95 articles
Total		368 articles

Next, the articles collected through the initial identification process were screened based on inclusion and exclusion criteria to ensure that only relevant and high-quality articles were analyzed further. This process included screening based on publication type, year of publication, journal indexing, language of writing, and topic relevance to the research focus. The inclusion and exclusion criteria are presented in Table 3.

Table 3. Sorting Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Peer-reviewed journal articles	Book chapters, proceedings, editorial notes, and review articles
Articles published between 2020–2025	Articles published before 2020
Articles indexed in Scopus (Q1–Q4)	Articles not indexed in Scopus Q1–Q4
Studies discussing gamification in the context of job training or employee recruitment	Studies not focusing on gamification, or not in the context of recruitment or training
Articles written in English or Bahasa Indonesia	Articles written in other languages

The search procedure yielded 368 initial articles. The first stage, the identification process, eliminated 45 duplicate articles, 76 articles marked as irrelevant by the automated system, and 20 articles that did not meet the publication quality criteria (non-Q1–Q4), as well as one article that did not have an abstract. After the initial screening, 226 articles were screened based on abstracts and titles, which were then further selected to produce 143 articles included in the retrieval stage. Of these, 102 articles could not be retrieved in full text, and 83 articles

were excluded for failing to meet content criteria. Finally, 41 articles were classified as suitable for comprehensive review and used as the basis for analysis in this study. The entire process is illustrated in the flowchart shown in Figure 2.

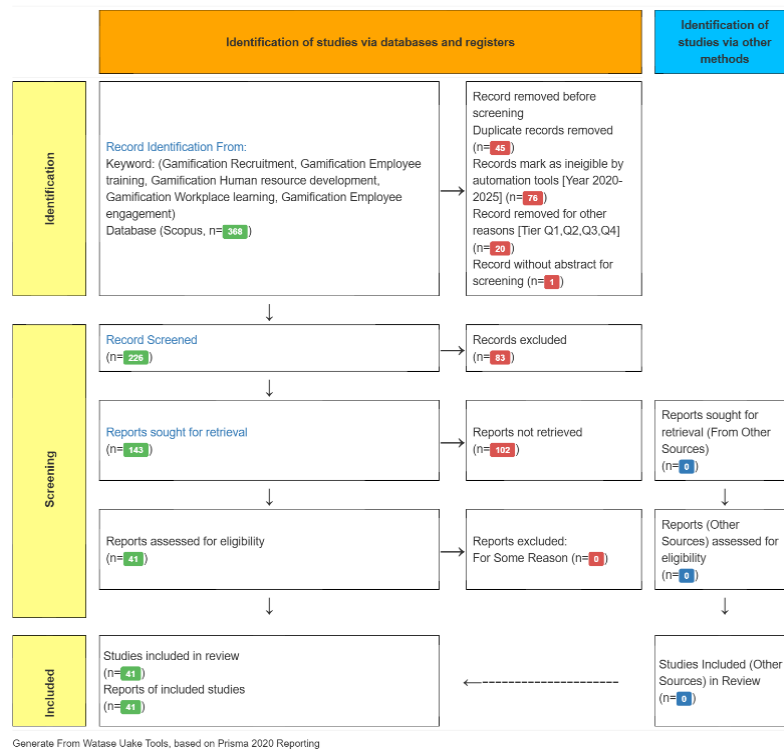


Figure 2. PRISMA Flowchart

Data Extraction

The data extraction was carried out systematically by collecting key information from each selected article, including publication year, authorship, journal, and research method. Key variables such as gamification implementation, game elements used, and user targets were identified. The data were then categorized according to the five research questions (RQ1–RQ5) to enable structured synthesis and inform the development of a taxonomic model for gamified HR systems.

Data Analysis and Synthesis of Findings

The extracted data were analyzed based on RQ1 to RQ5. RQ1 explored temporal trends by grouping articles by publication year. RQ2 analyzed the frequency of game elements used. RQ3 synthesized the context and issues addressed in implementations. RQ4 identified target user profiles, and RQ5 compared the focus on training versus recruitment. The findings were presented through tables and graphs to provide a comprehensive understanding of gamification adoption and impact in HR development.

RESULT AND DISCUSSION

This section presents the synthesis and analysis of the systematically reviewed articles, along with a summary of the key findings. The results are organized according to the predefined research questions, supported by descriptive statistics, visual representations, and thematic insights derived from the reviewed studies.

Result

A total of 13 articles were published in 2020, followed by 3 in 2021, 8 in 2022, 6 in 2023, 9 in 2024, and 2 in 2025. All included articles were analyzed and their data extracted to support the synthesis of this study's findings, as shown in Figure 3.



Figure 3. Distribution of articles by year

The United States contributed 10 articles, followed by Germany with 7, India and Italy with 5 each, and Pakistan and Sweden with 3 each. This distribution suggests that gamification in recruitment and job training has gained significant global attention, particularly in North America and Europe, as shown in Figure 4.

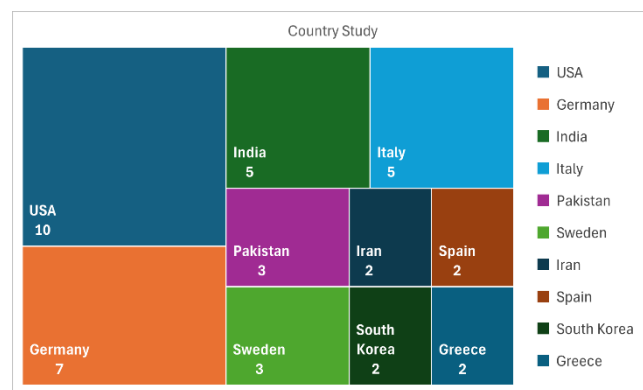


Figure 4. Distribution of articles by country

Points were the most frequently used game element (25 articles), followed by Badges and Leaderboards (24 articles each). These results indicate that classical PBL elements remain the core of gamification design, supported by other elements that enhance engagement and provide real-time feedback, as shown in Figure 5.

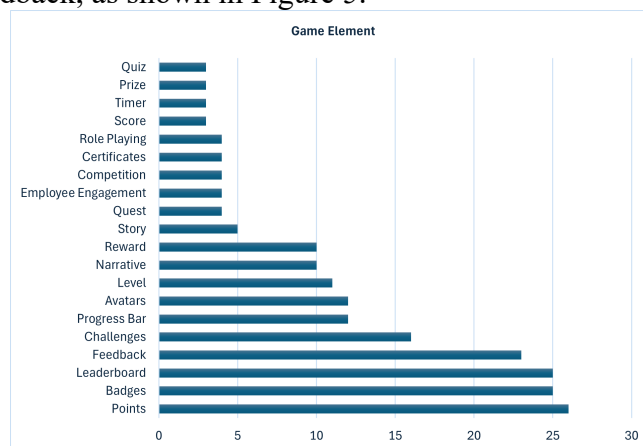


Figure 5. Various implementations of game elements in articles

The majority of studies 26.8% implemented gamification through E-learning Systems, followed by Generic Implementations 24.4% and Serious Games or Simulations 14.6%, indicating a strong preference for structured digital training approaches. In terms of user focus, 85.4% of the articles targeted existing employees, while only 7.3% addressed new employees and another 7.3% addressed the general public, highlighting the dominance of internal training applications. Regarding research orientation, 65.9% of the studies focused on job training, 26.8% had a general scope, and only 7.3% specifically addressed recruitment, as shown in Figure 6.

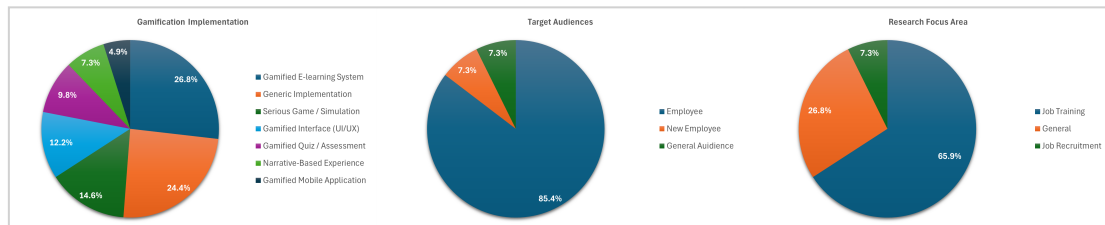


Figure 6. Gamification implementation types, target audiences, and research focus areas

The most common forms of gamification implementation are Gamified E-learning Systems with 11 studies, Generic Implementation with 10 studies, and Serious Games or Simulations with 6 studies. These findings highlight gamified e-learning as the primary choice for digital training development in the workplace, as shown in Table 4.

Table 4. Type of gamification implementation

Type	General	Job Recruitment	Job Training	Count
Gamified E-learning System			(Eger et al., 2024), (Capatina et al., 2024), (Chen et al., 2023), (Bitrián et al., 2023), (Palmquist, 2023b), (Hamza & Tóvölgyi, 2023), (Romero-Gazquez et al., 2022), (Kulkarni et al., 2022), (Kapp et al., 2020), (Obaid et al., 2020), (Vanduhe et al., 2020)	11
Gamified Interface (UI/UX)	(Putranti et al., 2024), (Suh et al., 2022), (Silic et al., 2020)		(Lithoxidou et al., 2020), (Passalacqua et al., 2020)	5
Gamified Mobile Application			(Palmquist, 2023a), (Benitez et al., 2022)	2
Gamified Quiz / Assessment		(Magdalenic & Lusic, 2025), (Leutner et al., 2023), (Gkorezis et al., 2021)	(Friess, 2025)	4
Generic Implementation	(Ribeiro et al., 2024), (Sam-Epelle et al., 2022), (Behl et al., 2021), (Oxarart & Houghton, 2021), (Mitchell et al., 2020)		(Magioli Sereno & Ang, 2024), (Mohanty & Christopher B, 2024), (Torresan & Hinterhuber, 2023), (Ruggiu et al., 2022), (Fathian et al., 2020)	10
Narrative-Based Experience	(Grobbelaar & Alsemgeest, 2024)		(Dincelli & Chengalur-Smith, 2020), (Iacono et al., 2020)	3

Type	General	Job Recruitment	Job Training	Count
Serious Game Simulation	(Pirta-Dreimane et al., 2024), (Noorbehbahani & Salehi, 2021)		(Haj-Bolouri et al., 2024), (Polyanska et al., 2022), (Vigoroso et al., 2021), (Van der Heijden et al., 2020)	6

The most commonly used methods were experiments and surveys with 12 studies each, followed by systematic reviews with 8 studies and case studies with 7 studies. Most studies employed a quantitative approach, followed by qualitative and mixed methods, indicating a predominant focus on empirically measuring the impact of gamification, as shown in Table 5.

Table 5. Distribution of research methods used in articles

Research Method	Mixed Methods	Qualitative	Quantitative	Count
Case Study	(Haj-Bolouri et al., 2024), (Pirta-Dreimane et al., 2024), (Hamza & al., 2020), (Tóvölgyi, 2023)	(Ribeiro et al., 2024), (Van der Heijden et al., 2020), (Iacono et al., 2020)	(Polyanska et al., 2022)	7
Ethnography		(Palmquist, 2023a)		1
Experiment			(Friess, 2025), (Eger et al., 2024), (Leutner et al., 2023), (Chen et al., 2023), (Kapp et al., 2020), (Noorbehbahani & Salehi, 2021), (Lithoxoidou et al., 2020), (Silic et al., 2020), (Vanduhe et al., 2020), (Passalacqua et al., 2020), (Dincelli & Chengalur-Smith, 2020), (Gkorezis et al., 2021)	12
Interviews		(Magdalenic & Luić, 2025)		1
Survey	(Palmquist, 2023b), (Fathian et al., 2020)		(Putranti et al., 2024), (Magioli Sereno & Ang, 2024), (Capatina et al., 2024), (Bitrián et al., 2023), (Kulkarni et al., 2022), (Romero-Gazquez et al., 2022), (Suh et al., 2022), (Benitez et al., 2022), (Behl et al., 2021), (Mitchell et al., 2020)	12
Systematic Review	(Mohanty Christopher 2024)	& (Grobbelaar B, Alsemgeest, 2024), (Torresan & Hinterhuber, 2023), (Sam-Epelle et al., 2022), (Ruggiu et al., 2022), (Oxarart & Houghton, 2021), (Vigoroso et al., 2021), (Obaid et al., 2020)		8

Discussions

Research Trends in Gamification for Recruitment and Training (RQ1)

The analysis of publication trends from 2020 to 2025 shows a consistent increase in scholarly attention toward gamification in human resource contexts, with notable peaks in 2020 and 2024. This growth reflects the acceleration of digital transformation in HR practices triggered by the COVID-19 pandemic, as organizations sought innovative ways to maintain workforce engagement in remote and hybrid environments. The dominance of research output from the United States and European countries highlights the advantage of mature digital infrastructures and greater investment in HR technology innovation. However, this geographic concentration signals a gap in cross-cultural research, which is essential to understanding the adaptability of gamification strategies in regions with different levels of technological readiness.

Game Elements Used (RQ2)

The predominance of Points, Badges, and Leaderboards (PBL) across studies confirms their established role as effective extrinsic motivators in gamification design. The frequent integration of feedback systems, challenges, narrative components, avatars, and progress bars shows a strategic shift toward incorporating intrinsic motivators. This evolution aligns with Self Determination Theory, which emphasizes competence (reinforced through feedback and challenges), autonomy (supported by interactive choices), and relatedness (enhanced through shared narratives and role-play). By combining PBL with narrative-driven and feedback-rich mechanics, designers can sustain engagement over longer periods while fostering deeper emotional connections between users and the learning or recruitment process.

Implementation in Applications and Platforms (RQ3)

Gamified e-learning platforms emerged as the most widely adopted implementation type, followed by generic HR dashboards and serious games. The preference for e-learning systems can be attributed to their scalability, cost efficiency, and compatibility with existing Learning Management Systems. Serious games and simulations, while offering immersive and context-specific training experiences, are less prevalent due to higher development costs and longer implementation timelines. The choice of platform is closely linked to the type of game elements used and the measurable outcomes desired, underscoring the importance of aligning technology selection with organizational goals and the target audience's learning preferences.

Target User Profile (RQ4)

The strong focus on internal employees, representing 85.4% of the reviewed studies, suggests that gamification is primarily used for continuous professional development, performance improvement, and skills retention. This preference for internal training may stem from the lower risk and more controlled implementation environment compared to recruitment settings. However, the limited use of gamification in recruitment represents a missed opportunity. From a human capital theory perspective, gamifying recruitment can enhance employer branding, attract high quality talent, and improve candidate experience, ultimately reducing long term training costs. The challenge lies in addressing concerns over fairness, psychometric validity, and integration with applicant tracking systems.

Focus of Training and Recruitment Studies (RQ5)

The finding that 65.9% of studies emphasize training, compared to only 7.3% focusing on recruitment, highlights the perception that gamification is more suitable for structured learning environments. Recruitment processes often carry higher stakes, requiring rigorous assessment validity and compliance with hiring regulations. However, the growing empirical support for game based assessments, showing high predictive validity and positive candidate

perceptions, suggests untapped potential in this area. By integrating gamification into recruitment workflows, organizations can address candidate disengagement, improve the quality of hires, and modernize their talent acquisition strategies.

CONCLUSION

This Systematic Literature Review (SLR) analyzed 41 Scopus-indexed studies published between 2020 and 2025 on the application of gamification in recruitment and job training. The findings reveal that gamification is predominantly applied to internal employee training, with limited adoption in recruitment processes. Points, Badges, and Leaderboards (PBL) remain the most widely used game elements, increasingly complemented by feedback systems, challenges, narratives, avatars, and progress bars. This evolution reflects a shift toward balanced designs that integrate extrinsic and intrinsic motivators, consistent with Self Determination Theory and Flow Theory. Gamified e-learning platforms are the most common implementation, favored for their scalability, cost efficiency, and integration with existing learning management systems. The primary focus on internal employees (85.4%) underscores the role of gamification in continuous skills development and performance improvement. Recruitment-oriented gamification, although underrepresented, demonstrates strong potential to enhance candidate engagement, employer branding, and selection accuracy.

Methodologically, most studies employ quantitative approaches, particularly experiments and surveys, to measure concrete impacts on engagement, performance, and satisfaction. The review's key contribution is a three-dimensional taxonomy organized by platform type, game element depth, and user segmentation which provides both a theoretical framework for academic research and a practical guide for HR practitioners to design targeted, adaptable gamification strategies. This review is limited to Scopus-indexed studies from 2020 to 2025, which may exclude earlier foundational works and emerging innovations from other sources. This limitation is important as it narrows the diversity of perspectives and may affect the generalizability of the findings. Future research should address this gap through longitudinal studies, cross-cultural comparisons, and the integration of adaptive technologies such as AI-driven personalization and real-time analytics to enhance the scalability, contextual relevance, and effectiveness of gamification in both recruitment and training.

REFERENCES

- Behl, A., Sheorey, P., Jain, K., Chavan, M., Jajodia, I., & Zhang, Z. (Justin). (2021). Gamifying the gig: transitioning the dark side to bright side of online engagement. *Australasian Journal of Information Systems*, 25, 1–34. <https://doi.org/10.3127/ajis.v25i0.2979>
- Benitez, J., Ruiz, L., & Popovic, A. (2022). Impact of mobile technology-enabled HR gamification on employee performance: An empirical investigation. *Information and Management*, 59(4). <https://doi.org/10.1016/j.im.2022.103647>
- Bitrián, P., Buil, I., Catalán, S., & Hatfield, S. (2023). The use of gamification strategies to enhance employees' attitudes towards e-training systems. *International Journal of Management Education*, 21(3). <https://doi.org/10.1016/j.ijme.2023.100892>
- Capatina, A., Juarez-Varon, D., Micu, A., & Micu, A. E. (2024). Leveling up in corporate training: Unveiling the power of gamification to enhance knowledge retention, knowledge sharing, and job performance. *Journal of Innovation and Knowledge*, 9(3). <https://doi.org/10.1016/j.jik.2024.100530>
- Chen, C. M., Ming-Chaun, L., & Kuo, C. P. (2023). A game-based learning system based on octalysis gamification framework to promote employees' Japanese learning. *Computers and Education*, 205. <https://doi.org/10.1016/j.compedu.2023.104899>
- Dincelli, E., & Chengalur-Smith, I. S. (2020). Choose your own training adventure: designing a gamified SETA artefact for improving information security and privacy through interactive storytelling. *European Journal of Information Systems*, 29(6), 669–687.

- <https://doi.org/10.1080/0960085X.2020.1797546>
- Eger, V. M., Georganta, E., Zuercher, P. D. J., Mueller, F., Bohné, T., & Diefenbach, S. (2024). The power of play: gamification in virtual workplace training. *European Journal of Work and Organizational Psychology*.
<https://doi.org/10.1080/1359432X.2024.2412360>
- Fadillah A. R., F. M. N. (2024). Systematic literature review: identifying key variables and measuring maximum loan limits. *Jurnal ELTIKOM*, 8(2), 100–110.
- Fadlillah, N., Abdullah, M., & Kusaeri, K. (2024). Exploring the Potential of Constructivist Pedagogical Approach in Strengthening Religious Moderation a Systematic Literature Review. *Scaffolding: Jurnal Pendidikan Islam Dan Multikulturalisme*, 6(1), 109–128.
<https://doi.org/10.37680/scaffolding.v6i1.4306>
- Fathian, M., Sharifi, H., & Nasirzadeh, E. (2020). Conceptualizing the Role of Gamification in Contemporary Enterprises. *IEEE Access*, 8, 220188–220204.
<https://doi.org/10.1109/ACCESS.2020.3043144>
- Friess, M. (2025). Gamification in virtual sales training: evidence from a field experiment. *Journal of Personal Selling and Sales Management*.
<https://doi.org/10.1080/08853134.2024.2431817>
- Gkorezis, P., Georgiou, K., Nikolaou, I., & Kyriazati, A. (2021). Gamified or traditional situational judgement test? A moderated mediation model of recommendation intentions via organizational attractiveness. *European Journal of Work and Organizational Psychology*, 30(2), 240–250.
<https://doi.org/10.1080/1359432X.2020.1746827>
- Grobbelaar, C., & Alsemgeest, L. (2024). Gamification as an Educational Tool for Retirement Planning. *Adult Learning*. <https://doi.org/10.1177/10451595241286913>
- Haj-Bolouri, A., Katende, J., & Rossi, M. (2024). Gamified immersive safety training in virtual reality: a mixed methods approach. *Journal of Workplace Learning*.
<https://doi.org/10.1108/JWL-01-2024-0008>
- Hamza, I., & Tóvölgyi, S. (2023). The Effect of Gamified E-learning on Employees' Engagement A Case Study of a Lebanese Bank. *Periodica Polytechnica Social and Management Sciences*, 31(1), 80–89. <https://doi.org/10.3311/PPso.19616>
- Iacono, S., Vallarino, M., & Vercelli, G. (2020). Gamification in corporate training to enhance engagement: An approach. *International Journal of Emerging Technologies in Learning*, 15(17), 69–84. <https://doi.org/10.3991/ijet.v15i17.14207>
- Kapp, K. M., Valtchanov, D., & Pastore, R. (2020). Enhancing motivation in workplace training with casual games: a twelve month field study of retail employees. *Educational Technology Research and Development*, 68(5), 2263–2284.
<https://doi.org/10.1007/s11423-020-09769-2>
- Kulkarni, P., Gokhale, P., Satish, Y. M., & Tigadi, B. (2022). An empirical study on the impact of learning theory on gamification-based training programs. *Organization Management Journal*, 19(5), 170–188. <https://doi.org/10.1108/OMJ-04-2021-1232>
- Leutner, F., Codreanu, S. C., Brink, S., & Bitsakis, T. (2023). Game based assessments of cognitive ability in recruitment: Validity, fairness and test-taking experience. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.942662>
- Lithoxoidou, E., Doumpoulakis, S., Tsakiris, A., Ziogou, C., Krinidis, S., Paliokas, I., Ioannidis, D., Votis, K., Voutetakis, S., Elmasllari, E., & Tzouvaras, D. (2020). A novel social gamified collaboration platform enriched with shop-floor data and feedback for the improvement of the productivity, safety and engagement in factories. *Computers and Industrial Engineering*, 139. <https://doi.org/10.1016/j.cie.2019.02.005>
- Magdaleníć, D., & Luić, L. (2025). Assessing the Impact of Digital Tools on the Recruitment Process Using the Design Thinking Methodology. *Administrative Sciences*, 15(4).
<https://doi.org/10.3390/admsci15040139>

- Magioli Sereno, M., & Ang, H. Bin. (2024). The impact of gamification on training, work engagement, and job satisfaction in banking. *International Journal of Training and Development*, 28(3), 362–384. <https://doi.org/10.1111/ijtd.12324>
- Mitchell, R., Schuster, L., & Jin, H. S. (2020). Gamification and the impact of extrinsic motivation on needs satisfaction: Making work fun? *Journal of Business Research*, 106, 323–330. <https://doi.org/10.1016/j.jbusres.2018.11.022>
- Mohanty, S., & Christopher B, P. (2024). The Role of Gamification Research in Human Resource Management: A PRISMA Analysis and Future Research Direction. In *SAGE Open* (Vol. 14, Issue 2). SAGE Publications Inc. <https://doi.org/10.1177/21582440241243154>
- Noorbehbahani, F., & Salehi, F. (2021). A serious game to extract Hofstede's cultural dimensions at the individual level. *User Modeling and User-Adapted Interaction*, 31(2), 225–259. <https://doi.org/10.1007/s11257-020-09280-6>
- Obaid, I., Farooq, M. S., & Abid, A. (2020). Gamification for Recruitment and Job Training: Model, Taxonomy, and Challenges. *IEEE Access*, 8, 65164–65178. <https://doi.org/10.1109/ACCESS.2020.2984178>
- Oxarart, R. A., & Houghton, J. D. (2021). A spoonful of sugar: Gamification as means for enhancing employee self-leadership and self-concordance at work. *Administrative Sciences*, 11(2). <https://doi.org/10.3390/admsci11020035>
- Palmquist, A. (2023a). Design Elements of Conflict: A Design Study of a Gamified Smartphone Application for Employee Onboarding. *Technology, Knowledge and Learning*, 28(3), 1133–1173. <https://doi.org/10.1007/s10758-023-09657-7>
- Palmquist, A. (2023b). Stakeholders' design preferences for instructional gamification. *Behaviour and Information Technology*. <https://doi.org/10.1080/0144929X.2023.2255905>
- Passalacqua, M., Léger, P. M., Nacke, L. E., Fredette, M., Labonté-Lemoyne, É., Lin, X., Caprioli, T., & Sénécal, S. (2020). Playing in the backstore: interface gamification increases warehousing workforce engagement. *Industrial Management and Data Systems*, 120(7), 1309–1330. <https://doi.org/10.1108/IMDS-08-2019-0458>
- Pirta-Dreimane, R., Brilingaitė, A., Roponena, E., Parish, K., Grabis, J., Lugo, R. G., & Bonders, M. (2024). Try to esCAPE from Cybersecurity Incidents! A Technology-Enhanced Educational Approach. *Technology, Knowledge and Learning*. <https://doi.org/10.1007/s10758-024-09769-8>
- Polyanska, A., Andriiovych, M., Generowicz, N., Kulczycka, J., & Psyuk, V. (2022). Gamification as an Improvement Tool for HR Management in the Energy Industry—A Case Study of the Ukrainian Market. *Energies*, 15(4). <https://doi.org/10.3390/en15041344>
- Putranti, H. R. D., Retnowati, R., Sihombing, A. A., & Danang, D. (2024). Performance Assessment through Work Gamification: Investigating Engagement. *South African Journal of Business Management*, 55(1). <https://doi.org/10.4102/sajbm.v55i1.4287>
- Ribeiro, C., Fernandes, I., & Portela, F. (2024). Toward an Enterprise Gamification System to Motivate Human Resources in IT Companies. *Information (Switzerland)*, 15(1). <https://doi.org/10.3390/info15010026>
- Romero-Gazquez, J. L., Canavate-Cruzado, G., & Bueno-Delgado, M. V. (2022). IN4WOOD: A Successful European Training Action of Industry 4.0 for Academia and Business. *IEEE Transactions on Education*, 65(2), 200–209. <https://doi.org/10.1109/TE.2021.3111696>
- Ruggiu, D., Blok, V., Coenen, C., Kalloniatis, C., Kitsiou, A., Mavroeidi, A. G., Milani, S., & Sitzia, A. (2022). Responsible innovation at work: gamification, public engagement, and privacy by design. *Journal of Responsible Innovation*, 9(3), 315–343. <https://doi.org/10.1080/23299460.2022.2076985>

- Sam-Epelle, I., Olayinka, O., & Jones, P. (2022). The Evolution of Enterprise Gamification in the Digital Era and the Role of Value-Based Models. *Sustainability (Switzerland)*, *14*(15). <https://doi.org/10.3390/su14159251>
- Silic, M., Marzi, G., Caputo, A., & Bal, P. M. (2020). The effects of a gamified human resource management system on job satisfaction and engagement. *Human Resource Management Journal*, *30*(2), 260–277. <https://doi.org/10.1111/1748-8583.12272>
- Suh, A., Cheung, C. M. K., & Lin, Y. (2022). Meaningful engagement with a gamified knowledge management system: theoretical conceptualization and empirical validation. *Industrial Management and Data Systems*, *122*(5), 1355–1383. <https://doi.org/10.1108/IMDS-07-2021-0454>
- Torresan, S., & Hinterhuber, A. (2023). Continuous learning at work: the power of gamification. *Management Decision*, *61*(13), 386–412. <https://doi.org/10.1108/MD-12-2020-1669>
- Van der Heijden, B. I. J. M., Burgers, M. J., Kaan, A. M., Lamberts, B. F., Migchelbrink, K., Van den Ouweland, R. C. P. M., & Meijer, T. (2020). Gamification in Dutch Businesses: An Explorative Case Study. *SAGE Open*, *10*(4). <https://doi.org/10.1177/2158244020972371>
- Vanduhe, V. Z., Nat, M., & Hasan, H. F. (2020). Continuance Intentions to Use Gamification for Training in Higher Education: Integrating the Technology Acceptance Model (TAM), Social Motivation, and Task Technology Fit (TTF). *IEEE Access*, *8*, 21473–21484. <https://doi.org/10.1109/ACCESS.2020.2966179>
- Vigoroso, L., Caffaro, F., Cremasco, M. M., & Cavallo, E. (2021). Innovating occupational safety training: A scoping review on digital games and possible applications in agriculture. In *International Journal of Environmental Research and Public Health* (Vol. 18, Issue 4, pp. 1–23). MDPI AG. <https://doi.org/10.3390/ijerph18041868>