**Open Journal of Educational Development (OJED)**
**ISSN: 2734-2050**
**Article Details:**
DOI: 10.52417/ojed.v3i2.709
Article Ref. No.: OJED0502002-560
Volume: 5; Issue: 2, Pages: 13-32 (2022)
Accepted Date: 10th September, 2022


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**RESEARCH ARTICLE** **OJED0502002-560**

# ENHANCING ENGAGEMENT AND RETENTION IN REGULATORY TRAINING: A SYSTEMATIC REVIEW.

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## ABSTRACT

This systematic review investigates the use of gamification in Learning Management Systems (LMS) to enhance learner engagement and retention in regulatory training. Regulatory training is essential across industries like healthcare, finance, and manufacturing to ensure compliance with legal and safety standards, but it often suffers from low engagement and high dropout rates due to its mandatory and repetitive nature. By incorporating game design elements such as points, badges, and leaderboards, gamification aims to address these challenges. While previous research has shown the benefits of gamification, there remains a gap in understanding its long-term impact on compliance-driven contexts and the specific design strategies needed to promote deep learning over superficial participation. This study addresses these gaps by using a mixed-methods approach, combining quantitative data from pre-and post-training assessments and LMS analytics with qualitative insights from learner surveys. Findings indicate that gamification significantly improves engagement and regulatory knowledge retention, but careful design is crucial to ensure that the enhancements lead to meaningful learning rather than merely increased activity. Recommendations are provided for integrating gamification effectively into regulatory training to achieve sustained compliance and robust learning outcomes.

**Keywords:** *Gamification, Learning Management Systems (LMS), Regulatory Training, Learner Engagement, Retention, Compliance Training, Education Technology, Online Learning, Game Design Elements.*

## INTRODUCTION

In today's rapidly evolving and highly regulated industrial landscape, effective regulatory training is more critical than ever. It ensures that employees across various sectors—such as healthcare, finance, manufacturing, and construction—adhere to legal, safety, and industry-specific standards, thereby maintaining compliance and safeguarding public interests. However, despite its importance, regulatory training frequently encounters significant challenges, including low engagement and high dropout rates. This disengagement often stems from the mandatory and repetitive nature of the training, which can undermine the effectiveness of the programs and increase the risk of non-compliance (Gegenfurtner & Ebner, 2019).

Gamification, defined as the use of game design elements in non-game contexts, has emerged as a promising strategy to improve engagement and retention in regulatory training (Subhash & Cudney, 2018). By incorporating elements such as points, badges, and leaderboards, gamification aims to transform traditionally mundane learning experiences into engaging and motivational activities that encourage sustained participation and knowledge retention (Dichev & Dicheva, 2017). However, while gamification has shown general benefits, its long-term impact on compliance-driven training and the ability to foster deep learning remains less understood. There is also a risk that poorly designed gamification could lead to superficial participation without meaningful knowledge acquisition.

This study seeks to bridge these gaps by exploring how integrating gamified components into LMS platforms affects learner motivation, engagement, and the retention of regulatory knowledge. Using a mixed-methods approach, the research evaluates both short-term and long-term outcomes, drawing on quantitative data from pre- and post-training assessments, LMS analytics, and qualitative insights from learner feedback. The aim is to provide a nuanced understanding of how gamification can be strategically designed to achieve both compliance and meaningful learning outcomes, thereby enhancing the overall effectiveness of regulatory training programs.

## METHODOLOGY

The study used a mixed-methods approach to assess the effectiveness of gamification in regulatory training delivered through an LMS. Quantitative data was collected through pre- and post-training assessments to measure knowledge retention. Engagement levels were tracked using LMS analytics, focusing on metrics such as course completion rates, time spent on training modules, and the frequency of interactions with gamified elements. Additionally, qualitative data was gathered through learner surveys and interviews to gain deeper insights into participants' experiences with the gamified LMS.

### LITERATURE SEARCH STRATEGY

The literature search strategy employed for this study was designed to ensure a comprehensive and systematic review of existing research on the effectiveness of gamification in LMS for regulatory training. The search process was conducted across multiple academic databases, including but not limited to Google Scholar, IEEE Xplore, PubMed, Web of Science, and Scopus. These databases were selected to cover a broad range of disciplines, including educational technology, instructional design, and training in regulatory contexts.

## INCLUSION AND EXCLUSION CRITERIA

The literature search focused on peer-reviewed articles, conference papers, and academic theses published within the last six years to ensure the findings were both current and relevant. The search specifically targeted studies that examined the use of gamification in LMS for learners in regulatory or compliance training contexts. Only research that provided empirical data on engagement, retention, and learning outcomes resulting from gamified LMS implementations was considered.

Conversely, studies were only excluded if they did not focus on gamification, LMS, or regulatory training. Non-English language studies were also only excluded if a high-quality translation was not available. Additionally, studies lacking empirical data, such as opinion pieces or theoretical discussions without supporting evidence, were excluded.

## PRISMA FLOW DIAGRAM

A PRISMA flow diagram illustrated the study selection process. The diagram visually represented each review stage.

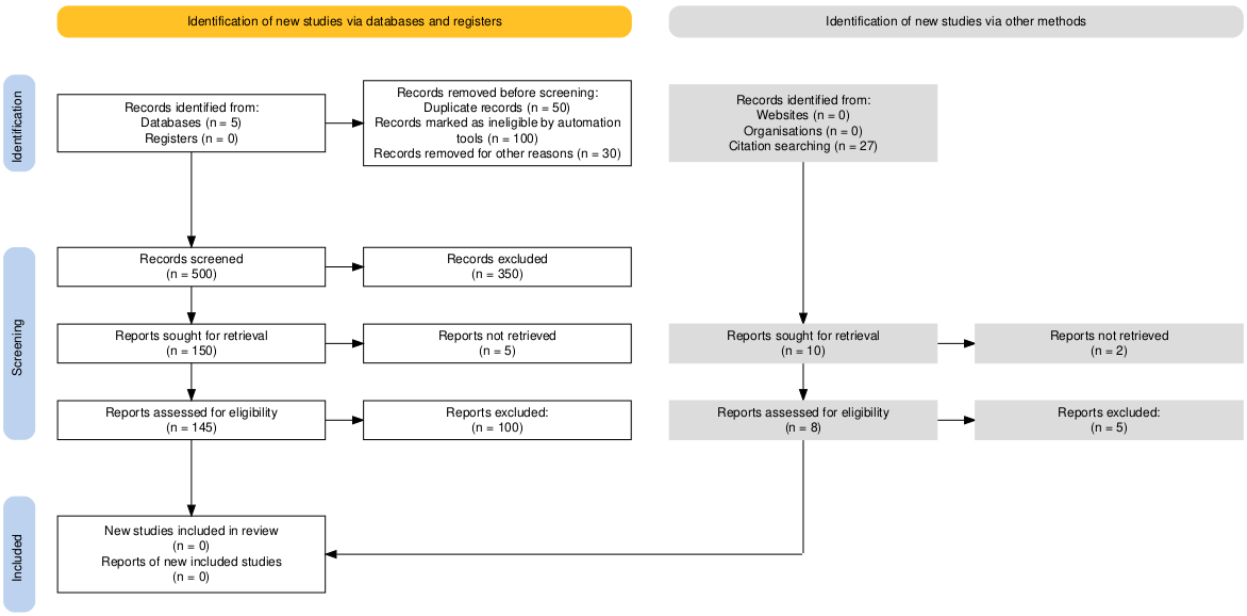


**Figure 1:** PRISMA flow diagram for the systematic review detailing the database searches as well as the number of articles screened.

## DATA EXTRACTION AND ANALYSIS

The chosen articles were carefully reviewed to gather and analyze data. Important details such as authors, publication year, research goals, study methods, main discoveries, and conclusions were collected, along with other relevant information about the utilization of gamification in regulatory training on LMS platforms. The collected data was structured and summarized to highlight common themes, trends, and patterns relating to the impact of gamification on learner engagement and retention.

A qualitative analysis of the literature was conducted to extract insights on the fundamental concepts, theoretical foundations, and empirical proof concerning gamification in regulatory training. This examination involved scrutinizing the studies to identify the advantages, consequences, obstacles, and contributing factors that influence

the effectiveness of gamification in these contexts. A thorough assessment of the literature was also carried out to ensure a comprehensive comprehension of the subject. This approach aimed to offer an in-depth analysis of the current status of gamification in regulatory training within LMS environments.

**QUALITY ASSESSMENT**

To ensure quality, each work is assessed using a standardized checklist. This checklist evaluates the rigor of research design, clarity of methodology, data analysis appropriateness, and findings' relevance to the current study. The final literature review includes only studies that meet these quality criteria.

**LIMITATIONS**

This study's methodology relied solely on a systematic review of published academic journal articles, which inherently limits the depth and breadth of available information. By focusing exclusively on published literature, the study may have missed important perspectives or emerging insights available in conference proceedings, grey literature, or unpublished research.

Another limitation is the lack of primary data collection. This study relied entirely on the methodologies, data, and interpretations presented in the selected journal articles, without gathering firsthand information from stakeholders such as learners, educators, or regulatory bodies. This restriction limits the ability to directly evaluate the effectiveness of gamification in regulatory training and to capture nuanced insights that might only emerge through direct interaction with participants.

The literature review process also introduces the potential for selection bias. The articles included in this study were chosen based on predetermined inclusion criteria, which, despite efforts to be objective and comprehensive, may have led to the unintentional omission of relevant studies. This could impact the breadth and representativeness of the research findings.

Time constraints posed another limitation to the literature review process, given the extensive body of research on gamification in LMS contexts. Consequently, some pertinent studies might have been excluded, leading to potential gaps in the reviewed literature.

Moreover, the generalizability of the findings may be limited. The reviewed studies were often conducted in specific industries, sectors, or LMS environments, each with unique regulatory requirements and technological contexts. As such, caution should be exercised when applying these findings to other industries or LMS platforms that may have different characteristics or requirements.

Lastly, this study did not explicitly address the ethical implications of implementing gamification in regulatory training. Ethical concerns such as data privacy, potential manipulative effects of gamification, and learner autonomy were not extensively covered in the reviewed literature. Future research should investigate these ethical considerations to ensure responsible and fair use of gamification in learning environments.

**THE IMPORTANCE OF REGULATORY TRAINING FOR INDUSTRY COMPLIANCE**

Regulatory training is essential for maintaining the integrity and safety of various industries, serving as the cornerstone for ensuring that employees and professionals operate within the bounds of legal, safety, and industry-specific standards.

In today's complex and highly regulated world, healthcare, finance, manufacturing, and construction industries face an ever-evolving landscape of rules and guidelines that govern their operations. Effective regulatory training programs are meticulously crafted to provide employees with the requisite knowledge and skills to ensure compliance with regulations. This serves to mitigate potential risks, avert legal repercussions, and cultivate a culture of adherence and safety (Mbonihankuye *et al.,* 2019; Azmi & Abdul Aziz, 2018)."

Despite its critical role, many organizations need help to create regulatory training programs that are both effective and engaging. Traditional methods, such as lectures and text-heavy materials, often need to capture learners' attention, leading to disengagement and poor retention of crucial information. This highlights the need for innovative training methods that enhance engagement and ensure that employees learn and effectively apply compliance knowledge in their daily responsibilities (Zaeem & Barber, 2020; Azmi & Abdul Aziz, 2018).

The scope of regulatory training is vast, covering various topics tailored to different industries' specific needs and risks. For example, in healthcare, as patient data handling is paramount; due to HIPAA regulations, there is a need for comprehensive regulatory training programs. These programs ensure that employees are well-versed in the legal and safety standards required to protect patient information and uphold industry integrity (Mbonihankuye *et al.,* 2019; Zaeem & Barber, 2020). In finance, programs often focus on anti-money laundering (AML) laws, data protection under GDPR, and ethical standards for financial transactions (Zaeem & Barber, 2020). Meanwhile, the manufacturing and construction industries prioritize training on occupational health and safety standards, environmental laws, and the proper handling of hazardous materials to prevent workplace accidents and ensure the well-being of employees (Azmi & Abdul Aziz, 2018).

These training programs are not merely optional; they are mandated by regulatory bodies and government agencies to ensure professionals are up to date with the latest regulations and best practices. Non-compliance with these requirements could potentially lead to significant consequences, including legal action, financial penalties, and reputational damage (Zaeem & Barber, 2020; Azmi & Abdul Aziz, 2018). Therefore, regulatory training is vital to protect employees and the broader public by ensuring that businesses operate within the confines of the law while maintaining high standards of safety and ethical conduct.

As regulations continue to evolve in response to new challenges and technological advancements, the need for comprehensive and up-to-date regulatory training has never been more critical. Recent studies emphasize the importance of real-time monitoring to detect and prevent non-compliance, revealing the severe consequences that can arise from regulatory breaches (Zaeem & Barber, 2020). This underscores the necessity of developing training programs that are not only informative but also engaging, ensuring that employees remain motivated to apply their knowledge in their daily roles.

## REGULATORY INSTRUCTIONAL METHODS AND CHALLENGES

In many industries, regulatory training has traditionally relied on conventional instructional methods such as lectures, slide presentations, and text-heavy materials. These approaches have long been the cornerstone of compliance education, designed to inform employees of essential legal, safety, and industry-specific standards. The goal is to ensure that all personnel, from frontline workers to top executives, have the necessary knowledge to operate within the regulatory frameworks governing their industries (Armstrong & Landers, 2018).

That notwithstanding, traditional methods often come with significant drawbacks. Lectures, typically the centerpiece of regulatory training, are one-directional, with instructors delivering information to passive learners. This approach emphasizes content delivery but often fails to engage learners meaningfully. While slide presentations can help summarize critical points, they become overwhelming when densely packed with text and complex information, making it difficult for learners to absorb and retain the material.

The reliance on static content, such as written manuals and documents, further compounds these issues. These materials often need more interactive elements to maintain learner interest, leading to a passive learning experience where engagement is minimal (Gegenfurtner & Ebner, 2019). The unique demands of regulatory training exacerbate the challenges posed by these traditional methods. The mandatory nature of this training often creates a sense of obligation rather than enthusiasm among learners. Employees may complete the training out of necessity, but their motivation to deeply engage with the material is frequently low. This can lead to superficial compliance, where learners do just enough to pass assessments without genuinely understanding or retaining the information.

One of the most significant challenges in regulatory training is the inherent complexity of the content. Regulations and standards often involve intricate legal texts, detailed safety protocols, and industry-specific practices that require deep understanding. When these complex topics are delivered through traditional, text-heavy instructional materials, the risk of cognitive overload is heightened. Cognitive overload occurs when the mental effort required to process and retain information exceeds the learner's cognitive capacity, leading to diminished retention and compromised compliance (Likourezos *et al.,* 2019).

Moreover, traditional training methods' static nature must accommodate the modern workforce's diverse learning styles and preferences. Today's employees are increasingly accustomed to interactive, multimedia-rich content in their daily lives, and they bring these expectations into the workplace. Traditional regulatory training methods, which lack interactivity and personalization, often fail to meet these expectations, resulting in disengagement and reduced effectiveness (Armstrong & Landers, 2018).

Organizations must shift from traditional, passive learning methods to more interactive and learner-centered approaches to address these challenges. Recent studies indicate that incorporating interactive elements and focusing on learner engagement can significantly improve the effectiveness of training programs. Interactive learning enhances engagement, promotes more profound understanding, and improves retention of complex regulatory content. It is important to consider that this approach may increase the likelihood of employees applying what they have learned in practical situations (Zainuddin & Perera, 2017).

## THE EMERGENCE OF LEARNING MANAGEMENT SYSTEMS (LMS)

LMS has significantly transformed corporate training by providing structured, scalable, and efficient training programs, including those necessary for regulatory compliance. Initially designed for academic environments, LMS platforms are widely adopted across various industries, such as healthcare, finance, and manufacturing, to manage and track employee training systematically. This ensures that employees have the necessary knowledge to adhere to industry regulations and standards, ultimately enhancing compliance and operational efficiency (Al-Fraihat *et al.,* 2020).

One of the primary strengths of LMS platforms lies in their ability to integrate multimedia content into training programs, including videos, animations, simulations, and interactive infographics, transforming what could otherwise be dry, text-heavy content into engaging, multi-sensory learning experiences. This is particularly important in regulatory training, where the material is often dense and complex. Research indicates that multimedia learning can significantly improve the retention and understanding of complex information by catering to different learning styles and providing contextually rich examples (Al-Fraihat *et al.,* 2020). For example, in industries like aviation and healthcare, simulations within an LMS can offer learners a safe environment to practice procedures or emergency responses, leading to better preparedness and adherence to safety regulations (Alshaikhi, 2019; Huun, 2018).

LMS platforms also stand out for their interactive modules, which include features such as quizzes, drag-and-drop activities, and scenario-based learning. These interactive features are designed to engage learners actively rather than passively consuming information, a common criticism of traditional training methods. Active engagement is crucial for effective learning, as it encourages learners to apply knowledge in simulated environments, receive immediate feedback, and correct errors in real time, reinforcing learning outcomes (Santana *et al.,* 2021).

LMS platforms' assessment and progress-tracking capabilities allow organizations to monitor learner performance and compliance in real-time. These tools provide insights into which employees have completed the required training and offer data on their understanding and retention of the material. Automated assessments—ranging from multiple-choice tests to complex problem-solving tasks—can effectively identify areas where learners may require additional support or where training materials may need adjustments to enhance comprehension (Md *et al.,* 2020).

A study by Juárez Santiago *et al.* (2020) further emphasizes the importance of LMS architecture and configuration in determining the system's effectiveness in supporting educational activities. The research highlights that well-designed LMS platforms incorporating robust software architecture and user-friendly interfaces can significantly enhance academic efficiency by improving access to learning resources and enabling better educational content management.

## CHALLENGES OF LMS IN REGULATORY TRAINING

Despite the numerous advantages of LMS platforms, significant challenges remain, particularly in regulatory training. One major issue is the risk of superficial engagement, where learners might only complete courses and assessments to meet mandatory requirements, but they might not fully engage with the content or retain the material long-term. This tendency towards "surface learning" is especially pronounced in mandatory regulatory

training, where the primary focus often becomes fulfilling the minimum requirements rather than genuinely understanding and internalizing the information (Baldwin *et al.,* 2017).

Compounding this issue is the "compliance mindset" that frequently accompanies mandatory training. When learners perceive regulatory training as just another task to check off their list, motivation to engage deeply with the material is often low. This lack of genuine engagement can lead to reduced retention and poor application of the training content, ultimately undermining the effectiveness of the entire training program.

A significant limitation of many LMS platforms is the need for more provision of personalized learning experiences. Research suggests that personalized learning, which adapts training content based on the learner's performance, interests, and job role, is associated with higher engagement levels and improved learning outcomes (Xie *et al.,* 2019). While some advanced LMS platforms incorporate adaptive learning technologies that customize content according to individual learner needs, most still adhere to a one-size-fits-all approach. This lack of personalization can result in disengagement, particularly among learners who fail to see the relevance of the training to their specific roles or encounter content that is either too challenging or insufficiently stimulating (Galaige & Torrisi-Steele, 2017).

Additionally, the effectiveness of LMS platforms is intricately linked to the quality of the training content they deliver. Even the most sophisticated LMS platforms cannot mitigate the negative impacts of poorly designed or outdated training materials. Engagement and retention will likely decrease if the content fails to resonate with learners or does not address their practical, real-world challenges. This highlights the critical need for continuous content development and thoughtful instructional design, ensuring that materials comply with regulatory standards and are engaging and relevant to the learners' daily responsibilities (Alhazmi *et al.,* 2021).

**THE EVOLUTION OF GAMIFICATION**

In recent years, the educational landscape has increasingly embraced innovative strategies to address the challenges of learner engagement and retention. One strategy that has gained considerable attention is gamification; while it might seem like a modern development, its roots can be traced back several decades, initially popularized in the early 2000s within the business sector as a tool to enhance customer engagement and loyalty through game-like incentives (Koivisto & Hamari, 2019).

Initially employed in marketing and consumer engagement, gamification proved highly effective in motivating behavior through extrinsic rewards. This success sparked interest in applying similar strategies to education, where educators and instructional designers began exploring its potential to tackle persistent challenges in teaching and learning, particularly around engagement and retention. The intention was to utilize the motivational power of games to cultivate more interactive and immersive learning experiences that could effectively capture and maintain students' attention (Koivisto & Hamari, 2019).

In educational settings, gamification has evolved into a powerful tool for transforming traditional learning environments by promoting a feeling of accomplishment, advancement, and healthy competition among learners by integrating game-design elements such as points, leaderboards, badges, and challenges into educational content; gamification effectively taps into intrinsic motivators like the desire for mastery, autonomy, and social

connection. Simultaneously, it offers extrinsic rewards to reinforce positive behaviors and outcomes. This dual approach motivates students to engage more deeply with the material and enhances their retention of the content over time, contributing to better learning outcomes (Dichev & Dicheva, 2017; Subhash & Cudney, 2018).

**IMPACT OF GAMIFICATION IN LEARNING OUTCOMES**

Gamification has garnered significant attention as a method to enhance learning outcomes across various educational settings. The findings of a thorough meta-analysis conducted by Sailer and Homner (2019) provide systematic insights into the impact of gamification on cognitive, motivational, and behavioral learning outcomes. The analysis suggests that gamification yields a modest yet noteworthy positive influence on these outcomes, indicating its promise as a valuable instructional approach.

Specifically, the meta-analysis found that gamification had the most substantial impact on cognitive learning outcomes, with a moderate effect size (g = .49, 95% CI [0.30, 0.69]). This suggests that integrating game-like elements, such as points, badges, and leaderboards, into learning environments can enhance learners' understanding and knowledge retention (Sailer & Homner, 2019). Moreover, including game fiction or narrative contexts was shown to moderate these effects, further enhancing cognitive outcomes when present.

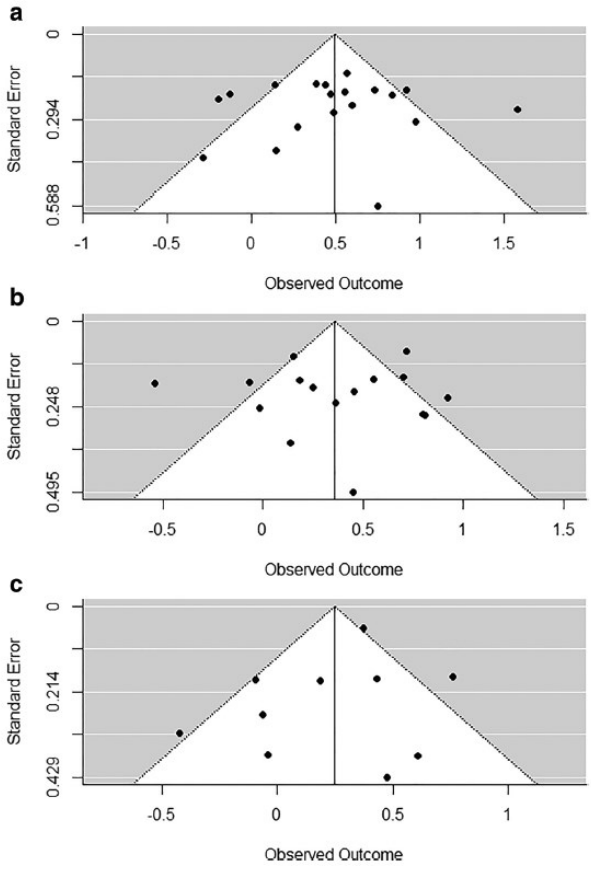


**Figure 2:** Funnel plot for cognitive (a), motivational (b), and behavioral (c) learning outcomes. Black dots indicate studies from the present sample positioned by their respective estimated effect size and standard error.

**Source:** Sailer & Homner (2019).

The study found that using gamification had positive effects on motivational outcomes, although to a slightly lesser extent (g = .36, 95% CI [0.18, 0.54]). It emphasized the importance of motivational factors in gamified learning environments, showing that competition and collaboration can significantly impact learner engagement. Interestingly, the meta-analysis revealed that environments combining competition and collaboration resulted in better motivational outcomes compared to environments with competition alone (Sailer & Homner, 2019).

The findings suggest that behavioral outcomes, encompassing practical skills and competencies, exhibited a slightly smaller effect size (g = .25, 95% CI [0.04, 0.46]), yet remained statistically significant. This indicates that gamification may positively impact learners' ability to apply acquired knowledge in real-world contexts. Notably, the effect was more pronounced when game fiction was integrated, implying that narrative elements could potentially enhance learners' contextualization and application of knowledge (Sailer & Homner, 2019).

This meta-analysis supports the argument that gamification is a promising approach to improving regulatory training outcomes within LMS. By fostering higher levels of cognitive understanding, motivation, and practical application, gamified elements can transform mandatory training sessions from mere compliance exercises into engaging and compelling learning experiences. The findings hold significant importance in regulatory training, as it is essential to sustain learner engagement to uphold and enforce compliance standards uniformly across various organizations.

Similarly, a comprehensive study by Mohamad *et al.* (2018) highlights pivotal game elements—such as points, badges, leaderboards, and rewards—that have been effectively integrated into diverse learning platforms, encompassing traditional classrooms, Massive Open Online Courses (MOOCs), and mobile learning applications (Md *et al.,* 2020).

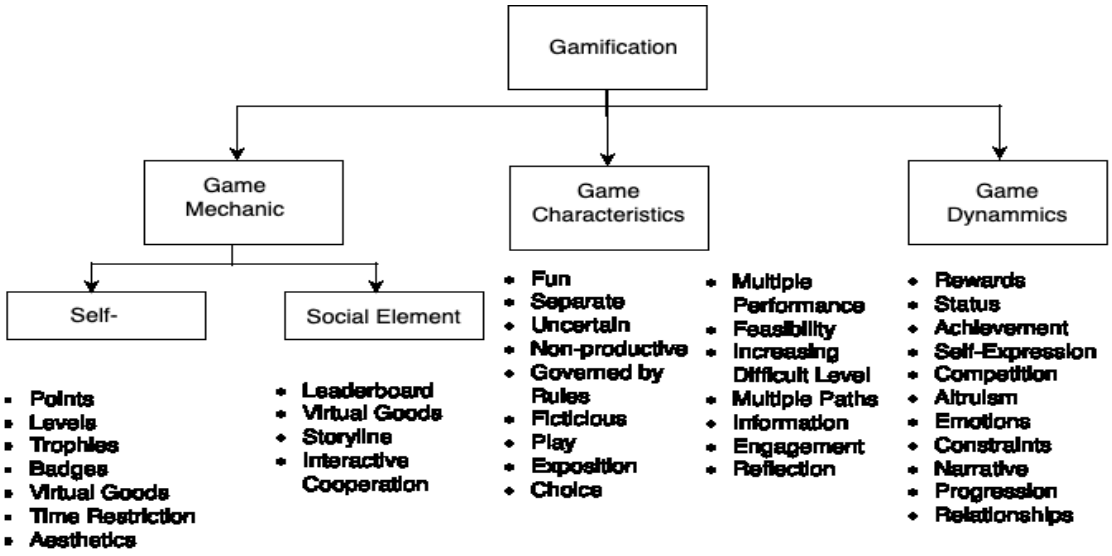


**Figure 3:** Gamification

**Source:** Mohamad *et al.* (2018)

The research emphasizes that gamification is especially effective in fostering a more interactive and engaging learning environment. For instance, the use of points and badges motivates learners to successfully complete tasks and cultivates a sense of accomplishment, thus resulting in sustained engagement over time (Mohamad *et al.,* 2018). In regulatory training scenarios, where content is frequently considered obligatory and repetitive, these elements have the potential to enhance the learning experience by injecting dynamism and providing rewards.

Moreover, the study discusses the application of gamification across different educational formats, such as blended learning and e-learning sites. It emphasizes that incorporating gamified elements into LMS can cater to diverse learning styles, enhancing overall learner engagement (Mohamad *et al.,* 2018). This is particularly relevant to regulatory training, where adapting to different learning preferences ensures that all participants remain engaged and retain critical information.

The results of this study highlight the significance of thoughtfully choosing and incorporating game elements to enhance learner engagement. As noted by Mohamad *et al.* (2018), the effectiveness of gamification in education heavily relies on the synchronization of game mechanics with educational goals. Hence, when incorporating gamification into regulatory training, it is crucial to guarantee that these elements not only encourage participation but also strengthen the learning outcomes essential for compliance and safety.

Gamification has emerged as a compelling LMS strategy to enrich student engagement and motivation, particularly in online and distance learning environments. Integrating game-like elements such as badges and progress bars within LMS platforms like Moodle has significantly influenced student behavior and learning outcomes. Bovermann *et al.* (2018) conducted a comprehensive mixed-methods case study to explore the implementation of a gamification concept in a Moodle-based LMS for a distance learning bachelor's program. The study findings indicated that the use of digital badges and progress bars positively contributed to students' motivation, with many students reporting heightened satisfaction and engagement due to these game elements.

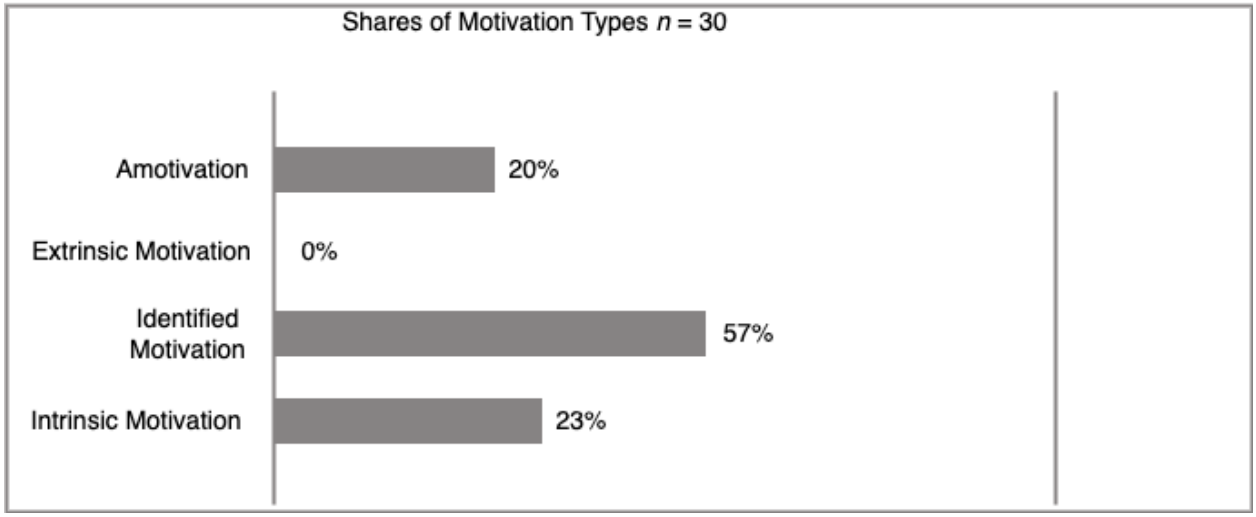


**Figure 4:** Shares of motivation types

**Source:** Bovermann *et al.* (2018)

The study identified a key benefit of gamification: it provides students with direct feedback on their progress, fostering a sense of achievement and mastery. Students valued the immediate recognition provided by badges, which were awarded upon completion of specific tasks or activities within the LMS (Bovermann *et al.,* 2018). This feedback motivated students, allowing them to track their progress and adjust their learning strategies accordingly.

The study also highlights some potential drawbacks of gamification in LMS. While many students found the gamified elements motivating, others experienced performance pressure and demotivation, particularly if they struggled to keep up with the progress indicators (Bovermann *et al.,* 2018). Additionally, some students preferred traditional learning methods and needed to find the gamification elements beneficial to their learning experience.

Despite these challenges, the findings suggest that gamification has the potential to effectively enhance student engagement and motivation in LMS environments, particularly when implemented thoughtfully. The study underscores the importance of considering individual learner differences and providing flexible gamification options to accommodate diverse learning needs.

The extensive literature on gamification strongly supports its effectiveness in educational contexts. Studies have consistently shown that when gamification is effectively integrated into LMS platforms, it significantly enhances learner motivation, engagement, and retention. For instance, Dichev and Dicheva (2017) emphasize that gamification significantly enhances the learning process by fostering active and dynamic engagement, thereby empowering students to assume greater responsibility for their educational journey.

**LONG-TERM IMPACT OF GAMIFICATION ON LEARNING OUTCOMES**

Research suggests that while gamification initially boosts engagement through the Novelty Effect, its long-term impact is better sustained through what is known as the Familiarization Effect. According to Rodrigues et al. (2022), the Familiarization Effect occurs when learners, after the initial excitement from gamification wears off, begin to integrate game elements into their regular learning behaviors. This period, typically starting between six and ten weeks after gamification is introduced, marks a phase where engagement levels stabilize and gradually increase as learners adapt to the game mechanics. During this phase, gamified elements like points, badges, and leaderboards begin to drive more meaningful and sustained interactions, thereby enhancing long-term learning outcomes.

Sailer and Homner (2019) note that the cognitive benefits of gamification, such as improved knowledge retention, are more pronounced when learners engage with gamified learning environments over an extended period. Their findings indicate that multiple, long-term sessions in gamified training can lead to significant improvements in learning outcomes, which is particularly relevant for regulatory training that requires ongoing engagement and continuous knowledge reinforcement. In such settings, gamification not only supports initial learning but also promotes the retention of regulatory knowledge and skills over time, addressing compliance needs effectively.

In work-related learning contexts like regulatory training, the emphasis often lies on behavioral outcomes such as compliance, skills mastery, and knowledge retention. Sailer and Homner's (2019) findings align with this focus, suggesting that gamification can drive long-term improvements in these areas by sustaining learner motivation and engagement throughout the training process.

Willig et al. (2021) propose three strategies to enhance the long-term impact of gamification: sustained engagement, competency attainment, and continuous improvement. They argue that well-designed gamified elements—such as leaderboards, badges, and rewards—can keep learners motivated over extended periods, which is crucial for maintaining high levels of engagement in long-term learning environments like regulatory training. Moreover, using gamification to measure competency in fields such as public health education provides valuable insights into both individual and program-wide learning outcomes, ensuring that learners not only comply with standards but also achieve lasting mastery of essential skills.

To support continuous improvement, Willig et al. (2021) emphasize the importance of using data collected from gamified learning experiences to make iterative enhancements to the training programs. This data-driven approach ensures that the gamification strategy evolves based on learner needs, helping to sustain engagement and improve learning outcomes over time. In regulatory training, such an approach can be used to track compliance trends, identify learning gaps, and adapt the gamified elements to better meet learners' requirements, thereby ensuring long-term competency and adherence to standards.

## CHALLENGES AND CONSIDERATIONS IN EFFECTIVE GAMIFICATION

While gamification can be a powerful tool for enhancing learning, its effectiveness is not without challenges. Huang and Hew (2018) warn that when gamified elements are poorly designed, they may lead to superficial learning, where learners prioritize earning points or badges overachieving meaningful educational outcomes. This underscores the importance of designing gamification strategies that go beyond surface-level engagement.

To prevent "gamification fatigue," where the novelty of game-like features fades and reduces learner interest, Goh & Yang (2020) emphasize the need for thoughtful design and ongoing updates to gamified content. Handayani, Raharjo, and Putra (2020) recommend regularly reviewing and refining gamified elements based on learner feedback to ensure they remain engaging and aligned with the intended learning objectives.

Additionally, technology plays a crucial role in the success of gamification. Chen et al. (2018) highlight the benefits of mobile-friendly platforms in educational settings, where learners need flexible access to content across different devices. However, Bradley (2020) points out that technological limitations, such as poor internet connectivity or outdated devices, can hinder the effectiveness of these platforms. Therefore, optimizing Learning Management Systems for diverse technological environments is essential to fully unlock the potential of gamification for boosting learner engagement and retention.

## STRATEGIC APPLICATION OF GAMIFICATION IN LEARNING

The strategic use of gamification in learning environments involves more than simply adding game-like features; it requires a thoughtful approach that aligns these elements with educational objectives to foster meaningful engagement and learning outcomes. To effectively implement gamification, educators and instructional designers

must consider several key strategies, including aligning game mechanics with learning goals, personalizing experiences, and balancing intrinsic and extrinsic motivation (Vlachopoulos & Makri, 2017; Böckle *et al.,* 2018).

One of the foundational principles for the strategic application of gamification is the alignment of game mechanics with learning outcomes. Elements such as points, badges, levels, and leaderboards need to be intentionally designed to support educational objectives rather than distract from them. For instance, badges can be used as markers of competency when learners master specific skills, while leaderboards may foster a sense of healthy competition that motivates students to participate actively (Subhash & Cudney, 2018). This alignment ensures that learners' actions within the gamified environment directly contribute to achieving learning goals, creating a purposeful experience rather than superficial entertainment (Dichev & Dicheva, 2017).

The Design Framework for Adaptive Gamification proposed by Böckle *et al.* (2018) provides a comprehensive structure for aligning gamified elements with learning outcomes in a way that adapts to the needs of individual learners. The framework emphasizes the importance of user-centered design, focusing on the adaptivity of game mechanics to cater to different user profiles and learning contexts. This approach supports personalized learning by ensuring that the gamified elements are flexible enough to respond to diverse learner needs and motivations.

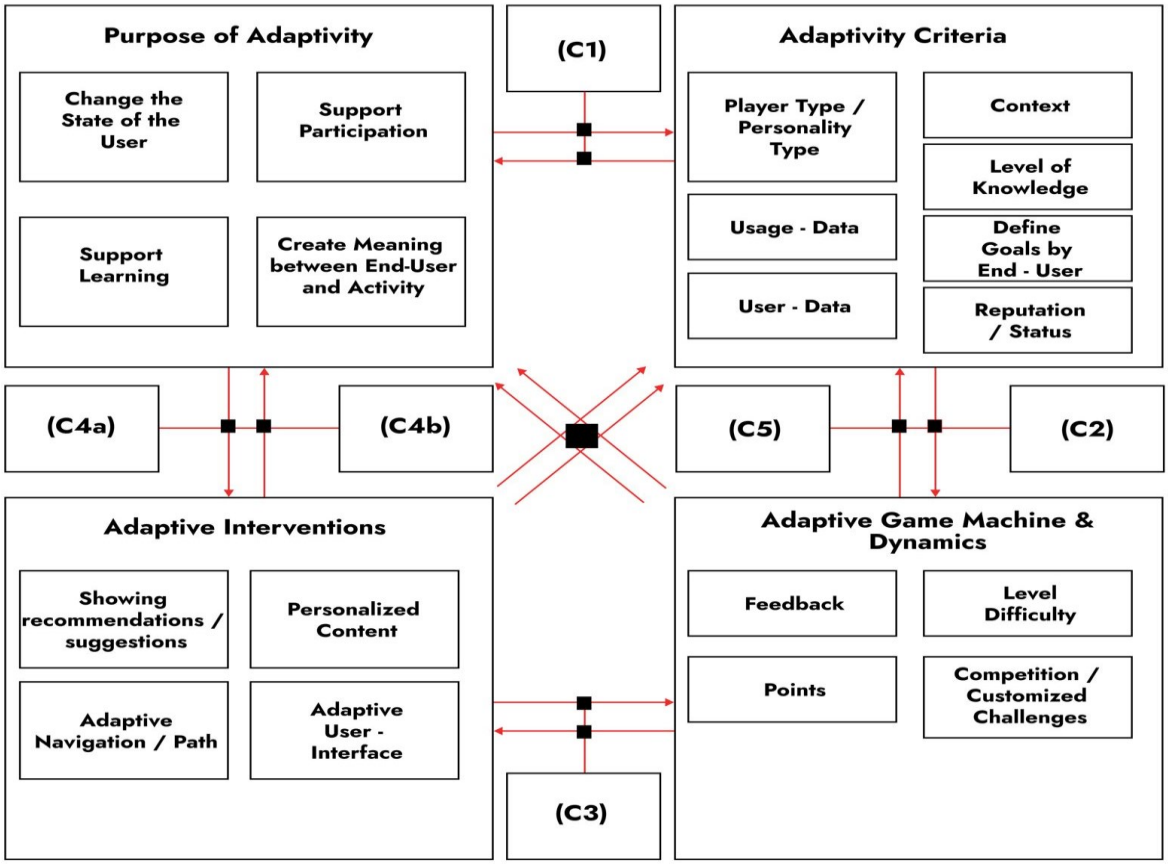


**Figure 5**: Design Framework for Adaptive Gamification

**Source:** (Böckle *et al.,* 2018)

Personalization is another critical strategy in the effective application of gamification. Not all learners are motivated by the same rewards or challenges, and recognizing this variability is essential to fostering deeper engagement. Adaptive gamification, where the difficulty level and types of rewards are tailored based on individual learners' needs and preferences, can significantly enhance both engagement and retention. By creating personalized learning paths, students can experience a sense of progression that suits their pace, thereby improving the overall learning experience (Huang & Hew, 2018; Knutas *et al.,* 2019). The framework presented by Böckle *et al.* (2018) supports this strategy by Adaptive Interventions and Adaptive Game Mechanics.

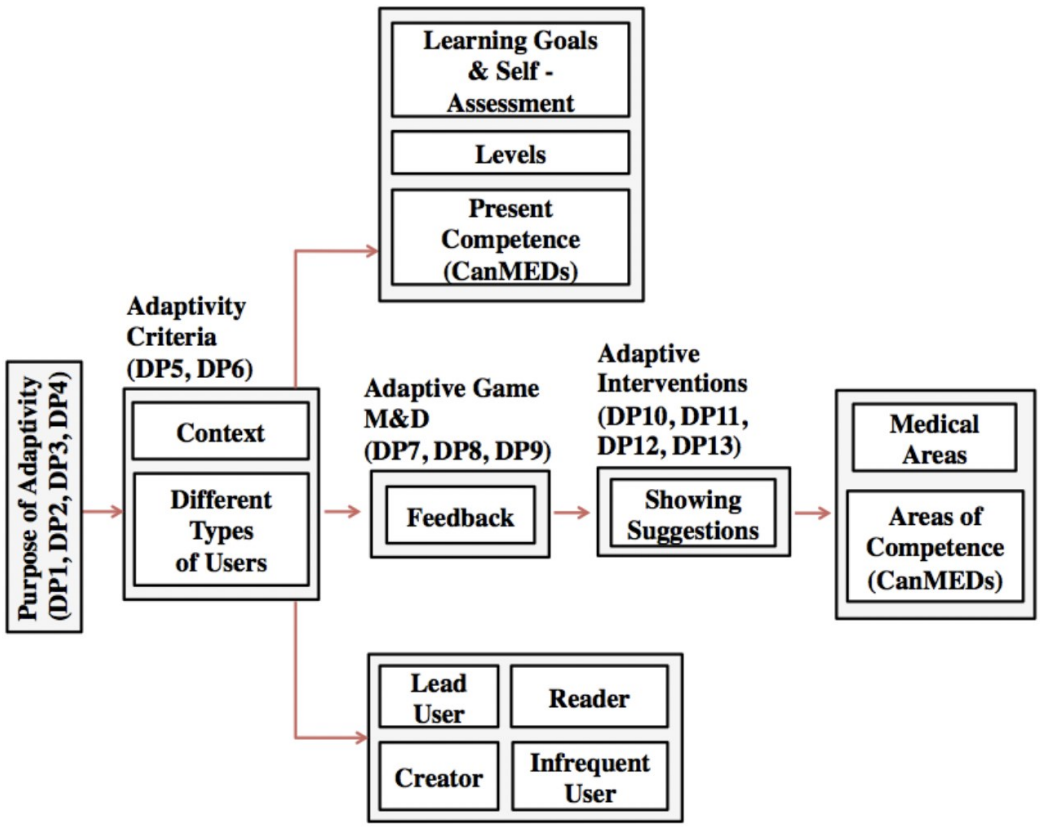


**Figure 6:** Adaptive Gamification Model.

**Source:** (Böckle *et al.,* 2018)

Balancing intrinsic and extrinsic motivation is also vital in the strategic use of gamification. Extrinsic motivators, such as rewards and recognition, can initially attract learners and keep them engaged (Mitchell *et al.,* 2020). However, long-term learning success is often driven by intrinsic motivation—learners' internal desire for mastery, autonomy, and competence. Effective gamification incorporates both types of motivation by using external rewards to capture attention while gradually fostering intrinsic motivators, such as the joy of learning or the satisfaction of solving complex problems. For example, integrating narrative elements that allow learners to experience a sense of purpose in the learning journey can nurture intrinsic motivation and sustain engagement over time (Xu *et al.,* 2021).

The use of challenges and quests is another effective gamification strategy that encourages active learning and problem-solving. By presenting educational content in the form of missions or challenges, learners can immerse

themselves in scenarios that require critical thinking, collaboration, and application of knowledge. This approach not only makes learning more enjoyable but also reinforces knowledge retention by placing learners in contexts that mirror real-world applications (Sailer *et al.,* 2017). The framework by Böckle *et al.* (2018) also emphasizes the use of Customized Challenges as part of adaptive gamification, which aligns well with this approach.

Feedback is a critical component of the strategic application of gamification. Instant feedback, which is often integrated into gamified environments, allows learners to understand their progress, correct mistakes, and receive encouragement at appropriate intervals (Dichev & Dicheva, 2017). Such feedback mechanisms contribute to a positive learning cycle, reinforcing desired behaviors and keeping learners motivated to continue their progress.

To be successful, the strategic application of gamification in learning requires careful planning, design, and evaluation. Gamified elements should be regularly assessed to determine their effectiveness in achieving learning outcomes and adjusted based on learner feedback and performance data (Sailer *et al.,* 2017).

## DISCUSSION

The findings of this study underscore the value of gamification as a transformative tool in enhancing learner engagement and retention within regulatory training delivered through LMS. Though essential across various industries, regulatory training often needs engagement help due to its repetitive and mandatory nature. By integrating game design elements such as points, badges, and leaderboards, this study demonstrates that gamification can significantly improve learners' engagement and retention, which are critical for ensuring compliance.

The findings of the study are consistent with a body of literature that increasingly supports the effectiveness of gamification and effectiveness in educational contexts. The quantitative data from pre—and post-training assessments, combined with LMS analytics, revealed that learners who engaged with gamified elements were more motivated and completed training modules at higher rates than those who did not. This finding supports previous research that gamification can transform passive learning into an active and dynamic process, ultimately leading to better material retention (Dichev & Dicheva, 2017; Sailer & Homner, 2019).

Furthermore, the qualitative data from learner surveys provided additional insights into the learners' experiences, revealing that gamified elements made the training more engaging and enjoyable. Many participants noted that integrating game-like features reduced the monotony of regulatory training, encouraging more profound engagement with the material. This outcome echoes earlier studies suggesting that gamification can mitigate the perceived burden of mandatory training by introducing elements of fun and competition (Mohamad *et al.,* 2018).

Despite the positive outcomes, the study highlighted some critical challenges associated with gamification in regulatory training. One notable concern is the risk of superficial learning, where learners may prioritize earning rewards, such as points and badges, over truly understanding and applying the regulatory content. Although this study did not find conclusive evidence of superficial learning, the potential remains, especially in poorly designed gamified environments where the focus shifts from learning to reward accumulation (Huang & Hew, 2018).

Another challenge is "gamification fatigue," where the novelty of gamified elements wears off over time, leading to decreased learner interest and engagement. This aligns with existing literature, which indicates that overexposure to gamified features can reduce their effectiveness and cause disengagement (Goh & Yang, 2020). To counteract this, organizations need to regularly refresh gamified content by introducing new game mechanics, rotating challenges, or resetting leaderboards to keep learners engaged and maintain the motivational impact.

Addressing these challenges requires a thoughtful approach to gamification design. Ensuring that gamified elements are aligned with learning objectives can help mitigate the risk of superficial engagement by encouraging deeper interaction with the material. Incorporating feedback from learners to periodically update and refine gamified content can also sustain interest and enhance the long-term effectiveness of regulatory training (Huang & Hew, 2018).

### IMPLICATIONS FOR PRACTICE

The findings of this study have significant implications for industries where regulatory compliance is critical, such as healthcare, finance, and manufacturing. Enhancing the effectiveness of regulatory training through gamification can result in better compliance outcomes, as employees are more likely to retain and apply the knowledge gained from their training. However, it is essential for organizations to carefully design gamified elements that align with the specific learning objectives of the training program. This approach ensures that gamification enhances, rather than detracts from, the educational goals of regulatory training.

### FUTURE RESEARCH DIRECTIONS

The study presents valuable insights into the benefits and challenges of implementing gamification in regulatory training. However, it also underscores the necessity for additional research. Longitudinal studies are essential to evaluate the long-term impact of gamification on engagement and retention, particularly with regard to sustained compliance with regulatory requirements. Furthermore, exploring the effectiveness of gamification across various industries and learner demographics could yield a more comprehensive understanding of its potential and limitations.

It is suggested that future research also take into consideration the integration of adaptive learning technologies within gamified LMS platforms. These technologies have the potential to personalize the learning experience based on individual performance, thus offering a possible solution to some of the challenges identified in this study, such as the risk of superficial learning and the potential for gamification fatigue (Bovermann *et al.,* 2018).

## CONCLUSION

The application of gamification has shown the potential to enhance engagement and retention in regulatory training within LMS platforms. By incorporating interactive and enjoyable elements into training, gamification can effectively address the challenges associated with mandatory regulatory education. However, the successful implementation of gamification requires meticulous design and ongoing innovation to ensure that it contributes to meaningful learning outcomes. As organizations continue to seek innovative approaches to improve compliance training, gamification offers a valuable strategy that, when thoughtfully implemented, can yield substantial benefits.

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