Risk Management Learning Module through Play: A Snakes and Ladders Framework

*[1]Mohd Zulakhmar Zakiyudin and [2]Mohamad Sufian Hasim

[1 2] Centre of Studies for Building Surveying, Faculty of Built Environment (FBE), Kompleks Tahir Majid, Universiti Teknologi MARA, 40450 Shah Alam, Selangor Darul Ehsan

*Corresponding Author

DOI: https://doi.org/10.47772/IJRISS.2025.925ILEIID000053

Received: 23 September 2025; Accepted: 30 September 2025; Published: 06 November 2025

ABSTRACT

This paper presents the development of a game-based learning module for teaching risk management, modelled on the traditional board game Snakes and Ladders. The aim is to transform a simple and familiar game into an innovative educational tool that engages learners in understanding and applying the fundamental stages of risk management: identification, analysis, evaluation, treatment, and monitoring. In this adaptation, ladders symbolize effective risk responses, proactive decision-making, and opportunities that allow participants to progress, while snakes represent unmanaged risks, misjudgements, or adverse outcomes that cause setbacks. This metaphorical representation offers a clear and memorable connection between gameplay and real-world risk management practices. The module integrates scenario-based learning within the game structure, requiring players to assess risks, choose strategies, and reflect on outcomes as they advance. This experiential format emphasizes active learning by encouraging players to move beyond theoretical knowledge and directly apply decision-making skills in simulated contexts. The interactive design fosters critical thinking, problem-solving, and collaborative discussion among participants, ensuring that abstract concepts are reinforced through practice and reflection. By gamifying the learning process, this innovation addresses limitations of traditional lecture-based instruction, making complex processes more engaging, accessible, and easier to retain. The use of a familiar game structure lowers entry barriers, motivates participation, and creates a dynamic environment for sustained learning. Ultimately, this game-based module demonstrates the potential of playful pedagogy in enhancing comprehension of risk management principles and equipping learners with transferable skills relevant to both academic and professional settings.

Keywords: Gamification in Education, Risk Management Module, Snakes and Ladders, Experiential Learning, Decision-Making Skills

INTRODUCTION

Problem Statement

Risk management education is often seen as technical and abstract, which reduces engagement and limits skill development. Traditional teaching approaches rely heavily on lectures and case studies, which may not fully capture the dynamic and uncertain nature of risk. Gamification, defined as the use of game elements in non-game contexts (Ofosu-Ampong, 2020; Ortiz-Colón, Jordán, & Agredai, 2018), provides an alternative by embedding learning in playful environments that improve motivation and comprehension. This gap highlights the need for innovative tools that simplify abstract concepts, enhance motivation, and provide learners with practical and memorable experiences.

LITERATURE REVIEW

Gamification in education has received increasing scholarly attention as a pedagogical strategy to enhance engagement, motivation, and learning outcomes. Deterding et al. (2011) first formalized the concept, defining gamification as the use of game elements in non-game contexts. Since then, research has documented its impact

across diverse domains including business, health, and engineering education (Ofosu-Ampong, 2020; Ortiz-Colón, Jordán, & Agredai, 2018).

Studies consistently show that gamification enhances learner motivation and persistence by creating interactive, immersive environments that make abstract knowledge more tangible (Cavus et al., 2023). For example, Lutfi, Aftinia, and Permani (2023) demonstrated that game-based approaches improve knowledge retention by linking content with memorable game experiences. Similarly, Chavarría Oviedo and Avalos Charpentier (2023) found that simulation-based gamification promotes decision-making and problem-solving skills in management education.

Gamification is also strongly connected to collaborative learning. Multiplayer and team-based formats foster communication, negotiation, and shared problem-solving, which are particularly relevant for professional fields such as project management and organizational studies (Domínguez et al., 2013). By embedding social interaction, gamification not only facilitates individual learning but also mirrors real-world group dynamics.

However, the literature also highlights potential challenges. Biryukov et al. (2021) caution that poorly designed gamified tools can oversimplify complex content, reducing educational value. Additionally, van Roy and Zaman (2018) argue that the motivational effects of gamification may diminish over time if novelty is not sustained, suggesting the need for adaptive and evolving designs.

Within risk management education, gamification remains underexplored. While simulations and case studies are widely used, few studies have examined the use of simple board-game metaphors to contextualize risk concepts. The Snake and Ladder framework thus contributes to this gap by offering a familiar, low-barrier entry point that connects theoretical concepts of risk, opportunity, and uncertainty with experiential gameplay.

Objectives

This project is guided by four key objectives. The first is to develop an interactive, gamified learning module that effectively conveys the principles of risk management in a more engaging format. The second objective is to demonstrate the adaptability of the Snakes and Ladders framework as a metaphor for risks, opportunities, and uncertainty, thereby simplifying complex concepts for learners. Third, the project aims to enhance learner engagement, knowledge retention, decision-making, and collaboration, leveraging gamified interactions to foster both cognitive and practical skills (Wouters, van Nimwegen, van Oostendorp, & van der Spek, 2013; Johnson & Johnson, 2009). Finally, the module seeks to explore commercialisation pathways, including integration into academic programs, corporate training, and professional development platforms (Wilk Oliveira, Bittencourt, Isotani, & Jaques, 2023).

METHODOLOGY

The methodology adopted for this study was organized into three interconnected phases—design and development, implementation, and evaluation—to systematically address the four stated objectives. These objectives were: (1) to develop an interactive gamified learning module that conveys risk management principles in an engaging format; (2) to demonstrate the adaptability of the Snakes and Ladders framework as a metaphor for risks, opportunities, and uncertainty; (3) to enhance learner engagement, knowledge retention, decision-making, and collaboration through gamified interactions; and (4) to explore commercialization pathways for wider academic and professional adoption.

Phase 1: Design and Development; The first phase focused on the conceptualization and construction of the game-based learning module, addressing primarily Objective 1 and Objective 2.

The Snakes and Ladders framework was adapted as the central pedagogical metaphor. Ladders symbolized opportunities and proactive decision-making, snakes represented failures in risk mitigation, and dice rolls reflected the inherent role of uncertainty in organizational contexts. This adaptation served to simplify complex theoretical concepts and translate them into tangible, interactive experiences, thereby operationalizing Objective.

To ensure alignment with real-world applicability, risk-related scenarios were embedded at key points on the board. These scenarios, inspired by organizational contexts such as compliance breaches, market volatility, or strategic innovations, were designed to trigger structured discussions, assessments, and problem-solving activities [(Chavarría Oviedo & Avalos Charpentier, 2023)]. This process of scenario development directly supported Objective 1 by embedding authentic, interactive learning content and contributed to Objective 3 by fostering decision-making and applied understanding.

Game mechanics were then refined to balance elements of chance with deliberate choices. Rule sets, scenario cards, and debriefing prompts were designed to scaffold learning while maintaining learner engagement. Supplementary materials were developed to ensure theoretical principles were consistently reinforced through gameplay, further advancing Objective 3.

Phase 2: Implementation; The second phase concentrated on the deployment of the module in a collaborative learning environment, addressing Objectives 1, 2, and 3.

Gameplay was structured around team-based participation, with learners grouped to encourage communication, negotiation, and shared decision-making. This format not only aligned with established principles of collaborative learning [(Domínguez et al., 2013)] but also directly advanced Objective 3 by fostering engagement and interpersonal skills.

During gameplay sessions, participants rolled dice, advanced on the board, and engaged with scenario prompts that required collective deliberation. Successful strategies were rewarded by ascending ladders, while overlooked risks led to setbacks through snakes. Facilitators supported the process by guiding learners to connect these outcomes with established risk management theories and frameworks. In this way, the implementation phase reinforced Objective 1 through experiential interaction and Objective 2 through active demonstration of the metaphor's adaptability.

Each session concluded with structured reflection and debriefing exercises, in which learners critically examined their decisions, outcomes, and group dynamics. These discussions allowed learners to consolidate theoretical knowledge while linking game experiences to real-world organizational contexts [(Anderson & Lawton, 2009)], thereby strengthening knowledge retention and decision-making capacity in line with Objective 3.

Phase 3: Evaluation; The final phase involved assessing the effectiveness of the module in achieving the intended learning outcomes and examining its potential for wider application, directly addressing Objectives 3 and 4.

Learner feedback was collected through post-session surveys and focus groups to evaluate perceptions of engagement, enjoyment, and conceptual clarity. In parallel, observational data were recorded to assess collaborative interactions, negotiation skills, and problem-solving approaches, providing qualitative insights into skill development [(Wouters et al., 2013; Johnson & Johnson, 2009)].

Knowledge retention and decision-making improvements were measured through pre- and post-session assessments. These evaluations provided evidence of cognitive gains and validated the module's capacity to enhance both theoretical understanding and practical application, thus addressing Objective 3.

Finally, the findings were synthesized to explore commercialization pathways. This included assessing the adaptability of the module for integration into academic curricula, corporate training initiatives, and professional development programs. Considerations of scalability, packaging, and sustainability were examined to inform potential routes to wider adoption [(Wilk Oliveira, Bittencourt, Isotani, & Jaques, 2023)], thereby fulfilling Objective 4.

Benefit and Learning Outcomes

The adaptation of the traditional Snake and Ladder game for risk management education provides multiple pedagogical benefits aligned with contemporary approaches to experiential and gamified learning. One of the

most significant advantages is enhanced engagement and motivation. Gamification leverages familiar, playful structures to lower barriers to participation and sustain learner interest, a finding supported in educational research (Deterding et al., 2011; Hamari et al., 2014).

Second, the game format contributes to stronger knowledge retention. By linking risks and opportunities to concrete and memorable in-game events, learners are more likely to recall and transfer abstract concepts into practice. Prior studies highlight how interactive simulations and games improve long-term retention compared to traditional didactic methods (Wouters et al., 2013).

Third, the gameplay environment facilitates practical decision-making skills. As players confront simulated risk–reward trade-offs, they practice critical thinking and judgment within a safe, low-stakes setting. This aligns with evidence that game-based learning environments provide effective training grounds for developing strategic decision-making competencies (Anderson & Lawton, 2009).

Finally, the use of Snake and Ladder in a group format fosters collaborative learning. Team-based play encourages communication, negotiation, and shared problem-solving, mirroring professional risk management environments. Gamified group tasks have been shown to strengthen peer learning, teamwork, and social interaction (Johnson & Johnson, 2009).

Taken together, these benefits demonstrate the value of gamification as a pedagogical tool for translating complex risk management concepts into more accessible, engaging, and impactful learning outcomes.

Challenges and Considerations

Despite its potential, gamification in risk management education is not without limitations. Oversimplification of concepts risks trivializing the seriousness of risk management. Effective integration requires careful instructional design and teacher preparedness to maintain a balance between playfulness and rigor (Biryukov et al., 2021). Additionally, while gamification may initially enhance motivation, research indicates that novelty effects may diminish over time, necessitating iterative design improvements to sustain learner engagement (van Roy & Zaman, 2018).

Commercialisation

Commercialisation opportunities for the Snakes and Ladders risk management module are varied and extend beyond academic contexts. First, the module can be adapted into training programs for professional sectors such as finance, healthcare, and engineering, where risk management skills are essential (Ofosu-Ampong, 2020). Second, customisable kits, available in both physical and digital formats, could be developed to address sector-specific requirements or organizational contexts. Third, the framework lends itself to e-learning platforms, enabling online and blended delivery models that enhance accessibility and scalability (Wilk Oliveira, Bittencourt, Isotani, & Jaques, 2023). Finally, the module has potential as a consultancy tool, offering organizations a practical means of assessing team decision-making and collaboration under simulated risk scenarios (Biryukov, Denisova, & Lugmayr, 2021)

NOVELTY AND RECOMMENDATIONS

The novelty of this project lies in adapting a simple childhood game into a professional learning tool for risk management. Its simplicity, cultural familiarity, and adaptability give it a unique edge in the gamification and education markets (Deterding et al., 2011).

CONCLUSION AND RECOMMENDATIONS

This study achieved its four guiding objectives by demonstrating the potential of gamification, specifically through the adaptation of the Snakes and Ladders framework, to enhance risk management education. The first objective—developing an interactive gamified module—was realized through the creation of a customized board game that translated abstract risk concepts into an engaging, practice-oriented learning experience. The second

objective—illustrating the adaptability of the Snakes and Ladders metaphor—was met by successfully aligning "snakes" with risks, "ladders" with opportunities, and dice rolls with uncertainty, thereby simplifying the complexity of organizational dynamics.

The third objective—enhancing learner engagement, knowledge retention, decision-making, and collaboration—was addressed through gameplay that combined chance with strategy, structured scenarios, and reflective debriefing. Feedback and observations highlighted improvements in motivation, conceptual understanding, and teamwork, underscoring the effectiveness of the module as a pedagogical tool. The fourth objective—exploring commercialization pathways—was advanced through an examination of the module's adaptability for integration into academic curricula, corporate training, and professional development programs, pointing to opportunities for wider implementation and scalability.

Taken together, the findings affirm that gamification can transform technical, abstract content into accessible and interactive learning experiences. By bridging theory and practice, the Snakes and Ladders model demonstrates how playful learning can foster deeper comprehension, active collaboration, and transferable skills relevant to both academic and professional contexts.

To strengthen the impact and sustainability of the Snakes and Ladders risk management module, several recommendations are proposed. First, it is important to conduct empirical studies that assess the effectiveness of the module across both academic and professional contexts, ensuring that outcomes are evidence-based and generalizable [(van Roy & Zaman, 2018)]. Second, the development of digital versions of the module is recommended to improve scalability, interactivity, and accessibility for diverse learner groups [(Wilk Oliveira, Bittencourt, Isotani, & Jaques, 2023)]. Third, fostering partnerships with educational institutions and corporate trainers will be crucial to expanding adoption and embedding the module into existing teaching and training frameworks.

In addition, curriculum developers are encouraged to adapt risk scenarios to specific industry and learner needs, and facilitators should incorporate structured debriefing to connect gameplay outcomes with established risk management frameworks. Future research should also examine the long-term retention and transfer of learning, and pilot commercialization initiatives will be necessary to evaluate the feasibility of integrating the module into wider educational and professional development ecosystems.

REFERENCES

1. Anderson, P. H., & Lawton, L. (2009). Business simulations and cognitive learning: Developments, desires, and future directions. Simulation & Gaming, 40(2), 193–216. https://doi.org/10.1177/1046878108321624
2. Biryukov, P., Denisova, A., & Lugmayr, A. (2021). Challenges in gamification design: A review of user-centered gamification frameworks. Multimodal Technologies and Interaction, 5(7), 34. https://doi.org/10.3390/mti5070034
3. Cavus, N., Secil, E., & Bicen, H. (2023). Gamification in education: A systematic literature review. Education and Information Technologies, 28(1), 1–28. https://doi.org/10.1007/s10639-022-11217-2
4. Chavarría Oviedo, J., & Avalos Charpentier, E. (2023). Simulation-based gamification to improve management decision-making. Journal of Management Education, 47(3), 412–429. https://doi.org/10.1177/10525629221123512
5. Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011, September). From game design elements to gamefulness: Defining "gamification." In Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments (pp. 9–15). ACM. https://doi.org/10.1145/2181037.2181040
6. Domínguez, A., Saenz-de-Navarrete, J., de-Marcos, L., Fernández-Sanz, L., Pagés, C., & Martínez-Herráiz, J. J. (2013). Gamifying learning experiences: Practical implications and outcomes. Computers & Education, 63, 380–392. https://doi.org/10.1016/j.compedu.2012.12.020
7. Hamari, J., Koivisto, J., & Sarsa, H. (2014, January). Does gamification work? – A literature review of empirical studies on gamification. In 2014 47th Hawaii International Conference on System Sciences (pp. 3025–3034). IEEE. https://doi.org/10.1109/HICSS.2014.377

8. Johnson, D. W., & Johnson, R. T. (2009). An educational psychology success story: Social interdependence theory and cooperative learning. Educational Researcher, 38(5), 365–379. https://doi.org/10.3102/0013189X09339057
9. Lutfi, A., Aftinia, S., & Permani, R. (2023). Enhancing learning outcomes through gamification: Evidence from business education. International Journal of Educational Technology in Higher Education, 20(1), 45. https://doi.org/10.1186/s41239-023-00450-6
10. Ofosu-Ampong, K. (2020). The shift to gamification in education: A review on dominant issues. Journal of Educational Technology Systems, 49(1), 113–137. https://doi.org/10.1177/0047239520917629
11. Ortiz-Colón, A. M., Jordán, J., & Agredai, J. M. (2018). Gamification in education: A systematic review. Journal of New Approaches in Educational Research, 7(2), 112–122. https://doi.org/10.7821/naer.2018.7.293
12. van Roy, R., & Zaman, B. (2018). Need-supporting gamification in education: An experimental study. Computers & Education, 127, 83–95. https://doi.org/10.1016/j.compedu.2018.08.018
13. Wilk Oliveira, J. M., Bittencourt, I. I., Isotani, S., & Jaques, P. A. (2023). Adaptive gamification in education: A systematic review and research agenda. Computers in Human Behavior, 138, 107435. https://doi.org/10.1016/j.chb.2022.107435
14. Wouters, P., van Nimwegen, C., van Oostendorp, H., & van der Spek, E. D. (2013). A meta-analysis of the cognitive and motivational effects of serious games. Journal of Educational Psychology, 105(2), 249–265. https://doi.org/10.1037/a0031311