Open Access Research Journal of
Science and Technology
Journals home page: https://oarjst.com/
ISSN: 2782-9960 (Online)

OARJ OPEN ACCESS RESEARCH JOURNALS

(REVIEW ARTICLE)

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Immersive serious games and educational escape rooms in adult education: A virtual reality approach to decision-making in critical situations

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Open Access Research Journal of Science and Technology, 2026, 16(02), 170-181

Publication history: Received on 02 March 2026; revised on 12 April 2026; accepted on 15 April 2026

Article DOI: https://doi.org/10.53022/oarjst.2026.16.2.0044

Abstract

The purpose of this study is to investigate the use of immersive serious games, educational escape rooms, and virtual reality (VR) as an innovative approach in adult education. It builds on previous studies and explores the potential of immersive and game-based environments to increase learner engagement, enhance critical thinking, and develop decision-making skills. Furthermore, this paper introduces a theoretical model of a virtual reality-based educational escape room, designed to simulate stressful situations and facilitate experiential learning. The combination of immersion, interactivity, and narrative aims to bring the model closer to real-world practice following theoretical instruction. Furthermore, the article draws attention to the pedagogical potential of the immersive environment and suggests a starting point for further academic and practical work.

Keywords: Immersive serious games; Educational escape rooms; Adult education; Virtual reality; Decision-making; Critical situations; Experiential learning; Game-based learning

1. Introduction

The landscape of adult learning has undergone a profound transformation, driven by the rapid proliferation of digital technology and the growing demand for transferable, practice-oriented skills (European Commission, 2020; OECD, 2019; Pellas et al., 2019; Bacca et al., 2017). The passive transmission of knowledge, long characteristic of traditional pedagogical methods, is becoming increasingly inadequate. Concurrently, learner-centered and experiential educational models are gaining considerable traction among educators, researchers, and policymakers (Kolb, 2015; Bower, 2017; Chaidi et al., 2021; Drigas & Theodorou, 2016; Politi-Georgousi & Drigas, 2020).

Game-based learning represents a relatively recent yet rapidly expanding addition to the repertoire of educational tools, and has demonstrated significant benefits for learner motivation and engagement (Fountoulakis & Simos, 2026a; Fountoulakis& Simos, 2026b). Beyond fostering active participation, serious games and educational escape rooms cultivate collaboration and problem-solving skills while providing learners with the opportunity to confront realistic situations and apply their knowledge in contextually appropriate ways (Plass et al., 2015; Nicholson, 2020; Whitton, 2018; Landers, 2015).

Virtual reality (VR), as an immersive technology, holds particular promise in this domain. VR is capable of delivering an experiential form of learning by approximating the authentic conditions of the real world, thereby enhancing engagement and deepening the learning process (Radianti et al., 2020; Makransky et al., 2019). Such environments are especially well suited for training decision-making skills in complex and high-pressure situations, where the consequences of poor judgment can be severe (Simos, 2025a; Simos, 2026; Simos & Katsiampoura, 2025).From both a

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conceptual and a design perspective, this paper examines how serious games, educational escape rooms, and VR technology can be integrated within adult education. To that end, a preliminary framework for a VR-based educational escape room is proposed, one that supports the development of decision-making competencies and experiential learning.

2. Methodology

2.1. Research Design and Participants

This study is a conceptual study that aims to examine the issue of using immersive serious games and educational escape rooms in adult education. As such, it primarily adopts a design-based research methodology. Design-based research is a powerful method for understanding new types of learning environments, as it allows researchers to combine theory with the actual design and use of products that can aid teaching and learning, while simultaneously generating knowledge (Wang & Hannafin, 2015; McKenney & Reeves, 2019). It also allows for the development and testing of a VR escape room framework, designed to aid decision-making in critical situations.

The research falls within the context of adult education, specifically lifelong learning and professional development. Although this is a theoretical study, it is based on authentic training environments where individuals are called upon to apply problem-solving and decision-making skills under conditions of time pressure and uncertainty (OECD, 2019; European Commission, 2020; Salas et al., 2020; Clark et al., 2018).

2.2. Research Tools, Procedure, and Data Analysis

At the core of the proposed research design is a VR educational escape room intended to provide learners with a simulated experience of decision-making under pressure. To deepen immersion and sustain a sense of realism, the design incorporates interactive elements linked to the narrative, puzzles, and a countdown timer (Radianti et al., 2020; Makransky& Petersen, 2019).Within this environment, learners explore the virtual world, engage with progressively challenging puzzles, and make decisions that directly influence the outcome of the scenario. Proposed data collection methods include observation, structured reflection, and self-reported measures of engagement and perceived decision-making effectiveness. Data analysis follows a qualitative and descriptive approach, with the aim of identifying patterns of interaction and assessing cognitive and strategic engagement (Salas et al., 2020; Makri et al., 2021).

3. Literature Review

3.1. Serious games in adult education

Serious games have attracted increasing scholarly and practical attention as tools for fostering engagement, motivation, and improved learning outcomes. Broadly defined, serious games are digital or non-digital games designed not solely for entertainment but primarily for educational and training purposes (Deterding et al., 2016; Plass et al., 2015; Pergantis&Drigas, 2024; Moraiti et al., 2022; Pergantis et al., 2025). What distinguishes serious games from traditional educational methods is their inherently interactive and experiential character, which supports active learning and the development of higher-order cognitive skills.

A key advantage of serious games lies in their capacity to facilitate learning from both failure and success within a safe, risk-free environment, as participants engage with real-world scenarios to practice decision-making (Connolly et al., 2016; Boyle et al., 2016). Adult learners typically bring prior experience, specific expectations, and goal-oriented learning dispositions, all of which align well with the problem-centered and experiential nature of game-based learning (Knowles et al., 2015; Merriam & Bierema, 2018). Through serious games, adults can learn in ways that meaningfully connect theoretical concepts to their practical applications (Mayer, 2020; Clark et al., 2018; Landers, 2015).

Research has consistently shown that serious games are highly effective in motivating learners and sustaining engagement, two factors that fundamentally determine the success of learning environments for adult populations (Hamari et al., 2016; Wouters et al., 2015; Simos &Karabatzaki, 2025; Simos, 2025b; Simos, 2025c). The incorporation of challenges, feedback, rewards, and progression systems yields highly engaging experiences that not only capture learners' interest but also foster persistence. These environments also contribute to enhancing critical thinking, problem-solving, and adaptive decision-making skills (Gee, 2017; Qian & Clark, 2016).

Serious games can also be understood as experiential learning support tools, closely aligned with Kolb's (2015) experiential learning cycle. The phases of active experimentation and reflective observation enable learners to test

different strategies, observe results, and revise their approaches accordingly. This iterative process is particularly effective in training decision-making under pressure, as learners can observe the consequences of their choices without facing real-world risks (Salas et al., 2020; Ericsson et al., 2018).

Serious games have gained particular prominence in professional training programs within fields such as healthcare, the military, and emergency response, where the capacity to make sound decisions in critical situations is essential (Graafland et al., 2017; Gorbanev et al., 2018). Game-based simulations in these domains have been shown to improve performance, situational awareness, and response accuracy (Clark et al., 2018). Beyond knowledge retention, these simulations also enhance knowledge transfer, as learners engage both cognitively and emotionally within immersive and interactive environments (Makransky et al., 2019; Kavanagh et al., 2017).

Nonetheless, serious games present certain challenges. Their effective integration into adult education requires addressing issues of technological accessibility, design complexity, and pedagogical alignment (Backlund & Hendrix, 2016; Vlachopoulos & Makri, 2017). Learners who are unfamiliar with or uncomfortable in game-based settings may not perform optimally and may struggle to engage fully with the experience.Despite these concerns, the expanding body of research overwhelmingly supports the value of serious games in adult education, as they provide opportunities for active participation, critical thinking, and informed decision-making. When augmented by technologies such as VR and combined with innovative formats like educational escape rooms, serious games hold the potential to deliver immersive, meaningful, and transformative learning experiences (Radianti et al., 2020; Hamilton et al., 2021).

3.2. Educational escape rooms

Educational escape rooms have emerged as a distinctive and rapidly growing dimension of game-based learning, notable for their capacity to generate high levels of student engagement. In escape rooms, participants are immersed in narrative-driven environments where they must solve interconnected puzzles within a limited timeframe (Nicholson, 2020; Clarke et al., 2017). This structure is particularly well suited for promoting active participation, collaboration, and problem-solving, making escape rooms an effective vehicle for experiential learning (Whitton, 2018; Chaidi &Drigas, 2022; Drigas&Sideraki, 2021).

As educational tools, escape rooms are especially effective because they require learners to apply, rather than merely recall, knowledge, thereby cultivating deeper problem-solving abilities (Fotaris& Mastoras, 2019; Makri et al., 2021). Participants are not passive recipients of information but active constructors of their own knowledge, engaged in deep thinking and decision-making within a dynamic environment. In this respect, educational escape rooms align closely with constructivist learning theory, which posits that knowledge is constructed through interaction and experience (Vygotsky, 2016; Jonassen, 2017; Simos, 2025a; Simos et al., 2026; Simos &Katsiampoura, 2025).Educational escape rooms also promote communication and collaboration, which are fundamental competencies in both adult education and the professional workplace (Pan et al., 2018; Nicholson, 2020). Teamwork, knowledge sharing, consensus-based strategic decision-making, and the collective pursuit of solutions constitute the core activities within the escape room environment (Clarke et al., 2017; Makri et al., 2021). The element of urgency created by time pressure further compels learners to make rapid decisions and exercise creative thinking.

The combination of narrative, challenge, and interactivity ensures a thoroughly immersive experience (Fotaris& Mastoras, 2019; Veldkamp et al., 2020). Adult learners are often occupied with multiple responsibilities, making it difficult to sustain consistently high levels of motivation. Escape rooms address this challenge by offering an inherently engaging and motivating learning environment that increases participation while also reducing cognitive fatigue. Escape rooms also play a significant role in developing higher-order thinking skills, including critical thinking, analytical reasoning, and decision-making (Makri et al., 2021; López-Pernas et al., 2019). The complexity and, at times, ambiguity of the tasks demand that learners analyze information, evaluate alternatives, select the most appropriate course of action, and execute decisions swiftly. Such processes mirror the demands of real-life professional contexts, where uncertainty and time pressure are commonplace.

An additional strength of educational escape rooms is their flexibility and adaptability. They can be implemented in physical, digital, or hybrid formats, allowing educators to tailor the experience to specific learning environments and available technological resources (Veldkamp et al., 2020; Sánchez-Martín et al., 2020). This versatility makes escape rooms applicable across a wide range of disciplines, including education, healthcare, business, and engineering.Nevertheless, designing effective educational escape rooms presents challenges. A well-crafted escape room requires careful alignment of game mechanics with content and learning objectives (Nicholson, 2020; Backlund & Hendrix, 2016). Task difficulty and accessibility must be carefully balanced, as overly complex tasks risk causing

frustration, while excessively simple ones may lead to disengagement. Technological and resource limitations can also impede implementation, particularly in settings with restricted access to digital tools.

The growing body of literature on educational escape rooms effectively supports their use as powerful, learner-centered tools in adult education (Veldkamp et al., 2020; Fotaris& Mastoras, 2019; Makri et al., 2021). When combined with immersive technologies such as VR, escape rooms promise to deliver highly realistic and engaging learning environments capable of developing key competencies, including decision-making in complex and high-pressure situations (Radianti et al., 2020; Makransky& Petersen, 2019).

3.3. VR in Learning

VR has emerged as a profoundly influential digital technology in the field of education, owing to the immersive, interactive, and experiential learning environments it facilitates. Unlike conventional digital tools, VR immerses the user in a simulated three-dimensional environment, substantially enhancing the sense of presence (Radianti et al., 2020; Makransky& Petersen, 2019). This immersive capability enables learners to experience scenarios that would be difficult, dangerous, or impossible to replicate in traditional educational settings.

VR has proven to be a particularly effective educational tool for adults, primarily because it supports experiential and situation-centered learning (Simos et al., 2025; Simos et al., 2026; Simos &Xyloparkioti, 2025). Constructivist and experiential learning theories argue that learners acquire knowledge most effectively when they actively participate in realistic environments and reflect on their experiences (Kolb, 2015; Jonassen, 2017; Pergantis et al., 2025). VR environments serve this purpose well by placing learners in lifelike scenarios where interactions, experimentation, and decision-making occur in real time (Freina& Ott, 2015; Jensen & Konradsen, 2018; Allcoat& von Mühlenen, 2018).

Among the most significant advantages of VR is its ability to simulate complex and high-risk situations in a controlled and safe manner (Mitsea et al., 2023; Mitsea et al., 2022; Drigas&Sideraki, 2021; Simos, 2026; Simos &Karabatzaki, 2025). This capability is especially valuable in fields such as healthcare, emergency services, and educational training, where correct decision-making under time pressure is critical (Radianti et al., 2020; Kavanagh et al., 2017). VR-based training enables skill development, builds self-confidence, and improves task performance without exposing learners to real-world consequences (Makransky et al., 2019; Parong & Mayer, 2018; Diemer et al., 2015).

VR also excels at maintaining learner interest and motivation. Immersive learning environments capture attention and offer interactive experiences that surpass traditional pedagogical methods in terms of engagement (Hamilton et al., 2021; Makransky& Petersen, 2019; Buttussi&Chittaro, 2017). The psychological sensation of "presence," or the feeling of "being there," is central to this effect, as it substantially increases emotional engagement and cognitive investment in the learning task (Radianti et al., 2020; Slater & Sanchez-Vives, 2016). Additionally, VR has been associated with improved learning outcomes, particularly regarding knowledge retention and transfer. Research indicates that immersive experiences promote higher levels of cognitive processing and a more thorough understanding of complex subject matter (Makransky et al., 2019; Parong & Mayer, 2018). VR environments can also be designed to deliver immediate feedback, prompting learners to reflect on their actions and adjust their strategies in real time (Jensen & Konradsen, 2018; Hamilton et al., 2021).

Despite these advantages, the application of VR in education is not without challenges. Cognitive overload, technological limitations, and accessibility barriers may hinder effective learning (Makransky et al., 2019; Radianti et al., 2020). Immersive environments can overwhelm learners with excessive information if instructional design does not adequately support cognitive processing. The cost and technical requirements of VR systems may also restrict their availability in certain educational contexts.Notwithstanding these challenges, a growing body of research confirms that VR is a powerful tool for enhancing adult education. When integrated with pedagogical strategies such as serious games and educational escape rooms, VR is capable of creating highly effective learning environments that promote engagement, critical thinking, and decision-making within realistic and meaningful contexts (Radianti et al., 2020; Hamilton et al., 2021).

3.4. Decision-making in critical situations

Decision-making in critical situations refers to the cognitive process of analyzing alternatives, managing uncertainty, and selecting the optimal course of action under time constraints. In professional environments such as healthcare, education, and emergency management, the quality of decisions can have far-reaching consequences, making this a vital competency for adult learners (Klein, 2017; Kahneman, 2015).A central factor influencing decision-making in high-risk situations is cognitive load. Cognitive load theory posits that human cognitive resources are inherently limited, and that overloading these resources with excessive information can impair performance and decision quality (Sweller et al.,

2019; Paas & van Merriënboer, 2020). In high-pressure scenarios, individuals must process large volumes of information within constrained timeframes, and the failure to manage cognitive load effectively can lead to errors and suboptimal outcomes (LeBlanc, 2015; Klein, 2017).Stress and emotional states also exert a significant influence on decision-making. Research suggests that elevated stress levels can negatively affect attention, memory, and reasoning, thereby diminishing decision quality (LeBlanc, 2015; Salas et al., 2020). Importantly, participation in simulated stressful situations has been shown to help individuals develop stress management skills and achieve improved outcomes through repeated exposure (Ericsson et al., 2018; Klein, 2017).

Simulation-based training is now widely recognized as an effective approach for developing decision-making competencies in critical situations. Through simulated environments, learners can practice their responses, evaluate consequences, and modify their behavior accordingly (Salas et al., 2020; Gaba, 2016). Experiential learning methodologies underpin this approach, aiming to enhance both cognitive knowledge and behavioral skills through structured practice.Immersive technologies, particularly VR, can substantially increase the realism and interactivity of such simulations. By incorporating game-based elements drawn from serious games and escape rooms, these environments can be transformed into highly engaging and effective training experiences (Makransky et al., 2019; Radianti et al., 2020). The addition of narrative structure, escalating challenges, and time pressure significantly enhances the authenticity of the experience, enabling learners to practice decision-making under conditions that closely approximate real-world demands.

Collaborative decision-making is also essential in many professional environments. Educational escape rooms are particularly well suited to enhancing teamwork and collaborative problem-solving, as they require participants to communicate, negotiate, and coordinate their actions effectively (Makri et al., 2021; Pan et al., 2018). The collaborative dimension introduces additional complexity to the decision-making process while simultaneously reflecting the social dynamics encountered in real-life professional situations.

In summary, the existing research literature indicates that the combination of immersive technologies, serious games, and escape room methodologies can serve as a powerful means of equipping adult learners with robust decision-making skills. Through realistic, engaging, and interactive scenarios, these approaches have the potential to prepare individuals more effectively for the challenges inherent in real-life critical situations (Hamilton et al., 2021; Radianti et al., 2020).

4. Design of the VR Escape Room

4.1. Scenario Description

The proposed VR educational escape room is designed to simulate environments in which adult learners must make rapid, accurate decisions under pressure, replicating conditions they would encounter in professional practice. The scenario is set within a professional context, such as an emergency situation at a school, where participants assume the roles of decision-makers responsible for determining the course of action. This setting was deliberately chosen because it reflects the familiar organizational and educational environment of adult learners while incorporating complex, time-sensitive challenges (Simos &Katsinis, 2026).

The narrative unfolds as an escalating crisis in which participants must monitor and respond to unpredictable developments after interpreting fragmentary information. The scenario involves multiple alternatives, uncertainty, risk, and ambiguity, all of which are characteristic of real-life situations requiring decisions based on incomplete information (Klein, 2017; Kahneman, 2015). The incorporation of narrative is a critical design element, as empirical evidence demonstrates that storytelling promotes immersion, emotional engagement, and deeper cognitive processing of information (Makransky& Petersen, 2019; Radianti et al., 2020).

The primary objective of the scenario is to enable learners to practice decision-making skills actively by assuming a role in which they must continuously confront new problems and make choices with direct implications for the outcomes of their actions. This approach aligns with Kolb's (2015) experiential learning cycle, which emphasizes the acquisition of concrete experiences, reflective observation, abstract conceptualization, and active experimentation. By situating learners within a responsive and evolving environment, the scenario provides a foundation for sustained engagement and iterative learning.

4.2. Game Structure and Mechanics

The escape room is structured around four progressive stages that culminate in the decision-making process itself. Each stage is designed to build upon the preceding one, requiring learners to develop and refine their skills as they advance

through the proposed experience. The stages are the following: (a) The first stage focuses on situation awareness. Learners observe the environment, identify relevant information, and form an initial understanding of the problem. This phase emphasizes observation, attention, and information gathering, which are foundational components of effective decision-making (Endsley, 2017). (b) The second stage involves problem identification and prioritization. Learners analyze the available information, distinguish between relevant and irrelevant data, manage their cognitive load, and prioritize tasks under time pressure (Sweller et al., 2019). (c) The third stage centers on decision-making under pressure. Participants must identify and execute the most appropriate course of action within a constrained timeframe, often collaborating with team members. During this phase, learners are exposed to stress and a sense of urgency, both of which are recognized factors influencing decision-making performance and cognitive processing (LeBlanc, 2015; Salas et al., 2020). (d) The fourth and final stage is the debriefing and evaluation phase. Learners receive structured feedback on their decisions and actions. The system presents the outcomes of their choices and facilitates opportunities for reflection and learning. This feedback loop is essential for developing metacognitive awareness and fostering continuous improvement (Ericsson et al., 2018).The game's core mechanics include puzzles, branching decision paths, time limits, and immediate feedback mechanisms. These features are designed to sustain learner engagement, reinforce motivation, and support the development of higher-order cognitive skills (Plass et al., 2015; Deterding et al., 2016).

4.3. VR Features and Immersion

VR technology is integral to the escape room's design, as it transforms the learning space into a compelling and dynamic environment. The concept of presence, defined as the psychological sensation of "being there," plays a central role in enhancing the effectiveness of VR-based educational experiences (Slater & Sanchez-Vives, 2016; Makransky et al., 2019).The virtual environment is constructed through three-dimensional spatial rendering, enabling participants to move through and manipulate objects in a manner analogous to the physical world. Realism is heightened by environmental audio, visual cues such as notifications and alerts, and dynamic environmental effects that evolve as the scenario progresses. These elements promote sensory immersion and support situational awareness.

Interactivity constitutes another essential dimension of the aforementioned VR experience. Users can grasp, move, and position objects, gain a shared understanding of unfolding events by interacting with virtual elements, and alter the situation through their actions. This high degree of interaction ensures active participation and substantially reinforces the principle of learning by doing, as learners are directly involved in the process of constructing knowledge and skills (Jensen & Konradsen, 2018).VR is also particularly valuable for training in contexts where the cost of error is high. It allows learners to practice decision-making without encountering real-world negative consequences, making it an important asset in adult education for crisis preparedness, emergency response, and leadership development (Radianti et al., 2020; Kavanagh et al., 2017).At the same time, the design acknowledges and mitigates the potential limitations of VR, including cognitive overload and accessibility constraints. To address these concerns, the environment was designed to provide clear navigational cues, intuitive interfaces, and a gradual increase in difficulty (Makransky et al., 2019).

4.4. Learning objectives and pedagogical value

The educational VR escape room aims to strengthen decision-making skills during emergency situations by raising awareness and guiding learners toward the development of critical thinking and problem-solving competencies through carefully designed scenarios in a controlled environment.Beyond cognitive skills, the escape room also fosters teamwork and communication. Participants' dispositions shift toward collaboration, information exchange, and coordinated action, as they experience the dynamics of collaborative decision-making in realistic contexts (Makri et al., 2021; Pan et al., 2018).

The design also emphasizes the acquisition of metacognitive skills, encouraging learners to evaluate their own decisions and their effectiveness. Metacognitive strategies are essential for achieving long-term learning and successful knowledge transfer, as they help learners recognize their strengths and areas for improvement (Flavell, 1979; Schraw & Dennison, 1994).From a pedagogical standpoint, the integration of serious games, escape rooms, and VR reflects the principles of constructivist and experiential learning theories, which advocate for active student participation, contextualized learning, and the construction of knowledge through experience (Jonassen, 2017; Kolb, 2015). The motivational and engaging qualities of the environment, which are core drivers of effective adult education, are further amplified by the immersive and interactive characteristics of VR (Hamari et al., 2016).

In sum, the proposed VR educational escape room represents a comprehensive and creative approach to adult education, offering a powerful instrument for cultivating decision-making and problem-solving skills. The combination

of advanced technology and thoughtfully designed pedagogical elements provides a meaningful and immersive learning experience capable of preparing learners for challenges that extend well beyond the classroom (Simos, 2025d).

5. Discussion

This study has examined the integration of immersive serious games, educational escape rooms, and VR as a unified framework for enhancing adult education. The literature consistently indicates that these approaches can improve learner engagement, critical thinking, and decision-making skills by providing highly interactive and experiential learning environments (Radianti et al., 2020; Makransky et al., 2019).A central notion that this study explored is the pivotal role of immersion in promoting meaningful learning. VR environments generate a sense of presence that leads to elevated levels of cognitive and emotional engagement, which in turn can facilitate deeper learning experiences (Slater & Sanchez-Vives, 2016). When escape room features, such as time constraints, narrative elements, and collaborative tasks, are combined with VR, they create scenarios that closely mirror real-world conditions where timely and informed decision-making is essential (Nicholson, 2020; Fotaris& Mastoras, 2019).

The design recommendations presented in this paper focus on providing an experiential, situated learning environment in which adult learners can interact with complex, context-rich situations. This approach aligns with leading learning theorists who argue that interaction combined with reflection constitutes the most effective pathway to knowledge acquisition (Kolb, 2015; Jonassen, 2017). The proposed framework thus positions the learner as an active agent rather than a passive recipient, a principle that is fundamental to contemporary adult education theory (Knowles et al., 2015).From a pedagogical perspective, the combined use of serious games, escape rooms, and VR has the potential to enhance not only cognitive competencies but also collaborative and communicative skills. The proposed model recognizes that decision-making under pressure in vocational training settings constitutes one of the principal challenges facing adult educators. However, factors such as cognitive load, technological accessibility, and instructional design quality remain critical considerations that must be addressed to realize the full potential of these immersive learning environments (Sweller et al., 2019; Backlund & Hendrix, 2016).

The theoretical nature of this study represents both a strength and a limitation. While the conceptual framework provides a foundation for future empirical investigation, the absence of experimental data means that the proposed model's effectiveness has yet to be validated in practice. Future research should prioritize the implementation and evaluation of VR escape rooms in authentic adult education settings, employing rigorous experimental or quasi-experimental designs to measure learning outcomes, engagement, and the transferability of decision-making skills to real-world contexts.

6. Conclusion

This study has investigated the use of immersive serious games, educational escape rooms, and VR as an integrated conceptual framework for improving decision-making in adult education. Drawing on existing research, the analysis demonstrates that gamified and immersive learning environments offer engaging, meaningful, and experiential learning opportunities that are well aligned with the principles of adult learning theory.The proposed VR escape room highlights the value of combining immersion, interactivity, and narrative to enhance the development of critical skills in complex, high-risk situations. This approach supports not only the acquisition of theoretical knowledge but also its practical application, thereby bridging a persistent gap in traditional adult education.

Although the study is primarily theoretical, it offers strong indications for the creation of a foundation for further empirical research and real-world implementation. Subsequent work should focus on validating the proposed framework through empirical studies conducted in diverse educational settings, with attention to participant demographics, contextual variables, and long-term skill retention. The findings of this study suggest that immersive learning environments are exceptionally well suited for adult education, providing learners with the innovative resources and experiential conditions necessary to confront real-life challenges with confidence and competence.

Compliance with ethical standards

Acknowledgments

The Authors would like to thank the SPECIALIZATION IN ICTs AND SPECIAL EDUCATION: PSYCHOPEDAGOGY OF INCLUSION Postgraduate studies Team, for their support.

Disclosure of conflict of interest

The Authors proclaim no conflict of interest.

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