

Title: A Scoping Review of Virtual Escape Rooms in Nursing Education

Abstract

This study examines virtual escape rooms as instructional tools within nursing education by conducting a scoping review of 17 studies. Leveraging various online platforms and immersive tools, virtual escape rooms offer promising avenues for enhancing critical thinking, teamwork, and knowledge acquisition among nursing students. Despite generally positive outcomes, challenges posed by a frequent lack of systematic instructional design approaches or theoretical frameworks are evident in some studies reporting cognitive overload and stress among students.

Body text

Background

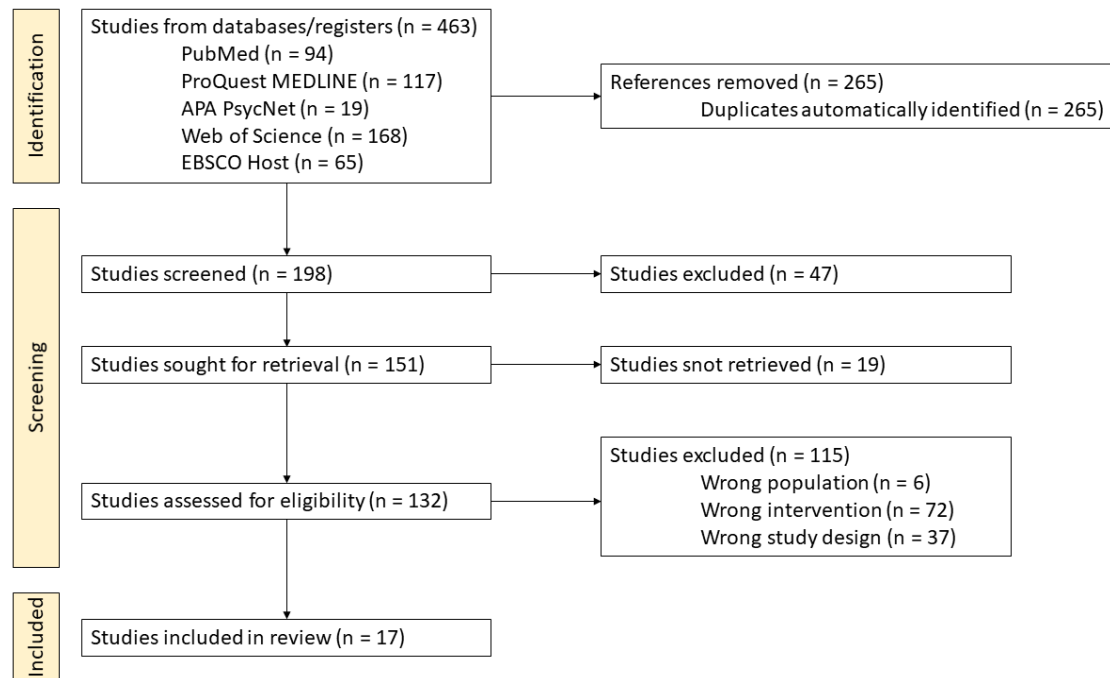
Simulations have been one of the popular instructional strategies for nursing education (Shin et al., 2015; Mulyadi et al., 2021). As a particular type of simulation, escape rooms are a gamified instructional strategy that situates students in a problem-solving context, providing clues to solve the problem and escape the room (Fotaris & Mastoras, 2019). Escape rooms have been highlighted for their potential to improve students' critical thinking, teamwork, and knowledge acquisition engagingly (Valdes et al., 2021, Reinkemeyer et al., 2022), and numerous studies have reported students' positive perception of the escape rooms (Gutierrez-Puertas et al., 2020).

While escape rooms for nursing education are usually designed physically in a patient room, there have been efforts to design virtual escape rooms. Virtual escape rooms come in different forms, using videoconferencing tools, cloud servers, virtual reality (VR) devices, or sometimes combining multiple media (Kubin et al., 2021, Schmuhl et al., 2023). Virtual escape rooms for nursing education overcome the spatiotemporal constraints of physical escape rooms, carrying the potential to be implemented for more students with relatively less cost (Rodriguez-Ferrer et al., 2022). However, there hasn't been an effort to delve into what has been studied in this specific type of instruction, making it hard for practitioners to catch up with the state of the art. Thus, I strive to answer three research questions through a scoping review: (1) What are the existing designs of virtual escape rooms? (2) What are the theories and frameworks used for designing virtual escape rooms? (3) What are the major findings and implications?

Methods

Five educational and medical databases were searched using the search terms "nursing" and "escape." The search yielded 198 results after the duplicates were removed. 47 irrelevant studies were excluded from the title and abstract screening process, and a full-text review was conducted on 151 studies. With the inclusion criteria of (1) being an empirical study on nursing students, and (2) discussing the design, development, and evaluation of virtual escape rooms, 17 studies were selected for review. All reviewed papers were published after 2020 in a peer-reviewed journal.

Figure 1. PRISMA Diagram



Results

Existing designs

The existing designs of virtual escape rooms in nursing education illustrated by the literature shared some common characteristics. First, online tools, such as Google Forms and Slides were extensively used. Several studies employed Zoom, and only two used VR equipment to simulate the virtual space (Kubin et al., 2021; Murphy et al., 2023). One notable finding is that most designs used multiple tools to simulate immersive experiences with different scenario branches. Second, the main purpose of the research was to enhance learning in nursing education, while Schmuhl et al. (2023) adopted virtual escape rooms in inter-professional training. Given that physical escape rooms sometimes serve purposes for assessment or recruitment (Connelly et al., 2018), this implies that the virtual escape rooms are currently used as one of the teaching strategies in online learning. Third, fourteen studies provided empirical evidence in favor of the use of virtual escape rooms which was collected from human participants, although the findings were preliminary and exploratory. Many authors self-developed the measure for knowledge gains, with only Yang et al. (2023) reporting the reliability of the self-developed measure. Five studies used published questionnaires to measure students' opinions on educational practice, stigmatizing attitudes toward people with severe mental disorder, collaborative learning, teamwork, problem-solving, and critical thinking. Fourth, a wide range of clinical topics was covered, including emergency cases such as acute myocardial infarction, cardiovascular disease, diabetes, and patient safety.

Theories and frameworks

As the nature of the field is highly practical, only a few studies included a theoretical framework in their design. Several studies built their argument upon the concepts of game-based learning and gamification while Smith and Davis (2021) leveraged active learning theory

and Vestal et al. (2021) mentioned constructivist theory. While the effort to ground the practice to the theory is evident in the existing literature, instructional models, design principles, or frameworks that guide designing the learning experience were barely used.

Major findings and implications

The existing literature collectively reports very positive results so far, with discussions on the practical implications of virtual escape rooms. They highlight the versatility of the virtual escape rooms for being embedded in learning management platforms, being easily redesigned for a different topic, and not being worn out as physical materials would. However, some researchers reported students struggling with cognitive overload, being too stressed, or feeling overwhelmed while experiencing virtual escape rooms. Yet, the authors emphasize the low-stakes situation virtual escape rooms can offer to go through such scenarios as training.

Discussion and Conclusion

The burgeoning interest in virtual escape rooms within nursing education has sparked considerable academic attention, with proactive faculty members actively engaging in their design and implementation. However, despite the diverse technological approaches, there remains a notable gap in adopting systematic theoretical frameworks to guide the design process effectively.

While some studies draw on theories of game-based learning, gamification, and active learning, many lack a cohesive instructional model or guiding framework. This absence highlights the need for a more systematic approach to designing and implementing virtual escape rooms, particularly in the context of nursing education, where theoretical grounding could enhance the efficacy and educational outcomes of these immersive experiences.

Moreover, while the literature generally reports positive results regarding the effectiveness and versatility of virtual escape rooms, there are notable challenges, such as cognitive overload and feelings of stress or overwhelm among students. These challenges underscore the importance of carefully balancing the immersive nature of the experience with considerations for student well-being and learning outcomes.

Looking ahead, there is potential for leveraging machine learning techniques and educational data mining to analyze discourse within escape room activities, providing valuable insights into student engagement and learning processes. Additionally, further exploration of the differences between physical and virtual escape rooms, particularly regarding collaboration dynamics, could inform the design of more effective and inclusive educational experiences.

In conclusion, while virtual escape rooms hold promise as innovative instructional tools in nursing education, there is a pressing need for a more systematic and theoretically grounded approach to their design and implementation. By addressing these challenges and leveraging emerging technologies and methodologies, educators can unlock the full potential of virtual escape rooms to enhance critical thinking, teamwork, and knowledge acquisition among nursing students.

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