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Tutorless board game as an alternative to tabletop exercise for disaster response training: perception of interaction engagement and behavioral intention

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Abstract

Background Although tabletop exercise is a commonly used method for disaster response training, it is labor-intensive, requires a tutor for facilitation and may not be ideal in a pandemic situation. Board game is a low-cost and portable alternative that can be utilized for this purpose. The purpose of this study was to compare the perception of interaction engagement and behavioral intention to use a newly developed board game with tabletop exercise for disaster training.

Methods Using the Mechanics-Dynamics-Aesthetics' (MDA) framework, a new, tutorless educational board game known as the Simulated Disaster Management And Response Triage training ("SMARTriage") was first developed for disaster response training. Subsequently, the perceptions of 113 final year medical students on the "SMARTriage" board game was compared with that of tabletop exercise using a crossover design.

Results Using Wilcoxon signed rank test, it was that found that tabletop exercise was generally rated significantly higher (with $p < 0.05$) in terms of perceived usefulness, perceived ease of use and behavioral intention compared to tutorless "SMARTriage" board game. However, in terms of attitude and interaction engagement, there was no significant difference between these two learning methods for most of the items.

Conclusion Although a clear preference for tutorless board game was not demonstrated, this study suggests that board game was not inferior to tabletop exercise in fostering interaction engagement suggesting that "SMARTriage" board game could potentially be used as an adjunct for teaching and learning activities.

Keywords Board game, Disaster training, Gamification, Interaction engagement, Behavioral intention

Introduction

Disaster response management is an important subject that should be incorporated in medical and nursing education [1, 2]. This subject should be taught using a multimodal approach by leveraging on a variety of educational tools [1]. One of these frequently used tools is tabletop exercise [1, 3–5]. Tabletop exercise is a cost-efficient, classroom-type disaster response simulation activity where students are presented with an unfolding scenario;

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and through the iterative interactions with one another, the students learn to make decisions in a disaster scenario [5]. Tabletop exercise, however, is labor-intensive and it requires a tutor to facilitate or coordinate the session. Only a limited number of case scenario combinations could be discussed for the entire class in a tabletop exercise. As different students are assigned different roles and tasks, the learning experience of each student cannot be standardized [5]. Furthermore, tabletop exercises would require the gathering of the entire group of students which may not be ideal if the size of the group is becoming too large particularly in a pandemic situation.

One option that could be used as an alternative or a supplement to tabletop exercise in disaster training is through games and gamification strategies. Game is defined as a set of problem-solving activities approached with a playful attitude [6] whereas gamification is defined as the application of game design elements in a non-game context [7]. Generally, a major advantage of using games and gamification strategies for teaching and learning is the fact that it affords the opportunity for students to explore and to learn from mistakes in a safe environment [8]. A type of low-cost game that is portable enough and does not require internet connection or any electronic device to play is the board game.

To the best of our knowledge, although a number of games for disaster response training had been described in literature [9], the use of board game in disaster response training specifically designed for healthcare students is rarely reported. One recently published board game for medical students' disaster training was the "AFTERSHOCK" game designed by a group of German medical students. The aim of this board game is to train medical students to respond to the aftermath of an earthquake [10]. The authors found that "AFTERSHOCK" game was a suitable and acceptable method for disaster training. In that study, however, the level of interaction engagement was not measured and neither was a comparison between the board game with another conventional teaching and learning method made.

To fill in this gap, we conducted a study on a newly developed disaster training board game with the primary objective of comparing the perception of interaction engagement and behavioral intention to use this board game as compared to the conventional tabletop exercise.

Methodology

Setting

In our institution, i.e., Universiti Malaysia Sarawak (UNIMAS), disaster response training is part of our final year medical students' emergency medicine rotation. In this training, a 1 to 2-h tutorial session was first given to all students on the basic concepts of disaster, the different phases of a disaster, the principles of multi-agency field and hospital management and the contingency planning to minimize the impact of any future recurrence. This was followed by a practical session on disaster triaging and response skills, conventionally conducted using tabletop exercise.

Study design

We divided our study into two main phases. In Phase 1, we first described the processes of designing a new educational board game known as the Simulated Disaster Management And Response Triage training ("SMARTriage") (Phase 1 of our project). Subsequently, in Phase 2, we compared the medical students' perception on this tutorless "SMARTriage" board game with the conventional tabletop exercise.

The board game was designed in the year 2020 and the study was conducted throughout in the entire year 2021 (2 semesters). The board game sessions were conducted in our clinical skills training room. The room was spacious enough to accommodate about 12—14 students performing cardiopulmonary resuscitation on manikins at any one time. The tabletop exercise sessions were conducted in smaller tutorial rooms that allow students to break out into 3 smaller groups. Ethical approval was obtained from the institutional medical research ethics board of UNIMAS (reference no UNIMAS/NC-21.02/03–02 Jld.4 (22)).

Participants

For Phase 1, all authors participated in group discussions with the aim of designing and developing the board game. For Phase 2, the entire cohort of 113 final year medical students were recruited sequentially in groups of 43, 36 and 34 students. The medical students had to be recruited sequentially as they came in groups of 30 – 40 students per group for their emergency medicine rotation.

Materials

For Phase 1, the Mechanics-Dynamics-Aesthetics' (MDA) framework by Hunicke et al. [11] for game design was applied. "Mechanics" refers to a set of rules that define what can or cannot be done in the game. "Dynamics" refers to the players' experience and interaction with the rules of the game. "Aesthetics" refer to the intended emotional experience evoked when a player participates in the game. Hunicke et al. [11] further described a taxonomy of at least 9 types of aesthetics, i.e., sensation (game as sense-pleasure), fantasy (game as make-believe), narrative (game as drama), challenge (game as obstacle course), fellowship (game as social framework), discovery (game as uncharted territory), expression