

# A Review of the Progress in the Application of Board Games in Nursing Education

Juan Ge<sup>1</sup>, Fangyu Shi<sup>1</sup>, Wenjia Li<sup>1</sup>, Xuan Lian<sup>2\*</sup>

<sup>1</sup>College of Health Management, Shanghai Jian Qiao University, Shanghai 201306, China

<sup>2</sup>Shanghai Sipo Polytechnic, Shanghai 201300, China

\*Corresponding author: Xuan Lian, 1551241290@qq.com

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**Abstract:** Board games are emerging teaching tools that show good application effects in nursing education. This paper reviews the concept and development of board games, teaching design ideas, and the application effect in nursing teaching, aiming to provide a reference for the further development of board games in nursing education.

**Keywords:** Serious games; Board games; Nursing education; Review

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## 1. Introduction

With the development of information technology, the traditional teaching mode is difficult to fully mobilize the enthusiasm of students, and the phenomenon of “head-down people,” such as playing games and swiping videos, often occurs in university classrooms <sup>[1]</sup>. In order to attract students’ attention and improve classroom quality, teachers need to innovate teaching strategies <sup>[2]</sup>. Serious games can enhance students’ motivation and engagement, and improve nursing students’ theoretical performance and satisfaction <sup>[2-6]</sup>. As a type of serious game, board games are relatively easy to develop, do not rely on external systems such as networks or servers, and are highly regarded for their ability to effectively promote student interaction and improve their reflective skills <sup>[7]</sup>. In recent years, they have been gradually applied to various educational fields such as pharmacy <sup>[8]</sup>, dermatology <sup>[9]</sup>, and nursing <sup>[10]</sup>. This paper intends to review the application of board games in the field of nursing teaching, in order to provide a reference for the development of board games in nursing education in China.

## 2. Concept and development of board games

A board game is a strategic game that applies game principles and game design to place and follow certain rules to move pieces on a board labelled with a specific pattern, which may contain props such as dice, cards, tokens, etc. <sup>[11-13]</sup>. Board games have a long history and diverse origins, involving several ancient civilizations. One of the

oldest board games in the world is the Ancient Egyptian “Senet Chess”<sup>[14]</sup>. The “Senet Chess” game incorporates both secular and religious cultures into the game content and lays the foundation for the evolution of subsequent board games through the strategic movement of pieces on the board<sup>[15]</sup>. In recent years, the field of education has continued to evolve, with board games being incorporated into curricula from kindergarten to higher education as a pedagogical tool<sup>[12,16,17]</sup>. In the practice of nursing education, board games are mostly a teaching method in which teachers integrate nursing-related professional knowledge into the design of the game, including the development of game elements and rules, so that students can reach the end point of a predetermined board through a race, or determine the winner of the game by accumulating the number of points<sup>[10,18]</sup>.

### **3. Board game teaching design ideas**

#### **3.1. Teaching content selection**

Currently, board game teaching is used in both nursing classroom education and clinical training. In nursing classroom education, researchers tend to choose consolidation courses, teaching content that is not easy for students to master or has a clear structure to be integrated into board games. For example, Shang *et al.*<sup>[18]</sup> chose the whole-body physical examination in the health assessment course as the teaching content, originating from the fact that the whole-body physical examination belongs to the consolidating knowledge, which can help students to integrate the knowledge of each independent system previously learnt, and to form a more complete knowledge system. Wu *et al.*<sup>[19]</sup> applied the board game to the psychiatric nursing course, and the game revolved around the concepts of mental illnesses that were easy to confuse for the students in the process of learning, such as different types of mental disorders, medical diagnosis, pharmacotherapy, and therapeutic communication skills. Chiu *et al.*<sup>[14]</sup> argued that the systems of medical and surgical nursing are taught in a clear and similar structure, and that the etiology, clinical manifestations, and nursing interventions can be integrated into the board grid. In nursing clinical training, the selection of the teaching content of the board game can be integrated with the clinical nursing needs, the importance and complexity of the teaching content, and other factors. For example, Wang *et al.*<sup>[20]</sup> carried out a board game teaching design, selecting extracorporeal membrane lung oxygenation as the teaching content, based on the fact that it is a highly complex and high-risk life support system, which requires nursing staff to be familiar with the pathophysiological knowledge of various body systems, and at the same time, need to closely observe the parameters of the extracorporeal membrane lung machine in order to prevent and identify complications, which is crucial and challenging for nurses in the intensive care unit.

#### **3.2. Design forms**

In addition to the need to develop simple game rules for the application of board games in nursing teaching, the key lies in how to effectively integrate nursing teaching content into board games. According to the different ways of integration, the design form of board game teaching can be roughly divided into three kinds. One is to make the teaching content into cards separately, arrange the cards into a board travelling track, or ask players to directly draw cards to answer questions. For example, Chang *et al.*<sup>[21]</sup> designed a set of cards for 14 drugs commonly found in Taiwan hospitals, with a photo of the drug printed on the front side of each card, and textual information such as indications, mechanism of action, and side effects of the corresponding drug listed in detail on the reverse side. Twenty-eight cards (2 cards for each drug) were randomly arranged face up in a circle as a path

of travel on a chessboard. At the same time, 14 back-facing cards are placed in the middle of the circle. Players are eliminated if they mismatch the cards in the travelling path with the cards in the middle of the board. Wang *et al.* [20] designed the “10-second life and death game” and the “red with green game.” The former is played in small groups and requires players to answer card questions correctly within 10 seconds. In the latter, the teaching content was embedded in two types of cards, red and green, with red being clinical care problems and green being care measures, and players were required to correctly match the cards within a specified time. The second form of design is to make the teaching content directly into a board track. For example, Shang *et al.* [18] used the human anatomy as a chessboard, with the head as the starting point of the game and the foot as the end point. The content of the chessboard grid is the anatomical position of each organ corresponding to the examination items, and the first team to reach the end wins. The third form of design is to integrate the teaching content into the chessboard. For example, Chiu *et al.* [14] in the internal medicine and surgical nursing course, for different system diseases have the characteristics of the teaching structure is relatively similar, drawing on the Monopoly game mode, with the disease as the main axis, the definition of the disease, pathogenesis, clinical manifestations, auxiliary examination, and the treatment and nursing points, such as arranging into a chessboard path. Each of the above teaching methods has its own characteristics. The first one can incorporate rich knowledge points into the cards, increasing the depth and breadth of game education. The second helps students deepen their understanding of knowledge through visual and spatial memory. The third one closely integrates the game process with the learning objectives, provides an immersive learning experience, and promotes students’ comprehensive mastery of knowledge.

### 3.3. Design principles

#### 3.3.1. Fun

The fun of game teaching is a key factor in increasing students’ intrinsic motivation to learn, and ensuring that board games have a certain degree of fun can stimulate students’ curiosity and desire to explore, and improve their learning efficiency. Simpson *et al.* [22] set up a board game café for nursing students at the University of Nottingham, UK, which means that a café-like environment was created within the classroom to allow students to learn and communicate in an informal and relaxing atmosphere for students to learn and interact in order to increase the fun of the game. Shang *et al.* [18] added branch lines, forbidden points, backward points, direction change points, and other game elements in the board game to create a confrontation atmosphere, and at the same time, explored ways to change forbidden points to compulsory questions to increase the difficulty of the game and increase the fun. Heish *et al.* [23] gave the board game the theme of “Let’s Fight Fire,” drew real-life scenarios to design the game plot, and equipped it with role cards such as the field commander, announcer, firefighter, and evacuation team, etc., with the aim of increasing fun and encouraging all medical staff to participate in learning fire prevention. In view of this, the researcher can improve the fun of the board game by improving the game environment, optimizing the rules of the game, and improving the design of the game scene.

#### 3.3.2. Fairness

Lack of fairness in game design will prompt players to become frustrated and defeated, affecting the playability of the game and not conducive to the maintenance of a positive learning environment. Currently, most researchers provide players with a relatively fair game experience by applying randomization principles, appropriate supervision, and iterative design [12,17,18,24]. For example, Surapaneni *et al.* [17] designed a board game instruction that emphasizes grouping students randomly and ensuring the fairness of the game by casting dice and randomly

drawing cards. In addition, maintaining fairness through Delphi expert consultation, optimizing board paths, and balancing problem difficulty are also key strategies <sup>[18,24]</sup>. Almeida *et al.* <sup>[24]</sup> selected 17 qualified experts for 2 rounds of Delphi expert consultation through a combination of convenience sampling and snowball sampling methods, whereby the instructional content needed to be supported by more than 70% of the experts, and no other experts suggested modifications to be included in the game design. Shang *et al.* <sup>[18]</sup> designed two main and branch lines with a similar degree of difficulty in order to ensure that each player has an equal chance to complete the task on different paths. Meanwhile, with the results of the interviews, it is proposed to classify the operation and theory answer cards into “difficult,” “medium,” and “easy” levels to match the difficulty level, i.e., nursing students who have completed the high-difficulty operation items can choose from the simple theory answer cards if they need to answer the questions, so as to emphasize the fairness of the game.

## **4. Effectiveness of board games in nursing teaching**

### **4.1. Stimulating learning interest and consolidating theoretical knowledge**

The combination of board games and teaching content can prompt students to absorb real-world knowledge, abilities, and literacy in a relaxing and enjoyable gaming situation, and stimulate their interest in learning <sup>[25,26]</sup>. The effect of board game teaching method on the interest and mastery of pharmacy knowledge of nursing college students was investigated in a randomized controlled study conducted in Taiwan region by Chang *et al.* <sup>[21]</sup>, in which the students in the experimental group experienced 1 hour of board game teaching while the students in the control group attended 1 hour of traditional teaching lectures. The results of the study <sup>[21]</sup> showed that board game teaching stimulated students’ interest in learning pharmacy knowledge, and students’ satisfaction scores were significantly higher compared to the control group. Although there was no statistically significant difference between the two groups after the intervention, the experimental group had significantly better pharmacy knowledge than the control group 1 month after the end of the intervention, which indicates that teaching through board games is conducive to the consolidation of students’ theoretical knowledge, and prompts the transformation of learning content from short-term memory to long-term memory, thus improving the learning effect. In another study, Wu *et al.* <sup>[19]</sup> randomly divided 108 nursing college students into two groups and intervened with board game teaching and traditional teaching, respectively, and found that the experimental group had significantly higher scores than the control group in terms of learning attitudes, knowledge, and satisfaction after 8 weeks. Heish *et al.* <sup>[23]</sup> trained 122 clinical nurses in fire prevention, in which the research group used a board game teaching method, and the control group used the traditional emergency drills. The results showed that the board game teaching method was effective in improving the level of fire safety knowledge, attitudes, and behaviors of the clinical nurses, especially in the area of fire safety knowledge, which showed statistically significant differences compared to the control group. In conclusion, the board game teaching method can stimulate learners’ interest in learning and teach traditional teaching methods with significant advantages in consolidating theoretical knowledge and promoting long-term memory.

### **4.2. Strengthening nursing skills and enhancing clinical reasoning**

The board game teaching method not only enhances learners’ knowledge but also prompts the transformation of theoretical knowledge into clinical practice, thus enhancing their clinical practice. A study conducted by Lavender *et al.* <sup>[27]</sup> in three countries, Kenya, Malawi, and Tanzania, integrated the skills required by midwives into board

games, and the results found that board games could significantly improve the competence of midwives and midwifery students in the area of labor monitoring, and that this skill-enhancing effect was maintained three months after the end of the intervention. Clinical reasoning is the ability of nurses to use professional knowledge, clinical experience, and critical thinking to accurately identify and manage patient problems and to evaluate the process and outcomes of care <sup>[28,29]</sup>. Studies <sup>[30,31]</sup> have shown that board games, as a teaching tool, are effective in reducing learning anxiety and enhancing problem-solving skills, contributing to the development of clinical reasoning skills. Wang *et al.* <sup>[20]</sup> divided ICU nurses into a board game teaching group and a classroom teaching group, using the hospital as a randomized grouping unit. The former required nurses to collect abnormal data, then identify nursing problems based on clues, followed by matching the appropriate nursing measure cards, and finally performing a nursing evaluation. The latter only conducted basic questions and answers. It was found that nurses in the board game teaching group significantly improved their clinical reasoning skills at both 1 and 3 weeks post-intervention and outperformed the classroom teaching group. De *et al.* <sup>[31]</sup> conducted their own before-and-after controlled study at a Brazilian university, incorporating expert opinion to include 9 clinical cases of similar difficulty, testing students' analytical skills in 2 clinical cases before and after the board game was implemented, and the remaining 5 clinical cases were used to teach the game. It was found that students' reasoning skills significantly improved after the board game was implemented, especially with regard to the accuracy of primary and secondary care issues. In addition, studies <sup>[32,33]</sup> found that simulation, situational simulation, and problem-based teaching methods had a positive impact on the nurses' clinical nursing competence. Subsequent studies could further explore the differences between board games and other pedagogies in enhancing clinical reasoning skills.

### **4.3. Providing real-time teaching feedback to increase interprofessional learning**

Researchers can obtain real-time teaching feedback by observing the players' performance in the game, assessing their understanding of knowledge, and providing a basis for subsequent teaching and training <sup>[22]</sup>. The board game developed by McMaster University in Canada <sup>[34]</sup> incorporates the emergency triage system, and the game process is recorded through video in order to identify players' cognitive errors in the emergency triage process, which in turn clarifies the focus and difficulty of subsequent teaching. Additionally, board games provide learners with a platform for face-to-face, immediate interaction and communication, which helps to promote communication and collaboration among team members and increase inter-professional learning <sup>[18,35]</sup>. Qualitative interviews <sup>[18,27]</sup> found that the competitive attributes of board games motivate team members to work together, which is important for developing learners' teamwork. American researchers <sup>[36]</sup> randomized 148 university students majoring in nursing, rehabilitation, and food nutrition. Students in the experimental group were randomly selected role cards representing different healthcare professionals, such as nurses, pharmacists, rehabilitation therapists, and dietitians, etc., and were then matched with the most appropriate three healthcare professionals based on specific healthcare scenario cards within 20 seconds. Students in the control group experienced a traditional poker game. It was found that students in the experimental group made significant progress in recognizing and understanding the roles of other healthcare professionals, as well as in inter-professional learning and perceptions of this type of collaborative education. In conclusion, the board game pedagogy not only provides real-time pedagogical feedback to the researcher but also leads to teamwork and increased inter-professional learning.

## 5. Conclusion

At present, in order to adapt to the traits of college students in the new era and improve the effectiveness of teaching, it has gradually become a trend to integrate the concept of serious games into teaching. Board game teaching method is a branch of serious games, which can stimulate students' learning interest, enhance their clinical reasoning ability, and promote teamwork. At the same time, it can provide teachers with real-time teaching feedback, which can help guide subsequent teaching. Nevertheless, board games still face challenges in specific applications, such as insufficient fairness assurance, imbalance between pedagogical and recreational aspects, and high teachers' time investment, etc. It is suggested that future researchers can further explore the board games in terms of balancing the pedagogical and recreational aspects of board games, optimizing the assessment content to ensure fairness, and developing shared resources to reduce teachers' time investment.

## Disclosure statement

The authors declare no conflict of interest.

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