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Instructional Design: Under the Concept of Game Based Learning for Nursing Education

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Abstract

Game-based learning (GBL) is a method that motivates students to learn content in a fun way. Learners are motivated by challenge, fantasy, and curiosity in games. GBL provides learners with the opportunity to test the game and empower them to make decisions. The course content can be inserted into the minds of the learners through the game to help them develop and achieve higher learning outcomes. GBL can be used for both traditional classroom teaching and online teaching. This article presents information about game-based learning management. The concept of game-based learning and a review of the design elements of educational games are discussed. We then review the game development process and the implement of games in the classroom as well as assessing outcomes. Lastly, GBL trend for nursing education is discussed.

Introduction

Higher education is essential to society because it prepares graduates to work or train for a career. Learning by memorizing or studying by lecture is not enough in this era of high competition. It is necessary that a change in learning style must be implemented through proactive learning management. Instructional design should be changed from a lecture to learning activities and involve actively engaging students in teaching and learning activities in the classroom. Teachers become the director of learning management through learning activities (Chooha et al., 2019). When the role of the teacher become a facilitator of knowledge, then it is possible to design a classroom for effective learning and implement teaching and learning activities effectively. Student's understanding arises when the teacher offers opportunities for learners to create knowledge for themselves.

The global Covid-19 pandemic has led to an urgent change in the education of nursing students from traditional to distance learning. The active engagement of nursing students has deteriorated over time. Therefore, there has been a widespread search for teaching methods that balance learning, enjoyment and active student participation, such as game-based learning (GBL). (Tavares, 2022). Game-based learning (GBL) is a new teaching tool in the field of education research. Researchers have highlighted various benefits of using GBL, such as improved academic performance (Hwang & Chang, 2020), higher learning motivation, and greater retention of acquired knowledge (Kao, 2020). The result of research on applying game-based learning to enhance the participation of students proved that adding game elements in operating system courses can increase the level of attraction of syllabus to students and the students would be willing to spend time in

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courses because they want to win, thus fulfilling the purpose of elevating learning motivation (Lai et al., 2012). In addition, Camacho-Sánchez et al. (2023) identify GBL and gamification as significant learning methods due to their impact on student motivation, academic performance and commitment to improving health and physical performance.

To meet the developing needs of today's nursing students and the demand for 21st-century skills in current healthcare, game-based learning is increasingly becoming a strategy to complement simulation strategies in nursing education. It can improve learning outcomes while enhancing learning experiences by promoting engagement and motivation (Xu et al., 2021). At present, nursing education is rapidly evolving. Game-based learning has been gradually used for education and several innovations have emerged. The emergence of serious games and gamification provides alternative approaches for educators to improve the nursing teaching process. Both serious games and gamification exert their education-promoting function by providing the possibility of combining learning activities such as feedback, testing and spaced repetition with active participation and autonomy as well as positive experiences for students. Developing effective GBL modalities has the potential to bring immersive experiences for medical students and improve their study outcomes. Herein, we reviewed recent studies employing GBL in medical education, including serious games and gamification teaching. Furthermore, we also discussed the effectiveness and limitations of GBL to suggest future directions for the development and application of GBL in nursing education.

Game-based learning activities can create a fascinating learning environment for students to improve their study outcomes. The benefits of GBL on learners include enhancing their collaborative awareness, providing them with opportunities for active learning to better solve clinical problems and improving their clinical reasoning and decision-making skills. Furthermore, GBL can enable educators to explore novel and feasible teaching strategies, which contribute to the reformation of current didactical activities. Therefore, the application of serious games and gamification in medical education is meaningful (Jan & Gaydos, 2016; Gudadappanavar et al., 2021; Xu et al., 2023).

This article presents information about game-based learning management. The concept of game-based learning and a review of the design elements of games. We then review the game development process and then discuss the use of games in the classroom and assessment. Lastly, GBL trend for nursing education is discussed.

The concept of game-based learning

1. Definition of game-based learning

Kirriemuir & Mcfarlane (2004) described game-based learning (GBL) as a medium of gaining knowledge and skill acquisition via gameplay where game activities require the player to solve problems and challenges provided to gain achievement. GBL is the borrowing of certain gaming principles and applying them to real-life settings to engage users. The motivational psychology involved in GBL allows students to engage with educational materials in a playful and dynamic way. GBL is not just creating games for students to play, it is designing learning activities that can incrementally introduce concepts and guide users toward an end goal (Pho & Dinscore, 2015). GBL describes an environment where game content and gameplay enhance knowledge and skills acquisition and where game activities involve problem-solving spaces and challenges that provide players/learners with a sense of achievement (Qian & Clark, 2016). GBL is a style of learning that uses games as an instructional method to promote effective learning. A game helps attract learners' attention and allows students to have fun while learning (Jan & Gaydos, 2016).

Summary, GBL is where game characteristics and principles are embedded in learning activities that promote student engagement and learning motivation. GBL is also an active learning technique where games enhance student learning with a learning context designed by teachers. Components of GBL include point systems, discussion boards, quizzes and classroom response systems.

2. Types of game-based learning

Exploring the world of GBL will open the door to many types and examples of games. Compared to games outside of the education space, "serious games" are ones designed to teach or help students practice specific skills or content. Dimitra et al. (2020) described some of the most common type of game-based learning that include:

2.1 Flash Cards are games that uses a traditional or game-specific deck of cards. "War" is a traditional card game that can have a mathematical twist. The study of Fernandes et al., (2021) identified the use of card games with patients in palliative care, assessed self-reported

satisfaction and synthesized findings on the effectiveness of its application. The card game to facilitate conversations with patients in palliative care is a productive and effective approach to discussing uncomfortable topics of death, dying and end-of-life care.

2.2 Board games include playing on a board that usually involves the movement of pieces. Chess and checkers are popular ones, but there are hundreds if not thousands of board game to explore. A gerotechnology board game was implemented in clinical nursing practices and functioned as a playful resource to exercise self-determination and independence among older adults, boosting memory, self-esteem, socialization processes, exchanging experiences and shared learning (Olympio & Alvim, 2018). In Thailand, board games are used to teach financial literacy among teenagers and improves the critical thinking skill of people (The Nation Thailand, 2018).

2.3 Simulation games are designed to closely simulate real-world activities. For example, Koivisto & Eriksson (2020) designed a gamified simulation to evaluate the effectiveness of a simulation game on nursing students clinical reasoning skills.

2.4 Quiz games are typically designed to explore the properties of language or the ability to use a language itself such as Kahoot game. In prior research the effects of Kahoot game-based versus nongame-based learning achievements and anxiety among nursing students showed that: Kahoot improves learning achievements and decreases agitation among students in game-based groups compared to nongame-based groups (Ofori et al., 2020).

2.5 Puzzle games emphasizes puzzle solving through one's use of things such as logic, word completion, sequence solving, as well as spatial and pattern recognition.

2.6 Reality testing games are electronic games wherein players can manipulate what appears on the screen such as augmented reality (AR) and virtual reality (VR). The virtual simulation was found to have high-quality outcomes that are related to the student experience and satisfaction with the learning environment, acquisition and retention of knowledge correlated to clinical concepts and the development of performance-based skills, including performing procedures with improvements in the ability to complete the scheme and efficiency during the step (Lee et al., 2020).

2.7 Role-playing games are interactive which players assume the role of imaginary characters who engage in adventures.

3. The benefits of game-based learning

Game-based learning can create a dynamic that can inspire learners to develop skills and competencies as they focus on the activities of the game. They can function as individual learning activities, a powerful content delivery mechanism over several sessions and last for the duration of the course. To deliver a range of a game, faculty members tend to divide the syllabus into levels through which the students must progress, with students getting feedback rather than grades. For it to be effective, the game must align with learning outcomes and should not be competitive in the conventional sense. The benefits of game-based learning are as follows: 1) helps in retaining learning insights, 2) learning through familiar devices, 3) stimulating imagination, 4) learning to last a lifetime, 5) helps in simplifying complex concepts, 6) learning by doing, 7) improving sales, 8) collaborating, 9) reducing chances of failure in the real world and 10) higher receptivity to learning (Hurix, 2023). A well-designed game and supporting materials in the classroom can make education more relevant by allowing students to assume different roles, confront problems, make meaningful choices and investigate the consequences of these choices. Teachers are now confronted with larger classrooms with widely disparate capabilities. These types of learning materials and educational board games allow students to take on various challenges, fail in a safe environment and eventually succeed and level up at their own pace. The use of games in the classroom allows students to develop an emotional connection to learning and subject matter. It gives them the chance to get feedback and practice. The games can also be tailored to fit specific teaching situations. Furthermore, games encourage students to participate more actively in their classes and healthy competition can boost their motivation. As students feel more capable of achieving their interim goals, they feel more successful and can see their progress. They also learn about the availability and value of alternative procedures for gaining a better understanding of their subjects. All of this helps students become more confident, independent thinkers who are better prepared to take on large projects and see them through to completion. While we have accepted that games in class are beneficial in key aspects of a student's learning, let us now look at how games work to improve multiple aspects of a student's learning.

The game development process

Game-based learning is a great way to improve student learners' creativity, critical thinking, and problem-solving skills. It is based on the use of imagination. Instructors can give students the freedom to come up with solutions and ideas which boost their level of creativity. Game-based learning incorporates game characteristics and principles into learning activities. Learning activities inspire student engagement and enthusiasm to learn. The motivational psychology involved in game-based learning allows students to engage with educational materials in a playful and dynamic way. Points systems, badges, leaderboards, discussion boards, quizzes and classroom response systems are all components of game-based learning (Prodigy, 2021; Bulut et al., 2022).

From our lesson to learn, we concluded that the principles of game-based learning consist of 1) Practice game-based learning design must cover various exercises. 2) Learning by doing must focus on a self-learning, which self-learning will allow learners to understand more deeply. 3) Learning from mistakes, allowing learners to learn from mistakes. It does not hurt to learn from mistakes. 4) The game must have a clear goal for goal-oriented learning. What to let students learn so that the learners try to achieve their goals and 5) The learning point must contain all the relevant information or critical issues that the learners should learn so that students can apply that knowledge to practical use.

Games may help us obtain and remember facts and figures, but games are best utilized when designed around a concept as a learning goal. Therefore, we use the ADDIE Model process in this context to create game-based learning (Aldoobie, 2015; Prachuaplap, 2016). The ADDIE model is an instructional design model used by training developers and other educators. It consists of five critical phases: Analysis, Design, Development, Implement and Evaluation.

1. Analysis

1.1 In the analysis phase, instructional problem is clarified, the instructional goals and objectives are established, and the learning environment and learner's existing knowledge and skills are identified. Below are some of the questions that are addressed during the analysis phase:

* Who is the audience and their characteristics?
* Identify the new behavioral outcome?
* What types of learning constraints exist?
* What are the delivery options?

1.2 Analyze relevant factors such as the number of students' basic knowledge and learner's learning styles. Analyze the content to determine the scope of the content. Prioritize content to connect relationships by defining main topics, subtopics and resources conducive to development to formulate a development plan.

2. Design: Designing the game

2.1 Write down your ideas. You never know when the perfect inspiration is going to hit. You may find that combining two different ideas makes a neat new game concept. Keep a log of ideas in a notebook, on your computer, or in a note-taking app on your phone.

2.2 Develop your game with a theme. Themes are the "feel" of a game and can also be referred to as the types of game-based learning.

2.3 Use mechanics to develop your game, alternatively. Mechanics are the ways players interact with the game and each other. In Monopoly, the mechanics are centered around dice-rolling, buying/selling property and making money. The mechanics of Axis & Allies involve moving pieces across a large board and resolving player conflicts with dice rolls.

2.4 Determine the age range of your players. The age range of your players will influence the complexity of your game board and its rules. If you are designing a game for students, your game should be simple, easy to understand and fun.

2.5 Set player, time and size limits for your game.

2.6 Decide how players will win. Once you have the basic ideas behind your game written down, ask yourself, "What are the winning conditions of this game?" Consider the different ways the player could win and keep these in mind as you work on the game.

2.7 Write out the basic rules. These will undoubtedly change as you continue to develop your game, but a basic set of rules will allow you to begin testing quickly.

3. Development: Making a prototype and playtesting the prototype

Make a prototype to use and evaluate your game (Alpha testing to game designers). This is a phase of the process after game design elements have been brainstormed and the creation of a playable game is started. Game designers can use anything in creating a prototype. Before you begin work on the finished product, create a rough prototype so that you can play around with it. It does not have to be pretty, but a hands-on experience will help you to see if the basics work the way you planned. A prototype is a vital part of

the game creation process, as it gets ideas out of your head and into the real world where you can evaluate them with other players. Hold off on adding artistic details until you begin assembling the final product.

3.1 Sketch a rough draft of your board design. In this step, you will use your storyboards as a guide in creating your game to ensure that you are on the right track.

3.2 Assemble prototype game pieces. Buttons, checkers, poker chips, chess pieces and knickknacks work well as prototype game pieces. Avoid using game pieces that are too large for your prototype, since these can make it difficult to read information written on the board. Game pieces can change considerably over the course of your game's development. Keep prototype game pieces simple so you do not invest a lot of time designing something that ends up getting changed.

3.3 Use game cards to add variation. Randomly shuffled game cards will affect players in unexpected ways. A card often tells a quick story about an event that befalls a player and then changes their score/position/inventory accordingly.

If prototyping is the alpha test, playtesting is the beta. This phase can be the most frustrating, but also the most important part of the design process. It is important that you find people to play the game who are not biased to the designers and who are not told how to play the game. Observing gameplay will allow designers to revise game elements.

3.4 Test your prototype by yourself. Once you have all the basics assembled for your prototype, you can start testing the game to see how it plays. Before trying it out on a group, play it by yourself. Play through the game as each player and record any positives or negatives you notice as you play.

3.5 Test your game with friends. After you solo played your game enough to work out most of the kinks, it is time to playtest. Gather some friends and explain that you would like them to test your game. Let them know that it is a work in progress and that you'd appreciate any feedback.

3.6 Switch up the test players for a better perspective of your game. Everyone approaches games differently and some might see things missing that you would not have realized on your own. The more people you get to test your game, the more opportunities you will have to find flaws or weak points and fix them. Refine your prototype throughout testing. As you finish each playtest, make necessary changes or adjustments to your game board, rules and other components. As you continue to test, keep track of the features that you have changed.

4. Creating the Final Product

4.1 Make a list of needed materials. Once testing is complete and you are happy with your game, you can get started on the final version. Each game will have unique needs, so your materials may vary. Make a list of all the parts your finished game will require so you do not forget anything.

4.2 Illustrate your board. Your game board is the centerpiece of your board game, so feel free to get creative with the design. Make sure that the path or playing field is clearly marked and that all the instructions on the board are easy to read.

4.3 Create the game pieces. The simplest way of doing this is by drawing or printing images on paper and then taping or gluing them to a sturdy backing, like cardstock. If you are making a game for family or friends, you can even use real photos of players.

5. Implement: Implement GBL in the classroom

This phase is about transforming the plan into action. Instructors proved the influence of game-based learning strategies on students' learning effectiveness. In particular, the combination of game-based activities and flipped teaching distinguished from traditional flipped instruction, which focuses on video watching or using static digital teaching materials. Thus, this study developed a digital game based on the content of the learning units in the teaching materials. Students arranged to play the game before engaging in classroom learning activities in the flipped classroom. For instance, to investigate its effectiveness in boosting learners' motivation, this study conducted an experiment where the experimental and control groups engaged in different learning activities.

6. Evaluation

Their learning effectiveness was then assessed and the participants of the experimental group filled out a learning perception questionnaire at the end of the game-based learning activities. The results were analyzed and discussed. The evaluation phase consists of two parts: formative and summative. Formative evaluation is present in each stage of the ADDIE process. Summative evaluation consists of tests designed for domain specific criterion-related referenced items and providing opportunities for feedback from the users.

In this part, the author summarizes the design of a measurement and evaluation tool based on learning objectives from using board games. Measurement and evaluation tools include tests, interview forms,

questionnaires, measurement forms and lessons learned, which are analyzed to be used to measure and evaluate using board games for learning as follows:

6.1 Knowledge, memory, comprehension, classification and conceptual content should use lessons learned and quizzes to focus mainly on the development of student achievement. The advantage is that knowledge is precise. The disadvantage is that measuring and making measurements separate from learning activities is too stressful.

6.2 The content is related to the rules and their implementation. Lessons learned, questionnaires, interview forms, or subjective tests should be used. Because the nature of the commission, students can design their performance based on their opinions.

6.3 Game-based learning is widely employed and, if successfully executed, significantly enhances students' engagement and skill in learning in the classroom. It is essential to measure skill improvement to stay informed of the students' progress. Therefore, an assessment checklist and observation should be used by an instructor to measure and evaluate a student's skills.

6.4 Attitude-related content: educators used lessons learned, questionnaires and interview forms because the desired outcome is partial based on the way students think and feel about game playing.

Under the measurement and evaluation approach, there are tools to seek answers to the outcomes of using learning games. Measuring and evaluating lead to the learning outcome should not use the game once or once and then measure the result because it cannot lead to the development of students. Students learning development takes a reasonable amount of time with both formative and summative evaluation in the classroom. The focus is on inter-process evaluation, which uses single-point rubric assessment criteria. In addition, each person is sensitive to thinking and making decisions while playing the board game. Therefore, the use of simple measures must be able to capture student behavior. It may be an expression of gestures, words, and conversations in the game, which can be considered and easier evaluated with rubrics.

Game-based learning was used for many different courses or content in nursing education. Simulation games were the most used game type. Game-based knowledge facilitated the achievement of learning outcomes primarily in the cognitive domain. Some gamification and design-related aspects of game-based environments were evaluated as positive and negative. Game-based education helps assess learning outcomes in only three studies.

The use of game-based education intervention was found to have enhanced the nursing students' learning experiences, given its advantages as being motivating, engaging, enjoyable and conductive. Game-based learning is an alternative educational approach that can support and complement current teaching methods in nursing (Xu et al., 2021). Even with the emerging technologies in game-based learning, board games will still be relevant in many situations. Due to the divergence of media and technologies, board games are being re-introduced on tablets and online.

We summarized the process of game instructional design for evaluation as shown in the Fig. 1.

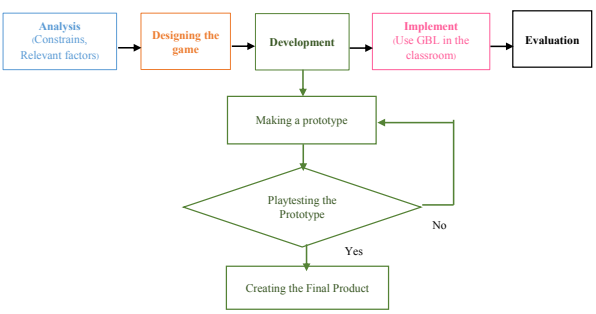

Fig. 1 Process of game instructional design for evaluation

Evidence of impact and outcomes of game-based learning

Previous reviews indicate that the most frequent outcome-investigated in educational game studies was knowledge acquisition (Connolly et al., 2012; Li & Tsai, 2013) the studies investigating problem-solving skills (Li & Tsai, 2013) and affective and motivational outcomes were examined more frequently in entertainment game studies (Connolly et al., 2012). Although educational game studies reveal varying degrees of success dependent upon academic topic, learner preferences and participant age (Hays, 2005; Young et al., 2012) impact the development of 21st century skills. Skills relevant to the 21st century are dramatically different from skills the educational system currently values (Squire, 2005). The 21st century learning and innovative skill set is defined as critical thinking, creativity, collaboration and communication (Binkley et al., 2012). Critical thinking skills include scientific reasoning, systems thinking, computational thinking,

decision making and problem-solving. Creativity includes divergent thinking, innovative thinking, originality, inventiveness and the ability to view failure as an opportunity to improve. Collaboration pertains to the ability to work effectively and respectfully with diverse teams, exercise flexibility and willingness to make compromises to accomplish goals and assume shared responsibility. Communication refers to the ability to articulate thoughts and ideas in a variety of forms, communicate for a range of purposes and in diverse environments and use multiple media and technologies. Traditional educational practices often hinder creativity by emphasizing only one correct answer, imposing high-stakes failure and favoring conformity and standardization (Plucker & Makel, 2010). In Thailand, the concept of game-based learning has begun to be used in teaching and learning. Prior studies have shown that the game-based learning group had a knowledge score higher than non-game-based learning (Chaeye & Thammajinda, 2020; Pholtana, 2020; Sornarkas, 2021; Maneejak et al., 2022, Thongpradab et al., 2022). In addition, Sirisawat et al. (2019) studied the effect of 2(CPA) model with a game on critical thinking in nursing student. The result of the study revealed that the student had a higher critical thinking score and was found to be highly satisfactory in all aspects. Lecturers' application of game-based learning to teaching can better integrate the contents of the course for the learners. This technique could contribute more effectively to the learners' improvement of their knowledge of the course contents. Therefore, we can summarize outcomes of game-based learning as shown in the following pictures and details (Fig. 2).

Fig. 2 Summarize outcomes of game-based learning

1. Problem-solving

Yang (2012) stated that a digital game where students designed their own cities using simulation games showed that student's had stronger problem-solving skills. Prior studies revealed that playing games helps improve student attentiveness. As games can move quickly, a student needs to be alert and attentive for extended periods (Yang, 2012). According to the study of Prajankett et al. (2022) about the effect of organizing learning activities based on gamification concept toward problem solving skills of nursing students. After at the end of the determining the outbreak learning activity, the results showed that the nursing students had higher average problem-solving skills than before participating in the activity with statistically significant at the .05 level.

2. Engagement in education

Traditional teaching has provided classroom settings where the engagement level of the students is minimal, often relying on a lecture tactic. GBL can be prepared with a platform that allows students to become engaged and studies show that playing games in the classroom can increase overall motivation. Students become more motivated to learn, pay attention and participate in in-class activities. GBL engages students and enhances studying (Gallegos et al., 2017). They can also be a great classroom management tool, helping to motivate a class. Grech & Grech (2021) indicated that levels of engagement and interaction were higher in the game-based webinar.

3. Immediate feedback

When student's complete tests, assignments, projects, etc., the feedback turn-around time may be too long for them to benefit from the learning. For example, when a mid-unit test is completed, if the feedback is not received until three-quarters of the way through the unit, those students who did not fare well may receive the comment too late to understand the rest of the content (Safeena Beevi & Veragi, 2023). One of the primary benefits of using games is that the feedback can often be instantaneous. This feedback immediately assists the students in their journey to mastering the content and can help them correct their mistakes to further their understanding. Many of these digital games even have a feedback system that can go directly to the teacher, allowing educators to monitor their student's progress and make necessary adjustments.

4. Safe for mistakes

Learning from your mistakes is, at times, one of the best methods of learning how to do something new or

improve your skill set in a particular area (Byrd, 2023). In video games, the ability to make a mistake and be able to try again is a beneficial component to help complete the mastering process. That can help solidify the idea that failure is not only okay but should be embraced. Providing a safe space in the classroom, where students may be afraid to make mistakes, will allow them to be creative and explore this classroom culture, which permits them to make mistakes. Therefore, they can learn without worrying about the opinions of their peers. In addition, students improve their learning and gain confidence in their decision-making as they master the content, which may ultimately progress their classroom skills outside the games. As much as matches in the classroom are about learning a concept, they are also about learning from what goes wrong, which gives students both the problem-solving development we already mentioned and the social-emotional benefits (Castro et al., 2019).

5. Utilize multiplayer based games

Utilization of multiplayer-based games over single-player-based games adds a factor for the students playing: collaboration, whether it's working as a team or against each other, while also adding a higher-level order of thinking to solve the problems that are changing depending on who else is taking part in the games (Tavares, 2022). Depending on the students, some may find motivation to try harder to show their peers they are capable. Perhaps these students will even try to beat their peers at the task or work hard to benefit the team if they are working in a team. For example, you can have the total time of the group add up to see which team performed the fastest by total time or by averages. The effects of game-based learning are principal elements of effective learning environments, which influence students and academics through reciprocity and cooperation communication of expectations and respect for the various learning approaches of students (Urh et al., 2015).

6. Incentives

While providing reinforcement is suggested, frequently, it does not work as well as people may think. Providing incentives sometimes during games may result in students putting in their best effort to complete a match to the best of their ability. Regarding the previous suggestion of using single-player games with speed-based requirements, using these results where the teams can have the option to do something dependent on where they finish can have the students try harder during the game (Anguas-Gracia et al., 2021). For example, educators may provide an incentive such as not needing to help clean the room at the end of the day if they finish with the fastest group time. Utilizing the proper times and incentives leads to students continually putting their best effort into learning and mastering the game themself. All papers reported high levels of students' experience, engagement and motivation in teaching sessions that used game elements. Despite this, levels of engagement and interaction were higher in the game-based webinar (Grech & Grech, 2021). Students perceived game-based learning as more successful at facilitating group and teamwork, improving student relationships and more enjoyable than non-game-based learning (Anguas-Gracia et al., 2021).

7. Focus on deep learning

The use of games promotes deep learning, which involves more critical thinking to solve a task, as opposed to being given a straightforward set of instructions to complete the same assignment; highly engaging video games can often induce a flow state within adolescents which can lead to higher levels of motivation and focus (Castro et al., 2019). Besides providing students with an educational game, this flow state can make them more intelligent in learning and understanding what is happening in the game, promoting more learning. The ability to use serious games in a classroom setting can help students who are actively engaged in the game to achieve that higher level of thinking with problem-solving and become more focused on understanding the content. The GBL teaching improves quality outcomes for students' education. Game-based quizzes and escape rooms were commonly employed when learning clinical skills, developing critical thinking and consolidating learning content (Tavares, 2022). Game-based learning was well accepted by students and seen as more successful at facilitating group work, improving student relationships and more enjoyable than non-game-based learning. GBL was a feasible option for getting the attention of students while achieving deep studying of information.

The use of games in the classroom and assessment

GBL will develop to a new stage, which requires researchers to carry out research to keep pace with the times. For teachers, it provides a guidance on implementing GBL in smart classrooms, because the model proposed in this paper is mainly designed according to the teaching process, teachers can refer to it in different teaching links (Pan et al., 2021).

(1) Before the class, teachers can choose the appropriate games and design teaching activities. Teachers can also design realistic and interactive game-based learning situations.

(2) In the class, teachers can create immersive GBL experience that can evoke thinking, promote learning by exploring through different game activities, as well as developing collaborative capability and to improve interpersonal communication skills. By encouraging presentation and sharing, learners will share their learning results with others and display their works through various content presentation methods in the smart classroom, such as multi-screen display and file transfer between terminals.

(3) After the class, teachers can monitor the online learning process to better enhance learning and improve the quality of teaching. Enhancing personalized guidance, where teachers can find students who have difficulty in learning by viewing and analyzing the student data collected in the learning process. Teachers provide targeted guidance to learners to solve students' learning difficulties. Boosting reflection and improvement, where teachers reflect on the effects of teaching, redesign and improve the deficiencies. Teachers can get enlightenment from the reflection, which can become the experience and basis for teachers to improve their teaching ability.

Game-based learning trends

Game-based learning is a system that is increasing and being implemented in the educational process and reveals clearly in several research papers published over the last decade. In this context, game-based learning is approached via the cognitive and affective dimensions of learning. The users can adopt such games for their intelligible needs and interests and ensure motivation for learning. Game-based learning allows the use of methods: that are consistent with the modern theories on productive learning and encourage active problem-oriented, experimentally interactive and socially mediated access to educational processes according to the current thinking (Vusic' et al., 2018). Researchers suggest that game-based learning in higher education can view advantage tools for developing, implementing, improving and facilitating the student's learning experience. Furthermore, the development a hybrid board game that combines non-digital and digital elements to introduce new game experiences.

Conclusion

This article argues the definition of game-based learning viewpoints of knowledge, motivation and creativity. Outcome of GBL came from various games such as problem-solving and engagement in education. The evidence from advantages of GBL includes helping in retaining learning insights, stimulating imagination, helping in simplifying complex concepts and higher receptivity to learning. We also discussed the type of game that will lead to the design of learning games with the ADDIE model and the game instructional process was designed for evaluation. At present, game-based learning is used in teaching and learning in nursing. Although educational game studies reveal varying degrees of success dependent upon academic topic, learner preferences and participant age which all impact the development of 21st century skills. Lecturers' application of game-based learning to teaching can better integrate the contents of the course for the learners. This technique could contribute more effectively to the learners' improvement of their knowledge of the course content. Further research should investigate the effects of games on affective and behavioral learning outcomes (Ozdemir & Dinc, 2022). The potential of digital games to promote learning is a growing field of education. The increasing use of mobile phones makes it possible to explore digital educational games in outside environments. Because of this, educators can develop a hybrid board game that combines non-digital and digital elements to introduce new game experiences to increase students' motivation and engagement in the learning processes.

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