

IMPACT OF GAMIFICATION IN NURSING EDUCATION: A SYSTEMATIC REVIEW

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Abstract

Background: Gamification, defined as the integration of game design elements into non-game learning environments, has emerged as an innovative and transformative pedagogical strategy in nursing education. Nursing students are expected to acquire theoretical knowledge, clinical reasoning, psychomotor skills, communication abilities and professional attitudes within a limited academic and clinical time frame. Traditional teaching methods may sometimes lead to reduced student engagement, passive learning and lack of motivation. Gamified learning strategies such as digital simulations, escape rooms, quizzes, leaderboards, badges, reward systems, mobile applications, virtual games and storytelling-based learning are increasingly being used to improve student participation and learning outcomes.

Objectives: This systematic review aimed to synthesize empirical evidence on the impact of gamification in undergraduate and graduate nursing education, evaluate key educational outcomes, and identify effective strategies and gaps in the existing literature.

Methods: A systematic search was conducted in PubMed, Scopus, CINAHL and Google Scholar for peer-reviewed empirical studies published between 2020 and 2024. Boolean operators and keywords such as “gamification,” “nursing education,” “game-based learning,” “nursing students,” “engagement,” “motivation,” and “learning outcomes” were used. PRISMA 2020 guidelines directed the selection process. Studies were included if they were published in English, focused on nursing education and used gamification as an intervention. Quality appraisal was performed using Joanna Briggs Institute Critical Appraisal Tools. A total of 57 records were initially identified. After screening and eligibility assessment, 20 studies were included for synthesis.

Results: The included studies consisted of randomized controlled trials, quasi-experimental studies and qualitative or mixed-method designs. Gamification techniques included digital simulations, escape rooms, gamified flipped classrooms, mobile applications, AI-based chatbots, competitive quizzes and visual storytelling through graphic novels. Findings consistently reported improvement in student engagement, motivation, knowledge retention, clinical skill development, collaborative learning and learner satisfaction. Positive outcomes were especially noted in areas such as CPR learning, nursing administration, health assessment, medication safety and clinical decision-making. However, heterogeneity in study designs, outcome measures and gamification models was observed.

Conclusion: Gamification demonstrates significant potential in enhancing nursing education by creating interactive, learner-centered and psychologically engaging learning environments. It supports theoretical learning, clinical skill development, teamwork and student confidence. However, the field lacks standardized gamification frameworks and robust longitudinal evidence. Future research should focus on scalability, technological inclusivity, long-term retention, mental well-being of learners and alignment with adult learning principles.

Keywords: Gamification, Nursing Education, Game-Based Learning, Nursing Students, Engagement, Motivation, Systematic Review.

Introduction

Nursing education is a dynamic and practice-oriented discipline that requires the integration of knowledge, skills, attitude, communication, empathy and clinical judgment. Nursing students must learn not only theoretical concepts but also develop confidence in applying those concepts in real clinical situations. In modern nursing education, one of the major challenges faced by teachers is maintaining student engagement and motivation throughout the learning process. Many students experience academic stress, clinical anxiety, fear of making mistakes and difficulty in retaining complex information. These challenges are especially important from the perspective of Mental Health Nursing, where motivation, attention, emotional safety and active participation are essential for effective learning.

Gamification has emerged as an innovative educational strategy to address these issues. Gamification refers to the use of game design elements in non-game contexts. In education, it

involves the use of points, badges, rewards, leaderboards, challenges, levels, missions, scenarios, role play, competition, feedback and storytelling to make learning more active and meaningful. It does not always mean playing a full game; rather, it means using selected game-like elements to increase participation, curiosity and motivation.

In nursing education, gamification can be used in classroom teaching, simulation laboratories, clinical skill training, online learning and group activities. Examples include quiz-based competitions, virtual patient games, medication safety games, CPR games, escape-room learning, gamified case studies, mobile app-based learning, digital badges and team-based clinical challenges. These strategies transform students from passive listeners into active participants.

The psychological foundation of gamification is linked with motivation, reward, attention, curiosity and achievement. Game elements create a sense of progress and accomplishment. Immediate feedback allows students to understand mistakes and correct them. Competition and collaboration can increase involvement. In Mental Health Nursing education, gamified activities may also reduce fear, promote peer interaction and support emotionally safe learning.

Nursing students often face stress during clinical learning because they are expected to perform procedures, communicate with patients, manage emergencies and make clinical decisions. Gamified learning provides a safe environment where students can practice repeatedly without harming real patients. It also encourages students to learn from errors in a constructive manner. This approach is highly relevant to nursing education because patient safety requires students to develop confidence before entering clinical practice.

The COVID-19 pandemic further increased the use of technology-based and interactive teaching methods. Online learning, digital simulations and mobile learning platforms became more common. During this period, gamification gained importance as a way to improve student engagement in virtual learning environments. After the pandemic, many nursing institutions continued to explore blended and gamified teaching methods.

Although several individual studies have reported positive outcomes of gamification, the overall evidence needs systematic synthesis. Different studies have used different gamification models, outcome measures and research designs. Therefore, this systematic review was conducted to

examine the impact of gamification in nursing education and identify its effectiveness, challenges and future scope.

Need and Significance of the Review

The need for this systematic review arises from the changing nature of nursing education. Nursing students today are digital learners. They are familiar with smartphones, online platforms, visual content and interactive applications. Traditional lecture-based teaching alone may not be sufficient to maintain attention and promote deep learning. Therefore, innovative methods are required to make nursing education more interactive, student-centered and outcome-based.

Gamification is significant because it supports active learning. Active learning allows students to think, respond, solve problems, discuss, compete, collaborate and reflect. In nursing education, this is especially important because students must apply theory to clinical practice. A gamified case study can help students understand patient assessment, nursing diagnosis, prioritization and intervention planning in a practical manner.

From the Mental Health Nursing perspective, gamification may influence psychological learning factors such as motivation, confidence, anxiety reduction, peer bonding and satisfaction. Students who are anxious or hesitant may participate better when learning is presented in a playful, structured and supportive format. Gamification may also help students develop social interaction and teamwork, which are essential qualities in psychiatric and general nursing practice.

Gamified learning is useful in both theoretical and clinical subjects. In theoretical learning, it helps students remember concepts through quizzes, puzzles, levels and challenges. In clinical learning, it supports skill development through simulation games, procedural games and scenario-based activities. For example, gamified CPR learning can improve response time and procedural confidence. Gamified health assessment can improve observation and decision-making skills. Escape rooms can strengthen teamwork, communication and critical thinking.

The review is also important because nursing education requires evidence-based teaching strategies. Just as nursing practice is expected to be evidence-based, nursing teaching should also be guided by research evidence. Systematic review provides a structured summary of available

empirical studies and helps educators decide whether gamification is effective and how it can be implemented.

Another significant aspect is learner satisfaction. Student satisfaction is not the only goal of education, but it is important because satisfied and engaged students are more likely to participate actively. Gamification can make learning enjoyable without compromising academic seriousness. When properly designed, it can promote both enjoyment and meaningful learning.

However, gamification also has potential limitations. Poorly designed games may distract students from learning objectives. Excessive competition may create stress or discourage weaker students. Technology-based gamification may not be accessible to all students. Some students may focus more on winning points than understanding concepts. Therefore, gamification must be carefully planned and aligned with learning outcomes.

This systematic review is useful for nursing faculty, curriculum planners, administrators and researchers. It provides evidence on how gamification affects engagement, motivation, knowledge, skill development and satisfaction. It also identifies gaps such as lack of long-term follow-up, absence of standardized models and limited studies in diverse settings.

Methodology

Review Design

A systematic review design was adopted to identify, evaluate and synthesize empirical evidence regarding the impact of gamification in nursing education. The review followed PRISMA 2020 guidelines to ensure transparency and systematic reporting.

Review Question

What is the impact of gamification on engagement, motivation, knowledge acquisition, skill development and learner satisfaction among nursing students?

Objectives of the Review

1. To identify gamification strategies used in undergraduate and graduate nursing education.
2. To assess the effect of gamification on student engagement and motivation.
3. To evaluate the impact of gamification on knowledge acquisition and retention.

4. To examine the effect of gamification on clinical skill development and confidence.
5. To identify learner satisfaction and collaborative learning outcomes.
6. To determine gaps and limitations in existing research on gamification in nursing education.

Search Strategy

A systematic search was conducted in PubMed, Scopus, CINAHL and Google Scholar. Studies published from 2020 to 2024 were included. The following keywords were used individually and in combination:

“Gamification,” “nursing education,” “nursing students,” “game-based learning,” “serious games,” “digital games,” “simulation games,” “escape room,” “mobile learning,” “student engagement,” “motivation,” “knowledge retention,” and “clinical skills.”

Boolean operators such as AND and OR were used to refine the search strategy. The reference lists of relevant articles were also checked to identify additional studies.

Inclusion Criteria

Studies were included if they met the following criteria:

1. Published between 2020 and 2024.
2. Published in English.
3. Conducted among undergraduate or graduate nursing students.
4. Used gamification or game-based learning as an educational intervention.
5. Reported measurable educational outcomes.
6. Published as peer-reviewed empirical studies.
7. Used quantitative, qualitative or mixed-method research design.

Exclusion Criteria

Studies were excluded if they were editorials, commentaries, opinion papers, conference abstracts without full text, non-nursing studies, studies without gamification intervention or studies without educational outcome assessment.

Study Selection Process

A total of 57 records were initially identified through database searching. After removing duplicates and irrelevant records, titles and abstracts were screened. Full-text articles were assessed for eligibility based on inclusion and exclusion criteria. Finally, 20 studies were included in the systematic review.

Quality Appraisal

Quality appraisal was conducted using Joanna Briggs Institute Critical Appraisal Tools. The appraisal focused on clarity of objectives, appropriateness of study design, sample selection, intervention description, outcome measurement, statistical analysis, ethical considerations and validity of findings.

Data Extraction

Data were extracted using a structured format. The extracted information included author, year, country, study design, sample size, type of gamification intervention, duration, outcome measures, major findings and limitations.

Data Synthesis

Due to heterogeneity in intervention types, study designs and outcome measures, meta-analysis was not performed. A narrative synthesis approach was used. The findings were grouped under major outcome domains: engagement and motivation, knowledge acquisition, clinical skill development, collaborative learning, learner satisfaction and challenges.

Results

Characteristics of Included Studies

The systematic review included 20 empirical studies published between 2020 and 2024. Among these, 8 were randomized controlled trials, 6 were quasi-experimental studies and 6 were qualitative or mixed-method studies. The studies were conducted in diverse academic settings including nursing colleges, simulation laboratories, online platforms and clinical skill learning environments.

The sample populations mainly included undergraduate nursing students, while a few studies focused on graduate nursing students. The sample size, intervention duration and outcome measures varied across studies. Most studies assessed immediate post-intervention outcomes, while only a few examined retention after a longer period.

Types of Gamification Strategies

The gamification strategies identified in the review included:

1. Digital simulations.
2. Escape room learning.
3. Gamified flipped classroom.
4. Mobile app-based learning.
5. AI-based chatbots.
6. Competitive quizzes.
7. Team-based games.
8. Serious games.
9. Visual storytelling through graphic novels.
10. Badge and reward-based learning.

Among these, digital simulations and serious games were commonly used for clinical skill development. Escape rooms were used to promote teamwork and problem-solving. Gamified flipped classrooms were used to improve preparation and participation. Mobile applications and chatbots supported self-directed learning.

Impact on Student Engagement and Motivation

Most studies reported that gamification improved student engagement and motivation. Students showed increased class participation, enthusiasm, attention and willingness to complete learning activities. Game elements such as points, levels, rewards, competition and immediate feedback created interest and encouraged students to participate actively.

From a psychological perspective, gamification may increase intrinsic and extrinsic motivation. Intrinsic motivation is enhanced when students enjoy the learning process, while extrinsic

motivation is supported through rewards, badges and recognition. The combination of enjoyment and achievement can make learning more meaningful.

Impact on Knowledge Acquisition and Retention

Several studies reported improvement in knowledge scores after gamified interventions. Gamification helped students understand complex concepts through repeated practice, visual presentation, scenario-based learning and immediate feedback. Knowledge improvement was noted in subjects such as CPR, health assessment, nursing administration, medication safety, infection control and patient safety.

However, long-term retention was not consistently assessed. Most studies measured knowledge immediately after the intervention. Therefore, although gamification appears effective for short-term knowledge acquisition, more evidence is needed regarding long-term retention.

Impact on Clinical Skills and Confidence

Gamification showed positive effects on clinical skill development and procedural confidence. Students who participated in simulation games, CPR games and skill-based challenges reported higher confidence in performing nursing procedures. Gamified clinical scenarios helped students apply theoretical knowledge to practical situations.

In nursing education, confidence is important because students often experience fear before performing procedures on real patients. Gamification provides a safe learning environment where students can make mistakes, receive feedback and improve performance.

Impact on Collaborative Learning

Team-based gamification strategies improved collaboration, communication and peer learning. Escape rooms and group challenges required students to work together, share information, solve problems and make decisions within a limited time. These activities promoted leadership, teamwork and communication.

Collaborative learning is especially important in nursing because patient care is delivered through teamwork. Gamified team activities can help students develop interpersonal skills required in clinical practice.

Learner Satisfaction

Most studies reported high learner satisfaction with gamified learning. Students described gamification as enjoyable, interesting, interactive and helpful. They appreciated immediate feedback, visual learning, teamwork and the opportunity to practice in a stress-free environment. However, some students reported technical difficulties, time pressure and anxiety during competitive activities.

Discussion

The findings of this systematic review suggest that gamification has a positive impact on nursing education. It improves student engagement, motivation, knowledge acquisition, clinical confidence, teamwork and satisfaction. These outcomes are highly relevant in nursing education because students must develop both academic understanding and practical readiness.

The improvement in engagement can be explained by the interactive nature of gamification. Traditional lectures may lead to passive listening, while gamified activities require active participation. Students must answer questions, solve problems, perform tasks, communicate with peers and respond to scenarios. This active involvement supports better attention and learning.

Gamification also supports motivation. In Mental Health Nursing, motivation is considered an important psychological factor influencing learning behavior. Game elements such as rewards, progress levels, badges and immediate feedback create a sense of achievement. When students feel successful, their confidence and interest in learning may increase.

The review found that gamification improved knowledge outcomes in many studies. This may be because gamified learning provides repetition and reinforcement. For example, quiz games allow students to review important concepts repeatedly. Simulation games allow students to apply knowledge in clinical situations. Immediate feedback helps correct misunderstandings quickly.

Clinical skill development was another important outcome. Nursing students need opportunities to practice procedures before performing them on patients. Gamified simulations create safe spaces for practice. Students can learn from errors without fear of harming patients. This is important for patient safety and student confidence.

Team-based gamification also showed positive outcomes. Nursing practice requires collaboration with doctors, nurses, patients, families and other health professionals. Escape rooms and group-based challenges help students practice communication, leadership and teamwork. These activities also build peer support, which may reduce learning anxiety.

However, gamification should not be used only for entertainment. The main purpose of gamification should be learning. Every gamified activity must be linked with specific learning objectives. For example, a CPR game should improve compression technique, response sequence and emergency decision-making. A medication safety game should improve calculation accuracy and error prevention. Without clear objectives, gamification may become a distraction.

The review also identified several challenges. First, there was considerable heterogeneity in gamification models. Different studies used different interventions, making comparison difficult. Second, outcome measures were not standardized. Some studies measured knowledge, while others measured satisfaction, confidence or engagement. Third, many studies had short duration and lacked follow-up assessment. Fourth, technology-based gamification may not be equally accessible in all institutions.

Another concern is psychological safety. Competitive games may motivate some students but create stress in others. Students who repeatedly score low may feel embarrassed or demotivated. Therefore, nursing educators must design gamification carefully. The goal should be healthy competition, collaboration and supportive learning.

From the Mental Health Nursing perspective, gamification should promote confidence, emotional safety and positive learning experiences. Faculty should avoid humiliating leaderboards or overly stressful competition. Instead, they should encourage team achievement, reflective debriefing and supportive feedback.

The role of the teacher remains central. Gamification cannot replace faculty guidance, clinical supervision or reflective discussion. Teachers must plan, facilitate and evaluate gamified learning. Debriefing after gamified activities is essential because it helps students connect game experiences with real nursing practice.

Implications, Recommendations and Conclusion

Implications for Nursing Education

Gamification can be used as an effective teaching-learning strategy in nursing education. It can be included in classroom teaching, skill laboratories, simulation sessions, online learning and revision activities. Faculty can use quizzes, case-based games, digital simulations, escape rooms, role-play games and mobile applications to improve student participation.

Gamified learning should be designed according to course objectives. It should not be added randomly. Each activity should have clear learning outcomes, rules, feedback methods and evaluation criteria. Reflection and debriefing should be included after gamified sessions.

Implications for Mental Health Nursing

In Mental Health Nursing education, gamification can be used for topics such as therapeutic communication, mental status examination, psychiatric emergencies, suicide risk assessment, substance use disorders, stress management and crisis intervention. Role-play games, scenario-based simulations and storytelling can help students understand patient emotions and therapeutic responses.

Gamification can also reduce student anxiety by creating a safe and engaging learning space. It may improve confidence in communicating with patients having mental health problems. However, educators must ensure that mental health topics are handled sensitively and ethically.

Implications for Nursing Practice

Gamification may indirectly improve nursing practice by preparing students to be more confident, engaged and clinically competent. Students trained through interactive methods may show better decision-making, teamwork and readiness for patient care. Gamified learning can also support patient safety education and emergency response training.

Implications for Nursing Administration

Nursing administrators should support faculty in developing gamified teaching strategies. Institutions should provide simulation laboratories, internet access, digital tools and faculty

training. Policies should be developed for the ethical and effective use of digital games, mobile applications and AI-based learning platforms.

Implications for Nursing Research

Future research should focus on long-term outcomes of gamification. More randomized controlled trials and multicentric studies are needed. Researchers should assess not only knowledge and satisfaction but also clinical competence, communication skills, ethical reasoning and patient safety outcomes. Studies should also explore the psychological effects of gamification, including stress, confidence, motivation and learning anxiety.

Limitations of the Review

This review included studies published between 2020 and 2024 and only English-language articles. The included studies showed variation in design, sample size, intervention type and outcome measures. Meta-analysis was not performed due to heterogeneity. Some studies relied on self-reported outcomes such as satisfaction and confidence. Long-term retention and clinical transfer of learning were not adequately assessed.

Recommendations

1. Nursing colleges should integrate gamification as a supplementary teaching strategy.
2. Gamified activities should be aligned with learning objectives and curriculum outcomes.
3. Faculty should be trained in designing and evaluating gamified learning.
4. Gamification should promote collaboration rather than unhealthy competition.
5. Long-term studies should be conducted to assess knowledge retention and clinical competence.
6. Technology-based gamification should be inclusive and accessible to all students.
7. Debriefing should be included after gamified learning activities.
8. Mental health and emotional safety of learners should be considered during game design.
9. Standardized tools should be developed to measure engagement, motivation and skill outcomes.
10. Future research should include diverse nursing institutions and larger sample sizes.

Conclusion

This systematic review concluded that gamification has a significant positive impact on nursing education. It enhances student engagement, motivation, knowledge acquisition, skill development, collaborative learning and learner satisfaction. Gamified strategies such as digital simulations, escape rooms, flipped classrooms, mobile applications, chatbots and serious games can make nursing education more interactive and learner-centered.

From the perspective of Mental Health Nursing, gamification is valuable because it addresses psychological aspects of learning such as motivation, attention, confidence, anxiety reduction and peer interaction. It creates a safe and enjoyable environment where students can participate actively and learn from mistakes.

However, gamification should be used thoughtfully. It must be guided by clear learning objectives, adult learning principles, ethical considerations and proper faculty facilitation. It should supplement, not replace, conventional teaching, clinical practice and reflective learning.

The available evidence supports the use of gamification in nursing education, but future research should focus on standardized frameworks, long-term outcomes, technological inclusivity and clinical transfer of learning. With careful planning and implementation, gamification can become a powerful educational approach for preparing competent, confident and motivated nursing professionals.

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