

SUPERVISE: A Prototype Gamified Mentorship Program for Nursing

Creative Nursing

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DOI: 10.1177/10784535261463309

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A Part of Sage

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Abstract

Objective: Clinical mentorship in nursing education is often constrained by insufficient communication, engagement, and structured interaction between students and mentors. This study aims to describe the development and evaluation of a gamified technological prototype, Support, Understanding, Professional Growth, Enhancing Skills, Reflective Practice, Validation, Improvement, Supportive Environment, and Evaluation (SUPERVISE), designed to enhance the mentorship process for nursing students.

Methods: A user-centered design approach was employed, involving phases of user requirements identification, iterative prototyping, and usability testing. Gamification elements were integrated to support engagement and interaction. Usability testing included 43 participants, comprising nursing students and professionals, who evaluated the prototype using the System Usability Scale (SUS) and open-ended feedback.

Results: The SUPERVISE application incorporates features such as quizzes, reflective logs, achievement systems, and role-based access to support communication and interaction among stakeholders. The prototype achieved a mean SUS score of 80.8, indicating excellent usability, although some areas for improvement were identified and subsequently refined in later stages.

Conclusion: The integration of gamification elements enhances the structure and dynamics of the mentorship process, promoting user engagement, feedback, and interaction. SUPERVISE demonstrates strong acceptability and potential as a supportive tool for mentorship in nursing education. Further research is needed to assess its long-term impact and scalability.

Keywords

gamification, nursing education, mentoring, technology

Received: August 21, 2025; accepted: June 11, 2026

Implications for Practice, Education, Research, or Policy

- SUPERVISE[®] is a prototype developed to support mentorship processes in nursing education.
- SUPERVISE[®] integrates gamification elements, including quizzes, achievement systems, progress tracking, and reflective logbooks, to enhance motivation and engagement.
- The platform supports bidirectional interaction between nursing students and mentors through feedback, messaging, mentorship requests, and progress monitoring.

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Nurses are important workers in health care, and their clinical competencies are primarily developed in clinical environments (McKenna et al., 2019; Pramila et al., 2020). Both theoretical preparation and practical experience are essential components of nursing curricula, necessary for nursing students to achieve a professional level of nursing competence (Cant et al., 2021; McKenna et al., 2019). The quality of these environments, and the quality of these processes, in terms of promoting learning, substantially affects the development of professional competencies, with the clinical part being important and challenging to ensure competency development (Pramila et al., 2020).

The clinical learning environment directly influences students' educational outcomes, as well as their preparedness for practice and satisfaction with the nursing career. Additionally, the experiences in these contexts and the mentoring models shape the ongoing development of nurses and their future choices (Zhang et al., 2022). Unlike in theoretical courses, where student learning activities are structured, students in clinical environments are often exposed to unplanned events, such as dealing with challenging patients and their families, as well as inadequate supervision (Najafi Kalyani et al., 2019; Zhang et al., 2022).

In addition to these challenges, the clinical mentorship process is often affected by limitations in interaction and coordination among students, mentors, and academic institutions, which may compromise the effectiveness of supervision (Fernández-Lorente et al., 2025). These limitations may result in a lack of feedback, reduced engagement, and difficulties in monitoring student progress, ultimately compromising learning outcomes and competency development (Cant et al., 2021; Mikkonen et al., 2020).

Thus, the quality of supervision and mentors in these clinical environments assumes particular importance, directly influencing the competence and confidence of future nurses (Rodríguez-García et al., 2021). The entire process of clinical supervision involves reflecting on the development of practice guided by qualified professionals, incorporating various actors, notably mentors, who facilitate the socialization and adaptation of the individual to their new role (Almeida et al., 2024). Although higher education institutions have the primary responsibility for nursing education, nurses acting as mentors in clinical practice play a fundamental role in effectively promoting students' clinical learning (Cant et al., 2021). In this context, nurses in clinical care settings are expected to undertake the complex task of helping students assimilate classroom theory into the practice environment (Cant et al., 2021; McKenna et al., 2019). Evidence has shown that mentor support is crucial for the professional development of nursing students in clinical practice, and positive experiences from mentors can enhance students' motivation to continue in the nursing profession (Mikkonen et al., 2020; Zhang et al., 2022). However, these supervisory interactions are often informal and insufficiently structured, which may hinder effective communication, continuity, and overall

process effectiveness (Morley, 2014; Rodríguez-García et al., 2021).

Despite technological advancements, the educational system remains centered on traditional, predominantly didactic tools (Almeida et al., 2024), necessitating assistance to meet the needs of this context, for both the mentor and the student. Consequently, it is essential to incorporate modern methods of communication and collaboration into the mentoring process, highlighting the potential of technological resources to overcome obstacles and enhance the performance of nursing students in clinical environments (Green et al., 2014; Willemse et al., 2019). Tools such as electronic portfolios (Bahri et al., 2023), WhatsApp (Ajuwon et al., 2018; Willemse et al., 2019), and other technological resources (Hart et al., 2019; Lai & Wu, 2016; Rodger, 2020), are recent innovations that are increasingly being adopted in the mentoring of nursing students. Despite their potential for use, these tools are largely limited to information sharing and lack mechanisms to promote engagement, sustain motivation, and support continuous interaction among users (Green et al., 2014; Willemse et al., 2019).

Building on these limitations, gamification has emerged as a promising strategy to enhance engagement, motivation, and interaction in educational contexts. Grounded in motivational frameworks such as Self-Determination Theory (Ryan & Deci, 2020), gamification incorporates elements such as feedback, rewards, progression systems, and challenges to foster active participation and both intrinsic and extrinsic motivation among users. In nursing education, several studies have demonstrated the potential of gamification-based approaches to improve learning and engagement, particularly when designed to support mentorship and professional development (Almeida et al., 2024; Fernandes et al., 2018, 2019, 2025).

Recent evidence indicates that gamification enhances knowledge retention, engagement, and the development of clinical competencies (Çelik et al., 2025; Pangandaman et al., 2025; Seo et al., 2024), highlighting its positive impact on motivation and learning outcomes (McMillan et al., 2026; Nylén-Eriksen et al., 2025). However, current applications are primarily focused on knowledge acquisition and skills training, with limited attention to their role in supporting communication and interaction within mentorship processes (Almeida et al., 2024; Fernández-Lorente et al., 2025).

Despite these advances, there remains a lack of digital solutions specifically designed to integrate gamification into the mentorship process with the aim of enhancing communication, interaction, and engagement among stakeholders. This represents a critical gap in nursing education.

In response to this gap, the present study aims to describe the development and evaluation of a gamified technological prototype, Support, Understanding, Professional Growth, Enhancing Skills, Reflective Practice, Validation, Improvement, Supportive Environment, and Evaluation (SUPERVISE), designed to support the mentorship process of nursing students in clinical settings. Although previous

studies have explored the use of technological tools to support communication and interaction among stakeholders in mentorship processes (Hart et al., 2019; Morley, 2014; Willemse et al., 2019), the integration of gamification in this context remains limited, particularly with regard to enhancing communication and interaction in clinical education settings. Therefore, this study extends existing research by proposing a gamified solution specifically designed to support mentorship processes.

Methods

Study Design

The User-Centered Design (UCD) methodology was adopted for the development of a technological prototype incorporating elements of gamification, aimed at enhancing the mentorship process for nursing students in a clinical context. This approach places users at the center of the development process, recognizing them as the primary source for identifying their own needs and objectives. User-focused design ensures customer satisfaction through regular interactions during all product development stages, guaranteeing its usability, accessibility, and functionality. The applied methodology, in accordance with the international standard ISO 9241-210 (International Organization for Standardization, 2019), involved three main stages: User Requirements, Create Design Solutions, and Usability Testing.

User Requirements

Considering the adoption of the UCD methodology and the timeframe designated for this project, it was decided to organize meetings for the initial requirement gathering. The purpose of these meetings was to understand the needs, challenges, and goals of the users involved in the mentorship process, identifying the key aspects that should be incorporated into the product under development. Participants included nursing students, practicing nurses, and academic staff, who actively contributed to the identification of needs and the validation of the system's functionalities. Participants were recruited using a convenience sampling strategy through professional and academic networks.

These sessions took place throughout November 2023, with participants selected for convenience. All were informed about the objectives of the research and the limits of confidentiality concerning their information. In total, four meetings were held, involving two nursing professors, two practicing nurses, two undergraduate nursing students, and one master's degree student. Detailed notes were taken during each meeting. Although the requirements elicitation phase took place at an early stage of the project, continuous validation was conducted throughout the development process, ensuring that the requirements remained up to date and aligned with the current context. This iterative process ensured the continuous

refinement of the system based on user feedback. The identified requirements directly informed the development of key system functionalities, including questionnaires, activity logs, and feedback mechanisms, as well as the need to implement role-based access for students and nurses (mentors), ensuring effective communication and interaction among all stakeholders.

Create Design Solutions

A web application with gamification elements was developed using the IntelliJ programming environment, programmed in Java for implementation and PostgreSQL for database management. The choice of Java was due to its robustness and platform independence, facilitated by the Java Virtual Machine (JVM), which ensures that the resource is reliable and scalable. In the business layer, the Spring Framework was used to simplify functions such as dependency injection and transaction management. For the front-end, Thymeleaf was implemented to dynamically render content, enhancing user interactivity. The architecture of the resource was based on the Model-View-Controller (MVC) pattern, which effectively separates the resource logic, user interface, and data management. The Model handled the data structure and business logic, the View presented the data, and the Controller processed user requests, supported by PostgreSQL for efficient and flexible database management.

Usability Testing

For the usability testing phase, a “non-interventionist” approach was adopted, allowing users to experience the technological resource autonomously, without external interventions or assistance that could influence their responses. This approach ensured that the feedback was authentic and reflected the users' real experiences. The testing took place between April and May 2024. For this section, a User-App interaction was employed, followed by a Post-Interaction Questionnaire.

Participants completed a detailed questionnaire, divided into two sections. The first section assessed user experience using the System Usability Scale (SUS) tool, with 10 questions based on the standard SUS method (Martins et al., 2015). The SUS score was calculated following the standard procedure, in which 1 is subtracted from the user's response for odd-numbered items, and for even-numbered items, the response is subtracted from 5. The resulting values are summed and multiplied by 2.5 to obtain a total score ranging from 0 to 100 (Brooke, 1996).

The second section consisted of open-ended questions, allowing participants to detail their experiences with the technological resource and suggest improvements. Responses in the SUS sections ranged from *strongly disagree* to *strongly agree*, and were later converted into numerical values from 1 to 5. This usability evaluation phase was conducted with

the active participation of nurses (mentors) and students, unlike earlier phases. To guide users within the technological resource, each participant was given two tasks focused on the main functionalities of the technological resource: the quizzes and the logbook. These tasks served as an introduction, helping users to familiarize themselves with navigating the menus and using the integrated systems. By guiding users through these essential functions, the testing process was optimized to collect more precise feedback.

Participants accessed the resource via a link and the evaluation questionnaires, through email, allowing them to explore and evaluate the game at their convenience before providing feedback on the experience. This procedure ensured that the evaluation occurred in a comfortable and familiar environment, contributing to the reliability of the data collected about usability and experience. Furthermore, this strategy promoted a more authentic interaction with the resource and, potentially, generated more accurate and thoughtful responses, as participants were able to engage with the technological resource freely, without the constraints of a structured testing environment.

Ethical Considerations

The study was approved by the Ethics Committee of the Porto School of Nursing (approval number CE27/2023). All participants were informed about the purpose and objectives of the study and provided informed consent prior to participation. Participation was voluntary, and participants were informed that they could withdraw from the study at any time without any consequences. All data were stored securely and analyzed in an aggregated form to ensure confidentiality and anonymity.

Results

To present the results in an organized manner, the same steps described in the methodology will be followed: User Requirements, Create Design Solutions, and Usability Testing.

Understanding the User Requirements

User requirements were collected through structured meetings and iterative feedback sessions. These sessions enabled the identification of key needs related to the mentorship process. Based on these findings, the system was designed to incorporate features such as questionnaires, activity logs, and feedback mechanisms, as well as role-based access to support different user profiles and facilitate interaction among stakeholders, while integrating elements of gamification dynamics. In the initial phase of the study on user requirements, the process began with the identification of all potential actors who could interact with the technological resource. Authenticated users were categorized into subclasses “mentor” and “pupil.”

Mentors had the capability to select pupils for mentorship, monitor and interact with their progress, and provide feedback as needed. Pupils, in turn, could request guidance and view mentors’ feedback. This detailed structuring ensured that the technological resource met the varied needs of its users, promoting an effective and engaging mentorship process, enriched by gamification.

Regarding the technical development of the technological resource, the aspects of back-end and front-end were meticulously planned and executed in the past. Lucidchart, a web-based diagramming tool, was crucial for designing the database, standing out for its collaborative capabilities that facilitated the validation of the design according to the project’s requirements. For the front-end design, Figma, a user interface design and prototyping tool, proved effective in creating and adapting interfaces for various screens of the technological resource. Regular meetings, occurring every two weeks with the participation of two nursing professors, two practicing nurses, two undergraduate nursing students, and one master’s student, allowed for continuous revisions of the technological resource’s progress. This iterative process, enriched by constant feedback and productive discussions, culminated in multiple iterations that confirmed the quality and suitability of the final product before its initial development in a desktop environment and subsequent adaptation for mobile devices. These activities reflected core UCD techniques, including iterative prototyping, user feedback integration, and collaborative design, supported by digital tools such as Lucidchart and Figma.

Iterative Prototyping

The prototype named “SUPERVISE” was designed to encapsulate the core values and goals of the mentorship program. SUPERVISE is an acronym that stands for Support, Understanding, Professional Growth, Enhancing Skills, Reflective Practice, Validation, Improvement, Supportive Environment, and Evaluation. Each letter in the acronym reflects a fundamental aspect of the mentoring process, aiming to create a holistic and supportive environment for nursing professionals. The name “SUPERVISE” was carefully chosen to convey the dual roles of oversight and guidance, essential in nurturing the development of new nursing staff.

The homepage served as the first point of contact for users when accessing the application. By navigating through this page, users could familiarize themselves with the functionality of the application. See part of Figure 1 labeled A.

The SUPERVISE application allowed two distinct types of access: one for students and another for mentors, facilitating communication and interaction between these different stakeholders through a variety of available features. After logging in, each user was directed to their personalized profile page, which served as a central hub of information and interactive resources. See part of Figure 1 labeled B. This page provided details about their activities within the app, as well as access to

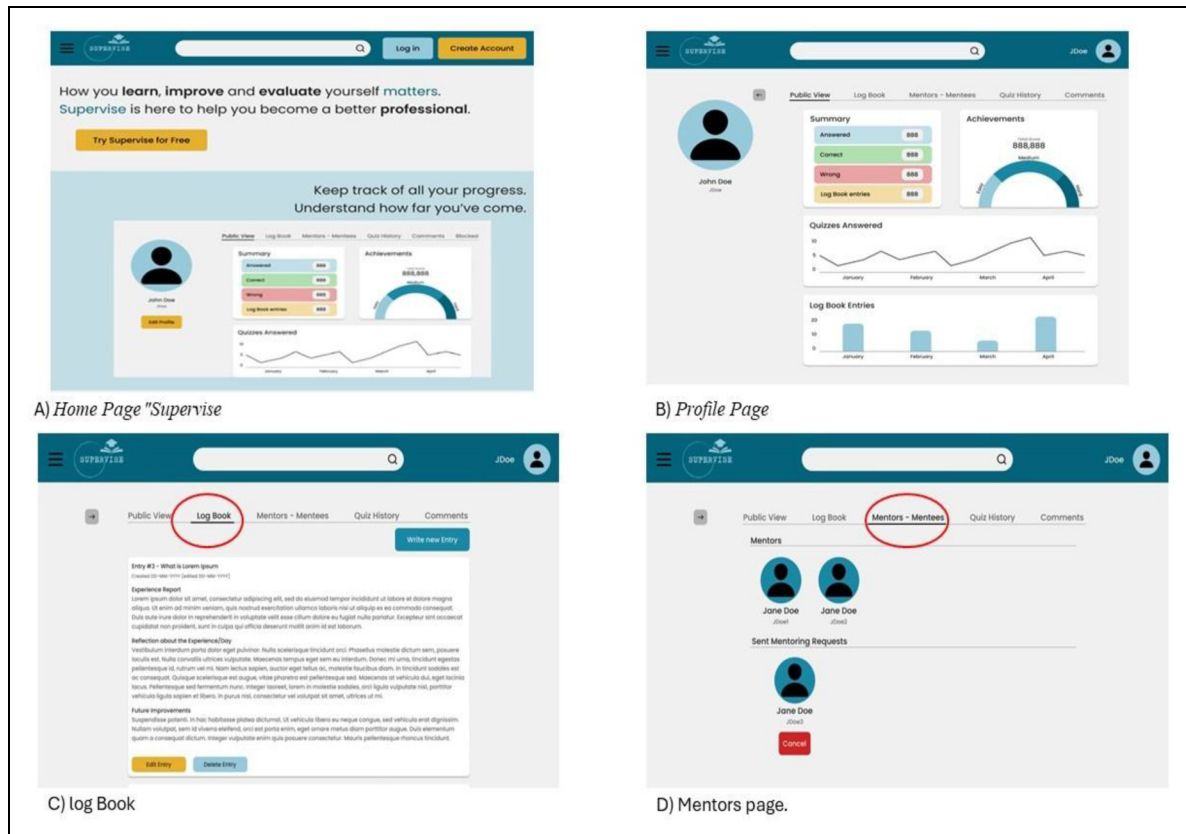


Figure 1. Support, Understanding, Professional Growth, Enhancing Skills, Reflective Practice, Validation, Improvement, Supportive Environment, and Evaluation (SUPERVISE) Interface: (a) Home Page; (b) Profile Page; (c) Logbook; and (d) Mentors Page.

specific sections, a logbook, and lists of mentors or mentees, tailored to their specific role in the mentorship dynamic.

Furthermore, the profile integrated a gamified feedback system, visually represented and detailed, that included achievements at different levels of difficulty and activities such as quizzes and journal entries. The management of mentorship relationships was facilitated by sections dedicated to "mentors" and "mentees," where users could view details, manage mentorship requests, and respond to these requests. This structure not only promotes effective interaction between students and mentors but also supports personal progress and efficient management of relationships within the educational environment of the SUPERVISE app.

In the "logbook" section of the profile page, users could view a chronological list of their logbook entries, as illustrated in the part of Figure 1 labeled C. Each entry was structured into distinct sections: an account of the experience, reflections on the experience, and plans for future improvements. Users had the option to edit existing entries or create new ones directly from this interface.

To manage mentorship relationships, the "mentors" and "mentees" sections provided users with lists of their mentors and mentees, respectively. The part of Figure 1 labeled D illustrates the ability to view mentor details and manage

mentorship requests, including the option to cancel pending requests. On the other hand, the part of Figure 2 labeled A shows the mentees section, where users can accept or reject received mentorship requests.

The "quizzes" and "comments" sections of Figure 2 provided users with detailed records of their interactions within the app. The quiz page in the SUPERVISE application displayed the questions and response options in detail, complemented by a vote count that reflects user engagement. In advanced models, after users answer the quiz, additional interface elements revealed the status of the responses and allow access to comments from other users, enhancing clarity and learning opportunities. This structure promoted effective and collaborative interaction among users, enriching the educational experience and encouraging a dynamic and interactive learning environment. The message page in the SUPERVISE application features a user-friendly interface, designed to facilitate efficient communication between users, as illustrated in the part of Figure 2 labeled D.

All sections were designed to increase user engagement, provide insightful feedback, and facilitate the effective management of mentorship relationships and personal progress within the SUPERVISE® app. The gamification elements implemented in the system were based on immediate

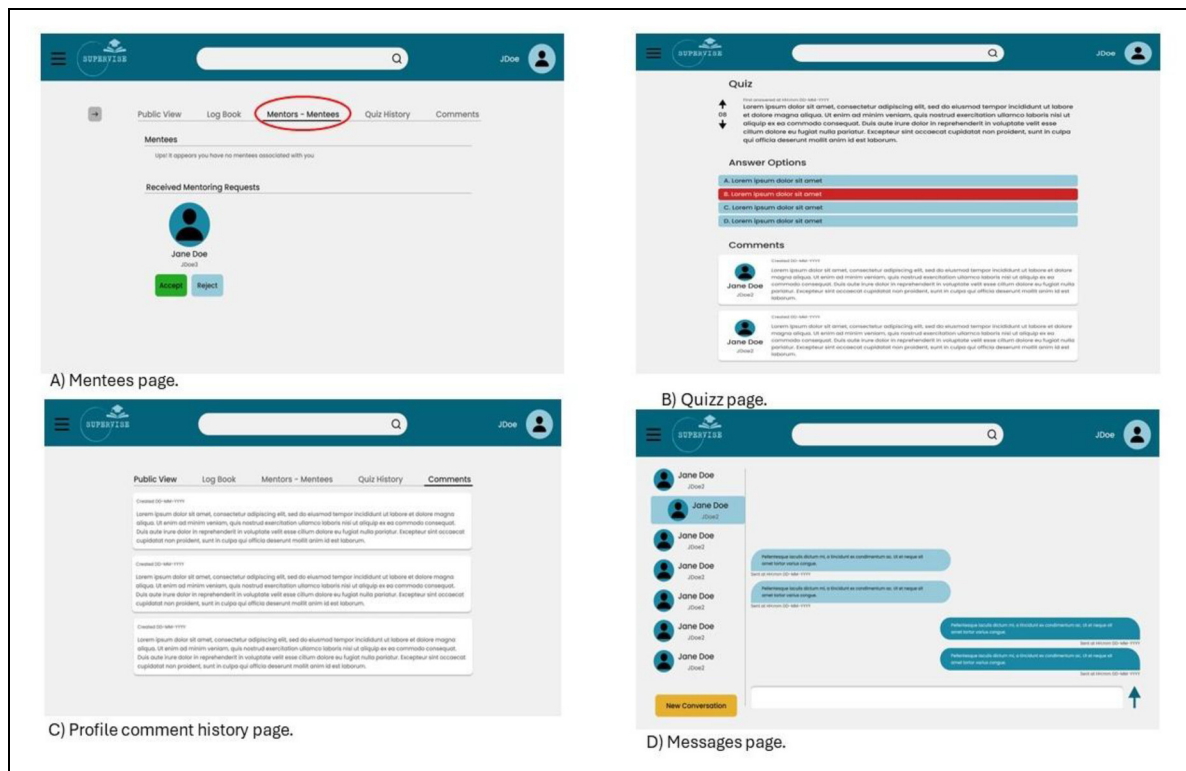


Figure 2. Other Pages: (a) Mentees Page; (b) Quizz Page; (c) Profile Comment History Page; and (D) Messages Page.

feedback, progression, and achievement. Mechanics such as quizzes, reflective journals, and achievement recognition systems were used to enhance engagement, support performance monitoring, and sustain user motivation throughout the mentorship process.

Tests and Evaluations

Characterization of Participants. To evaluate the usability of the SUPERVISE application, 43 participants were included, consisting of eight students and 35 nurses (mentors), with a predominance of women, who represent 81.4% of the group, reflecting the typical demographics of nursing. The age range varied significantly, with an average age of 38.53 years and a standard deviation of 9.92 years. Approximately 18.6% of the participants were students, revealing a balanced representation across different years of training, although the group was relatively small. Specifically, there were three fourth-year students, three second-year students, and two third-year students; 81.4% of participants were nursing professionals holding qualifications ranging from baccalaureate to doctoral degrees, with an average of 17.94 years of professional experience and a standard deviation of 7.08 years. This diversity provided a broad perspective on the applicability and effectiveness of the application in the nursing context, spanning from young professionals at the start of their careers to experienced practitioners.

Usability

The SUS scores of the participants ranged from 45 to 100, with a mean score of 80.8 (SD = 14.83), indicating good usability while highlighting areas for potential improvement. The SUS score was calculated for each participant following the standard scoring procedure. Table 1 presents the median responses and interquartile ranges for each SUS item and is intended solely to provide a descriptive overview of participants' responses.

Open Feedback. During the testing phase of the SUPERVISE app, participants provided open feedback about their experience, highlighting both positive aspects and areas for improvement. They praised the simplicity and ease of use of the app, appreciating the intuitive interface that facilitated navigation and interaction, and recognizing the relevance of the quiz questions and content, which were aligned with real nursing scenarios. However, areas needing improvement were also identified, such as the quality of the quiz responses, which were often too easy due to the frequent use of the "all of the above" option, diminishing the challenge and the learning experience. Additionally, some users felt that the app assumed a higher level of technical proficiency, making engagement and usability more difficult.

Table 1. System Usability Scale (SUS) Scores.

SUS Scale Item	Median	Interquartile range (IQR)
I think I would like to use this serious game frequently	4.0	1.0
I found the serious game more complex than necessary	2.0	2.5
I thought the serious game was easy to use	5.0	1.0
I think I would need the support of a technical person to use this game	1.0	1.0
I found the various functions of this serious game well integrated	4.0	1.0
I thought there were too many inconsistencies in this serious game	2.0	1.0
I would imagine that most people would learn to use this game quickly	5.0	1.0
I found the serious game very cumbersome to use	1.0	1.0
I felt very confident using this serious game	4.0	1.0
I needed to learn a lot of things before I could get going with this game	1.0	1.0

Discussion

The study successfully achieved its goal of creating a gamified technological prototype for the mentorship process of nursing students in a clinical context. Nursing education requires that students in clinical environments receive ample support for the development of their competencies (McKenna et al., 2019; Pramila et al., 2020). Clinical training, essential in nursing education, exposes students to stress due to various factors, such as gaps in mentorship and the inherent challenges of professional contexts (Bailey et al., 2019; Najafi Kalyani et al., 2019). In a clinical environment, anxiety and stress are closely linked to nursing education, with stress levels among students negatively affecting their competence, confidence, and clinical performance (Lavoie-Tremblay et al., 2022; Welch, 2023).

Research highlights mentorship as an effective strategy in supporting the personal and professional growth of nursing students, aiding in their academic success and facilitating their integration into the profession (Cant et al., 2021; Ernawati & Bratajaya, 2021). For this, it is necessary to have experienced and competent professionals (Pramila et al., 2020), as well as technological resources (McMillan et al., 2026) that promote coordination between these stakeholders. Given these challenges, providing appropriate mentorship and resources is a fundamental strategy (Khunou & Kholofelo, 2023). It is noted that with the incorporation of electronic technologies, students made substantial progress in their clinical competence, particularly in reflection, teamwork, and communication skills (Lai & Wu, 2016).

The web prototype, SUPERVISE, offers two distinct types of access: one for students and another for mentors, promoting communication and interaction between these groups through

various available resources. The application provides features such as quizzes, reflective journals, and achievement systems to promote continuous professional development. The integration of gamification elements proves to be a useful tool to enhance this resource, showing promise for nursing student training (Sanz-Martos et al., 2024).

Methodologically, this project employed a rigorous approach that combined iterative development cycles with usability testing among nursing professionals. This methodological framework ensured that the SUPERVISE application not only met technical standards but also aligned with user expectations and educational objectives.

The tasks assigned to participants during the testing phase were carefully designed to cover essential functionalities such as account creation, login, quizzes, and logbook entries. These tasks helped identify usability issues and provided valuable quantitative and qualitative data. High scores suggest that many users found the application easy to use and efficient, while lower scores indicate areas needing improvement. A mean SUS score of 80.8 is considered excellent, indicating high usability and strong user acceptance (Martins et al., 2015). This finding reinforces the potential of the SUPERVISE application as a user-friendly and effective tool to support mentorship processes in nursing education.

The findings of this study demonstrate the usability and acceptability of the SUPERVISE application, as reflected by the high SUS scores and positive user feedback. Although the gamification elements may contribute to increased user engagement and interaction, neither engagement nor educational impact was directly assessed in this study. Future research should evaluate the effects of SUPERVISE on learning outcomes, mentorship effectiveness, and the development of professional competencies.

The benefits of this resource could be numerous, offering nursing professionals a structured platform for interactive learning, self-assessment, and mentorship. Through features like quizzes, reflective journals, and achievement systems, SUPERVISE can promote continuous professional development, increasing competence and confidence in clinical practice. By emphasizing the integration of gamification and reflective practice, SUPERVISE sets a precedent for innovative educational tools that can be adapted to various contexts, fostering a culture of continuous learning and professional growth.

Limitations

Although the SUPERVISE application represents a significant advancement in the nursing mentorship process by integrating gamification elements, several limitations were identified during the research. One of the main limitations is the need to evaluate its impact through larger and more comprehensive studies. Additionally, participants were recruited using a convenience sampling strategy, which, although appropriate for usability testing, may have introduced selection bias, thereby

limiting the generalizability of the findings. Another limitation concerns the scalability of the application's content. While the initial database was carefully populated with quizzes and relevant nursing practice content, maintaining and expanding this content base can be challenging. Future iterations of SUPERVISE could incorporate user-generated content features, allowing nursing professionals to contribute quizzes and educational materials, increasing content diversity and promoting community engagement.

Technical limitations were also observed during usability testing, particularly regarding the application's performance on different devices and internet connection speeds. Some participants reported slower loading times or interface delays, impacting their overall experience. Despite these limitations, the study serves as an important step for future development and long-term testing.

Conclusion

In conclusion, we present a comprehensive journey through the development, testing, and evaluation of the SUPERVISE application. The project focused on creating a technological resource prototype for the mentorship process of nursing students in a clinical context. The main achievements include the implementation of robust features such as quizzes, reflective logbooks, and gamification elements, designed to promote engagement and skill development. While we acknowledge the identified limitations, we also highlight future opportunities to refine content, improve user integration, and explore ways to further enhance the user experience. This research fills a gap in the literature and provides valuable insights for the future. It is hoped that future studies will explore its potential to positively impact its effectiveness.

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Maria Joana Campos: Data curation; Investigation; Visualization; Writing – review & editing.

Marta Campos Ferreira: Conceptualization; Investigation; Methodology; Supervision; Writing – review & editing.

Carla Silvia Fernandes: Conceptualization; Formal analysis; Formal analysis; Investigation; Methodology; Supervision; Writing – original draft.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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