

# Gamification in Teaching Electrocardiogram Interpretation and Cardiac Arrhythmias for Nurses

Gamificação no Ensino de Interpretação de Eletrocardiograma e Arritmias Cardíacas para Enfermeiros  
Gamificación en la Enseñanza de la Interpretación del Electrocardiograma y las Arritmias Cardíacas para Enfermeros

## RESUMO

**Objetivo:** Relatar a experiência de implementação de uma estratégia gamificada para o ensino da interpretação do eletrocardiograma (ECG) e arritmias cardíacas para enfermeiros alunos de um curso de pós-graduação de enfermagem em cardiologia e hemodinâmica. **Método:** Relato de experiência elaborado por docentes envolvidos na construção e aplicação de uma atividade gamificada baseada em um jogo digital. A experiência foi organizada em três momentos: (1) concepção e planejamento do jogo, (2) execução da atividade com os estudantes e (3) realização do debriefing após a vivência. **Resultado:** A equipe foi composta por docentes do curso de pós-graduação. O grupo desenvolveu um jogo eletrônico cujas perguntas foram articuladas aos conteúdos das disciplinas relacionadas à interpretação de ECG e arritmias. A atividade foi aplicada à 21 estudantes, e ao final, promoveu-se uma discussão coletiva para aprofundamento dos pontos abordados durante o jogo. **Conclusão:** A proposta gamificada favoreceu o engajamento dos estudantes e ampliou sua participação no processo de aprendizagem, além de facilitar a compreensão dos conteúdos referentes à análise do ECG e interpretação de arritmias cardíacas e por meio de uma abordagem lúdica. A experiência reforça o potencial da gamificação como metodologia ativa para qualificar o ensino e estimular novas práticas pedagógicas.

**DESCRIPTORES:** Eletrocardiografia; Enfermagem; Ensino; Jogos recreativos.

## ABSTRACT

**Objective:** To report on the experience of implementing a gamified strategy for teaching electrocardiogram (ECG) interpretation and cardiac arrhythmias to nursing students in a postgraduate course in cardiology and hemodynamics. **Method:** Experience report prepared by teachers involved in the construction and application of a gamified activity based on a digital game. The experience was organized into three stages: (1) game design and planning, (2) execution of the activity with students, and (3) debriefing after the experience. **Results:** The team was composed of professors from the graduate program. The group developed a computer game whose questions were linked to the content of courses related to ECG interpretation and arrhythmias. The activity was applied to 21 students, and at the end, a collective discussion was held to further explore the points addressed during the game. **Conclusion:** The gamified proposal encouraged student engagement and increased their participation in the learning process, in addition to facilitating the understanding of content related to ECG analysis and interpretation of cardiac arrhythmias through a playful approach. The experience reinforces the potential of gamification as an active methodology to improve teaching and stimulate new pedagogical practices.

**DESCRIPTORS:** Electrocardiography; Nursing; Teaching; Recreational games.

## RESUMEN

**Objetivo:** Relatar la experiencia de implementación de una estrategia gamificada para la enseñanza de la interpretación del electrocardiograma (ECG) y las arritmias cardíacas a enfermeros estudiantes de un curso de posgrado de enfermería en cardiología y hemodinámica. **Método:** Relato de la experiencia elaborado por los docentes involucrados en la construcción y aplicación de una actividad gamificada basada en un juego digital. La experiencia se organizó en tres momentos: (1) concepción y planificación del juego, (2) ejecución de la actividad con los estudiantes y (3) realización de la sesión informativa tras la experiencia. **Resultado:** El equipo estaba compuesto por profesores del curso de posgrado. El grupo desarrolló un juego electrónico cuyas preguntas se articulaban con los contenidos de las disciplinas relacionadas con la interpretación del ECG y las arritmias. La actividad se aplicó a 21 estudiantes y, al final, se promovió una discusión colectiva para profundizar en los puntos abordados durante el juego. **Conclusión:** La propuesta gamificada favoreció el compromiso de los estudiantes y amplió su participación en el proceso de aprendizaje, además de facilitar la comprensión de los contenidos relacionados con el análisis del ECG y la interpretación de las arritmias cardíacas mediante un enfoque lúdico. La experiencia refuerza el potencial de la gamificación como metodología activa para mejorar la enseñanza y estimular nuevas prácticas pedagógicas.

**DESCRIPTORES:** Electrocardiografía; Enfermería; Enseñanza; Juegos recreativos.

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**INTRODUCTION**

Educational institutions have faced increasing challenges in stimulating student interest when using traditional methods. Conventional pedagogical approaches, centered on the unidirectional transmission of content by the teacher, tend to promote passive and unreflective learning, which often results in a lack of motivation among students. Given this, it is essential to adopt strategies that present curricular content in a more attractive way and are capable of favoring the learning process<sup>(1-2)</sup>.

In the field of health education, studies have reinforced the importance of adopting active methodologies and innovative strategies that increase student participation. Several experiences have shown positive results in this regard, including Brazilian initiatives that explore playful elements, interaction, and digital tools. Among these initiatives, studies such as that by Ribeiro et al. (2022)<sup>3</sup> stand out, demonstrating the potential of instructional design combined with active strategies in remote nursing education, and the Academic Radio Project, which showed how innovative and participatory resources can promote student involvement and meaningful learning during distance education<sup>3</sup>. These experiences highlight the relevance of strategies capable of increasing student participation and engagement, which includes, in a

particularly promising way, the use of gamification.

Gamification has stood out for its ability to promote greater involvement, awaken motivation, and stimulate active student participation. By positioning students as protagonists of the educational experience, this approach contributes to increasing interest, curiosity, and engagement throughout the activities. The use of games in the educational environment, in turn, encourages dynamic participation and strengthens active learning practices, increasing interaction and involvement among participants<sup>2,4-6</sup>.

An electrocardiogram (ECG) is a simple, inexpensive, and noninvasive test that provides insight into an individual's cardiac condition and can identify abnormalities such as cardiac arrhythmias<sup>7</sup>. However, nursing professionals find it difficult to correctly interpret ECGs, and the teaching strategies offered are not always the most appropriate for understanding and apprehending the knowledge<sup>8-9</sup>.

The ability to interpret electrocardiographic tracings requires time, structured practice, and teaching methods that favor the progressive development of this skill. Therefore, the teaching of ECG and cardiac arrhythmias should involve techniques that increase student participation, stimulate reflection, and promote professional qualification<sup>9-10</sup>. Interactive environments and digital resources can complement learning in health-relat-

ed disciplines by increasing student interaction and engagement<sup>11</sup>.

Considering that teaching methodologies based on playful activities favor learning by facilitating understanding and expanding the development of skills, and recognizing that games can integrate formative elements into the educational process, the relevance of adopting active methodologies, such as gamification, becomes even more evident. This approach is particularly useful for improving the teaching of ECG interpretation and the recognition of cardiac arrhythmias, promoting more effective and meaningful learning by students.

Therefore, this article aimed to report on the experience of implementing a gamified strategy for teaching electrocardiogram (ECG) interpretation and cardiac arrhythmias to nurses enrolled in a postgraduate nursing course in cardiology and hemodynamics.

**METHOD**

This is a qualitative descriptive study, in the form of an experience report, based on the experiences of teachers responsible for the discipline of a specialization course in Nursing in Cardiology and Hemodynamics, offered by a private university located in the interior of the State of São Paulo. The gamification experience was conceived and implemented in the first semester of 2025. The activity was organized in three stages: (1) game

design and planning, (2) execution of the activity with students, and (3) *debriefing* after the experience.

The teachers' perceptions and experiences were recorded through observations during the activity, field notes, and summaries produced after the *debriefing*. The analysis was descriptive and reflective, seeking to identify elements relevant to pedagogical practice and the improvement of gamification strategies in health education.

As this is an experience report without individual data collection or participant identification, there was no need to submit it to the Research Ethics Committee, in accordance with current legislation. The institution au-

thorized the description of the pedagogical practice for academic purposes.

## RESULTS

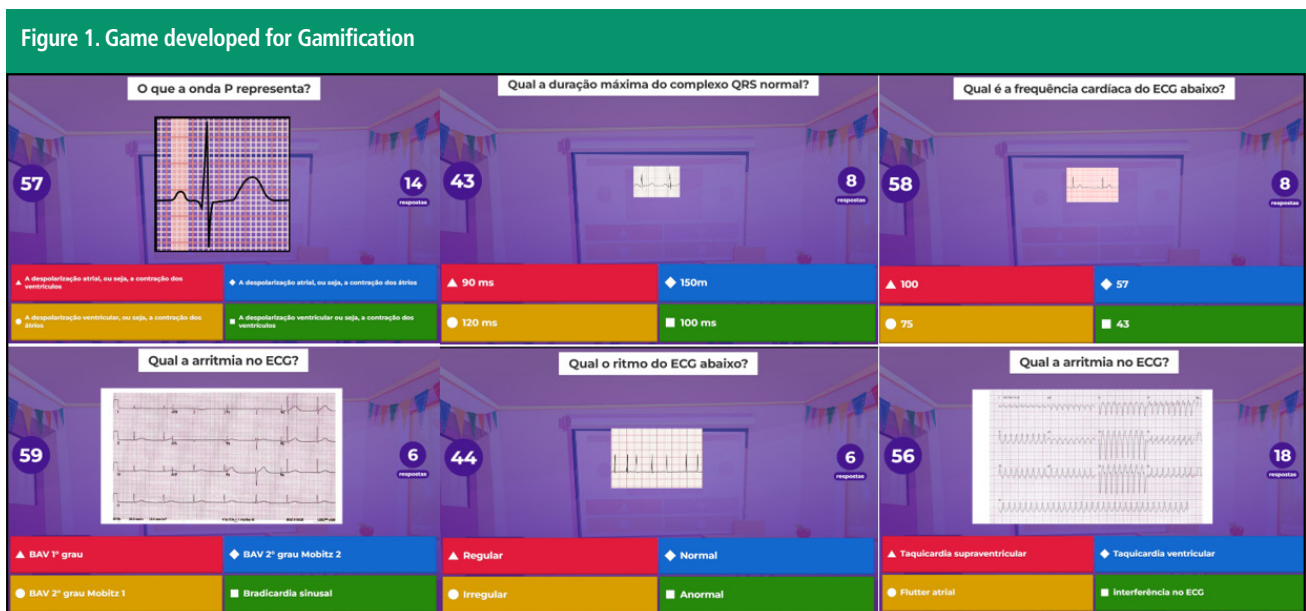
### 1) Game design and planning

The game was developed with the participation of the professors responsible for the specialization course. Initially, the content to be covered was selected, considering the modules previously offered in the training, specifically the topics of electrocardiogram and cardiac arrhythmias. The topics defined to compose the gamified activity included: meaning of ECG waves (P, QRS, and T), reference values for intervals (PR, QRS, and

QT), identification of heart rhythms (regular and irregular), calculation of heart rate, characteristics of the main tachyarrhythmias and bradyarrhythmias, and overall interpretation of the electrocardiographic trace.

To operationalize the game, we opted to use the *Kahoot* digital platform, chosen for its synchronous interaction features, encouragement of healthy competition, visual engagement, and immediate feedback to participants.

A total of 25 questions were prepared, each containing four answer options. The time to answer ranged from 30 to 60 seconds, adjusted according to the level of complexity of each question.



Source: Developed by the authors themselves

### 2) Execution of the activity with students

Twenty-one students enrolled in the specialization course participated in the activity. To ensure digital accessibility, free access to the institution's internet network was provided. All students were instructed to access the *Kahoot* platform and enter a nickname, ensuring anonymity during par-

ticipation.

In order to familiarize participants with the digital environment, a test game was initially held, enabling them to understand the platform's features and the dynamics of the questions. The questions in the main activity were answered individually, using the students' own mobile devices. This format allowed for simultaneous and continuous interaction with the

content, maintaining the dynamics and pace of the gamified proposal.

Throughout the activity, a high level of engagement was observed, evidenced by the students' active involvement, constant participation, and healthy competitiveness among them.

### 3) Debriefing

After the game was over, a *de-*

*briefing* was held, a stage dedicated to reflection and consolidation of the content covered. Each question was presented again and discussed collectively, with a detailed explanation of the correct answer, analysis of the most frequent errors, and clarification of questions raised by the students.

At the end of the discussion, students were given the opportunity to share their perceptions of the gamified experience. Their reports showed greater motivation, better understanding of the concepts, and recognition of the potential of gamification as a pedagogical strategy in teaching ECG and cardiac arrhythmias.

## DISCUSSION

The reported experience showed that gamification can act as an effective pedagogical tool for teaching complex content, such as electrocardiogram interpretation and cardiac arrhythmia recognition. These findings converge with research highlighting the potential of educational games to promote engagement, increase motivation, and encourage active learning<sup>2,4-5</sup>. Recent literature reinforces that gamified approaches act as catalysts for student participation and engagement, especially when applied to topics traditionally perceived as challenging in health education<sup>1,12-13</sup>.

The use of *Kahoot* proved to be an appropriate choice, as it offers dynamism, continuous interaction, and immediate *feedback*, which are essential elements in pedagogical proposals mediated by digital games. This finding is consistent with other gamified experiences in health education, in which real-time interaction contributed to the improvement of clinical reasoning, increased participation, and greater content retention. These aspects are consistent with studies indicating that gamified digital platforms assist in decision-making in

controlled and motivational environments, making learning more meaningful and contextualized<sup>3</sup>.

Another central element of this experience was *debriefing*, a stage recognized as essential in active methodologies and simulation practices. By promoting structured reflection, critical analysis, and collective discussion of errors, *debriefing* acted as a mechanism for transforming experience into consolidated knowledge. This perspective is supported by studies on interactive learning processes in health and the sociocultural approach that guides reflective educational practices<sup>11,15</sup>. In this logic, the activity was not limited to competition, but broadened conceptual understanding and favored the integration of theory and practice.

It is also worth noting that nursing professionals and students often have difficulties related to ECG interpretation, as widely documented in the literature, which points to limitations in both training and the low effectiveness of pedagogical strategies traditionally used to teach this content<sup>8-9</sup>. Gamification, as observed in this study, proved to be a promising alternative to mitigate these difficulties by promoting greater emotional and cognitive involvement, reducing anxiety associated with technical content, and promoting the retention of electrocardiographic parameters. These findings converge with scientific recommendations on the development of skills in cardiac monitoring and arrhythmia recognition<sup>7,11</sup>.

Thus, the results reinforce that well-planned active methodologies integrated into the curriculum can enhance the training of specialist nurses, contributing to the development of essential skills for clinical practice in cardiology. By combining gamification, immediate feedback, and structured reflection, teaching becomes more meaningful and oriented toward

clinical safety in patient care.

## CONCLUSION

The implementation of the gamified strategy proved to be a positive experience in teaching nurses how to interpret electrocardiograms and cardiac arrhythmias. The activity promoted high engagement, encouraged active participation, and facilitated the assimilation of traditionally complex content. The *debriefing* stage further enhanced learning by enabling structured reflection, critical review, and clarification of doubts.

Thus, it is concluded that gamification contributes to meaningful learning, participant engagement, and the development of critical and competent professional training. These results justify its adoption in curricula and educational practices focused on teaching electrocardiograms and essential nursing skills.

Although no longitudinal follow-up was conducted to verify the retention of acquired knowledge, the findings of this experience indicate that the use of digital games in ECG teaching is a viable strategy that enhances learning and is aligned with contemporary demands in health education.

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