










REVIEW

Gamification in personal health management: a focus on mobile apps

Gamificación en la gestión de salud personal: un enfoque en apps móviles

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ABSTRACT

This review article explores the concept and applications of gamification in personal health management, with a focus on mobile apps. Gamification is the use of game elements and techniques in non-game contexts to motivate and engage users in achieving certain goals or behaviors. Gamification has been applied to various domains of health, such as wellness, diet, exercise, chronic disease management, and mental health. The article discusses the benefits and challenges of gamification for health, as well as the theoretical frameworks and empirical evidence that support its effectiveness.

Keywords: Gamification; Personal Health Management; Mobile Apps.

RESUMEN

Este artículo de revisión explora el concepto y las aplicaciones de la gamificación en la gestión de la salud personal, con un enfoque en las apps móviles. La gamificación consiste en el uso de elementos y técnicas de juego en contextos no lúdicos para motivar e involucrar a los usuarios en el logro de ciertas metas o comportamientos. La gamificación se ha aplicado a diversos dominios de la salud, como el bienestar, la dieta, el ejercicio, el manejo de enfermedades crónicas y la salud mental. El artículo analiza los beneficios y los desafíos de la gamificación para la salud, así como los marcos teóricos y la evidencia empírica que respaldan su efectividad.

Palabras clave: Gamificación; Gestión de Salud Personal; Aplicaciones Móviles.

INTRODUCTION

Personal health management has become a contemporary challenge, exacerbated by sedentary lifestyles and the increasing incidence of chronic diseases.^(1,2) In this context, gamification emerges as an innovative and promising strategy to foster the adoption of healthy habits and enhance individual health management.^(3,4)

Gamification is a learning technique that incorporates elements and principles of games to foster motivation, participation, and improved performance among students in educational settings. It can be considered as a fifth learning theory, which differs from previous ones by its emphasis on fun, reward, competition, and

cooperation. Gamification seeks to leverage the potential of games to create meaningful, functional, and personalized learning experiences.⁽⁵⁾

By applying these elements to personal health management, the objective is to transform daily tasks related to well-being into more engaging and motivating experiences. Psychological theory supports this strategy, as gamification capitalizes on both intrinsic and extrinsic motivation to encourage behavior change.

Gamification in personal health management manifests itself in diverse forms, ranging from mobile applications to wearable devices and online platforms. These systems integrate challenges, virtual rewards, and narrative elements to make the adoption of healthy habits, such as regular exercise, balanced diet, and adequate sleep, more appealing and sustainable.

The incorporation of gamification into personal health management is based on psychological principles such as flow theory, which suggests that individuals are more engaged and satisfied when they face challenges balanced with their abilities. Additionally, gamification leverages intrinsic motivation by providing a sense of achievement and personal satisfaction, as well as extrinsic motivation through tangible or virtual rewards.

The gamification strategy to enhance the prevention, diagnosis, treatment, and rehabilitation of various diseases and disorders has been closely linked with the development of the metaverse. This has been significant, as it has provided an immersive, interactive, and personalized virtual environment where patients and healthcare professionals can access therapeutic, educational, and motivational games, helping them improve their quality of life, learning, and performance.^(6,7,8,9)

This conjunction has facilitated the creation of communities, networks, and platforms that foster collaboration, communication, and support among users, as well as the generation of data and information contributing to research and innovation in the field of health.^(10,11,12)

While gamification presents significant promises, it is not exempt from challenges and ethical considerations. Data privacy, equity in access to gamified technologies, and the possible dependency are critical aspects that must be addressed to ensure that gamification in personal health management benefits all users fairly and responsibly.

The aim of this study is to describe the benefits and limitations of gamification in healthcare.

METHOD

A bibliographic review was conducted by accessing the Scopus, PubMed, Dialnet, Scielo databases, and the search engine Google Scholar, using the following search strategies: ((gamification) AND (health)), ((gamification) AND (personal care)) and ((mobile applications) AND (gamification) AND (health)). The search was also conducted using the Spanish terms. The search was limited to the period 2019 - 2024, in both Spanish and English languages. Articles that were freely accessible, presented the full manuscript, and were relevant to the addressed topic were selected based on the authors' criteria. A total of 31 information sources were included in the review.

DEVELOPMENT

Benefits of gamification in healthcare

The use of applications with gamification elements in healthcare is being investigated and applied in several areas. For example, the use of applications for smoking cessation with gamification elements has been evaluated, where it was found that these applications can incorporate behavior change techniques such as feedback and self-monitoring, to assist in the process of quitting smoking.^(13,14)

In the context of smoking cessation, gamified applications have integrated elements including virtual rewards, point systems, user competitions, and the development of interactive narratives to assist users in their journey to quit smoking. These elements aim to make the process of quitting smoking more engaging and motivating.⁽¹³⁾

In the realm of physical exercise, some applications utilize challenges, achievements, and competitions to motivate individuals to maintain an active lifestyle. In the management of chronic diseases, gamified applications can help patients monitor their health, adhere to treatments, and adopt healthy lifestyle habits.⁽¹⁴⁾

Feedback and self-monitoring are key components in these applications. Providing positive feedback when users achieve certain milestones or accomplish goals contributes to reinforcing healthy behaviors. Self-monitoring, achieved through data collection on habits and progress, enables users to exert greater control over their health and facilitates the customization of interventions.⁽¹⁴⁾

The use of mobile applications to facilitate access to nutritional information and reinforce healthy habits has been a promising approach in the field of health. The integration of sports monitoring into these applications provides a more comprehensive experience, and this approach could be effectively applied in the context of physical education.⁽¹⁴⁾

The combination of nutritional information with sports monitoring data allows users to have a comprehensive view of their health and well-being. Applications can provide personalized nutritional advice based on recorded

physical activity, helping users make informed decisions about their diet.

The use of playful elements is becoming increasingly popular in the context of fitness and health care. It is used to promote health and well-being activity. In particular, wearable activity trackers, along with gamified applications for smartphones, have been promoted as promising tools to increase physical activity among their users.⁽¹⁵⁾

Furthermore, gamification can play a crucial role in motivating users to maintain healthy habits, whether through challenges related to nutrition, achievements for meeting physical activity goals, or virtual rewards for adopting healthier lifestyles.

Although specific results regarding the use of metaverses in healthcare were not found, the potential of gamification in health applications is an area of growing interest in medical research. Metaverses, by offering immersive virtual environments, could provide new opportunities for gamification in health, creating more engaging and personalized experiences.^(6,7)

Medical research is actively exploring how gamification, including the utilization of metaverses, can enhance user involvement, treatment adherence, and the achievement of health goals. Designing interventions that leverage the intrinsic motivation generated by gamification is essential to maximize the benefits in healthcare.⁽¹⁶⁾

Gamification of mHealth applications is considered a promising approach to counteract the long-term decline in user motivation with this type of applications.⁽¹⁷⁾ Gamification, when integrated into mHealth applications, has the potential to better facilitate patient self-management. It could be leveraged to develop applications for managing and monitoring the behavior of chronic diseases.⁽¹⁸⁾

In medical education, benefits of gamification have also been observed. Incorporating elements into learning can make it more effective, enhance knowledge retention by stimulating memory, attention, and reasoning, and increase motivation to learn by offering challenges, feedback, and recognition.^(10,19,20)

Internet users are seeking information related to healthcare at an unprecedented pace. Gamification is effective in increasing users' intention of utilizing health platforms.^(21,22) It can generate benefits that contribute to improving users' quality of life and optimizing the resources and outcomes of healthcare platforms.⁽¹⁰⁾

Gamification in treatment adherence has emerged as an innovative approach to addressing the persistent challenge of ensuring that patients consistently follow their treatment plans. This strategic approach seeks to integrate game elements and mechanics into the treatment process, with the objective of making it more engaging and motivating for patients, thus enhancing their level of adherence.⁽²³⁾

Moreover, gamification benefits from tracking and self-monitoring features in applications. These characteristics enable patients to record and visualize their progress in treatment, providing immediate feedback that can increase awareness and motivation to follow the treatment plan more consistently.⁽²³⁾

Another important aspect is the introduction of challenges and competitions among patients. This strategy fosters a sense of community and camaraderie, as friendly competition incentivizes patients to surmount obstacles and adhere more rigorously to their treatments. Likewise, the incorporation of interactive narrative elements guides patients through their treatment journey in an immersive and meaningful way.^(23,24)

Personalization of treatment is also a key component of gamification in adherence. The ability to tailor interventions according to the individual needs and preferences of patients contributes to enhancing the efficacy of the gamified approach. Furthermore, gamification facilitates the integration between patients and health professionals, enabling closer monitoring of patient progress and the ability to provide additional support when necessary.^(23,24)

Gamification has yielded favorable outcomes in motivating patients to follow their treatments or rehabilitation programs by making the process more entertaining and engaging. The utilization of these techniques in the field of physiotherapy represents a tactic that merges gaming with therapy, with the purpose of increasing the level of commitment, adherence, and eventually, treatment outcomes in patients.⁽²⁴⁾

It is important to emphasize that adherence is paramount for the success of the treatment of some diseases; however, currently, it is estimated that only around fifty percent of patients manage to maintain appropriate adherence to treatment. Gamification employs gaming elements in the rehabilitation and physical training process, which helps turn boring tasks and exercises into more engaging and appealing activities.^(24,25)

Studies suggest that remote virtual therapies have contributed to the reduction of expenses associated with travel, hospitalization, and hospital readmissions. Therefore, it would be a great idea that public services could invest in these new technologies, as the long-term benefits will outweigh the initial investment.^(24,26)

Applied to neurological rehabilitation, studies on gamification demonstrate an increase in patients' interest in more regular and continued monitoring to prescribed rehabilitation guidelines. Games can provide a useful distraction from the anxiety or pain associated with certain health conditions or treatments, helping to reduce stress levels.⁽²⁷⁾

By employing these techniques, collaboration can be fostered by facilitating teamwork, communication, and interaction among students and educators. Additionally, communication skills can be enhanced by developing the ability to express oneself, listen, and negotiate in simulated or real situations. These benefits

can contribute to improving the quality and effectiveness of the education of future physicians and other healthcare professionals.^(10,19,20)

Limitations of gamification in healthcare

Schmidt-Kraepelin et al.⁽²⁸⁾ maintain that research on gamification in healthcare is still in its early stages, with methodological deficiencies and fragmented knowledge. It is recognized that the current understanding is primarily based on research prototypes and emphasizes the need to understand how gamification is implemented in real-world healthcare applications.

In light of this dearth of knowledge regarding best practices in the design and implementation of gamification for mobile health applications, it is understandable that there are aspects that need to be developed with emphasis to maximize the efficacy of these techniques.

The digital divide represents one of the factors slowing down the adoption of gamification in healthcare. The digital divide in gamification refers to the inequality that exists in the access, usage, or impact of gamification. According to Puerto et al.⁽²⁹⁾ the lack of access to smart mobile devices is a barrier to the use of applications among patients attending a medical consultation.

The study by Castilla-Martínez et al.⁽³⁰⁾ makes reference to the increased use of mobile applications in neuroscience areas; nonetheless, the study itself warns about certain limitations. It underscores the indiscriminate use of mobile applications by healthcare personnel, the lack of certification for the majority of applications, and a limited number of reviews for mobile applications utilized in this field. There is a declared need for further research to evaluate the impact of applications on disease management.

Phillips et al.⁽³¹⁾ suggests that the necessity for clinical practice guidelines and the digital practitioner is not well established. This study suggests the potential emergence of a need for the development of clinical practice guidelines and the “digital practitioner”: an individual specialized in healthcare applications, who accepts references from other professionals, identifies the best programs to meet individual patient needs, and provides consultations to evaluate whether gaming applications could enhance clinical outcomes.

Another aspect that needs to be strengthened in gamification is the persistent lack of interest among healthy or young individuals in utilizing healthcare applications. Moreover, there is limited understanding of how gamification contributes to the adoption of mobile healthcare applications among healthy individuals. The document also acknowledges that existing healthcare-related services have not paid much attention to healthy individuals, suggesting that there may be other factors beyond gamification that need to be considered to encourage healthy individuals to engage in healthcare services.⁽²²⁾

It is important to highlight that, although there is evidence of the effectiveness of gamified applications in healthcare, further research is still needed to fully understand their long-term impact and efficacy in different populations. The customization of these applications according to individual needs and the integration with healthcare professionals are also areas under exploration to enhance their utility and effectiveness.

CONCLUSIONS

Research on the utilization of gamification in health applications has shown that it can be effective in increasing user engagement and motivation. However, more empirical evidence is needed to support its long-term effectiveness. Nevertheless, a positive correlation has been discovered between the level of gamification and user ratings in mobile health applications.

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