SERIOUS GAMES AS TOOLS FOR NUTRITION EDUCATION. AN EXPLORATORY STUDY ON UNIVERSITY STUDENTS' PERCEPTIONS

Martina Rossi
University of Foggia
martina.rossi@unifg.it

Guendalina Peconio
University of Foggia
guendalina.peconio@unifg.it

Double Blind Peer Review

Citation
Rossi, M., & Peconio, G. (2026). Serious games as tools for nutrition education. an exploratory study on university students' perceptions. *Italian Journal of Health Education, Sport and Inclusive Didactics*, *10*(1). https://doi.org/10.32043/gsd.v1i1.1707

Doi: https://doi.org/10.32043/gsd.v1i1.1707

Copyright notice:
© 2026 The Author(s). This is an open access, peer-reviewed article published by Cares S.r.l. – REN Press and distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

renpress.it/index.php/gsdj
ISSN: 3103-5744

ABSTRACT
The use of serious games in education today represents an innovative strategy for promoting learning and awareness in various educational contexts, including nutrition education. The research presented here explores the educational potential of these digital tools, with a particular focus on the perceptual and symbolic processes that influence their acceptability and educational effectiveness. Set within the theoretical framework of game-based learning and theories of embodied cognition, this exploratory study involved a sample of n=11 third-year students in the Bachelor's program in Psychological Sciences at the University of Foggia, who were administered a specially designed self-report questionnaire. The results highlight a generally positive perception of serious games as tools capable of stimulating participation, immersion, and motivation, but at the same time underscore the need for a solid scientific foundation, content consistency, and adequate pedagogical mediation. Students recognize the game as a formative and reflective experience, the effectiveness of which, however, depends on the quality of the pedagogical design and the epistemic transparency of the content.

KEYWORDS
Serious Games; Game-based Learning; Food Education; Exploratory Study.

Accepted 2026-07-12
Published 2026-07-15

1. Introduction

In recent years, the ongoing digitization of educational settings and the increasingly pervasive presence of video game elements in everyday life have sparked renewed interest in the pedagogical use of games in digital environments. In this context, serious games, defined as video games designed with explicit training or educational purposes, occupy the intersection of learning, simulation, and entertainment. Their distinctive feature lies in their ability to replicate complex real-world situations within a controlled interactive space, where users can experiment with roles, actions, and consequences without real-world risks (XXX et al., 2022). The use of serious games has gradually expanded to numerous educational fields: from environmental safety to medicine, and from environmental sustainability to professional training. In the field of education, these tools have been recognized for their ability to combine emotional engagement with the acquisition of cognitive content, fostering intrinsic motivation and active learning (Toto & Limone, 2022). The field of food education offers an ideal setting for the application of serious games, as it allows abstract knowledge about health, nutrition, and sustainability to be transformed into concrete experiences. Through simulation, the game enables players to explore the cognitive and behavioral consequences of food choices, fostering the development of critical awareness and responsible attitudes toward food and the environment (xxx et al., 2023).

Nevertheless, the widespread adoption of these tools still faces obstacles linked to the perception that video games lack "seriousness" and to the complexity of effectively integrating them into traditional educational programs (Lamas et al., 2023). This resistance appears particularly pronounced in university courses that train future experts in behavior and cognitive processes, such as psychology students. This paper is part of this line of research, with the aim of exploring how a group of third-year students enrolled in the Experimental Pedagogy course - as part of the Bachelor's degree program in Psychological Sciences - at the University of Foggia perceive serious games as tools for learning and nutrition education. The specific objective is to understand to what extent these students, who are nearing the start of their professional careers in the fields of psychology and education, recognize digital games as having credible, effective, and scientifically grounded educational potential, and what conditions they consider necessary for these games to serve as a genuine resource in promoting nutritional awareness and responsibility.

1. Theoretical framework

Within the landscape of contemporary educational research, the discussion of serious games is part of a broader debate concerning the transformation of learning practices in the digital society and, in particular, the role of interactive media in the construction of educational meanings. Play, historically interpreted as a symbolic space for experimentation and expression, acquires a new epistemological status in the contemporary media ecosystem, as it evolves from a recreational activity into a cognitive and cultural tool capable of mediating the relationship between knowledge and action.

Serious games - a term first introduced by Clark Abt as early as 1970 and later systematized by Michael and Chen (2005) - represent a specific form of digital learning environment in which the game-based component is designed to facilitate the acquisition of knowledge, skills, and attitudes through simulation, feedback, and progressively increasing complexity. They serve as a synthesis of narrative and performative dimensions, translating subject-specific content or cross-disciplinary skills into interactive and multisensory experiences that stimulate active, reflective, and autonomous learning processes (Scuotto et al., 2024). The literature on game-based learning has amply demonstrated (Gee, 2009; Djaouti et al., 2011; Caserman et al., 2020) that video games, when appropriately designed, possess a pedagogical structure. Their mechanics align with the principles underlying effective learning, as already outlined in theories of constructivism and experiential learning. In Kolb's model, the act of learning is conceived as a circular cycle of experience, reflection, conceptualization, and experimentation; the video game, as a controlled experiential environment, allows the learner to move through this cycle naturally (Hammady & Arnab, 2022), transforming error into a cognitive opportunity and feedback into a tool for self-regulation. The Deweyan idea that "learning by doing" constitutes the most authentic form of knowledge finds one of its most evident manifestations in the medium of video games: playing is not a secondary activity, but a way of exploring reality through simulated action.

From a theoretical perspective, the educational value of serious games is rooted in a multidimensional paradigm that integrates constructivism, embodied cognition, and sociocultural perspectives. The embodied cognition approach (Wilson & Golonka, 2013) has shown that cognition is inseparable from the body and the environmental context, since thinking, learning, or remembering involves activating sensorimotor and perceptual processes. Through direct interaction and simulation, serious games create an environment where concept and experience overlap; the user learns by "acting" within a system of constraints, consequences, and possibilities that mirror real life. In particular, in immersive or augmented reality experiences (Lin et al., 2024), the bodily component becomes an integral part of the learning process, and knowledge emerges as the result of a negotiation

between perception, decision-making, and emotion. At the same time, theories of situated learning (Lave & Wenger, 1991) help us understand the social nature of the educational-play experience. Learning is never an exclusively individual process, but rather a practice of participation within contexts of shared meaning; in this sense, the digital gaming dimension fosters the construction of communities of practice, in which cooperative interaction, regulated competition, and symbolic communication become forms of collective knowledge construction (Toto & Limone, 2022). Gaming, therefore, not only conveys content but also builds cognitive and social habitus oriented toward collaboration, responsibility, and reflexivity.

The integration of embodied and situated approaches makes serious games a powerful cognitive laboratory, a space where learners can explore, reflect on, and consciously rework their own actions. From a pedagogical perspective, they constitute a "highly mediated" learning environment, in which knowledge is not a static object of transmission but becomes an embodied and narrated event. This perspective finds a particularly significant application in the field of food education, understood not only as the transmission of nutritional knowledge but as the development of critical and behavioral skills that engage the value-based, ethical, and social dimensions of the relationship with food (Ponte et al., 2024). The act of eating, being linked to cultural representations, emotions, and daily practices, requires educational strategies capable of combining information, experience, and reflection. Serious games address these needs by offering simulated environments in which users can experiment with food-related decisions, confront the consequences of their choices, and reflect on the interactions between health, pleasure, and sustainability.

Despite this, the literature highlights the persistence of challenges related to the acceptability of video games in formal educational settings. The cultural association between play and superficiality tends to clash with the idea of rigorous, academic knowledge, leading to mistrust among both teachers and students. As Maxim and Arnedo-Moreno (2025) observe, the effectiveness of serious games depends not only on the quality of their pedagogical design but also on the perception of "epistemic seriousness" they manage to generate. To be recognized as such, an educational video game must ensure transparency in its sources, consistency between learning objectives and gameplay mechanics, and the ability to stimulate independent reflection. Without these requirements, there is a risk that the playful component will prevail over the educational one, reducing the experience to entertainment devoid of cognitive value.

2. The study

This exploratory study employs a cross-sectional research design and integrates digital media pedagogy, situated learning theories, and models of health education and food sustainability. The research was conducted using a qualitative design that combines thematic analysis and Grounded Theory. First, thematic analysis was used to identify, analyze, and interpret recurring patterns in the data, providing a representation of the phenomena under investigation and proving suitable for systematically mapping students' perceptions regarding general representations of Serious Games, their credibility, and the identification of any barriers or critical issues.

3. Research objectives

The overall objective is to analyze how undergraduate students in the Experimental Pedagogy track of the Bachelor's Degree Program in Psychological Sciences and Techniques at the University of Foggia perceive serious games as tools for formal and informal learning in the context of nutrition education, and to what extent these perceptions influence their willingness to consider them credible and effective pedagogical resources. The focus is therefore on the students' cognitive and value-based perceptions regarding the educational function of digital games, in order to understand the mechanisms through which the medium of video games is accepted, rejected, or reinterpreted within the realm of educational knowledge. Based on this framework, three specific objectives were defined:

1. to explore university students' general perceptions of serious games, examining how they define the relationship between play, knowledge, and learning;
2. analyze perceptions of the usefulness and credibility of serious games applied to nutrition education, investigating the degree of trust in their ability to promote nutritional awareness and reflective behaviors;
3. identify any critical issues, reservations, or barriers to acceptance that may hinder the inclusion of serious games in university curricula or formal educational programs.

4. Sample

Participants were recruited on a voluntary basis from the Bachelor's Degree Program in Psychological Sciences and Techniques at the University of Foggia, as part of the Experimental Pedagogy course. The recruitment involved a convenience sample consisting of n = 11 students enrolled in the third year of the degree program. The sample composition was predominantly female (81.8%; n = 9), with a mean age of 23.6 years (SD = 0.82); furthermore, the participants regularly attended third-year courses. For descriptive purposes, the students reported daily

use of digital technologies, with an average of 3–4 hours per day spent on devices such as smartphones, computers, and social media platforms. 72.7% (n = 8) reported having prior experience with educational or simulation-type digital games, while the remaining 27.3% (n = 3) reported primarily recreational use.

5. Measures and tools

The self-report questionnaire was developed ad hoc based on a systematic review of the literature on serious games and digital-play-based learning (Gee, 2009; Djaouti et al., 2011; Caserman et al., 2020), and subsequently adapted to the university setting in the fields of psychology and education. The development process involved the operational definition of the constructs of interest and their translation into items consistent with the theoretical framework. The instrument is divided into three thematic sections, corresponding to specific conceptual dimensions:

1. general perceptions and digital familiarity, aimed at assessing the level of exposure, perceived competence, and attitudes toward digital games and playful learning practices.
2. Perceived utility, credibility, and educational potential in the field of food education, aimed at exploring beliefs regarding the effectiveness of serious games in promoting food awareness and responsible behaviors.
3. Limitations, risks, and conditions for effectiveness, aimed at investigating any resistance, perceived critical issues, and conditions deemed necessary for the effective integration of digital games into university educational programs.

6. Data collection and analysis procedure

Data collection was conducted in a single administration session, at the end of a lecture in the relevant university course, in order to ensure consistency in context and timing. The self-report questionnaire was administered online via the Google Forms platform, with an estimated average completion time of 15 to 20 minutes. Participation was voluntary and anonymous; the data were stored in digital format and exported for subsequent analysis. The open-ended responses were subjected to a qualitative analysis conducted from a categorical analysis perspective. The qualitative data were processed through an inductive thematic analysis (Braun & Clarke, 2006), aimed at identifying semantic recurrences and clusters of meaning emerging from the text corpus, without the application of predefined interpretive frameworks. The analytical process consisted of the following phases:

1. familiarization with the data through exploratory and repeated reading of the entire corpus.
2. Manual open coding, with highlighting and annotation of relevant text segments.
3. Construction of thematic categories through the progressive aggregation of codes into conceptually coherent sets.
4. Definition and systematization of the final categories, organized into interpretive clusters according to the research objectives.

7. Results and discussion

As previously outlined, the questionnaire was designed to explore university students' social representations and perceptions regarding the use of serious games as tools for nutrition education, with the aim of understanding to what extent these digital applications are perceived as educational, motivational, and training resources within the academic context. The qualitative analysis of the open-ended responses, conducted using a thematic-inductive approach and a manual categorical analysis procedure, identified three main thematic clusters. These clusters represent recurring and conceptually coherent clusters of meaning, capable of synthesizing the structure of the representations expressed by students regarding the pedagogical value of serious games in promoting awareness, knowledge acquisition, and the adoption of healthy eating behaviors. The clusters identified are as follows:

1. motivation and engagement, relating to the experiential and emotional aspects of learning, with reference to the ability of serious games to increase interest, active participation, and cognitive engagement.
2. Credibility and perceived usefulness, pertaining to the assessment of the reliability of the content, its scientific consistency, and the actual educational effectiveness attributed to the tool.
3. Limitations and critical issues in use, concerning the reservations expressed by students regarding potential risks, conditions for effectiveness, and methodological or contextual obstacles related to the integration of serious games into educational programs.

The organization into thematic clusters allows for a structured interpretive mapping of student representations, highlighting both the positive aspects and the problematic elements associated with the pedagogical use of serious games in the field of nutrition education.

8. Cluster 1. Motivation and engagement

The first cluster concerns the motivational and experiential aspects of serious games as a learning tool in the field of nutrition education. Students tend to view this approach as a more active, interactive, and dynamic method compared to traditional teaching, one that fosters participation, attention, and curiosity. Several participants emphasize how the game fosters a personal experience, in which the student is not a passive spectator but the protagonist of their own learning process:

"*The game makes you feel part of the experience, not just a spectator. You learn by doing, not by listening*" (Student 4, F, 24 years old).

"*You can really get involved: you try, you make mistakes, you repeat, and you understand better what you're learning"* (Student 7, M, 24 years old).

Several students also noted that the challenge aspect, immediate feedback, and the ability to simulate real-life situations facilitate memory and meaningful learning. In the context of nutrition education, the opportunity to experiment with choices and consequences in a simulated environment is perceived as particularly effective:

"*A game that shows you the effect of dietary choices is more effective than a theoretical lesson*" (Student 10, F, 24 years old).

This cluster reflects the principles of game-based learning (Shi & Shih, 2015; Nadeem et al., 2023), according to which learning occurs through experiences in virtual contexts that foster reflection, problem-solving, and emotional engagement. In line with the theory of embodied cognition, many students perceive the game not only as a technological tool, but as an integrated experiential space where mind, body, and emotion cooperate in the construction of knowledge related to food choices and healthy behaviors.

9. Cluster 2. Credibility and perceived usefulness

The second cluster focuses on the dimensions of epistemic credibility and educational utility attributed to serious games dedicated to nutrition education. Students recognize these tools as having high educational potential, but they consider it essential that they be scientifically grounded, designed with methodological rigor, and consistent with the objectives of a university curriculum. Some responses highlight the need for accurate and validated content that strikes a balance between the playful component and informational value:

"*To be useful, it must contain correct information, not just generic messages or slogans*" (Student 2, F, 24 years old).

"*I am only convinced by games that are based on expert research, with real data, not made-up information*" (Student 5, M, 25 years old).

More than one response also highlights the central role of the instructor as a facilitator and cognitive mediator, a figure necessary to connect the gaming experience with theoretical reflections and metacognitive processes:

"*Without guidance, the game risks being just a pastime; we need someone to help us understand what we're learning*" (Student 8, F, 23 years old).

This cluster is consistent with theories of mediation pedagogy, according to which a serious game acquires genuine educational value only when placed within an intentional, reflective, and guided context, where the playful experience becomes an opportunity for conscious learning. In the context of food, this implies that the game must promote accurate knowledge of nutritional principles without trivializing the content, and stimulate critical reflection on one's own consumption habits and daily choices (XXX et al., 2023).

Cluster 3. Limitations and critical issues in use

The third cluster gathers reflections concerning the perceived limitations and operational conditions necessary for the effective use of serious games in food education within academic contexts. Several students report cultural and institutional resistance linked to the limited legitimacy of games as educational tools:

"*Many lecturers would not view it favorably, because they associate games with something unserious*" (Student 3, F, 24 years old).

Others highlight disparities in digital skills that could hinder the full participation of all students:

"*Not everyone is good with technology; for some, it would be difficult to keep up with the game's pace*" (Student 9, M, 23 years old).

Finally, some participants express concerns about the risk that, if poorly designed, serious games might oversimplify scientific content or distract from the main educational objectives:

"*It's important to avoid situations where the playful aspect outweighs the educational message or oversimplifies complex topics*" (Student 1, F, 23 years old).

Although students acknowledge the educational potential of serious games, they stress the necessity of careful pedagogical design, appropriate time for teacher mediation, and adequate infrastructural resources (digital laboratories, accessible technologies, institutional support). These considerations align with limitations already noted in the literature (Michael & Chen, 2006; Soler et al., 2017), which suggest that serious games are truly effective only when embedded within coherent educational ecosystems capable of integrating playfulness, pedagogical intentionality, and scientific validity.

10. Discussion

The results of the qualitative analysis reveal that students enrolled in the Bachelor's Degree in Psychological Sciences at the University of Foggia perceive serious games as an innovative and motivating learning methodology that integrates cognitive, emotional, and relational processes. The serious game is perceived as an accessible and formative tool capable of enhancing learning through direct experience, active participation, and personal experimentation with realistic situations related to nutrition and health. The overall perception is positive yet reflective: while students express enthusiasm toward the interactive dimension of games, they simultaneously demonstrate critical awareness of their limitations and of the necessary conditions for serious games to become effective tools for cognitive and value-based growth. Hence, no uncritical acceptance nor idealized vision of learning "gamification" emerges. Instead, the serious game is seen as an integrative resource that complements existing didactic methodologies and effectively bridges theory and applied experience. Students recognize digital gaming as a contemporary cognitive language, capable of engaging with experiential and multimodal forms of learning. In this light, the serious game is interpreted not merely as technological support, but as a situated cognitive environment—an ecosystem in which learning develops through the interaction between the individual and the ludic context. Particularly valuable is the mature perspective students display concerning the requirements of credibility and epistemic validity of serious games. They emphasize that, to be effective, an educational video game must be grounded in scientifically validated content, coherently aligned with academic curricula, and supported by deliberate pedagogical design that reconciles rigor and creativity. Consequently, students call for an active and mediating teaching role, one that interprets gaming not as an accessory activity but as a

didactic device to be integrated with lectures, reflection sessions, and personalized feedback.

Nonetheless, some critical reflections persist. Students note that the cultural legitimacy of games within academia remains partial: the videogame medium, still often associated with leisure or distraction, does not always enjoy full institutional recognition. Moreover, discrepancies in digital literacy, potential technical obstacles, and the lack of dedicated infrastructures pose challenges to equitable access and inclusivity. Another point of concern regards the risk of excessive content simplification, which could compromise the conceptual depth of the learning experience if the game is not properly designed or accompanied by structured debriefing and guided reflection sessions. Despite these limitations, students convey trust in the educational potential of serious games while reaffirming the centrality of pedagogical design, scientific soundness of content, and the teacher's role as facilitator of critical thinking.

11. Conclusions

This qualitative investigation, conducted among third-year students of the Bachelor's Degree in Psychological Sciences at the University of Foggia, explored how serious games are perceived as learning tools, specifically in the field of food education. Although the findings derive from a small and non-generalizable sample, they outline an interpretative framework in which students attribute strong formative potential to serious games, as tools capable of stimulating curiosity, engagement, and awareness, while also emphasizing the need for rigorous design and deliberate didactic mediation. Digital play is thus conceived not as an alternative to traditional methods but as an experiential complement that fosters learning through exploration and reflection, transforming the act of "playing" into a concrete and situated form of knowledge. The field of food education appears particularly fertile for experimenting with the educational potential of games, as it connects cognitive, affective, and behavioral dimensions, allowing students to simulate choices, evaluate consequences, and internalize values of health and sustainability. At the same time, the reflections highlight critical issues requiring attention: the limited academic legitimacy of games, uneven digital competences, and the risk of excessive simplification of educational content. Nonetheless, these concerns translate into actionable insights, suggesting the importance of training teachers and tutors to integrate ludic tools within structured learning pathways and to employ games as spaces for critical reflection rather than mere entertainment. Ultimately, the serious game emerges as a complex didactic device in which play becomes a language and experience transforms into knowledge, an embodied, participatory, and hybrid learning space that, when grounded in sound scientific and pedagogical foundations, can contribute to renewing the culture of education,

bringing it closer to the languages, experiences, and meaning-making processes of new generations.

References

Toto, G. A., & Limone, P. (2022). From the theory of Pedagogical Problematism to contemporary teaching applications: the case of real learning experiences in teacher training. *Ricerche di Pedagogia e Didattica. Journal of Theories and Research in Education*, *17*(2), 75-94.

Nadeem, M., Oroszlanyova, M., & Farag, W. (2023). Effect of digital game-based learning on student engagement and motivation. *Computers*, *12*(9), 177.

Shi, Y. R., & Shih, J. L. (2015). Game factors and game-based learning design model. *International Journal of Computer Games Technology*, *2015*(1), 549684.

Wilson, A. D., & Golonka, S. (2013). Embodied cognition is not what you think it is. *Frontiers in psychology*, *4*, 58.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge university press.

Lin, X., Li, R., Chen, Z., & Xiong, J. (2024). Design strategies for VR science and education games from an embodied cognition perspective: a literature-based meta-analysis. *Frontiers in Psychology*, *14*, 1292110.

Lamas, S., Rebelo, S., da Costa, S., Sousa, H., Zagalo, N., & Pinto, E. (2023). The influence of serious games in the promotion of healthy diet and physical activity health: a systematic review. *Nutrients*, *15*(6), 1399.

Chen, S., & Michael, D. (2005). Proof of learning: Assessment in serious games. *Retrieved October*, *17*, 2008.

Scuotto, C., Triberti, S., Iavarone, M. L., & Limone, P. (2024). Digital interventions to support morality: A scoping review. *British Journal of Educational Psychology*, *94*(4), 1072-1090.

Gee, J. P. (2009). Deep learning properties of good digital games: How far can they go?. In *Serious games* (pp. 67-82). Routledge.

Djaouti, D., Alvarez, J., Jessel, J. P., & Rampnoux, O. (2011). Origins of serious games. In *Serious games and edutainment applications* (pp. 25-43). London: Springer London.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101.

Caserman, P., Hoffmann, K., Müller, P., Schaub, M., Straßburg, K., Wiemeyer, J., ... & Göbel, S. (2020). Quality criteria for serious games: serious part, game part, and balance. *JMIR serious games*, *8*(3), e19037.

Kolb, D. A. (2013). The process of experiential learning. In *Culture and processes of adult learning* (pp. 138-156). Routledge.

Hammady, R., & Arnab, S. (2022). Serious gaming for behaviour change: a systematic review. *Information*, *13*(3), 142.

Ponte, I. A. D., Silva, B. B. D., & Batista, L. L. M. (2024). Serious games as tools for food and nutrition education: a systematic review. *ABCS health sci*, e024306-e024306.

Maxim, R. I., & Arnedo-Moreno, J. (2025). Identifying key principles and commonalities in digital serious game design frameworks: Scoping review. *JMIR Serious Games*, *13*, e54075.

Soler, J. L., Contero, M., & Alcañiz, M. (2017, November). VR serious game design based on embodied cognition theory. In *Joint International Conference on Serious Games* (pp. 12-21). Cham: Springer International Publishing.