Healthier behavior: can games be a health promotion strategy for college students?

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ABSTRACT

The use of technologies such as games can be promising tools for health promotion among university students. The study aimed to verify the relevance of the use of games in encouraging behavior change among university students. A cross-sectional exploratory and descriptive study was carried out with 219 university students from southern Brazil. Online questionnaires were applied and frequency distributions and statistical models were analyzed to identify the influence of games on students' health and learning. Most of the academics said they played games, with a preference for action and adventure styles with the predominant use of smartphones. The students stated that they believe that games can positively (73.97%) and negatively influence (23.75%) their behaviors. Thus, women and older students were the most likely to believe in the impacts of games on their behavior. It is concluded that games have surpassed entertainment, becoming effective tools to teach and encourage healthy behaviors.

Keywords: computer games; health education; videogames, educational games, games.

1. INTRODUCTION

The promotion of healthier behaviors has been one of the strategies adopted by public health policies, articulating the determinants of health to the population's lifestyle (Brasil, 2023). Encouraging the choice of healthier and more sustainable behaviors can increase autonomy in promoting self-care, placing the individual as the protagonist to live with a good quality of life (Loch et al., 2019).

The efficiency of these policies must consider that an individual's lifestyle is determined by economic, social, and psychological conditions, in addition to behavior influenced by the situations experienced in each individual's individuality (Madeira et al., 2018). In this context, it is possible to observe the change in the lifestyle of young people when entering university. The beginning of academic life requires a process of adaptation of students, since the expectation of building a university identity and a future well-consolidated professional career are faced with the challenges of higher education (Carloto et al., 2015).

The strategies for coping with the adversities experienced in this new cycle often result in a change in lifestyle with the establishment of health risk behaviors by university students (Zanon et al., 2014). Risky or unhealthy behaviors are understood as behaviors that negatively affect health, whether physically, mentally or socially. Reckless sexual behavior, alcohol abuse, legal and illegal drugs, sedentary lifestyle, and eating disorders are the most frequent risk behaviors in the academic population (Morgan et al., 2017; Pinheiro et al., 2017).

An observational study of 2764 college students revealed that risky sexual experiences, both protected and unprotected, are common among them. The main risk behaviors included unprotected vaginal (39.7%), oral (21.7%), and anal (13.6%) contacts. In addition, sexual experiences while intoxicated were reported by 20.9% of the students, and sexual relations with unknown persons were mentioned by 16.5% of the participants (Łukaszek, 2022).

In this scenario, the academic environment is favorable for the implementation of health promotion actions (Borges et al., 2014; Busarello, 2016). The preference and mastery of digital technologies by this population provide the opportunity for a gamified approach to promote health. In recent years, games are no longer just an entertainment alternative and are designed with specific learning, productivity, and health objectives (Udeozor et al., 2022).

Elements such as the presence of attractive scenarios and engaging narratives have made games increasingly immersive and captivating experiences. The feeling of protagonism offered to the player from characters and reward strategies has made games a promising tool in the development of cognitive and motor skills, or even in stimulating behavior change (Maskeliūnas et al., 2020; Swacha et al., 2021). Therefore, this study aimed to verify the relevance of the use of games in encouraging behavior change among university students.

2. METHODOLOGY

This cross-sectional exploratory and descriptive study was approved by the Research Ethics Committee of the Higher Education Institution, under opinion No. 5,900,621. The research was conducted with a sample of 219 students from a private university in southern Brazil, using a non-probabilistic sampling approach with voluntary adherence of the participants.

The sample consisted of 219 students, chosen for convenience, who were willing to participate in the research. The inclusion criterion considered students regularly enrolled in the institution, ensuring that the participants were inserted in the academic context and, therefore, more likely to have experiences with electronic games.

The data collection instrument consisted of a structured questionnaire, divided into two sections: sociodemographic aspects and preferences and perceptions about games. The first section covered questions about gender, age, race, marital status, and housing status. These data were essential to characterize the profile of students who have the habit of playing games, allowing a more detailed analysis of the variables that can influence the relationship between the use of games and health behaviors. The second section of the questionnaire focused on identifying the daily time dedicated to playing, the preferred equipment for access (such as consoles, PCs or mobile devices) and the preferences of the genre of games. Participants were able to express what they found most attractive about games and whether they believed that games could serve as tools to encourage healthier habits.

The questionnaires were made available online through the Google Forms® application, with easy access through a QR Code distributed in various locations on the university campus. This strategy aimed to maximize student adherence, allowing them to participate voluntarily and at any time during the collection period. The form was available for 15 days, during which 225 responses

were collected. However, 6 questionnaires were excluded due to inadequate completion, resulting in a total of 219 valid questionnaires for analysis.

For data analysis, descriptive statistics were performed, allowing the observation of the frequency distributions of each response. This initial approach provided an overview of the sample's characteristics and preferences regarding games. Then, Poisson regression and logistic regression models were applied. These models were adjusted with the objective of identifying patterns and correlations between the students' profile and the influence of games on their health behaviors and the generation of new learning.

The use of Poisson regression allowed the evaluation of the count of events, such as the number of hours dedicated to games, while logistic regression was used to analyze the probability of students considering games as effective tools for the promotion of healthy habits. The results obtained enabled a deeper understanding of the relationship between games and health promotion among university students, contributing to the construction of strategies that can integrate electronic games in health education.

3. RESULTS

A total of 219 university students participated in the study, most of whom (74.89%) were in the initial semesters of their undergraduate studies. About 70% of the sample stated that they were female and lived with family members. The average age of the interviewees was 20.7 years, with a range of 17 to 41 years. White students made up the majority of the sample (77.63%), followed by brown (16.89%), black (3.20%) and yellow (2.28%) skin color. When asked about their marital status, 89.95% indicated that they were single or divorced and only 9.13% were married or in a stable union.

The habit of playing *games* was pointed out by 64.8% of the university students interviewed and when seeking to identify the profile of these students, it was found that male students are 10.96 times more likely to play *games* compared to the female gender, as well as single or divorced students are almost 3 times more likely compared to married or stable unions. For the brown ethnicity, a 72% reduction in the chance of playing games was identified when compared to white students.

The university students stated that they had the habit of playing at least once a week, but 18.26% said they played daily. It was identified that the average time of permanence of university students in the practice of *games* was 2 hours and 40 minutes, with a higher concentration of students who played for up to 1 hour a day (35.62%), followed by those who played 2 to 3 hours a day, 4 to 5 hours a day and more than 5 hours a day. respectively: 31.96%, 7.76% and 5.02%.

The use of *smartphones* as a tool to access *games* was reported by 71.23% of the students, while computers or *tablets* are used by 42.47% of the students, while the video game device by only 22.37% of the survey participants. Among the types of *games* that college students usually play, the action and adventure genre (32.88%) was the most preferred, followed by simulation (27.40%), *puzzle* (17.35%), strategic (12.79%) and sports (9.59%).

This diversity in gender choices reveals not only the individual preferences of students, but also the versatility of games in catering to different interests and styles of play. The predominance of action-adventure games can be interpreted as a search for immersive and dynamic experiences, which offer an escape from the academic routine. In addition, access to a wide range of games on mobile devices allows students to play during pauses, making it easier for them to include games in their daily lives. This interaction with different types of games not only diversifies entertainment experiences, but can also contribute to the development of cognitive, social, and emotional skills, highlighting the potential of games as a multifaceted tool in the university context.

The Game Brasil Survey (2023) identified that about 70% of Brazilians, in a varied age group, claim to play some type of *game*. According to McGonigal (2012), the reason for the rise of *games* is the capacity for involvement, interaction and motivation offered, aspects that are often not found in the user's daily life, but are possible in the virtual world. The popularity of *games* among young people and adolescents is indisputable, evidencing the potential of this tool beyond entertainment (Passos and Novo Jr., 2021). This trend underscores the importance of games as a means of socialization and interaction, where players can connect with others in virtual communities, sharing experiences and forming bonds that transcend the screen. Additionally, the collaborative nature of many games encourages skills such as teamwork, communication, and problem-solving, preparing young people for real-world challenges. Thus, the rise of gaming not only reflects a shift in leisure preferences, but also indicates a valuable opportunity to utilize this

media as an educational and social resource, promoting learning and personal development in an environment that is, by nature, attractive and accessible.

The rewards offered in the *games* was pointed out as one of the main aspects that motivated the students to choose the practice of a *game* (Table 1). Among these, 58.90% said they do not care about the type of reward they will receive, 30.59% prefer rewards that give the possibility of unlocking levels to advance in the game, while 10.50% said they prefer rewards in the form of ranking disclosure among players.

This diversity in rewards preferences suggests that game developers can explore different approaches to engaging players, creating a more personalized and satisfying experience. The wide acceptance of varied rewards indicates that players' motivation goes beyond simple incentives; It is based on the search for progress and achievement within the game. The possibility of unlocking levels, for example, not only offers a sense of achievement, but also keeps the player invested in the narrative and the challenges proposed. Thus, reward mechanics not only foster game continuity, but also contribute to the development of skills such as perseverance and strategy, which are valuable both in the virtual context and in everyday life (Hamari and Koivisto, 2015).

Table 1: Aspects that most attract students in a game.

Characteristics	Frequency	Percentage
Game Setting	149	68,04%
Presence of rewards	140	63,93%
Possibility to play in *offline mode*	130	59,36%
Possibility of interaction with other players	89	40,64%
Join as avatar (own image)	74	33,79%
Sound and visual effects	56	25,57%
Presence of a plot/narrative	14	6,38%
No *bug*	7	3,2%

*Respondents had the option to indicate more than one answer

In the investigation on the possibility of *games* influencing behaviors, most (93.61%) students indicated that they totally or partially believe that they can acquire new knowledge by playing a *game*. When asked about the ability of a *game* to influence their behavior, 73.97% of the students totally or partially agree that *games* about healthy habits can positively influence them

(Table 2). However, female students are 46% more likely to believe in this hypothesis compared to male students.

A study conducted in 2022 by Espinosa-Curiel et al. developed the serious game "HelperFriend" with the purpose of encouraging healthy lifestyle habits in children. The game designed to promote healthy behaviors, including physical activity, balanced eating, and social-emotional well-being. The study used a questionnaire to measure children's intentions to engage in physical activity, consume a healthy diet, and engage in social-emotional wellness activities. The results indicated that "HelperFriend" had a positive impact on children's intentions to adopt healthy lifestyle behaviors, demonstrating that serious games can be effective tools to promote positive behavioral changes in children (Espinosa-Curiel et al., 2022).

Table 2: Estimates of the logistic regression model for the response variable "Do you believe that games about healthy habits can positively influence?" considering the covariates Gender, Age, Ethnicity, Marital Status, and Current Residence.

	Estimates	Standard Error	P-value	Odds Ratio
(Intercept)	1.28	1.30	0.3246	3.58
Gender: Male	-0.62	0.34	0.0668	0.54
Age	0.01	0.04	0.7753	1.01
Color or Ethnicity: Yellow	-0.91	0.96	0.3414	0.40
Color or Race Ethnicity: Black	-0.20	0.88	0.8233	0.82
Color or race ethnicity: Brown	-0.14	0.43	0.7383	0.87
Marital status: Single/Divorced	0.21	0.60	0.7215	1.24
Marital status: Widowed	14.28	1020.93	0.9888	1596428.91
Current housing: with family members	-0.31	0.68	0.6523	0.74
Current home: lives alone	-0.75	0.73	0.3050	0.47

On the other hand, 23.75% of the students believe totally or partially that *violent games* can negatively influence them, while 76.25% totally or partially disagree with this statement. Female students are 76% more likely to believe that violent games can negatively influence them, compared to male students. In addition, it was found that for each 1-year increase in age, the chance of the student believing that violent games are capable of causing negative influence increases by 7%. This greater perception of the negative influence of violent *games* reflects

greater violent exposure to video games is associated with increased anxiety, insomnia, aggression, and approval of aggression among male adolescents (Akel et al., 2023). In addition, increased exposure to violent video games is associated with reduced empathy concerns, aggression-related thoughts, and increased aggressive behavior among young adults (Addo et al., 2021).

In general, *games* present narratives that direct the player to use critical thinking and judgment for decision-making, making the experience of playing important in the adoption of motor, cognitive, and learning skills (de & Rita Melissa Lepre, 2022). Studies indicate that an experience based on the use of a game can also raise the perception of risk and favor the change of behavior (Medema et al., 2019; Ghodsvali, Dane and de Vries, 2022; Damaševičius et al., 2023).

The motivation to change a behavior from a game is driven by a combination of elements, such as voluntary participation, the presence of goals that help engage the user to stay in that activity, and the use of a *feedback system* (Fortim and Santaella, 2020). Feedback can be presented in the form of progression charts (level evolution), performance charts (*ranking*) or the presence of rewards. The presence of *feedback* was pointed out as one of the main aspects that motivated students to stay in a *game* in the current study, with about 30% preferring rewards that give the possibility of unlocking levels to progress in the game, while 10.50% prefer that the reward be in the form of recognition of their performance in the game from *ranking*.

The stimulus for the adoption of healthier habits can come from proposals for *exergames-style* games, which are games that require body movement stimulating the development of motor skills, the practice of physical activities, and combating a sedentary lifestyle (Souza et al., 2022). The combination of *games* with some technological resources such as a GPS device and oximeter has also been shown to be effective in motivating the permanence of the habit established from the achievement of goals (Zhao and Arya, 2020). Almost unanimously, the students participating in this study stated that they believe that a *game* can influence the adoption of healthy habits, since the female gender was 46% more likely to believe in this hypothesis compared to male students.

Studies show that the use of *games* has the potential to benefit players in cognition, working memory, attention, motivation and the development of social skills such as leadership and teamwork. The improvement of motor coordination and spatial perception can also be developed through games (Al-Thaqib et al., 2018; Vajawat et al., 2020). According to Pandian

(2021), the training of skills from *games* favors some physiological conditions of the body such as the release of dopamine, increased blood flow, brain volume, and white matter plasticity.

However, since the nineteenth century, *games* have sometimes been taxed as an idle and addictive activity that could bring harm to mental and social health, and can promote negative changes in the behavior of their users. This theme starts to gain more visibility in the occurrence of violent crimes where the author has some relationship with the practice of *games* (Alejandro & Valero-Aguayo, 2024). In addition to the graphic elements present in games, the level of immersion in the game, that is, the level of realism of a game, can be decisive in this condition (Jeong et al., 2012).

In the present study, a portion of the interviewees (23.75%) said they believe that violent games can influence them in a negative way, and the female gender was more likely to believe in this hypothesis. However, it was identified that for each 1-year increase in age, the chance of the student believing in this hypothesis increased by 7%. A study by Kersten and Greitemeyer (2022) points out that some players may have a cathartic effect when exposed to violent games. This effect refers to a discharge of emotions with a feeling of liberation from a previous problem with the perception of improved mood and decreased feelings of aggressiveness.

The desensitization theory is also one of the hypotheses to justify the adoption of negative behaviors from games, since it proposes that repeated exposure to a violent *game* can promote a cognitive and emotional adaptation to that event, reducing the empathic response when faced with a real scene of violence (Engelhardt et al., 2011). Studies indicate that in addition to changes in behavior, games with violent content can promote changes in the player's physiological state, such as sweating and tachycardia during and after a game session (Bailey, West, and Anderson, 2009).

Other negative aspects about the use of electronic games present in the literature emphasize the possibility of physical damage: resulting from inadequate posture and hours in the same position, obesity stimulated by a sedentary lifestyle, psychological damage: such as the stress factor related to the loss of a game, not completing a requested activity, or even without a specific reason, by the expectations created by the user and social damage arising from social isolation or the creation of characters with characteristics that allow for better socialization without discrimination (Figueiredo, Sbissa. 2013; Xavier et l., 2014; Ferrari et al., 2015).

As the complexity of the interaction of university students with electronic games is explored, it becomes evident that this practice goes far beyond mere entertainment. The data collected reveal a diverse panorama that encompasses gender preferences, gaming habits, and beliefs about the influence of games on behavior and health. The recognition of rewards and the impact of game mechanics underscore the importance of understanding the motivations that drive students to engage with this media. Therefore, fostering an ongoing dialogue about the benefits and risks of electronic games is crucial, not only to maximize their contributions to learning and personal development, but also to mitigate the negative consequences that can arise from excessive or inappropriate use. This reflection provides a space for education and awareness, encouraging both developers and users to embrace a responsible and healthy approach to games.

4. FINAL CONSIDERATIONS

Considering all the stimuli that games can provide in their user, it is inevitable to recognize that games have gone beyond a simple moment of entertainment and opened possibilities for their use as a powerful tool to facilitate the relationship with their user. The possibility of using it as a resource to teach new learning and stimulate new behaviors is associated with the variety of game genres that exist, allowing the game to be molded according to the characteristics and needs of the target audience (Pessoni, 2017). The success of a game is evidenced by the convergence of the players' intrinsic and extrinsic motivations, providing in a playful way the prospect of a favorable future outcome (Zhonggen, 2018).

Inherent limitations of this study include the possibility of response bias, since participants responded influenced by their own personal experiences with electronic games. The generalizability of the results may be limited due to the specific nature of the sample or the cultural context in which the study was conducted. As well as, the lack of control over external variables that can influence the participants' responses, such as access to different types of games or the environment in which the games are played.

In view of the results of this study, it was identified that *games* have the potential to be applied as a resource in the promotion of the health of the academic population. In addition to being an attractive and effective tool for engagement, it proved to be very present in the daily lives of younger people, a public that is frequent in higher education. Considering that this study

pointed out that more than 70% of the interviewees believe that they can develop healthier behaviors due to the influence of a *game*, we can infer the importance of providing opportunities for the interest and ability of university students to play *games* to offer, during the academic cycle, a tool that motivates them to develop healthier behaviors.

Based on this study, it is concluded that the development of *games* to promote healthier lifestyle habits can become a valuable tool for promoting the health of students.

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