

ENGAGING WAYS OF LEARNING: ESPORTS AND VIDEO GAMES AS A LEARNING ENVIRONMENT FOR STUDENTS IN BRAZIL

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ABSTRACT

Video games can represent a motivational environment for teaching and learning processes, considering the non-compulsory, healthy competition, and audiovisual resources they provide. There are many skills proven to be enhanced by virtual reality learning. Gaming and video-game-based approaches regarding learning processes were associated with improved motor, social, and interpersonal skills metrics, demonstrating potential as complementary approaches in education. Therefore, including video games as part of the academic curriculum can be a valuable resource for learning processes. In time, comprehensive and up-to-date research and systematic reviews are necessary to confirm and enrich this discussion. This paper aims to start a broader and deeper research looking to increasingly incorporate eSports as a learning approach in the scholar curriculum in the Brazilian public education system.

A literature survey of PubMed, Google Scholar, Elsevier, and SiBiUSP was conducted in January 2023, filtering publications by keywords such as eSports, gaming, education, curriculum, discovery-based learning. This included literature from different academic fields (education, psychology, and music, among others).

KEYWORDS

Esports, Gaming, Education, Curriculum, Discovery-Based Learning

1. INTRODUCTION

A world constantly evolving towards a more technological future demand new and sophisticated skills from students in the 21st century. There are also new pieces of knowledge that can help children develop skills such as problem-solving, interpersonal conflict resolution, mathematical and logical thinking, crisis management, emotional intelligence, cooperative behavior, resource management, and decision-making (Zhong et al., 2022, p. 3). By bringing different approaches to learning processes that are aligned with contemporaneity this paper aims to briefly present and better understand the possibilities for learners, as well as methods, their limitations, and the potential that rests in eSports.

As gaming elements are being carefully and progressively incorporated into education, an ecosystem serving the purpose of learning can be created in a space as interesting and safe as possible for kids.

2. BRAZILIAN EDUCATIONAL SCENERY: ADDRESSING THE GAP BETWEEN THEORY AND PRACTICE

As the world becomes increasingly more technological, it is mandatory to look into our education strategies (Toner, 2011, p.56). In Brazil, the current model of primary and secondary education is established by National Curricular Common Base (BNCC). The report was created by the Guidelines and Bases of National Education Act (most recently revised in 2018). It states, among other aspects, that the bases of Brazilian education should promote competency learning and prepare students for the market. (Brazil, 2018).

Even though the concept of competencies is paramount for the development of the future workforce (Dondi et al., 2021), some competencies seem to be under-prioritized by BNCC - not in the document *per se*, but in its application (Morais, 2021, Ferreti & Silva, 2017). The focus on standardized testing and a narrow curriculum

limit students' creativity and interests. This model also fails to address students' diverse needs and backgrounds, contributing to a high dropout rate and a lack of equity in educational opportunities in a country impacted by social inequality (Ferreti & Silva, 2017, pp. 394-398).

It is paramount to discuss assisted discovery, gamification, and challenge-based learning approaches. The benefits of gaming applicability and the eSports presence in educational settings must be investigated.

3. GAMIFICATION APPROACHES IN NUMEROUS LEARNING PROCESSES

3.1 Playing, Gaming, and Learning

Gaming and playing provide leisure and/or casual settings to address learning issues. On account of sets of procedures, backdrop simulations, or even peer participation, gaming strategies in education have found a prolific field and seem to stimulate students to engage in their education. Drawing on narratives, scenery, characters, and specific goals, students find a space and time to materialize, implement, and transfer their knowledge in many areas, while connecting and expressing their feelings, likes, and dislikes. As a result, applied gaming strategies encompass different sets of skills to promote controllable and assisted setups that can be secure, captivating, and non-compulsory for students (Zhong et al., 2022).

3.2 Challenge-Based Gamification Strategies

Challenge-based gamification such as the application of points and levels systems, leaderboards, and clear goals, tasks, and quests, have been shown to improve learning outcomes. The gamification tools suggest that, when combined with or integrated into traditional approaches in education, gamification of learning improves students' performance. (Zixiu, Cahalane & Carbonie, 2022, p. 2-5).

As pointed out in research, groups who experienced challenge-based gamification performed better than those who only participated in traditional methods such as attending the class or reading the material (Legaki et al., 2020; Nah et al., 2014).

Merging assisted discovery-based learning, gaming, and challenge-based approaches and the effectiveness of said combination must be further investigated.

3.3 Esports: Benefits and Limitations

eSports (competitive electronic games) have become increasingly popular in recent years and have been associated with health benefits to their players, including educational contexts.

Research has shown that video games can help improve motor coordination, precision, and reaction time (Gupta, et al., 2021). The possibility to incorporate gaming resources into learning processes can be particularly useful for people who need to improve their skills, such as students, doctors, and drivers (González-González, et al., 2018; Mallow, et al., 2020).

Virtual reality tools can also aid in developing stress-reducing abilities and improving self-esteem and self-efficacy, forming healthy and result-oriented habits (Huang, et al., 2017).

Other researchers point out that eSports can promote socialization and teamwork conditions, being an effective tool for individuals who struggle with social interactions, live in remote areas, or can benefit from collective learning ecosystems (Cañabate, et al., 2021). These abilities are crucial for success in school and life, at every age. The promotion of teamwork and collaboration settings seems to be possible by the *principle of not-leaving-anyone-behind* and incorporating each one's best skills to put them into game strategies. For example, role-playing games (RPGs) use this very principle. They can integrate multiple skills and knowledge from various fields, fostering teamwork, problem-solving, critical thinking, and creativity (Soares, et al. 2015). These skills are essential for success in both the classroom and the workforce (Cañabate, et al. 2021).

Moreover, eSports can be an engaging way to teach academic content, such as math, languages, and history. These games can help students become interested in the content and learn more effectively (Caponetto et al., 2014). As such, gaming as an educational strategy represents a motivational way to learn, considering the

activeness of the setting, the gamers' non-compulsory adherence to the proposal, and the self-determined goal. All of that indicates that learning often extends beyond just playing and passing time. (Anderson, et al., 2018).

Besides learning and refining delicate professional skills or even how to cope with emotions, the game Rocksmith is a good example of how eSports and other games can enhance learning.

3.4 Rocksmith: A Case to Analyze

Rocksmith is a game that utilizes a real guitar or bass as the controller, serving learning purposes by allowing players to learn and play along with a variety of popular songs while gradually building up their skills through dynamic difficulty adjustment (Havre, et al., 2019).

The game creates an environment based on 5 aspects to develop player skills, relying on gamification (Havre et al., 2019):

1. Learn-a-song mode: Rocksmith has a dynamic difficulty system that reads a player's skill level, adapts to it, and suggests lessons that help practice difficult parts at a slower rhythm.

2. Lesson mode: interactive video lessons are shown to the player. The mode provides feedback and is pointed to new challenges if they are overcome.

3. Jam-session mode: the mode simulates jamming with the virtual band, allowing improvisation skill practice.

4. Arcade mode: the player can practice skills and techniques such as playing the right chords to shoot alien spaceships or zombies.

5. Amplifier-mode: allows the player to use the game as a virtual amplifier with a vast selection of effects.

This approach aims to refine students' skills, increase adherence to the learning process, and foster a desire to learn through gaming experience. The model could include a competitive component, utilizing the game as a fair referee to teach students skills such as focus, resilience, and emotional regulation during a performance. Furthermore, it could also promote socialization, teamwork, and collaboration, capitalizing on the positive aspects of eSports.

4. CONCLUSION

This preliminary research proposes that the Brazilian educational curriculum needs updates and can benefit from incorporating assisted gamification strategies to enhance student learning and performance. The presence of assisted video games and eSports in the academic setting stimulates interest and curiosity among students, and also has the potential to improve student engagement and motivation during the learning process. Role-playing games (RPGs) can be particularly useful for integrating different subjects and fostering teamwork, problem-solving, critical thinking, and creativity, which are essential skills for students' academic and professional development. However, the implementation of these strategies must consider the diverse needs of students and the limitations of contexts, and be used in conjunction with proper methods as assisted approaches. Advanced technologies, such as eSports and virtual simulation, have the potential to enhance student engagement and provide new educational experiences but must be closely monitored to ensure children and adolescents are not exposed to harmful content. Therefore, additional research is needed to improve effective technology strategies in education, and the national curriculum must shift towards a student-centered approach that emphasizes critical thinking, problem-solving, and creativity, integrating technology and digital skills.

REFERENCES

- Anderson, C.G., Tsaasan, A.M., Reitman, J.G., Lee, J.S., Wu, M., Steel, H., Turner, T., & Steinkuehler, C. (2018). Understanding Esports as a STEM Career Ready Curriculum in the Wild. (2018) 10th International Conference on Virtual Worlds and Games for Serious Applications (VS-Games), 1-6.
- Cañabate, D., Bubnys, R., Nogué, L., Martínez-Mínguez, L., Nieva, C., & Colomer, J. (2021). Cooperative Learning to Reduce Inequalities: Instructional Approaches and Dimensions. *Sustainability*, 13(18), 10234. <https://doi.org/10.3390/su131810234>

- Caponetto, I., Earp, J. & Ott, M. (2014). Gamification and Education: A Literature Review. Proceedings of the 8th European Conference on Games-Based Learning - ECGBL 2014. 1. 50-57.
- Dondi M. Klier, J, Panier, F. & Schubert, J. (2021). Defining the skills citizens will need in the future world of work. McKinsey & Company. Geneva, Switzerland.
- Ferreti, C. J., & Silva, M. R. d. (2017). Reforma do ensino médio no contexto da medida provisória nº 746/2016: Estado, currículo e disputas por hegemonia. *Educação & Sociedade*, 38(139), 385–404. <https://doi.org/10.1590/es0101-73302017176607>
- González-González, C., Río, N. G., & Navarro-Adelantado, V. (2018). Exploring the Benefits of Using Gamification and Videogames for Physical Exercise: a Review of State of Art. *International Journal of Interactive Multimedia and Artificial Intelligence*, 5(2), 46. <https://doi.org/10.9781/ijimai.2018.03.005>
- Guo, Z., Cahalane, M. & Carbonie, A. (2022): Online gaming with a purpose: exploring positive personal development achieved through esports play, *Behaviour & Information Technology*, DOI: 10.1080/0144929X.2022.2154266
- Gupta, A., Lawendy, B., Goldenberg, M. G., Grober, E., Lee, J. Y., & Perlis, N. (2021). Can video games enhance surgical skills acquisition for medical students? A systematic review. *Surgery*, 169(4), 821–829. <https://doi.org/10.1016/j.surg.2020.11.034>
- Havre, S., Väkevä, L., Christophersen, C., & Haugland, E. (2019). Playing to learn or learning to play? Playing Rocksmith to learn electric guitar and bass in Nordic music teacher education. *British Journal of Music Education*, 36(1), 21-32. doi:10.1017/S026505171800027X
- Huang, J., Yan, E., Cheung, G., Nagappan, N., & Zimmermann, T. (2017). Master Maker: Understanding Gaming Skill Through Practice and Habit from Gameplay Behavior. *Topics in cognitive science*, 9(2), 437–466. <https://doi.org/10.1111/tops.12251>
- Mallow, C., Shafiq, M., Thiboutot, J., Yu, D. H., Batra, H., Lunz, D., Feller-Kopman, D. J., Yarmus, L. B., & Lee, H. J. (2020). Impact of Video Game Cross-Training on Learning Bronchoscopy. A Pilot Randomized Controlled Trial. *ATS scholar*, 1(2), 134–144. <https://doi.org/10.34197/ats-scholar.2019-00150C>
- Morais, G. A. de, Leme, V. B. R., Falcão, A. O., & Pereira-Guizzo, C. de S. (2021). Habilidades sociais e expectativas de futuro como preditores da autoeficácia para a escolha profissional. *Psico*, 52(2), e32374. <https://doi.org/10.15448/1980-8623.2021.2.32374>
- Legaki, N., Xi, N., Hamari, J., Karpouzis, K. & Assimakopoulos V. (2020). The effect of challenge-based gamification on learning: An experiment in the context of statistics education, *International Journal of Human-Computer Studies*, Volume 144, 102496, ISSN 1071-5819, <https://doi.org/10.1016/j.ijhcs.2020.102496>.
- Soares, A. N. et al. The Role-Playing Game (RPG) as a pedagogical strategy in the training of the nurse: an experience report on the creation of a game. *Texto & Contexto - Enfermagem*, v. 24, n. Texto contexto - enferm., 2015 24(2), pp. 600–608, abr. 2015.
- Toner, P. (2011). Workforce skills and innovation: an overview of major themes in the literature. OECD Directorate for Science, Technology, and Industry (STI) Centre for Educational Research and Innovation (CERI). <https://www.oecd.org/sti/inno/46970941.pdf>
- Zhong, Y., Guo K., Su J. & Chu, S. K. W. (2022). The impact of esports participation on the development of 21st-century skills in youth: A systematic review, *Computers & Education*, Volume 191, 104640, <https://doi.org/10.1016/j.compedu.2022.104640>