Development of Numeracy in Pokémon GO

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EXECUTIVE SUMMARY

The chapter investigates how the video game Pokémon GO contributes to the development of mathematical skills outside the formal educational context. Through the analysis of game strategies, resource management, and data-based decisions, it is shown that trainers apply and develop numeracy in practical situations. The method used in this study is the reflective phenomenological approach, which allows for a richer and more nuanced understanding of human reality, promoting a continuous dialogue between the researcher and the phenomenon under study. The research highlights the importance of recognizing mathematical learning opportunities in informal contexts and suggests that these experiences significantly complement formal mathematics education. Additionally, it highlights how interaction within the gaming community fosters a collaborative environment that enriches mathematical learning and strategy development based on numerical data.

INTRODUCTION

Mathematical learning has traditionally been conceived as a process that exclusively develops within formal education. However, this limited perspective must account for the breadth and diversity of contexts in which mathematical learning can occur. Research such as that of González-Sanmamed, et al. (2022) has evi-

denced that everyday experiences and informal settings offer learning opportunities. These studies argue that daily interactions, games, and practical activities outside the school environment can contribute to a deep and meaningful understanding of abstract concepts.

Informal learning environments are often spaces for diverse expressions, where creativity, empowerment, and individual agency are encouraged (Smith, 2018) and provide mathematical experiences that complement formal classroom education (Cooper, 2011). These environments allow curricular topics to encounter practical and creative experiences; for example, it is widespread to find the application and representation of geometric concepts through artistic activities such as painting and origami, where students can manipulate and visualize geometric shapes tangibly. Other media, such as television, video games, and the internet, also contribute to developing visual and spatial skills (Greenfield, 2009), providing students different scenarios to explore and understand abstract concepts interactively and dynamically.

Digital technologies are transforming education by expanding learning opportunities beyond the traditional classroom, adapting to users' needs and rhythms. In this scenario, video games have emerged as a potentially powerful educational resource, promoting a participatory and practical approach to learning and enriching students' educational experiences. In the context of mathematics education, video games like Minecraft provide scenarios for the representation of mathematical concepts, allowing students to visualize and manipulate geometric structures in a three-dimensional environment (Castaneda et al., 2023), promoting the development of skills associated with mathematical thinking, such as visualization and problem-solving (Danesi, 2016). Additionally, video games can enable students to adopt proactive roles in their learning through exploration, seeking answers, and applying knowledge in practical projects.

Furthermore, video games offer immediate and quantifiable feedback through scores and reward systems, giving users direct indications of their understanding and skills. Feedback motivates a sense of achievement and allows them to adjust their strategies and approaches instantly. This approach contrasts significantly with traditional assessment methods in formal education, which often involve a considerable delay between task execution and feedback, slowing the learning process.

One noteworthy aspect of video games, which has been the subject of study, is their ability to enhance various cognitive skills and their potential to transfer these improvements to new situations (Gee, 2008), both within the game universe and in the real world. Another aspect highlighted by Gee (2008) refers to the exchange of experiences, allowing individuals to share knowledge, strategies, and solutions to specific challenges. Exchange can occur in various contexts, such as within games, discussion forums, online communities, or formal educational settings. The dynamics of exchange promote collaboration, peer learning, and collective