Interplanetary Journey: Exploring High School with Virtual Reality in the Study of the Solar System in the state of Amazonas

Luana Oliveira Barrros
University of the State of Amazonas
E-mail: lob.fis18@uea.edu.br

Daniel Cunha Andrade
University of the State of Amazonas
E-mail: dac.fis17@uea.edu.br

Thais dos Santos Martins
University of the State of Amazonas
E-mail: tdsm.fis18@uea.edu.br

Yago Vitório Colares Pinto
University of the State of Amazonas
E-mail: yvcp.bio19@uea.edu.br

Pâmela Vitória Lima Canto
University of the State of Amazonas
E-mail: pvlc.bio19@uea.edu.br

Edilson Barroso Gomes
University of the State of Amazonas
E-mail: ebgomes@uea.edu.br

ABSTRACT

This pioneering project to develop educational content in virtual reality, using the "*Solar Space Exploration VR*" application, was designed to transform the learning experience in the 2nd year of high school. The introduction of virtual reality glasses allowed students to not only explore, but immerse themselves in complete immersion in the solar planets. By wearing these glasses, students not only viewed but also interacted with virtual planetary scenes, providing a unique and in-depth understanding of the solar system. This innovative approach not only made classes more engaging and stimulating, but also sparked a spark of interest in astronomy and science. The project doesn't just offer a stunning visual experience; it mainly highlights the revolutionary potential of immersive technologies in the educational field. By preparing students for a more advanced, technology-driven learning environment, this project aims to inspire a new generation of knowledge explorers, encouraging the quest to understand the cosmos in an innovative and thought-provoking way.

Keywords: Virtual Reality, High School, Planets.

1 INTRODUCTION

In ever-evolving education, innovative approaches to more engaging learning are sought. The integration of virtual reality into high school is a promising proposition. This pioneering project uses virtual

reality goggles as an educational tool, especially in the study of the planets, providing students with an immersive and interactive experience beyond the classroom. Lévy (1999) argues that new technologies should be employed to enrich the educational environment. Virtual reality (VR) is a technology that has gained increasing attention in a variety of areas, from entertainment to professional training. Its ability to create simulated 3D environments, in which individuals can not only observe but also interact, offers revolutionary potential for education. In this project, this technology is adapted for the context of high school, where the exploration of the universe of planets becomes a fascinating journey. Through the use of virtual reality goggles, educators can transform the way knowledge is imparted to students. Instead of just reading about the planets in textbooks or attending lectures, students now have the opportunity to virtually "visit" the planets and explore their geological, atmospheric, and other features in detail. This virtual presence experience generates a deeper emotional connection with the content, resulting in a more solid and lasting understanding. Additionally, virtual reality offers a perspective of scale that is often difficult to convey through traditional methods. In virtual space, students can appreciate the relative size of the planets relative to the sun, understand their orbits, and grasp complex concepts in a tangible way. This tangible approach to learning contributes to the formation of a solid foundation of knowledge, which can be applied not only in classrooms but also in everyday situations. The project isn't just about delivering a stunning visual experience. Kenski (2001) assures that it is necessary for the teacher to know the computer, the media media and all the educational and interactive possibilities to take advantage of them in the most varied teaching-learning situations and in the most different educational realities. Virtual reality enables interactive simulations, where students explore scenarios and experience consequences of decisions, stimulating curiosity and critical thinking. The introduction of virtual reality goggles in high school fosters interest in astronomy and science. This captivates students and paves the way for a more technological educational future. The project connects tradition and innovation, combining traditional teaching methods with modern approaches that meet the trends and needs of new generations.

2 METHODOLOGY

The methodology adopted to carry out the project at the "Dom Gino Malvestio State School", in Parintins, in the State of Amazonas, was carefully planned and executed. The project was implemented in the second years over one afternoon, covering several key stages. Initially, an introductory class on the formation of the solar system was given, using a slide provided by the school to illustrate the location of each planet. Then, a careful analysis was carried out to choose the most appropriate application, which would meet the educational objectives and be compatible with the students' smartphones. The "*Solar Space Exploration VR"* application was chosen due to its quality and ability to provide an immersive experience, covering all concepts related to the solar system. To ensure that the app works correctly on all devices,

detailed testing has been conducted, ensuring a smooth and engaging experience for students. Subsequently, we present the chosen application to the students, explaining its educational purposes and guiding them on the use of the VR glasses, as well as the installation of the application on them. The next stage consisted of the individual experience of the students, who were able to explore the virtual reality glasses and experience a journey through the solar system. After this experience, we conducted a group discussion, where students shared their observations, experiences, and reflections on the planets. We encourage comparison between planets, identifying similarities and differences, and highlighting curiosities aroused during exploration. This approach aimed to consolidate the knowledge acquired and encourage critical thinking. Below are figures 1, 2,3,4, 5, and 6 are some materials used in our classes.

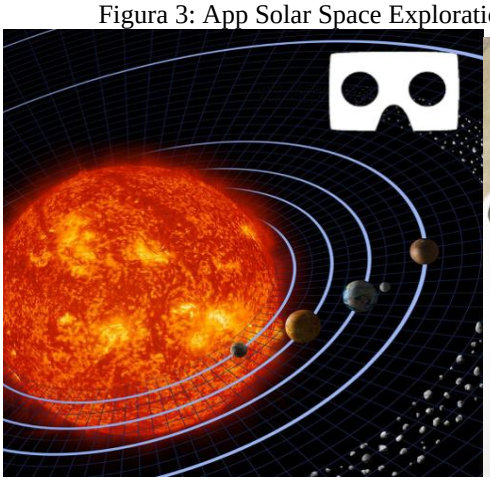
Figure 1: Virtual Glasses

Source: Personal archive

Figure 2: Virtual Glasses

Source: Personal archive

Figura 3: App Solar Space Exploration VR



Source: Personal archive

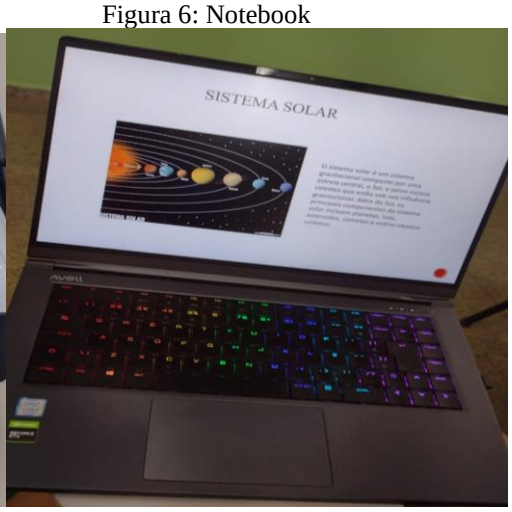
Figure 4: Smartphone

Source: Personal archive

Figura 5:Data-show

Source: Personal archive

Figura 6: Notebook



Source: Personal archive

At the end of the lesson, we encourage students to continue exploring the VR app outside of classroom activities, pointing out that this autonomous exploration can further deepen their understanding of the planets and stimulate scientific curiosity. The strategy adopted seeks not only to transmit knowledge, but also to foster students' continued interest in space exploration and science as a whole.

3 RESULTS AND DISCUSSION

The results obtained in the project revealed a significant advance in high school, introducing an innovative approach with the use of virtual reality glasses. This strategy provided an engaging and immersive exploration of the planets, creating an environment in which students not only observed but also interacted with the virtual scenarios, complemented by initial theoretical understanding, as demonstrated in Figure 7. The direct experience of these planetary environments has contributed substantially to a deeper and more memorable understanding of the solar system, surpassing traditional teaching methods. A notable point was the positive reaction of the students during the preparation of the virtual glasses with the cell phones, as illustrated in Figure 8. This moment aroused the curiosity of the students, evidencing the interest and enthusiasm generated by the introduction of virtual reality technology. The preparation phase not only anticipated the immersive experience, but also served as a motivational component, establishing a atmosphere conducive to learning.

Figure 7: Lecture on virtual reality.

Source: Personal archive

Figure 8: Organizing class with virtual reality.

Source: Personal archive

Figure 9: Students' interaction with virtual reality.

Source: Personal archive

Figure 10: Experiment with virtual reality.

Source: Personal archive

In summary, the project had a positive impact on student motivation, as evidenced in Figure 9. The immersive nature of virtual reality has sparked students' curiosity and interest in astronomy, encouraging them to explore scientific concepts in a deeper way, as illustrated in Figure 10.

This experience not only enhanced their understanding of the solar system but also prepared them for a future in which technology will play an increasing role in education. Immersing themselves in virtual reality not only stimulated students' curiosity but also motivated them to investigate and understand scientific principles more deeply. The project not only fostered effective learning about the solar system but also equipped students with valuable skills to tackle more advanced and technology-driven learning environments, preparing them for the educational challenges of the future. The positive impact on motivation and willingness to explore scientific knowledge suggests that the introduction of innovative technologies, such as virtual reality, can be an effective strategy to promote meaningful learning and prepare students for an increasingly technological world.

4 CONCLUSION

The project presented in the Physics class during the second year of high school not only stood out, but also proved to be a deeply enriching experience. The innovative introduction to virtual reality provided students with a unique and engaging approach to exploring the intricate physical concepts related to the solar planets. The fascination observed, especially among those who had never experienced the use of virtual glasses, vividly underscores the effectiveness of the initiative in arousing students' interest in the topics covered in the classroom. The novelty and immersion provided by technology contributed not only to the theoretical understanding, but also to the emotional connection of the students with the contents. The integration of this innovative technology into the discipline of Physics not only demonstrates a practical application, but also emphasizes how dynamic and adaptable education can be. This hands-on and engaging approach, by enriching the students' learning experience, opens doors to a deeper and more lasting

understanding of the physical concepts covered. The project not only fosters interest in the discipline but also signals the transformative potential of technology in education.

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