**Research Title: "Exploring the Impact of Augmented Reality Technology on Student's Learning Outcomes in Education"**

1. **Introduction**
2. **Objectives**
3. **Scope and Limitation**
4. **Presentation of the Chosen Technology**

**Effectiveness of AR technology in improving student engagement and motivation**

AR technology can enhance scientific learning by visualizing complex concepts. A study conducted by Ziden, A & et al. (2022). NutricARd prototype delivers pedagogical content on the human digestive system. A comparative analysis compared NutricARd treatment to a control 9 group. Students are worried about having to download/print or scan the Zip code marker for the study, which interrupts their concentration. Although the issue arose upon starting with NutricARd, they were still motivated by its innovation. NutricARd boosted student motivation by 9% and improved academic performance. NutricARd improved student test scores, proving its effectiveness. The correlation coefficient of 0.895 indicates a strong link between motivation and academic performance. Augmented Reality tech boosts student involvement, motivation, and achievement.

Similarly a study by Shiue et al. (2019), AR technology was used to teach middle-school students about the human body structure. Research showed that pupils exposed to AR apps had higher academic achievement compared to non-exposed students. Augmented reality tech in education had a positive impact on motivation and engagement, resulting in superior academic outcomes.

Furthermore, Sirakaya, M., & Cakmak, E. (2018). studied the effects of AR technology on student engagement and motivation in computer hardware courses using the HardwareAR app, which focuses on motherboard assembly. AR technology improved student academic performance in motherboard assembly. The experimental group had faster assembly and higher proficiency than the control group. The investigation found that AR technology improves academic performance, fosters student engagement, and accelerates learning computer hardware-related curricula via immersive experiences.

In conclusion AR technology has positive effects on education and achievement. The NutricARd, HardwareAR, and augmented reality apps improve student motivation and engagement. AR technology is effective for complex ideas, improving understanding, and accelerating knowledge acquisition. Its importance in promoting successful educational experiences is highlighted by the link between motivation and academic achievement. AR technology can boost student engagement, motivation, and academic achievement in various scientific fields.

**Effectiveness of AR technology in collaborative learning**

According to a study conducted by El-Nahas, M. (2021). The results of the study indicate that the integration of augmented reality (AR) technology in the field of education has the potential to equip educators with engrossing digital media, enabling them to effectively engage and captivate learners in a more prompt manner. Furthermore, it enhances the level of collaboration between teachers and students within classroom settings.

A research study by Asquith, S. & Frazier, E. (2022) Choose Your Own Adventure (CYOA) AR digital storytelling studied how collaborative learning and AR can improve language learning. This approach has a powerful impact for students to effectively impact them in a positive manner. Based on the research findings students found using AR valuable. If AR applications become more widespread, adding AR projects in different teaching contexts would be a valuable improvement.

Furthermore, Their findings imply that the integration of augmented reality technology within a collaborative problem-solving context has a beneficial effect on the group's learning outcomes and ability to cooperate effectively Radu, I & et al. (2020). Moreover, augmented reality technology facilitated equitable participation of both individuals involved in the problemsolving tasks, ensuring a balance in their contributions. The results indicate that utilizing Augmented Reality (AR) in contexts that require problem-solving could potentially enhance equitable collaboration in settings where access to resources is imbalanced. Additionally, AR could serve as an aid for group learning more broadly.

In summary, the incorporation of augmented reality (AR) technology within the realm of education has demonstrated optimistic results. The utilization of this technology enhances the potential for educators to effectively engage and captivate learners, facilitates the cultivation of collaborative relationships between teachers and students, and ultimately contributes to an improved learning experience in regards to language acquisition. Applications based on Augmented Reality (AR) have been found to hold significant value among students, presenting diverse opportunities for enhancing the teaching and learning environment in multiple contexts. On top of that, the implementation of augmented reality technology in collaborative problemsolving exercises yields improved educational outcomes, facilitates effective teamwork dynamics, and fosters an environment of equitable participation amongst all members of the group. Overall, augmented reality (AR) possesses the potential to yield a positive impact on education as it offers captivating digital experiences, promotes collaborative practices, and fosters group learning.

1. **Summary**

Studies have found that using augmented reality (AR) technology in education boosts student motivation, engagement, and achievement. The NutricARd is a developed prototype by Ziden et al (2022) it is used to distribute educational content about the human digestive system. Students had to download/print or scan the Zip code marker for the study, which interrupts their concentration. However, it only arose at the beginning and NutricARd positively impacted student motivation by 9% and academic performance Ziden et al (2022). A Research by Shiue et al (2019). supports these findings. Their study found that middle-school students who used Augmented Reality (AR) apps had better academic performance than those who didn't. Furthermore Sirakaya, M., & Cakmak, E. (2018), studied the effects of AR technology on student engagement and motivation in computer hardware courses. Using the HardwareAR application improved students' ability to assemble motherboards, leading to higher academic performance. The intervention group performed assembly tasks more efficiently than the control group. Additionally, studies have explored AR technology in collaborative learning. AR fosters interactivity and cooperation between instructors and pupils, using captivating digital media that stimulates learners. Asquith, S. & Frazier, E. (2022) found that AR in language instruction with CYOA digital storytelling benefits students. Radu et al. (2020) highlighted AR's use in collaborative problem- 14 solving, promoting fair participation and efficient teamwork. Overall, AR could have some lacking and issues that may arise, currently accessibility to technology, interruptions are one of its problems. However Augmented Reality technology improves education and academic achievement by enhancing learners' motivation, involvement, and scholarly attainment in diverse scientific disciplines. Augmented reality in education promotes immersive digital engagements, collaboration, and learning. The effectiveness of AR learning hinges on usability, intuitiveness, and satisfaction. Feedback, further research and data gathering about AR technology can improve in education.

1. **Conclusion and Recommendation**

The researcher's preliminary stance resides with the promising and beneficial impacts in the education industry. The study of AR in education provided the researchers the knowledge, evaluation and investigation regarding augmented reality (AR). The investigation of augmented reality (AR) implementation in academic settings has brought to light its capacity to augment 15 learning through the integration of digital information with physical reality. Augmented Reality (AR) technology offers an all-encompassing and user-engaging experience that allows for the seamless integration of both virtual and physical objects. It provides a unique opportunity for hands-on exploration of intricate concepts, consequently enhancing the level of interactivity and immersive learning. Over time, this technology has undergone three generational advancements, culminating in increased accessibility and incorporation of artificial intelligence capabilities with smart glasses and WebAR. Augmented Reality (AR) has been found to enhance student engagement, motivation and academic attainment, particularly in scientific and linguistic domains. Augmented Reality (AR) has been increasingly garnering attention in the field of K-12 education in the Philippines. There have been proposals for the development of mobile AR applications that aim to enhance the learning experience. The implementation of Augmented Reality (AR) presents a number of impediments arising from technical requisites, inadequate availability of unrestricted resources and inconsistency in the quality of applications. Undoubtedly, augmented reality technology embodies significant potential for enhancing educational practices by means of immersive and interactive modalities. The impact of such technology on education is expected to be amplified, as the technology evolves and becomes more sophisticated. Therefore, the Researchers final stance remains the same as their preliminary stance, for the reason that numerous studies concluded a promising impact or effect of augmented reality (AR) technology in the domains of education, with expectations of facing challenges particularly the implementation having limited resources, technical issues, inconsistencies of applications, etc.

1. **References**

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