

A STUDY TO ASSESS THE KNOWLEDGE ON AUGMENTED REALITY LEARNING AMONG PRIMARY SCHOOL TEACHERS AT COIMBATORE DISTRICT

Author : Suja P S, M.Ed Scholar, RVS College of Education, Coimbatore

Guide : Dr. B. Jayashree Rani, Principal, RVS College of Education, Coimbatore

Abstract

This study aimed to assess the level of knowledge on augmented reality (AR) learning among primary school teachers in Coimbatore District. A quantitative survey approach was used, and data were collected using a structured questionnaire specifically designed for this study. The study sample consisted of 200 primary school teachers from various schools, including those run by the State Government of Tamil Nadu and the Central Government. The questionnaire included demographic information and knowledge assessment section consisted of multiple-choice questions, with each item having one correct answer. Descriptive and inferential statistics, were used to analyze the data. The results showed that primary school teachers had varying levels of knowledge regarding AR learning. The mean knowledge score was used to categorize the level of knowledge as adequate, moderately adequate, or inadequate. The findings indicated that a significant proportion of teachers had moderately adequate knowledge, while a smaller percentage had inadequate knowledge. The study's findings provide insights into the current level of knowledge on AR learning among primary school teachers in Coimbatore District. The results can inform educational policymakers and stakeholders about the need for targeted professional development programs and support to enhance teachers' knowledge and understanding of AR learning.

Keywords: *Augmented Reality Learning, Primary school teachers, Knowledge, Quantitative survey method*

INTRODUCTION

In recent years, augmented reality (AR) has emerged as a promising technology with the potential to revolutionize education by providing immersive and interactive learning experiences. AR blends the virtual and physical worlds, allowing users to overlay digital content onto the real environment, thereby enhancing engagement, interactivity, and knowledge retention. As AR continues to gain momentum in various industries, including gaming, healthcare, and marketing, its application in the field of education has garnered significant attention. Educators are recognizing the unique opportunities presented by AR to transform traditional teaching methods and engage students in new and exciting ways.

While the potential of AR in education is widely acknowledged, the successful integration of this technology into classrooms depends heavily on the knowledge, skills, and readiness of teachers. Teachers play a critical role in facilitating meaningful learning experiences and guiding students' interactions with AR tools. They need to be equipped with the necessary knowledge and skills to select, design, and implement AR activities that align with educational objectives and cater to the diverse needs of their students.

Given the rapid advancements in AR technology and its increasing accessibility, it is crucial to assess the current knowledge and understanding of AR among primary school teachers. This assessment will help identify potential gaps and challenges that teachers may encounter when integrating AR into their classrooms. Understanding teachers' perspectives, beliefs, and attitudes towards AR can provide valuable insights into their readiness to adopt this technology and the support they may require to navigate the implementation process successfully.

Additionally, exploring the influence of demographic factors, such as age, teaching experience, and technology proficiency, on teachers' understanding of AR learning can shed light on the contextual factors that may impact their readiness and receptiveness to integrating AR into their teaching practice. Such insights can

inform the development of targeted professional development programs and support mechanisms to empower teachers and facilitate the seamless integration of AR technology into primary school classrooms.

Therefore, this study aims to investigate the knowledge and understanding of AR among primary school teachers, explore their perspectives on its integration into education, and examine the influence of demographic factors on their understanding of AR learning. By addressing these objectives, this research seeks to bridge the gap between the potential of AR in education and the readiness of teachers to embrace this transformative technology, ultimately enhancing the quality of teaching and learning experiences in primary schools.

REVIEW OF LITERATURE

The review of literature for the above study highlights the growing interest in integrating augmented reality (AR) technology into education. Existing studies have shown that AR-based learning experiences improve academic performance and student motivation. Smith and Johnson (2018) conducted a meta-analysis of existing studies and found that AR-based learning experiences resulted in improved academic performance and increased student motivation compared to traditional instructional methods. A study by Lee and Hammer (2020) explored the factors influencing teachers' intentions to use AR in the classroom. Their findings revealed that teachers' self-efficacy, perceived usefulness of AR, and pedagogical beliefs significantly influenced their intention to integrate AR into their teaching practices. Chen and Wang (2019) found that younger teachers with higher levels of technology proficiency were more likely to incorporate AR into their classrooms compared to older, less technologically proficient colleagues. These findings highlight the importance of considering the individual characteristics of teachers when designing professional development programs and support initiatives for AR integration. By incorporating these findings into the current study, we can gain a deeper understanding of the factors that influence teachers' knowledge and understanding of AR, ultimately informing the development of effective strategies and support mechanisms to facilitate the integration of AR into primary school education.

OBJECTIVES OF THE STUDY

- To find out the level of knowledge on augmented reality learning among primary school teachers
- To find out the level of knowledge on augmented reality learning among primary school teachers with respect to experience
- To find out the level of knowledge on augmented reality learning among primary school teachers with respect to Gender
- To find out the level of knowledge on augmented reality learning among primary school teachers with respect to Educational qualification

HYPOTHESES OF THE STUDY

- ❖ There is no significant difference in the mean knowledge score on augmented reality learning among primary school teachers with reference to their experience.
- ❖ There is no significant difference in the mean knowledge score on augmented reality learning among primary school teachers with reference to their gender
- ❖ There is no significant difference in the mean knowledge score on augmented reality learning among primary school teachers with reference to their educational qualification.

METHODOLOGY

The researchers adopted a quantitative survey approach to collect data. The sample consisted of 200 primary school teachers from various schools, including those under the State Government of Tamil Nadu and the Central Government. A structured questionnaire was designed specifically for this study, comprising two parts: Part 1 focused on collecting demographic information, while Part 2 assessed knowledge related to AR learning through multiple-choice questions. The development of the tool involved an extensive literature search,

as no standardized tool was found for the study population. The questionnaire was developed in English, pre-tested, and modified accordingly. The tool demonstrated objectivity, with one correct answer for each item and scoring based on correct responses. A pilot study was conducted to evaluate the feasibility and effectiveness of the research methodology and questionnaire, resulting in valuable insights and necessary refinements. Item analysis revealed good difficulty and discrimination indices for most items. Content validity was established through expert validation, while reliability was assessed through test-retest and internal consistency methods, showing good stability and internal consistency of the questionnaire. Descriptive and inferential statistics were employed to analyze the data collected from the survey.

For data collection, the investigator first identify the schools located in and around Coimbatore, which had primary sections. Then the investigator visited each and every school and permission was sought from relevant authorities, either/both school Principals or Administrators, to access the teachers. The purpose of the study was explained, and their participation was requested. Provide a clear overview of the study, including its voluntary nature, confidentiality, and potential benefits. 200 primary school teachers with their oral consent were included in the main study. Data collection was conducted by administering the questionnaire. Questionnaires were distributed in person based on participant preferences. 20-30 minutes was taken to fill the questionnaire. Participants privacy and confidentiality were ensure throughout the research study. Safeguard the collected data against unauthorized access, use, or disclosure.

RESULT

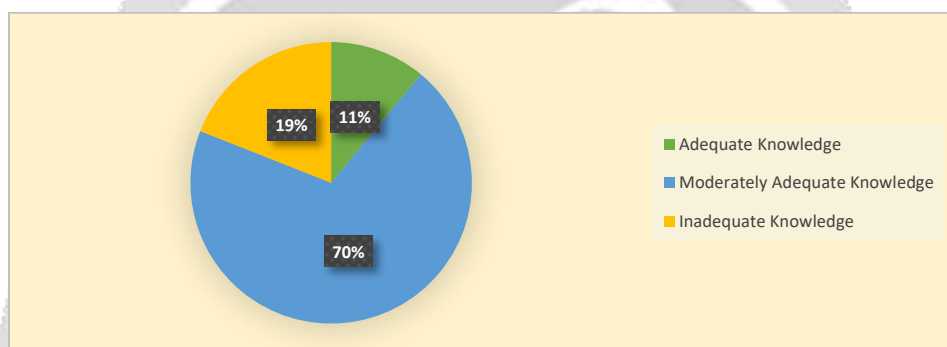


Figure 1 presents the Percentage distribution of level of knowledge on augmented reality learning among primary school teachers

Teaching Experience	N	Mean	Standard Deviation	ANOVA test df = (4, 195)	Significant Value
< 1 Year	23	14.91	3.60	F= 13.572 *	0.000
1-2 Years	40	13.50	3.29		
2-5 Years	87	12.14	3.90		
5-10 Years	30	9.37	2.31		
>10 Years	20	9.40	2.14		
Gender	N	Mean	Standard Deviation	t Value df =198	Sig Value
Male	29	15.07	4.15	4.886	0.000
Female	171	11.53	3.51		

NS - Not significant at P<0.05

* Significant at P<0.05

df = Degrees of freedom

Table 1 presents the Mean knowledge Score and Standard deviation on augmented reality learning among primary school teachers with reference to their teaching experience and gender and its level of Significance

FINDINGS OF THE STUDY

The findings of the study on knowledge regarding augmented reality learning among primary school teachers reveals that majority of primary school teachers (70.0%) had moderately adequate knowledge of AR learning, while 19.0% had inadequate knowledge and 11.0% had adequate knowledge. Also, there was a variation in knowledge levels based on teaching experience. Teachers with 2-5 years of experience had the highest proportion of adequate knowledge (11.5%), while those with less than 1 year of experience had the highest proportion of moderately adequate knowledge (73.9%). The findings of ANOVA test shows that statistically, there is a significant difference in the mean knowledge score on augmented reality learning among primary school teachers with reference to their experience. Hence the hypothesis, H_{01} was rejected.

Male teachers had a higher percentage of adequate knowledge (34.5%) compared to female teachers (7.0%). This difference was further supported by the mean knowledge score analysis using independent t-test, which showed that male teachers had a significantly higher mean knowledge score than their female counterparts. Hence, H_{02} : there is no significant difference in the mean knowledge score on augmented reality learning among primary school teachers with reference to gender, was rejected. Also, there were variations in knowledge levels based on educational qualification. Teachers with a B.Sc/BA with B.Ed had a higher proportion of adequate knowledge (12.6%) compared to those with a B.Sc/BA with D.Ed (0.0%) or an M.Sc/MA with B.Ed (4.3%). The findings of ANOVA table shows that statistically, there is no significant difference in the mean knowledge score on augmented reality learning among primary school teachers with reference to their educational qualification. Hence the hypothesis, H_{01} was accepted.

RECOMMENDATIONS OF THE STUDY

The recommendations focus on enhancing primary school teachers' knowledge and skills in augmented reality (AR) learning. It is suggested that educational institutions provide targeted professional development programs that cover the fundamentals of AR technology, its integration into pedagogy, and practical application in the classroom. Mentorship and collaboration among teachers should be encouraged to foster peer learning and knowledge sharing in AR integration. Furthermore, the incorporation of AR learning into the curriculum framework of primary schools, equitable access to AR tools and resources, and ongoing support for teachers' professional development are emphasized. These recommendations aim to empower teachers, enhance student engagement and learning outcomes, and prepare students for the digital age.

EDUCATIONAL IMPLICATIONS OF THE STUDY

The educational implications of the study highlight the significance of improving AR knowledge and competency among primary school teachers. Gender disparities in AR knowledge and the need for inclusive and accessible AR integration for all students are addressed. Integrating AR learning into the curriculum framework is recommended to provide innovative and engaging experiences aligned with the digital age. Collaboration and knowledge-sharing among teachers, ongoing research, and partnerships with AR technology experts are emphasized. Allocating resources to support AR integration in primary schools is crucial. Overall, these implications aim to promote effective AR integration, enhance student engagement and learning outcomes, and create a more inclusive and technologically proficient learning environment.

LIMITATIONS OF THE STUDY

- Small sample size limits generalizability.
- Reliance on self-reported data may introduce bias.
- Single location restricts generalizability to other contexts.
- Subjectivity in categorizing knowledge levels.
- Failure to account for potential confounding variables.

5.10 SUGGESTION FOR FUTURE RESEARCH

- Studies can be done to investigate the long-term impact of AR integration on student learning outcomes.
- A Study can be conducted to explore different pedagogical approaches for incorporating AR technology into various subjects and grade levels.
- A Study can be conducted to examine students' perceptions and experiences of AR learning.
- A Study can be conducted to evaluate the effectiveness of teacher training programs focused on AR integration.
- Develop and validate assessment tools for evaluating student performance in AR-enhanced classrooms.
- A Study can be conducted to investigate the equity and accessibility implications of AR integration in primary education.
- A Study can be conducted to explore the role of teacher-student interaction in AR-enhanced classrooms.
- The present study can be conducted among B.Ed Students

CONCLUSION

The study concluded that majority of the primary school teachers among in Coimbatore district had moderately adequate level of knowledge regarding augmented reality learning. The study underscores the importance of providing targeted professional development programs to enhance teachers' AR knowledge and skills, addressing gender disparities, incorporating AR learning into the curriculum, ensuring equitable access to AR tools and resources, and fostering collaboration among teachers. By implementing these recommendations, educational institutions can empower primary school teachers to effectively integrate AR learning in their classrooms, leading to enhanced student engagement and improved learning outcomes in the digital age.

REFERENCES

- Chen, C., & Wang, Q. (2022). Primary School Teachers' Perceptions and Practices of Augmented Reality Integration in Science Education. *Journal of Educational Technology & Society*, 25(1), 133-145. Retrieved from https://www.j-ets.net/ets/journal/25_1/11.pdf
- Du, X., & Zhang, X. (2022). Primary School Teachers' Attitudes, Perceptions, and Barriers towards Using Augmented Reality in the Classroom: A Case Study in China. *Journal: Interactive Learning Environments* Volume: 30 Issue: 4 Pages: 520-535 DOI: 10.1080/10494820.2020.1861113
- Lee, H., & Lai, C. (2021). Exploring the Factors Influencing Teachers' Adoption of Augmented Reality in Education: A Systematic Literature Review. *Computers & Education*, 176, 104395. <https://doi.org/10.1016/j.compedu.2021.104395>
- Lim, K. Y., & Lee, J. (2021). Augmented Reality in Early Childhood Education: A Case Study on Teachers' Knowledge and Attitudes. *Early Child Development and Care*, 191(5), 793-809. DOI: 10.1080/03004430.2020.1767372
- Eutsler, L. and Long, C.S. (2021). Preservice Teachers' Acceptance of Virtual Reality to Plan Science Instruction. *Educational Technology & Society*, 24(2): 28–43.
- Li, L., Tsai, C. C., & Shih, J. L. (2020). Developing augmented reality-based learning materials for primary school English education: A design-based research approach. *British Journal of Educational Technology*, 51(5), 1557-1572.
- Liano, R.A., Amanda, N., Pratiwi, A. and Gumawan, A.S. (2020). A Systematic Literature Review: Learning with Visual by The Help of Augmented Reality Helps Students Learn Better. *Procedia Computer Science*, 179: 144–152.

- Raber, J.A. (2020). Analysis of motivation, situational interest, and augmented reality. Dissertation, Kent State University College of Education, Health, and Human Services.
- National Education Association (NEA). (2020). Using Augmented Reality in the Classroom. Retrieved from <http://www.nea.org/tools/lessons/augmented-reality-in-the-classroom.html>
- Sari, S., & Sari, D. (2020). Primary School Teachers' Perspectives on Augmented Reality Integration: A Case Study in Indonesia. *Education and Information Technologies*, 25(5), 3921-3942. DOI: 10.1007/s10639-020-10198-4
- Li, Y., & Li, M. (2019). Augmented Reality Technology in Primary School English Teaching. *International Journal of Emerging Technologies in Learning*, 14(13), 46-61. Retrieved from <https://doi.org/10.3991/ijet.v14i13.11067>
- Garzón, J., Pavón, J. and Baldiris, S. (2019). Systematic review and meta-analysis of augmented reality in educational settings. *Virtual Reality*, 23: 447–459. <https://doi.org/10.1007/s10055-019-00379-9>
- Zhang, S., & Xie, H. (2019). Primary School Teachers' Attitudes, Beliefs, and Knowledge towards Augmented Reality Learning: A Mixed-Methods Study. *Educational Technology Research and Development*, 67(4), 901-921. DOI: 10.1007/s11423-019-09659-4
- <https://www.edutopia.org/>
- <https://journals.sagepub.com/toc/jeca/57/4>
- <https://www.eschoolnews.com/>
- <https://www.teachthought.com/>
- <https://www.edsurge.com/>
- <https://www.edweek.org/>
- <https://www.edutopia.org/topic/augmented-reality>

