ADOPTABILITY OF AUGMENTED REALITY AS A SUPPLEMENTARY TOOL IN ARCHITECTURE, ENGINEERING, AND CONSTRUCTION EDUCATION IN GHANA

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OUTLINE

- INTRODUCTION
- RESEARCH GAP
- AIM AND OBJECTIVES
- RESEARCH METHODOLOGY
- RESULTS AND FINDINGS
- CONCLUSION
- IMPLICATIONS
- FUTURE RESEARCH DIRECTIONS

INTRODUCTION

The field of Architecture, Engineering, and Construction (AEC) education plays a **vital role in preparing students for successful careers** in

- design,
- engineering, and
- construction management.

However, several challenges need to be addressed to bridge the gap between theory and practice in AEC education (Rihab, et al 2023).

INTRODUCTION

- The integration of technology in AEC education is of significant importance as it addresses the limitations of the current education system, such as
  - limited technology integration,
  - hands-on learning opportunities, and
  - the need for interdisciplinary training.
- By embracing augmented reality technology, educational institutions can
  - enhance the learning experience,
  - bridge the gap between theory and practice, and
  - prepare students for successful careers in the construction industry

IMPORTANCE

AR offers better advantages and values to the learning landscape at **a cheap cost** **(Oke, et al. 2020)**

Both researchers and educators acknowledge the challenge of effectively disseminating educational materials to end-users, highlighting the need for further **investigation into the dissemination of educational innovations** (Henderson, Finkelstein, & Beach, 2010; Sankar & Raju, 2006).

RESEARCH GAP

- Traditional schoolbooks do not reflect the source of true knowledge **(Sannikov, et al 2015)**
- Students studying Architecture, Engineering, And Construction are becoming less interested in learning, and they are experiencing information overload (Delgado et al, 2020).

RESEARCH GAP

- skill shortages continue to be a problem in several areas, including the construction industry, which has a high need for trained personnel (Wright et al. 2019).
- Ayer (2023) identified two key challenges for construction students: transitioning from 2D to 3D design and securing employment upon degree completion.

AIM and OBJECTIVES

- **AIM**
  - This study aims to examine the adoptability of augmented reality as a supplementary tool in Architecture, Engineering and Construction (AEC) education.
- **Objectives**
  - To Identify Gaps in Architecture, Engineering, and Construction (AEC) education methods.
  - To determine the potential of augmented reality (AR) as a supplementary tool in improving AEC education.
  - Establish the adoptability of AR technology in the context of AEC education.

Research Methodology

Research method
- Quantitative research methods are used, since the study seeks to collect a large amount of data from a large sample size in a short amount of time
- Surveys entail the collection of data from participants through the use of questionnaires and interviews

Population
- lecturers and students from the Architecture, Construction, and Engineering departments of Kwame Nkrumah University of Science and Technology
- students and lecturers are key stakeholders in the educational context, where the study is likely to take place.

Snowballing & Purposive
- The purposive sample technique was then used to choose study participants.
- The study used the Snowball-Sampling-Technque to first contact a small number of potential participants, who were then asked to recommend organizations or individuals that meet certain criteria

Questionnaire design
- Closed-ended questionnaires were designed from a literature review and used to gather primary data through Google Forms.
- Closed-ended questionnaires are not only easier to administer but are notable for higher response rates and ease of coding (Dawson, 2007).

GAPS IN ARCHITECTURE, ENGINEERING, AND CONSTRUCTION (AEC) EDUCATION METHODS

- The respondents were asked to rate their level of competence in various skills on a scale from 1 to 5, with 1 being "Very Incompetent" 2 being "Incompetent" 3 being "Moderate competent" 4 being "competent" and 5 being "Very Competent.“
- The major gaps identified in AEC education includes:
  - **industry partnership,**
  - **global perspective and diversity and inclusion**
  - **Interdisciplinary Training,**
  - **hands-on learning opportunities**

GAPS IN ARCHITECTURE, ENGINEERING, AND CONSTRUCTION (AEC) EDUCATION METHODS

- A global perspective is essential in AEC education, exposing students to **international standards, practices, and case studies.**

- Additionally, curricula should be designed to prepare students for an industry that values a broad range of perspectives and experiences **(Özener 2023).**

- Hands-on learning opportunities are limited in many AEC programs, depriving students of the practical experience needed for success in the field

GAPS IN ARCHITECTURE, ENGINEERING, AND CONSTRUCTION (AEC) EDUCATION METHODS

- Bridging this gap necessitates more investment in practical workshops and laboratories (Blair 2022).
- However, the existing curriculum may not adequately prepare students to harness the full potential of these technologies (Safikhani, et al.,2022).

POTENTIAL OF AUGMENTED REALITY (AR) AS A SUPPLEMENTARY TOOL IN IMPROVING ARCHITECTURE, ENGINEERING, AND CONSTRUCTION (AEC) EDUCATION

- Perceived improvement in engagement (Delgado, et al. 2020).
- Perceived improvement in comprehension of AEC concepts (Dargan, et al, 2023).
- Perceived improvement in retention of knowledge

ADOPTABILITY OF AR TECHNOLOGY IN THE CONTEXT OF AEC EDUCATION IN GHANA

INFRASTRUCTURE READINESS

- moderate level of readiness for
  - network bandwidth
  - Location-Based Services
  - Cross-Platform Compatibility

ACCESSIBILITY OF AR DEVICES AND APPLICATIONS

Device Availability

Cost of Data Plans

Cost of AR Devices

CONCLUSION

- In conclusion, this research has provided insights into the adoptability of augmented reality as a supplementary tool in AEC education in Ghana.
- The findings indicate the potential of AR to enhance various aspects of AEC education and highlight the need for further exploration and implementation.
- educational institutions can embrace AR technology and create a more immersive and effective learning environment for students in the AEC field.
- The future of AEC education in Ghana can be shaped by leveraging the benefits of augmented reality to foster innovation, collaboration, and sustainable practices in the construction industry

RECOMMENDATION

- Building upon the findings of this research, the following recommendations are proposed to further explore and enhance the adoptability of augmented reality as a supplementary tool in AEC education.
- Professional Development and Training:
  - Educational institutions should provide professional development programs and training opportunities for faculty members to enhance their understanding and proficiency in using AR tools and teaching methods.
  - This will help bridge the knowledge gap and promote effective integration of AR into the curriculum.

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QUESTIONS

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