

**IMPROVING QUALITY OF TEACHING METHOD IN
HISTORY AND THEORY OF ARCHITECTURAL
EDUCATION VIA TECHNOLOGY ENHANCED
ACTIVE LEARNING METHOD**

BY

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**A thesis submitted in fulfilment of the requirement for the
degree of Master of Science (Built Environment)**

**Kulliyyah of Architecture and Environmental Design
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ABSTRACT

The growing concern about History and Theory of Architectural (HTA) education has been an area of substantial research interest. The central aim of this research is to examine the relevance of Mobile Augmented Reality (MAR) and its potential benefit in teaching and learning History and Theory of Architecture (HTA) in design schools. The objectives of the research are; to identify the current educational technology used in HTA education, to investigate the role of MAR application in HTA education and to evaluate MAR technology's effectiveness in generating favourable learning outcomes. The scope of the investigation focuses on two higher learning institutions; International Islamic University Malaysia (IIUM) and University Sains Islam Malaysia (USIM). The research is built on threefold dimensions of the research questions, objectives and sources of the relevant data. Regarding the approach, a mixed-method was used in generating relevant information to the investigation ranging from an in-depth interview, observation and survey questionnaires. About the techniques, content analysis, reflective remarks and descriptive analysis are applied in data interpretation. Based on the findings, the major setback of HTA lies in the methodological lapses in the dominant teaching method. In addressing this issue, the study proposes a useful notion on how to improve the quality of the current teaching method by adopting MAR technology in the teaching strategy. The effectiveness of this application was evident from the conducted workshop where a factual assessment was made based on the learning feedback from the students.

مُلخَصُ البَحْثِ

أصبح الاهتمام الزائد بالتاريخ ونظرية العمارة موضوع بحث ثريًا ومهمًا، ويهدف هذا البحث أساسًا إلى دراسة أهمية الواقع المعزز وفائدته المتوقعة في تدريس التاريخ ونظرية العمارة في مدارس التصميم، وفي درجة ثانية؛ يهدف هذا البحث إلى تعيين الأساليب التعليمية الحالية المستعملة في تدريس التاريخ ونظرية العمارة، وفحص دور تطبيقات الواقع المعزز في ذلك، وتقييم أساليب الواقع المعزز ومدى تأثيرها في توليد نتائج تعليمية مؤثرة، وكان مجال البحث مركّزًا في نطاق مؤسستين من مؤسسات التعليم العالي؛ الجامعة الإسلامية العالمية ماليزيا، وجامعة العلوم الإسلامية الماليزية، وقد بُني البحث على نظام ثلاثي الأبعاد من حيث أسئلته وأهدافه ومصادر بياناته، أما منهجه فكان مختلطًا؛ فجمع البيانات استُعين بالمقابلات الشخصية العميقة، والرصد والملاحظة، والاستبانة، والدراسة الاستقصائية، وتحليل البيانات المجموعة اعتمد: تحليل المحتوى، وتقديم الملاحظات التأملية، والتحليل التصويري، وقد تبين من نتائج البحث أن المشكلة الرئيسة في تعليم التاريخ ونظرية العمارة تكمن في الثغرات المنهجية في النظام التعليمي السائد، ولمعالجة هذه الإشكالية؛ اقترح البحث فكرة تفيد في كيفية رفع جودة المناهج الحالية المتبعة عن طريق تبني تقنيات الواقع المعزز في مناهج التدريس، ومن ثم؛ استُدلّ على نجاعة تطبيق المنهج المقترح من طريق ورش العمل المبنية على ردود الفعل، والتغذية الراجعة من الطلبة.

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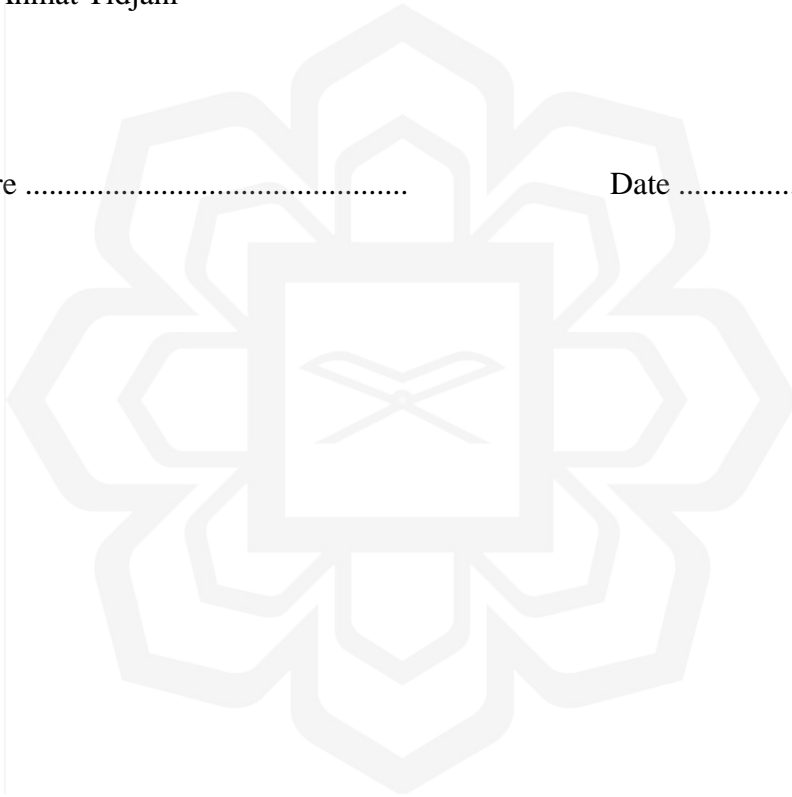
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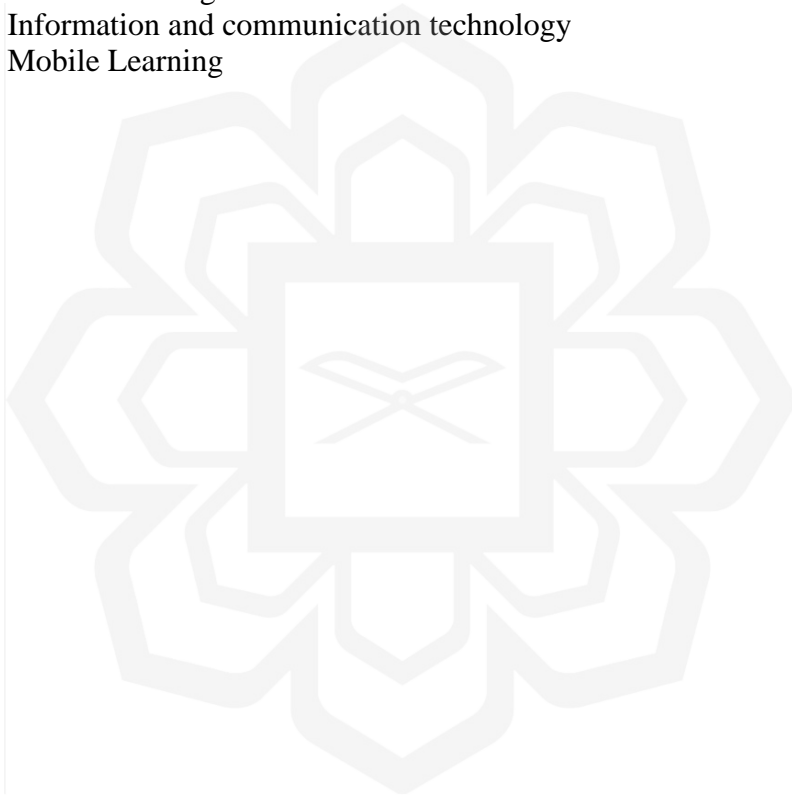
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ABBREVIATION

HTA : History and Theory of Architecture
MAR : Mobile Augmented Reality
VR : Virtual Reality
AR : Augmented Reality
LE : Learning Environment
IIUM : International Islamic University, Malaysia
KAED : Kulliyah of Architecture and Environmental Design
USIM : University Sains Islam Malaysia
FEBE : Faculty of Engineering and Built Environment
AL : Active Learning
ICT : Information and communication technology
ML : Mobile Learning



CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

History and Theory of Architecture (HTA) course holds a top position in the prisms of scholarship, especially regarding the intellectual legacies of bygone generations, from which the succeeding generations benefit a great deal. For this reason, HTA becomes universally recognised not only by individual researchers but also by academic institutions across the globe, as it connects present generation with the past. This connection gives an intellectual appreciation in making sense out of the glory of the past and benefiting therein. For this reason, architectural epistemology constitutes an indispensable component not only within the field of architecture but also to the fields that are associated with artefacts. As an academic field, HTA enjoys international recognition whereby most of the universities around the globe offer it.

Despite the foregoing demonstration on the role and benefits of HTA as a credible source of learning especially in the architectural domain, yet, it is observed that the traditional learning approach of the subject lacks the ability to engage and motivate the students to learn (Kiran Ijaz et al., 2016). The lack of students' interest in the subject could be attributed to various factors amongst is the current dominant teaching method that is characterised with deficiency and ineffectiveness (Johari, A.S., & Ahmad, A. (2016).

Hence, it is highly debatable that the genesis of the issues associated with HTA subjects is primarily attributed to the teaching method. The current dominant teaching method of the subject focuses on architectural evolution and regional characteristics of

different periods. Instead of focusing on students' learning style, teachers should adopt the appropriate teaching tools to captivate students' interest to learn more about the subject. So, this would ultimately make HTA education more interesting by showing its relevance and significance to the present-day.

It is highly observable that students from architectural schools fail to understand the academic boundaries among various sub-fields of architecture. Accordingly, it is important for the students to contemplate about the role of HTA in architectural education and the profession in general. The main reason in learning HTA subjects is to understand the morphological development of buildings from a particular society through styles, movements, theories and philosophies of the past. The contextual understanding would enhance students' creativity and design skills (Li, W., 2018). The learning contents of HTA subjects are beyond the scope of this study. Therefore, it is worthy of note to counter any misunderstanding that is likely to occur due to some sort of attack and scrutiny on the subject portrayed by the study.

Having said that, the primary assignment of teachers is to educate and inform their students. So, it is a duty or even a moral obligation upon HTA teachers to explain to the students the essence of learning the subject. This further implies that communication between teachers and students are inevitable while in this process. Therefore, communication is a continuous process in which teachers and students are involved in a chain of action and reaction in a stimulus fashion (Bâldea et al., 2015).

The contemporary educational setting witnesses a rapid technological revolution whereby the entire process of teaching and learning has been digitalised to a large extent (UK Essay, 2018). This remarkable change is driven by the fact that through Technology Enhanced Active Learning (TEAL) equipment, quality efficiency is highly attainable. One of the modern TEAL tools in the teaching process is the AR application,

especially in the teaching context. For effective teaching method, AR is highly instrumental. The application has the potential to make learning more pleasant and offer an interesting experience to the students.

However, Augmented Reality (AR) is yet to gain sufficient popularity within the schools of architecture in general and HTA subject in particular. Arguably, the absence of this remarkable technology in teaching method of HTA constitute a major setback of the subject. It is, therefore, essential to call attention towards using this remarkable technology in teaching HTA education per se. The inclusion of Mobile Augmented Reality (MAR) in the teaching method of HTA is highly essential in tackling the methodological lapses of the subject. The likely outcome of adopting MAR technology is that it creates a conducive learning atmosphere that engages students dynamically in acquiring knowledge.

It is against the backdrop of the above the foregoing study proposes a new technology based on pedagogical tools via visualisation and augmentation that are likely to display the learning content clearly. Therefore, MAR technology can be regarded as one of the solutions that are likely to tackle methodological deficiencies in teaching and learning of HTA.

1.2 STATEMENT OF PROBLEM

Generally, clear communication is an essential component of an effective means of information and knowledge transmission. The immediate impact of the modern technological revolution on education appears in the emergence of new technical and innovative equipment that enables effective learning environment.

Like other fields of study, HTA education needs to cope with the ongoing technological advancement and benefit therein. The emphasis here is that the traditional

methodological approach in teaching HTA subjects attracted numerous attack and intellectual scrutiny (Kiran Ijaz, 2016). The central attack lies in the fact that the dominant technique of instruction in teaching the subject lacks the ability to entertain and motivate the students. Besides, HTA subjects appear unattracted by a substantial number of the students whereby many of them overlook the basic information about the essence, the scope and the objective of the subjects.

Effective teaching strategy constitutes a necessary ingredient of active learning. Therefore, to address this issue, HTA can benefit from modern technology by adopting new technological instruments such as AR/MAR application in the teaching method. Hence, the forgoing study aims at examining the impact of MAR technology in teaching HTA subject.

1.3 RESEARCH QUESTIONS

To analyze the issues, the following questions are raised and answered in the course of the study:

- 1- What is the current educational technology deployed in HTA education?
- 2- To what extent has TEAL being applied in HTA education?
- 3- How effective is a MAR application to HTA education?

1.4 RESEARCH OBJECTIVES

This study aims at achieving the following objectives:

- 1- To identify the current educational technology used in HTA education
- 2- To investigate TEAL approach via MAR in HTA education
- 3- To evaluate MAR's effectiveness in generating favourable learning objective in HTA education.

1.5 SIGNIFICANCE OF THE STUDY

History and Theory of Architecture (HTA) holds an essential position within the broad umbrella of architectural education. Intrinsicly, academic research undertaking in respect of this important subject is highly recognised. As stated earlier, the ongoing study intends to investigate the driving forces behind the stagnation and backwardness of the subject vis-a-vis its counterparts. Certainly, effective teaching method plus a conducive atmosphere of learning are crucial components for effective learning. The growth incompetence and technological deficit in the current teaching method of HTA constitutes a stumbling block to the subject. Based on the findings of the investigation, the study suggests that an innovative teaching method of HTA is achievable by means of MAR application. Based on the foregoing, the significance of the study appears on three accounts; theoretical, practical and policymaking.

Theoretically, the findings from the foregoing investigation affirm the effectiveness of MAR technology in teaching strategy. Therefore, on a theoretical basis, the study is a value-added to the existing theory on the efficacy of MAR towards effective learning.

Practically, the significance of this study lies in direct engagement with teachers and students in finding out the genesis of the issue. As such, the inclusive consideration from teachers and students' perspective has enabled the researcher to offer practical guidance to effective teaching strategy.

In terms of policymaking, the significance of the study appears in the policy recommendation to the university governing council. The study suggests the need for government investment in technological infrastructure in the learning institutions. In addition, an emphasis was made regarding international seminars and workshops in

making teachers updated with technological discoveries related to effective teaching techniques which are often neglected.

1.6 SCOPE AND LIMITATION OF THE STUDY

The scope of the study is restricted to TEAL at the tertiary institutions where AR technology is applied. In terms of instrument and software in testing the preliminary assumption of the study, 3D software precisely the Trimble Sketch-Up and AR Plug-In for Sketch-Up are used. The study also benefited from other substances such as mobile phone, tablet, computer, TV Screen and external webcam. In terms of application, the study concentrates on AR technology with more emphasis on MAR application in teaching and learning domains. In respect of research limitation, the study narrows its investigation within the two selected tertiary intuitions namely, International Islamic University Malaysia (IIUM) and University Sains Islam Malaysia (USIM)

1.7 ANALYTICAL FRAMEWORK

The essence of the analytical framework in any research undertaking is the demonstration of steps that needed to be followed in order to successfully reach the end of the project. It displays the correct method of the research associations by clarifying the connections between various tasks that are progressing throughout the research. Hence, the analytical framework in guiding the foregoing study is partitioned into four phases, where each phase is elaborated in the subsequent paragraphs.

Phase 1, the research problem domain was discovered and understood at the start of the research. Thus, it provides a general overview of the matter under investigation.

Phase 2, comprises of literature review that present different scholarly point of views concerning the research topic. In other words, the review of the literature constitutes a secondary data collection from the existing stock of the literature.

Phase 3, contains the research method and method of data collection. As stated earlier, the relevant data for the study are generated from primary and secondary sources. What constitutes the primary sources are the in-depth interviews and the survey questionnaires, whereas the secondary sources are based on the exploration from the existing studies conducted on the subject matter. Also, periodical magazines both local and international are part of the secondary data. Apart from the forgone sources of data, this study gathered additional data from the conducted workshops among students of architecture reflecting the sample frame of the study. The design implementation covers the keywords of the research which are Augmented Reality (AR), Mobile Augmented Reality (MAR) History and Theory of Architecture (HTA) and Active Learning (AL). Afterwards, the data presentation and analysis where the entire variables in the study are critically examined.

Phase 4 of the framework is exclusively for analyses of findings and results. The chart below shows the flow of the methodology in detail that explain in visual graphic the above-described phases of research design, research methodology and method of data collections.

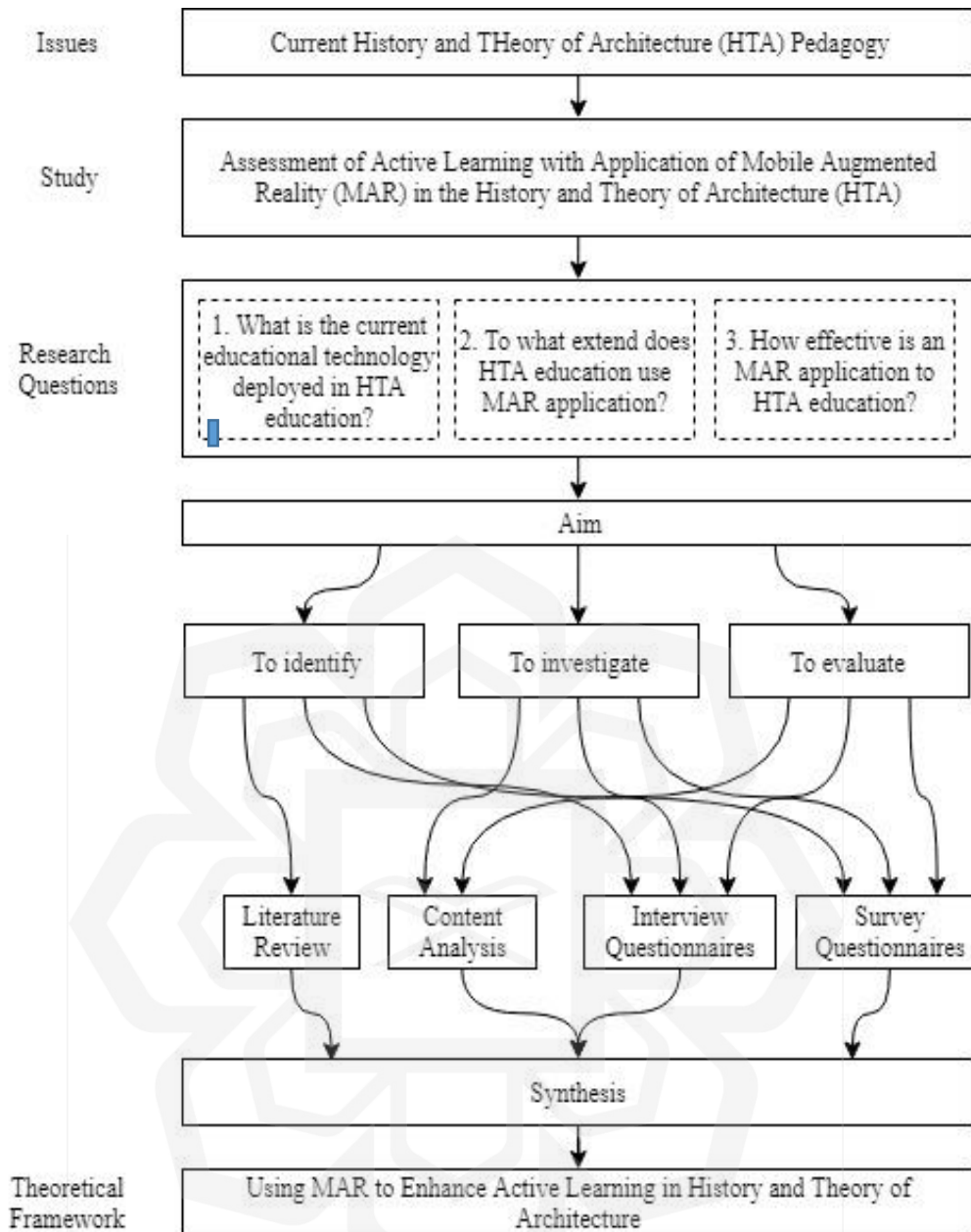


Figure 1.1 Framework Chart

1.8 RESEARCH ORGANIZATION

This study compiled its investigation into five chapters. The first chapter represents the general framework of the entire research. It conveys the problem statement, the significance of the study, the research questions and the objectives.

Chapter two presents the literature exploration related to the subject under investigation. Diverse scholarly opinion from the existing studies on AR/MAR technology and teaching methods are presented. Conflicting arguments regarding the effectiveness of the application are critically examined in the course of the review. The chapter also highlights the literature gap from the existing studies and how to fill it up.

Chapter three is the methodology and a guiding roadmap to the study undertaking. The research design, sampling frame and the population under investigation are coherently arranged. Also, the nature and the source of the data being used in discharging this investigation are explained in detail.

Chapter Four focuses mainly on data presentation and analysis. The findings based on the presented data are carefully examined to address the research questions. By doing so, the stated objectives of the study are finally materialized.

Chapter five makes a summary of the entire investigation based on the research findings, where it presents several recommendations for practical implication based on the obtained findings and suggestions for further investigation on the subject matter.