

**UNIVERSITI TEKNOLOGI MARA**

**FORMULATING A MODEL OF  
MOBILE AUGMENTED REALITY  
USAGE AMONG MALAYSIAN  
PRE-SERVICE TEACHERS**

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Thesis submitted in fulfillment  
of the requirements for the degree of  
**Doctor of Philosophy**  
**(Education)**

**Faculty of Education**

**September 2021**

## AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Postgraduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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## ABSTRACT

The popularity of Mobile Augmented Reality (MAR) has increased in recent years. However, the potential remains underexplored in education due to the massive penetration in the entertainment industry. It promotes flexibility in learning as well as enriches students' learning experiences. Therefore, this study aims to enhance the use of MAR and formulates a model of MAR usage for pre-service teachers. Since they are the limitations in achieving existing MAR technology resource, the present study developed a MAR technology, namely Mobile Augmented Reality Learning Cardiovascular (MARLCardio). In the context of this study, MARLCardio serves as a tool to exemplify the experiences of MAR usage. This study employs sequential explanatory research, and the data collection process were divided into three phases. The first phase involves the design and development of MARLCardio. A survey was distributed, and the responses were analysed using descriptive analysis. The second phase is highlighted to determine the acceptance level of MAR and the factors that might influence pre-service teachers' decision to use MAR in their learning. Responses from pre-service teachers through a survey were analysed using descriptive analysis and structural equation modelling. Lastly, the third phase reflects the interview sessions of pre-service teachers. The transcript data were further analysed through thematic analysis. The results suggest that five multimedia components (video, animation, text, visuals and sound) and systematic workflows contributed to the successful development of MARLCardio. This study also found that pre-service teachers are at their moderate level in accepting the use of MAR. In addition, there are four factors that contribute to the pre-service teachers' decision in using MAR for learning. This includes the performance expectancy (PE), effort expectancy (EE), social influences (SI) and attitude (ATT). All these factors were further used to formulate a model of MAR usage. The model suggests that the benefits gained from the use of MAR technology play a major role to increase the use of MAR. It also would determine how pre-service teachers want to perceive it, either in positive or negatives ways. At the same time, the easiness of use and support from surrounding people are also a concern for those who are not familiar with the use of MAR. It can help them to adopt the use of MAR easily. The model formulation of MAR usage perhaps is able to provide ideas and assist future research towards achieving better success of MAR usage.

## ACKNOWLEDGEMENT

Alhamdulillah. Praise and thanks to the God, the Almighty, for His showers of blessing throughout my research work to complete this thesis.

I would like to express my deep and sincere gratitude to my main supervisor, Dr. Mohd Khairezan Rahmat for providing invaluable guidance throughout this research. His dynamism, vision, sincerity and motivation have deeply inspired me. He has taught me the methodology to carry out the research and to present the research works as clearly as possible. I am extending my heartfelt thanks to Assoc. Prof. Ts. Dr. Siti Zuraida Maaruf and Assoc. Prof. Dr. Siti Maftuhah Damio, my co-supervisors for their constant guidance and encouragement to boost up my motivation in completing this research. It was a great privilege and honor to work and study under their guidance.

My sincere thanks also goes to Universiti Teknologi MARA and Research Management & Innovation (IRMI) which provided me an opportunity to undertake my study and support part of my research. Special thanks also go to the administrative staff of the Faculty of Education, Universiti Teknologi MARA who provided me facilities and assistance. My gratitude also goes to members of the Malaysian Higher Education, Faculty of Education, Universiti Putra Malaysia and Faculty of Science and Mathematics, Universiti Pendidikan Sultan Idris for their assistance and support in facilitating my data collection process. I would also like to acknowledge the participating students for their effort and time throughout this research.

I am extremely grateful to my parents, Hj.Mohamad Nizar Bin Mohd Abdul Jabar and Hj.h.Pahlaila Abdullah for their love, prayers, support and sacrifices for educating and preparing me for my future. Words are inadequate to express my gratitude for their moral support and understanding. Also, I express my special thanks to my brothers; Muhammad Fahkrul Ikhwan, Muhammad Hafizzudin, Muhammad Haziq and Muhammad Al-Azim and sister-in-law; Suhailah Abdullah for their valuable prayers and continuing support to complete this research. Having them is a blessing and I love them with all my heart.

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