

Parents' Perception on the Use of Augmented Reality Educational Mobile Application for Early Childhood Education

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Abstract - *The use of educational mobile applications is becoming prevalent in the field of education. This study investigates parents' perception on the use of educational mobile application (EMA) with augmented reality (AR) technology for their children to learn alphabets. This study could assist educators in identifying the potential of EMA to be used in early childhood education. Survey conducted had found that parents have overall positive attitudes towards the use of EMA with AR technology. In this study, found that parents have confidence in the use of EMA for early childhood education, hence educators could work on implementing this technology in their lesson. Copyright © 2016 Penerbit Akademia Baru - All rights reserved.*

Keywords: Educational mobile application, augmented reality, parents' perception, early childhood education.

1.0 INTRODUCTION

Little research has been carried out in the use of educational mobile application (EMA) with augmented reality (AR) technology for early childhood education. Mobile learning itself was claimed to be effective and engaging for young children [20]. On the other hand, AR was also proven by researches to significantly help facilitate students' understanding on the subject [2]. Recent advancement in technology has enabled AR to be integrated with mobile learning. However, few researches were conducted concerning the use of this combination of technology, especially in early childhood education.

2.0 STATEMENT OF THE PROBLEM

A mobile media revolution that is changing the lives of children of all ages is under way across the globe. One aspect is certain, technology occupies an increasing amount of time and focus in the lives of very young children. They tend to spend a great deal of time in front of screens. According to a study by [11], children spend an average of seven hours a day using screen media, including one to two hours a day for those under age two. Ninety percent of parents report that children below age two watch some form of electronic media [13]. Fifty-two percent of children aged birth to eight have access to a smart phone, tablet, or similar electronic device [9].

Educationalists and psychologists agree that it is within the first six years that the foundations of an individual's linguistic, cognitive, social, creative, physical, moral and spiritual development evolve. Research also has shown that parental guidance or scaffolding can improve young children's learning of high quality media's educational content, promote general language development, and increase engagement in relevant activities [7]. In considering developments in early childhood education, many influences and social movements have caused a focus of attention and of policy making on this important aspect of early development.

In this study investigates parents' perception on the use of EMA with AR technology for their children to learn alphabets. The use of EMA with AR technology for early childhood education is new forms of digital media are influencing very young children and their families. According to [6] in their study in what do young children do with smart mobile devices, kids say that they mainly play games with smart mobile devices, while parents report that their kids use these devices for a variety of activities. In the same study, they also mention that most children were able to use the device on their own without any trouble. Other children needed a little help, but only at the beginning, as they quickly became adept users. Parental influence on children's development is commonly accepted as essential but the main question is, to what extent do parents affect preschool students' EMA with AR technology use at preschool needs a further exploration?

3.0 LITERATURE REVIEW

3.1 Mobile Learning

Mobile devices are becoming increasingly involved in our daily activities and have made their entrance in the world of education. In the last few years, mobile learning is increasingly used to enhance learning experiences [2]. According to [21], the term 'mobile' indicates the 'possibility of activities taking place in multiple locations, across multiple times and accessing items using various equipments, such as smart phones or tablets'.

When used in early childhood education, mobile learning is said to be more engaging and effective for distracting and entertaining young children [20]. The literatures suggest research on potential use of mobile devices in education, as current researches has lagged behind the rate of its adoption, considering the rapid growth and advancement in mobile technology ([20]; [21]).

3.2 Gamification

[3] defined gamification as the use of game design elements in a non-game context. One of the context could be in education. Many educators believe the use of games will bring benefits in educational context [2]. Compared with traditional methods of learning, students identified game-based learning as "more fun and stimulating", at the same time offering "interesting context" which triggers motivation [2].

Furthermore, the adoption of mobile devices has made it less complicated for any task or process to be gamified [3]. However, gamification is not guaranteed to make the learning objectives clearer or easier to understand. This is because some research confirmed the positive impact of gamification [14], while the other failed to show the positive impact [10].

3.2 Augmented Reality

To understand the concept of augmented reality (AR), one must first understand the Reality-Virtuality Continuum [16], where reality involves physical world and virtual involves computer graphics. Combining both elements, a mixed reality is created. AR, therefore, is an instance of mixed reality, but predominant to the physical world [18]. In other words, AR enables users to see the real world, with virtual object superimposed in it [1]. [1] had outlined three characteristics of AR system, which is still being used by researchers:

1. Combines real and virtual world.
2. Interactive in real time.
3. Displayed in 3D.

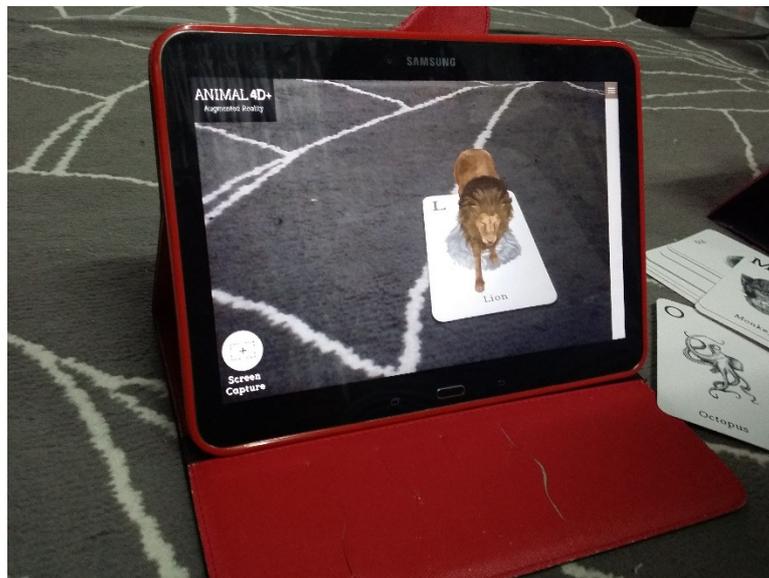


Figure 1: Augmented Reality Flashcards Displayed in 3D.

In their elaborate explanation on the technicality of AR, [4] listed three major platforms used for AR: head mounted display (HMD), handheld display and spatial display. However, it was only in recent years that handheld display gained popularity as smart phones and tablets are equipped with powerful CPU and camera, making them a promising platform for AR ([4], [2]).

With the potentials offered by this technology, challenge exist for educators to integrate them into teaching and learning process (NMC Horizon Report, 2014). Several researches had found benefits of AR when used in education. [2] found AR had significantly help students see and visualize complex concept in 3D, which facilitates their understanding. [12] revealed that all students in their research enjoyed using AR. In addition, [23] discovered teachers and students show positive attitudes towards using this technology.

4.0 SIGNIFICANCE OF THE STUDY

As AR technology are being integrated in mobile devices, it is important to investigate how learners make use of such technology: whether it actually benefits the learner. Numerous researches were already done in the context of mobile learning [8, 15, 24], but very few are focusing on the combination of AR technology and mobile learning [2, 12, 23]. As stated by

[17], the effectiveness of AR can be further extended when it is combined with other type of technologies such as mobile device. In the context of early childhood education where children are not yet capable of providing accurate written feedback, this study looks into parents' perception when AR technology is embedded into EMAs.

In addition, most research on AR application in education was done in the context of higher education settings [2, 5]. There are still few researches focusing on the use of AR in early childhood education. In Hong Kong, a research was done by [12] to explore the feasibility of using AR in kindergarten art education. In Turkey, [23] conducted a study to identify children's and teacher's opinion after engaging with AR-related activity. In Malaysia, the only found research was by [22] who uses interactive AR storybook to assist children learning numbers. Hence, a study is required to confirm whether findings from previous researches are applicable to current learners in early childhood education.

5.0 RESEARCH OBJECTIVES

Hence, this study is based on the following objectives:

- i) To identify whether educational mobile applications with AR technology facilitates learning in early childhood education.
- ii) To identify parents' opinion on the appropriateness of the EMAs.

6.0 METHODOLOGY

In this study, a questionnaire was used as data collection tool. The questionnaire comprised of multiple choice questions and Likert scale questions. Because the children are not yet proficient in reading and writing, the questionnaire was distributed to their parents. 36 parents are involved as respondents in this study. Children's learning performances using EMAs and parents' perceptions were analyzed by descriptive methods (frequencies and mean).

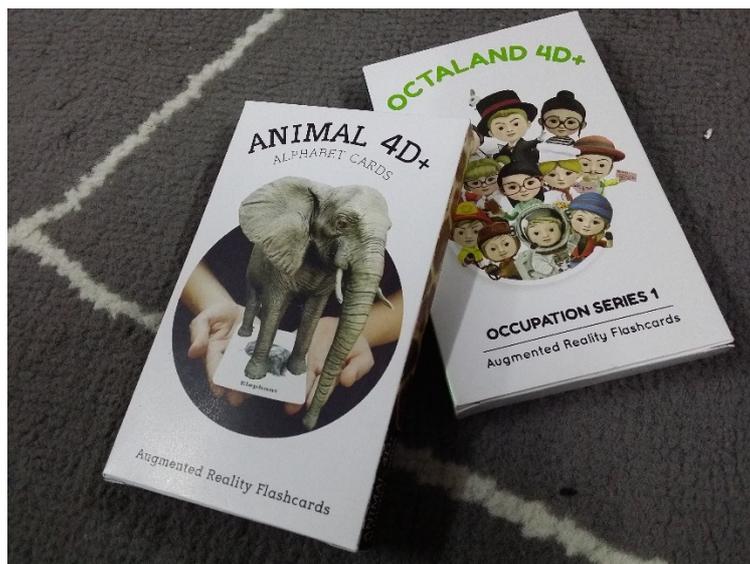


Figure 2: Augmented Reality Flashcards.

There are two educational mobile applications (EMAs) involved in this study. The aims of the EMAs is to teach children about different kinds of animals and occupations according to the alphabet. Both applications integrate AR technology, in which physical flash cards will be scanned using mobile application to see its 3D view. The EMAs involved in this research are Animal 4D Lite and Octaland 4D. Both EMA comes with physical flash cards to teach about animals (Animal 4D Lite) and occupations (Octaland 4D) for children in early childhood education (Figure 2).

7.0 RESULTS AND DISCUSSION

7.1 Children involvement with mobile device

For the first objective, effects of the use of EMAs in early childhood education was identified. All 36 respondents were asked several questions to identify their children's learning process. Majority of parents identified tablet as commonly used device (44.4%) followed by smart phone (55.6%). In addition, majority of the children use mobile device on daily basis (86.1%). However, time spent with mobile device daily is not too long, as parents claim their children only spend between 1 to 3 hours (72.2%) and 3 to 5 hours (27.8%) on mobile device. When asked about what their children do with the device, the main activities are watching videos on YouTube (36.1%), using learning application (33.3%) and using gaming application (30.6%). Detailed information is presented in Table 1.

Table 1: Children's Involvement with Mobile Device

Variables	Frequencies	Percentage
What device do your child use at home?		
Smartphone	16	44.4%
Tablet	20	55.6%
How often do the child use tablet?		
Everyday	36	86.1%
Others	36	13.9%
How many hours do your children spend on gadgets in one week?		
1 to 3 hours.	26	72.2%
3 to 5 hours.	10	27.8%
What does your children do with these devices?		
Gaming application	11	30.6%
Learning application	12	33.3%
YouTube	13	36.1%

5.1 Parents' opinion on the appropriateness of the AR mobile applications

For the second objective, parents' opinion on the appropriateness of educational mobile application was identified. Parents were asked 10 Likert scale questions to identify their positive or negative attitudes towards the EMAs. Most parents strongly agree that this EMAs are appropriate to be used in the classroom session (agree=38.9%, strongly agree=61.1%). They also think the EMAs are suitable for use at home (mixed feelings=2.8%, agree=50.0%, strongly agree=47.2%). They claim that the EMAs helped their children to recognize all the

alphabets (agree=38.9%, strongly agree=61.1%). In addition, the EMAs also helped their children to pronounce all the alphabets aloud (agree=25.0%, strongly agree=75.0%).

With regard to Animal 4D Lite EMA, parents claim that it helps their children to group the animals together (agree=33.3%, strongly agree=66.7%) and according to its colour (mixed feelings=2.8%, agree=30.6%, strongly agree=66.7%). The EMA help their children recognize the animals (agree=30.6%, strongly agree=69.4%) and describe new animals (agree=36.1%, strongly agree=63.9%).

Parents agreed that the EMAs help their children to arrange the alphabets cards accordingly (mixed feelings=2.8%. agree=25.0%, strongly agree=72.2%). In addition, the EMAs also help their children do basic counting (mixed feeling=19.4%, agree=30.6%, strongly agree=50.0%). Detailed information is presented in Table 2.

Table 2: Parents' Opinion on the Appropriateness of the Mobile Application

Variables	Frequencies	Percentage
The applications are appropriate to be used in the classroom session.		
Strongly disagree	0	0
Disagree	0	0
Mixed feelings	0	0
Agree	14	38.9%
Strongly agree	22	61.1%
The applications are suitable for use at home.		
Strongly disagree	0	0
Disagree	0	0
Mixed feelings	1	2.8%
Agree	18	50.0%
Strongly agree	17	47.2%
The applications could help my child to recognize all the alphabets.		
Strongly disagree	0	0
Disagree	0	0
Mixed feelings	0	0
Agree	14	38.9%
Strongly agree	22	61.1%
The applications could help my child pronounce all the alphabets aloud.		
Strongly disagree	0	0
Disagree	0	0
Mixed feelings	0	0
Agree	9	25.0%
Strongly agree	27	75.0%
The applications could help my child to group the animals according to its colour.		
Strongly disagree	0	0
Disagree	0	0
Mixed feelings	1	2.8%
Agree	11	30.6%
Strongly agree	24	66.7%

The applications could help my child group the animals together.

Strongly disagree	0	0
Disagree	0	0
Mixed feelings	0	0
Agree	12	33.3%
Strongly agree	24	66.7%

The applications could help my child recognize the animals.

Strongly disagree	0	0
Disagree	0	0
Mixed feelings	0	0
Agree	11	30.6%
Strongly agree	25	69.4%

The applications could help my child lay the alphabets cards accordingly.

Strongly disagree	0	0
Disagree	0	0
Mixed feelings	1	2.8%
Agree	9	25.0%
Strongly agree	26	72.2%

The applications could help my child describe new animals.

Strongly disagree	0	0
Disagree	0	0
Mixed feelings	0	0
Agree	13	36.1%
Strongly agree	23	63.9%

The applications could help my child do basic counting.

Strongly disagree	0	0
Disagree	0	0
Mixed feelings	7	19.4%
Agree	11	30.6%
Strongly agree	18	50.0%



Figure 3: Children using the Augmented Reality Flashcards.

8.0 CONCLUSION

This study discovered children's involvement with mobile device are quite high, in which majority of children nowadays use the device on daily basis. With this study also confirmed that parents' have really positive perception on the use of AR in early childhood education. This correlates with [12] and [23], who found that parents are supportive of this pedagogical innovation. In addition, the finding supplements several other authors addressing related topic. As [2], [23] discovered, AR significantly help students in learning. This study confirmed the positive impact of AR in the context of early childhood education.

As this study looks into parent's perception on the use of AR EMAs, one suggestion that could be made for future research is to extend the study into problems that children face when using AR EMAs. This notion is further supported by [12] who found that teachers and parents are concerned about the side effect of using AR in early childhood education. [19] acknowledge mobile devices as 'cultural resources' which could be used to support learning in formal context.

As the 21st century children are using mobile device on daily basis. So educators should really consider integrating this technology in their teaching and learning, beginning from early childhood education. Hence, resourceful educator should be able to find a way to integrate this resources to optimize teaching and learning. More research should be done to identify challenges in implementing AR in early childhood education.

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