Augmented Reality (AR) Concept in Hospitality Education: Advantages and Challenges

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Abstract: The Augmented Reality (AR) Concept in education is mostly studied and applied in the areas of mathematics education, science educations and educational technology. While in the tourism industry, it's played an important role as a marketing tools towards smart tourism approach. However, the Augmented Reality (AR) Concept in hospitality education have not yet been explored. Thus, this study aims to review existing literature to identify advantages and challenges pertaining to Augmented Reality (AR) Concept in the hospitality education. The output may give new perspective and potential application that may enhance the learning achievement and the hospitality course may become more interesting. Moreover. this may help the education provider towards movement to the Fourth Industrial Revolution 4.0 (IR 4.0) demand.

Keywords: *Mobile Augmented Reality, Challenges, Hospitality Education, Opportunity, IR 4.0*

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INTRODUCTION

An Augmented Reality (AR) is not a new technology as it was started evolving since 1990 across the industries of medicine, military, manufacturing and entertainment, and more recently it has expanded into advertising, healthcare, hospitality industry as well as education (Akc ayır & Akc ayır 2017; Uzunboylu & Yıldız 2016). AR was found to have a huge potential for pedagogical application where it has been chosen to be one of educational tool in a number of purposes such as collaboration, cultural exploration, digital storytelling and interaction (Bacca et al. 2014; Radu 2012, 2014).

AR also became a vital marketing tool in the hospitality Industry which can be deployed in many ways that changed the way of the customers used to see and interact with the industry. Moreover, this technology gives unlimited potential to engage with the customers. Figure 1.0 below represents the benefits of AR adoption in the hospitality and tourism industry.

Effective Planning and Suitable Management	Effective Entertainment Tool	Education Tool	Virtual Attractions at Effective Cost
Interactive Dining Experience	Convenient Translation Capabilities	Real Time and Reliable Navigation	Exploring the property
Booking Rooms	Experience of Rich luxurious Restaurants:	Local attractions	Marketing

Fig.1.0: Summary of the impact and importance of AR technology for the Hospitality and Tourism Industry (Nayyar, Mahapatra, Le & Suseendran,2018)

Moreover, recent advances have shown the opportunities offered by AR applications for smartphones to the hospitality industry (Fritz, Susperregui, & Linaza, 2005; Yovcheva, Buhalis, & Gatzidis, 2012), such as providing real-time information about a place and simulations of historical buildings,

monuments, and events, all by superimposing virtual objects into their current view of a landscape or interior.

With the rapid development of information communication technologies benefit and widespread use of mobile, smartphone or tablets open an opportunity to AR to be integrated. According to Aghaee and Larsson, (2013), those devices offer user friendly characteristics such as easily carried, wireless, containing many apps that making it easy for the student to do multiple tasks at one stand, and connecting while roaming. Previous has shown that smartphone give a great impact upon the nature of higher education as it was easily transmitted teaching experiences via smartphones, as well as the use of educational programs and the transfer of information outside the routine use of information communication technologies in higher education institutions (Ozuorcun & Tabak, 2012). Meanwhile, Traxler et al. found that Smartphones and iPads offered great impact towards students' usage as the educational content they offer in such a way that let them control their content especially when there are no laptops or desktops available (Kimura, n.d.). Smartphone augmented reality (SAR) is largely unexplored especially in the hospitality education. Thus, this review aimed to identify benefits and challenges in adopted AR on smartphone in the context of hospitality education.

LITERATURE REVIEW

A narrative review was carried out in order to identify advantages and challenges on adopting Augmented Reality (AR) in the Hospitality Education. Articles from reviewed journal were selected and comprehensively studied and rigorously discussed from the perspective of Malaysian Hospitality and Tourism Education.

2.1   Malaysian Education

The rapid growth of Internet of Things (IoT) became main challenges for educators especially in teaching the Net Generation. Different approach of teaching need to be adopted in order to meet the demand. Over the last decade blended learning approaches and online education has been applied/incorporated in many disciplines of education. Globalised online learning has been incorporated for higher education

under Shift 9. While the Malaysian Education Blueprint 2013-2025, incorporated of ICT was under Shift 7. In implemented the online education, three (3) factors need to be considered which were macro, meso and micro as shown in Figure 1.0 below.
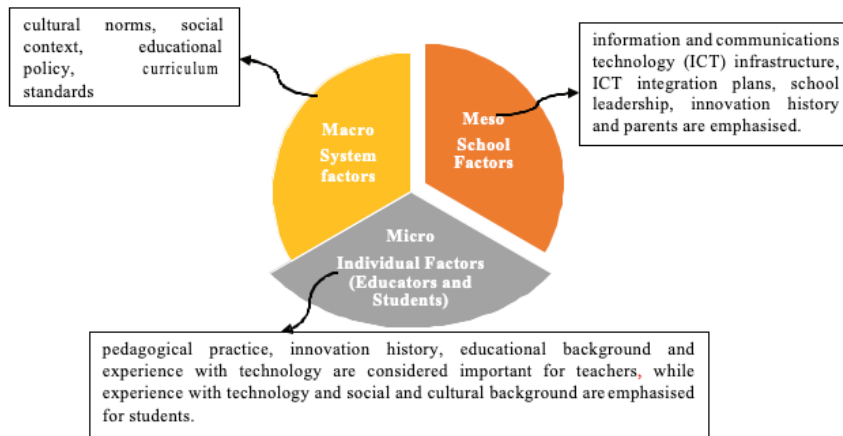

Fig. 2.0 Three Main Factors involved in adopting AR in education (Rozinah, 2018)

2.2 Hospitality Education in Malaysia

In Malaysia, tourism and hospitality education dates back to the early 1967 when the Institute of Teknologi MARA(ITM) began producing skilled graduates in hotel, catering and management from its Jalan Othman campus in Petaling Jaya,Kuala Lumpur. With such changes of name, Universiti Teknologi MARA in 1999, the Faculty of Hotel and Tourism Management continued offering Hospitality Programs (Hotel Management,Tourism Management,Culinary Arts and Gastronomy,Foodservice Management,Pastry) at six (6) different campuses throughout Malaysia . The evolution of education provider is then continuously rise as a rapid growth of this industry requires a workforce that is not only skilled but has a formal education to ensure a good quality of services were provided to guests or tourists. Thus, several academic institutions started offering the hospitality programs such as Universiti Putra Malaysia (UPM), Universiti Utara Malaysia (UUM) and International Islamic University Malaysia

(IIUM). Moreover, when the Private Higher Educational Institutions (PHEI) Act was passed in 1996, more private educational institutions have established hospitality programs namely Taylor's University College, Segi University College, Damansara Utama College and Limkokwing University of Creative Technology. The curriculum of hospitality education mainly consists of Food and beverage, Lodging (accommodation), Recreation and Travel and tourism.

The technology development in hospitality industry is growing thus required the education provider to adapt to the changing needs by the employer as well as customer where they are becoming more demanding, sophisticated and experienced. AR has been embedded in different fields of education but only a few studies have been conducted in Hospitality Education even though the number and variety of courses of hospitality and tourism education continuing to increase. According to (Cantoni, Kalbaska, & Inversini, 2009), the hospitality and tourism education were typically provided by four main sources: academic institutions, corporate entities, destination management organizations, or independent third party associates.

2.3   Augmented Reality

2.3.1 Definition

In general, augmented reality is referred to the integration of digital information with the user's environment in real time. In the other hand, AR presents virtually superimposed images on the real world view (Rauschnabel, 2018; Rauschnabel, Rossmann, & Tom Dieck, 2017). Furthermore, Agarwal et al., (2014) defined Augmented Reality is the augmentation or superimposing of graphical elements that are generated by computer such as audio, video, GPS data or graphical images on top of the real world environment. It could be understood more specifically by a notion called mediated reality through which artificial information can be added or subtracted or manipulated or overlaid on the real world. Meanwhile, Daponte et al., 2014 stated that AR is defined as involvement of virtual environment into the real world to enrich the view, the sound, sense of taste,

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feel or touch and scent or smell. This was supported by Johnson et al. 2010 that highlighted Users can also engage with AR objects through haptics, or touching their mobile device screens, and manipulating the various types of superimposed content.

2.3.2 Brief History of Augmented reality (AR) in Education

Recently, augmented reality is one of the technological innovations that moving towards mainstream. Throughout more than five (5) decades the history and revolutionary of augmented reality are rapidly changes across diverse disciplinaries including in Education. Within education, the adoption of AR and most commonly AR apps, represents a strand of m learning and technology   enhanced learning. Various devices can be used to display and integrated with AR technology. Brief history of AR technology application as shown in Table 1.0 below. There were five (5) main categories devices that suitable for AR application; mobile devices, special AR devices, AR glasses, AR contact lenses and virtual retina display.

Table 1.0: Brief History of AR applications

Year	History
1960	Detector, Morton Heiling
1973	First mountable head screen (HMD= Head Mounted Display)
1985	First augmented reality laboratory (Immersive/Interactional)
1990	Virtual Reality (Jaron Lanier)1992: Augmented Reality (Tom Caudell)
1994-99	First RA Systems (KARMA 1994 and ARToolkit, 1999)
2000	First augment reality played with mobile devices
2008	Wikitude: Augment reality scanner
2009	Initiation of Standardization operations
2013	Google is in the process of commercializing RA eye glasses

A few number of studies on mobile augmented reality in the hospitality context have been carried out. Summary of the research's as presented in table 2 below.

Table 2.0: List of AR Research in Hospitality Education

No	Author	Title
1	Deale, 2013	Incorporating second life into online hospitality and tourism education:A case study
2	Huang,Backman,Chang,Backman & McGuire, 2013	Experiencing student learning and tourism training in a 3D virtual world:An exploratory study
3	Hsu, 2012	Web 3D simulation-based application in tourismeducation: A case study with second life
4	Huang, Backman and Backman, 2010	Student attitude toward virtual learning in second life: a flow theory approach
5	Penfold,2009	Learning through the world of second life-a hospitality and tourism experience

2.3.3 Mobile Augmented Reality

The Fourth Industrial Revolution 4.0 (IR 4.0) is changing the world including the education landscape and system. The shift of this paradigm seems to force all the education provider, policy marker and educators to be ready in changing ways of thinking, teaching and learning. Internet of Things (IoT) becoming main driver towards IR 4.0. Thus, Mobile Augmented Reality was found to be an appropriate technology to be employed in the education system. Mobile Augmented Reality is referred to mobile, smartphones and tablets that currently the most available and best fit for AR mobile apps, ranging from pure gaming and entertainment to business analytics, sports, and social networking.

2.3.3 Advantages of Augmented Reality (AR)

Previous researchers found that AR application in the area of teaching and learning environments has remarked the advantages as follows:

Table 3.0: Advantages of AR application in teaching and learning

Author	Advantages
Anne-Marie DePape, Marissa Barnes & Jayme Petryschuk (2019)	Technological Factors-usability- & functionality Student Characteristics- demographic & Academic background Learning Outcomes – hard skills & soft skills & essentals skills
Bujak et al.,2013; Di Serio, Ibáñez, & Kloos, 2013).	Increase student's motivation Hybrid learning 'dynamic' and not 'static' " 'two dimensional', digital natives, physically enacting the educational concepts' "perfectly situated scaffolding" in ways that were not previously possible'. enables users to be immersed in a virtually enhanced real world
Serio et al., (2012 Chien, Chen and Jeng (2010) Dede (2009)	Boost students' motivation and interest Encourage kinaesthetic learning. Experience real life Break the boundaries of formal education-to reach a quality education from everywhere in the world, in an informal way and through ubiquitous technologies obtained by everyone to engage in authentic explorations in the real world

2.3.4 Challenges in Adopted Augmented Reality

However, several studies have identified potential challenges and drawbacks toward adopting AR smartphone in tourism and hospitality which were presented below:

Table 4: Challenges of AR application in teaching and learning

Author	Challenges
Uden et.,al (2019)	Potentially high cost of acquiring a system Lack of realism/fidelity/skill transfer issues Physical effects on end-users No curriculum content Require Mobile Device
Kerr & Lawson (2019)	Technological-AR complicated, technical problems (various divices) Pedagogical-excessive additional lecture time is required to use AR effectively in education Learning Challenges Privacy and Security issues
M. Akçayır, & G. Akçayır (2017)	AR is difficult for students to use Requires more time Low sensitivity in triggering recognition GPS errors cause student frustration Not suitable for large group teaching Causes technical problems (camera, Internet, indoor use) Causes cognitive overload Distracts students' attention Expensive technology Large file size limits the sharing of content Ergonomic problems Difficult to design Inadequate teacher ability to use the technology

CONCLUSION

Educators in the hospitality courses need to continue exploring the potential of Mobile Augmented Reality (MAR) in order to identify and develop a new educational opportunity that will encourage interaction and engagement among their students as well improvement in the method of teaching. Moreover, such technology is crucial in order to be aligned with the IR 4.0 shift. However, readiness in term of systems, organization (university or school) and Individual, are the other factors that need to be focused.

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