The Impact of Augmented Reality on E-learning Systems in Saudi Arabia Universities

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Abstract

The purpose of this paper was to investigate the impact of Augmented Reality on e-learning systems at colleges in Saudi Arabia. In this research, Augmented Reality could reenact real environment by computerized overlays that learners can interact with and without much of a stretch access. What is more, Augmented Reality helps consumers to explore alternative learning avenues around learning content. Setting that aside, there has not been sufficiently thorough research on the evaluation of Augmented Reality in the context of teaching. The primary objective of this research is to examine possible standard factors identified with the successful use of unparalleled scale. This prototype highlights the essential factors that affect the implementation of AR via the quantitative approach to Augmented Reality knowledge assortment and evaluation. The research finds the principal coefficients for the attainment of Augmented Reality: IT infrastructure, IT agility, interaction stability, self-learning ability, curriculum, student background, ease of use and Usefulness. The after-effects of this analysis includes useful debates to create up a perfect fate of Augmented Reality and help handle the enhancement of instruction and e-learning with competitive societies and frameworks in the Kingdom of Saudi Arabia as well as other countries.

Keywords: Electronic Learning (E-learning), Augmented Reality (AR), students, education, Saudi Arabia

1. Introduction

There are new suppositions, developments in the intelligent civilization, just as ideas that have evolved because of Internet exposure. New policies and applications are continually evolving amid these creative technologies and developments (Kaul, 2012). Various scholars argue that new learning is hugely affected by creativity. It is clear that creativity is being integrated into training and the effects of teaching and learning are positive. One of the most intuitive activities among people is the road towards learning. The outcome of the learning period is determined by the degree of collaboration between students and their teacher. In the learning cycle, e-learning and versatile learning have been implemented as of late. Similarly, previous reviews suggest that using technology to enhance preparation contributes to improved learning and training. Augmented Reality is a case of this (Christensen, 2002).

Computerized media is superimposed by innovation, as indicated by Fernandez (2017), so that legitimate users can use data through cell phones, PCs, as well as various gadgets. As of late, more attention has been given to Augmented Reality primarily, since Augmented Reality has not conceptualized the promotion of data access. According to Bimber and Raskar (2005), perspectives such as motion pictures, TV and PC games can be more than tools of amusement. They are used as entertainment devices in general, and this is an aspect that empowers them to be used when studying for friendly encounters. Edutainment is a term used when studying to refer to the use of diversion devices (Egenfeldt-Nielsen, 2005). E-learning is called the use of the Internet to enhance execution and data; it may also be known as separation learning. A fundamental reason for this research is to harness the ability of Augmented Reality to make learning enjoyable for students. This study investigates the influence of augmented reality on e-learning platforms at universities in Saudi Arabia. This study discusses the status of technology for Augmented Reality and e-learning. It ends with a review of the pros and constraints of the use of Augmented Reality in education. Incidentally, e-learning is more comprehensive and offers the ability for educational partners and organizers to provide learning resources from far-away electronic gadgets. Web-based learning materials can be delivered by electronic devices to understudies in higher learning

establishments as per (Wang et al., 2005). Quick/fast web improvements have rendered fresh open doors for understudies. For students in higher learning foundations, conventional learning procedures represent a lot of difficulties, but several regions can be updated. Augmented Reality helps students to easily access data on virtual symbolism in the climate of reality. Therefore, it is becoming a trend to find learning institutions that use computer-aided educational models, combined with other multimedia-based features. In e-learning, for example, Chandrasekera and Yoon (2018) used an interactive program modelled on the lunar phase. Their results proved that by providing real-time information, multimedia courseware could significantly enhance learning.

2. Literature Review

Given the quickly expanding development of the mimicked based instructional methodologies, it is presently feasible for academicians to investigate more robust e-learning frameworks that encourage improved learning when contrasted with the ordinary models that are progressively becoming obsolete and insufficient (Dalim et al., 2017). The capacity to incorporate the advantages of useful innovations to convey answers for unhindered genuine climate will settle difficulties related with the ideas of certain subjects unnecessarily depending on abstracts. Other difficulties include a few investigations that need risky examinations, a few teaches that require extended periods to record perceptions, and the significant expense of undertaking analyses and impediments of reality (Yuen, Yaoyuneyong & Johnson, 2013).

Examination on the conveyance of Augmented Reality in learning has picked up driving force in the ongoing past attributable to the way that the organization of different advancements in schooling has offered tremendous advantages and exceptional learning encounters. Olalde and Guesalaga (2013) saw that mimicked-based advances can help students acquire progressively enhanced and plentiful data to build a significant and complete image of learning ideas. Along these lines, it is turning into a pattern to discover learning foundations using PC helped instructional models, combined with different capacities dependent on media. For example, Chandrasekera and Yoon (2018) used intuitive programming displayed on the lunar stage in embraced e-learning. Their discoveries demonstrated that mixed media courseware could significantly improve learning by giving continuous information. Considering this and other ongoing model examinations, this part investigates and draws in with writing in regards to the organization of expanded reality in e-learning. Procedurally, it starts by looking at the e-learning ideas before exploring Augmented Reality and from that point, considers the components affecting increased validity in e-learning.

Web-based learning has more to do with the setting instead of the active use of innovation. For example, Elkins and Pinder (2015), see e-learning as the utilization of electronic advances to get to the instructive educational plan outside the ordinary homeroom. In a similar vein, Button, Harrington, and Belan (2014) present different ideas that allude to e-learning: separation instruction, web learning, and automated electronic learning among others. The current investigation, notwithstanding, embraced the Abdullah and Ward (2016) definition that depicts e-learning as casual and formalized learning accomplished by sending electronic (PC and organization innovations) assets, electronic and organization empowered exchange of information, and conveyance of learning materials.

Clark and Mayer (2016) partition e-learning into three significant perspectives, in particular, the circumstance of the course, the inclusion of the students and the utilization of an educator. These viewpoints incorporate simultaneous, accomplice, and offbeat learning. Appropriately, simultaneous learning happens when the students and educators are together simultaneously; however, not generally in a similar actual space (Abdullah & Ward, 2016). Simultaneously, the educator and the students participate in e-learning with the utilization of electronic stages for coordinated learning, for example, GoToMeeting and Adobe associate (Garrison, 2011). Conversely, nonconcurrent learning includes self-guided discovering that happens freely of the association among students and educators. For associate learning, educators and students' finished undertakings like recordings, tasks, activities and readings (Ma et al., 2017). A foreordained target is set for the coursework, however inside the set periods, where understudies and teachers impart at their own time.

One of the advancements utilized in e-learning includes sound methods, including tuning in to materials using audio devices. Computerized sound consists of the portrayal of sound in both the prepared and carefully put away electronic structures. The web has various sound documents, recorded and sent for the reasons of learning. While radio has been used for quite a while in the regular study hall (Button, Harrington and Belan, 2014), in the ongoing past, movement in innovation has seen the joining of radio on the web by means of streaming. Moreover, digital recordings and webcasts that can be downloaded by the students and educators have quickly become a typical element on the web. Video-empowered advances are additionally apparent in the study hall today. They include electronic media that record, duplicate and broadcast vivified visual pictures. The

method is used by understudies who need graphic images, including seeing the materials rather than just perusing (Urh, Vukovic & Jereb, 2015). These days, educators approach massive video cuts employing the web rather than the conventional Video Home System (VHS) tapes and Digital Video Disc (DVD). In the present day, online destinations, for example, YouTube are conveyed by student and educator (Abdullah & Ward, 2016). Additionally, instructors are using Adobe interface, webcams, and Skype applications to communicate effectively and frequently with the learners. The utilization of video-empowered learning advances has been esteemed to expand the maintenance of substance and help accomplish better execution in class. Efficient video advancement approaches are creating video models that are emphatically affecting learning measures (Bernard et al., 2014). Other than sound and video advancements, students approach cell phones, tablets, and PCs, which are broadly used in the homeroom.

SmartBuilder, an e-picking up writing instrument, is likewise used in e-learning for making course materials (Al-Samarraie et al., 2018). To manufacture e-adapting course materials, academicians do not need to code the program. They can utilize SmartBuilder application. Another discovery in e-learning involves human-made reasoning, including machines that structure a differentiation with the characteristic human knowledge (Huda et al., 2018). Human-made brainpower Artificial Intelligence (AI) is changing the whole experience of e-learning ascribed to its advantages. Human-made intelligence can help with featuring disciplines that need to upgrade as help students to improve in a portion of their frail territories. Progressed human-made brainpower models are taking care of various issues for the clients in a broadway when contrasted with the involved actual study hall approach.

The computer-generated reality or Virtual reality (VR) is another innovation that has been utilized in e-getting the hang of, including using headsets and complex-extended conditions, just as the actual climate or prop to offer reasonable sensations, pictures, recordings and sounds that improve the clients' essence inside a virtual or symbolism climate (Merchant et al., 2014). The remarkable utilitarian capacity and relevance of computer-generated reality have made it normal in e-learning, with possible applications in preparing material science and clinical preparing being the most encouraging. The advantages of computer-generated reality in e-learning has been investigated in different examinations. Dalim et al. (2017) saw that VR permits understudies to send data and information over the globe in a brief timeframe, as they use drawing in and invigorating instructive functionalities. Much the same as different innovations, VR has been found to intensify students' inspiration, since they do not stay with various pages of exhausting writings or delineations that they need to peruse. VR offers the opportunity to experience a genuine encounter, in actuality, on the planet outside the homeroom. As per Bacos and Carroll (2018), VR holds a substantial potential past the gaming business in regions, for example, VR films, music, game, schooling and preparing.

Another significant developing innovation includes the Augmented Reality (AR) that superimposes PC created content on the client's perspective on the genuine world and offers a composite view. It incorporates real tangible information, for example, sound, designs, pictures and recordings. Kipper and Rampolla (2013) set that in e-learning, AR can make the whole learning measure all the more intriguing just as simpler for the students to get a handle on. For instance, an online educator can offer a virtual visit through Mars without visiting the spot nor requesting that the understudies leave their home in a cosmic subject (Pérez-López & Contero, 2013). The innovation is beneficial, and numerous specialists have anticipated that enlarged reality market will come to the $200 billion marks regularly 2024, showing gigantic probability later on. Like computer-generated simulation, AR assembles a learning experience utilizing 3D displaying programming and can be gotten to using AR headsets (Bistaman, Idrus & Rashid, 2018).

3. Methodology

The objective populace of the investigation were college understudies in Saudi Arabia after characterizing objective. This proposition received a Non-Probability purposive examining strategy. Hair et al. (2003) characterized non-Probability purposive testing as a cycle that includes choosing individuals from an example with information about a specific issue, the capacity to give the vital data, and the availability to be engaged with the investigation. Approximately 288 understudies participated in the study. However,109 of members have left the survey page without finishing the remainder of inquiries. Therefore, the quantity of complete substantial polls is 179.The motivation behind this examination is the comprehension of applying Augmented Reality and their effects in Saudi Arabia colleges, as well as the key factors that assume a necessary function in the execution of the Augmented Reality in Saudi Arabia colleges.

This examination utilized both primary and secondary data. It gave essential data to accomplish the proposition. Likewise, the necessary and optional information supplement one another. In this proposal, vital information was

gathered using circulated overview, in a type of an electronic survey. Electronic polls estimate that a scientist can send them to an enormous number of people inside a limited ability to focus on investing cash and energy in talking each respondent on an individual premise (Patel, 2009). The number of inhabitants in the investigation will be college understudies in Saudi Arabia.

4. Results and Discussion

By testing the hypotheses, the researcher will be able to examine the level of influence of each key factor and the overall influence on the implementation of Augmented Reality in Saudi Arabia universities, regression analysis was conducted and the results are presented in Table 1. In addition, Table 1 contains a set of values that explain the relationship between dependent variable and independent variables; the main values are (R2, F-statistics, T-test, beta -value and P-value).

R square showed rate variety in the depended variable that can be anticipated by the autonomous factors, is additionally called the coefficient of assurance—F-measurements, which used to test the general criticalness of the relapse model. The T-test was valuable for making deductions about the relapse coefficients. Beta worth analyzed the quality of the impact of every free factor on subordinate factors. It was determined that the higher estimation of the beta coefficient, the more grounded impact. Besides, the P-esteem clarified the criticalness of the model, if p-esteem under 0.05, the model is measurably huge. If it is higher than 0.05, the model is not measurably huge (saunders et al., 2012). The outcomes in Table 1, showed that the general essentialness of the exploration model was spoken to in Table 1, where F =105.096 and P=0.00(P< 0.01). The estimation of F-measurements was measurably critical at the (0.01) level, implying that, the various relapse model could analyze and decide the key factors that effect on the execution of Augmented Reality in Saudi Arabia colleges. Notwithstanding that, the outcomes uncovered the coefficient of assurance (R2) is coming to (0.832), which demonstrated that the critical components remembered for the model was proficient at appraising the progressions on the execution of viable AR in Saudi colleges. The outcomes showed the essential elements clarified about 83.0% of the varieties in the usage of AR in Saudi colleges.

In light of the consequence of numerous relapse examination that was introduced in Table 1, which tried impact of IT infrastructure on the fruitful usage of Augmented Reality (T= 7.614, P = 0.00 that is under 0.01). In this manner, the speculation H1a (there is a measurably critical impact of IT infrastructure on the fruitful execution of Augmented Reality in Saudi colleges) was upheld. Accordingly, the speculation H1b (there is a measurably huge impact of IT agility of mastery on the effective execution of Augmented Reality in Saudi colleges) was upheld. In light of the consequence of different relapse investigation that is introduced in Table 1, which tried impact of interaction stability on the fruitful execution of Augmented Reality (T= 3.709, P = 0.00 that is under 0.01). In this manner, the speculation H1c (there is a measurably huge impact of interaction stability on the practical usage of Augmented Reality in Saudi colleges) was upheld. About the test which tried the effect of the ability of Self-learning on the fruitful execution of Augmented Reality (T= 3.934, P = 0.00 that is under 0.01). In this manner, the speculation H1d (There is a measurably massive impact of the ability of Self-learning on the practical usage of Augmented Reality in Saudi colleges) was upheld.

Again, the consequence of different relapse investigation that was introduced in Table 1, which tried impact of Curricula on the fruitful execution of Augmented Reality (T= 1.008, P= 0.32 (P > 0.05) that is more noteworthy than 0.05). Consequently, the theory H1e (there is a factually huge impact of Curricula on the fruitful execution of Augmented Reality in Saudi colleges) was dismissed. The trial which tried result of Students' background on the fruitful execution of Augmented Reality was found to be T= 2.126, P≤ 0.05. Accordingly, the speculation H1f (there is a measurably huge impact of Students' background on the fruitful execution of Augmented Reality in Saudi colleges) was upheld.

Based on the impact Easy to use on the effective execution of Augmented Reality (T=-0.565, P = 0.57 (P > 0.05) that is more prominent than 0.05). Like this, the speculation H1g (there is a factually huge impact of Easy to use on the effective execution of Augmented Reality in Saudi colleges) was dismissed. At last, based on the test impact of Usefulness on the fruitful usage of Augmented Reality was (T= 3.65**, P = 0.00 that is under 0.01). Accordingly, the speculation H1h (there is a measurably critical impact of Usefulness on the effective execution of Augmented Reality in Saudi colleges) was upheld.

Table 1. Illustrates multiple regression analysis regarding the influence of the key factors on the implementation of augumented reality in Saudi Arabia Universities

Model	Coefficients	Beta	T-test	P-value	F	Sig.
Constant	0.109		0.739	0.46		
IT technology / infrastructure	0.239	0.310	7.614**	0.00		
Influence of agility	0.067	0.085	1.994*	0.048		
Interaction's stability	0.176	0.195	3.709**	0.00		
The capability of Self-learning	0.146	0.180	3.934**	0.00	105.096**	0.00
Curricula	0.058	0.067	1.0008	0.32		
Students' background	0.108	0.120	2.126*	0.04		
Easy to use	-0.019	-0.026	-0.565	0.57		
Usefulness	0.197	0.203	3.650**	0.00		
R = 0.912		$R^2 = 0.832$,		Adj.$R^2 = 0.824$		

**indicated that F-statistics, and T-test is significant at the (0.01) level

*Indicated that T-test statistics is significant at the (0.05) level.

5. Conclusion and Future Recommendations

The results outline that an aggregate of eight examination theory was tried to look at if the free factors altogether clarified the needy variable. The outcome uncovered that the free factor, IT infrastructure, is the main key element that impacts decidedly on the execution of AR in Saudi colleges, while the subsequent key factor that affect AR usage was the interaction stability. At the same time, the ability of self-learning was the third key factor that likewise impacts emphatically and altogether on the execution of AR in Saudi colleges. Usefulness was the fourth affecting element, and student background has impacted decidedly and entirely. IT agility impacts AR usage. The two factors that seemed to have no critical impact were curriculum and ease of use. The examination gave a few occasions to additional assessment, given that the topic centered around a moderately new space of the utilization of AR in instruction. As innovation is opening up for use in learning, the requirement for such exploration increments. Exploration here will support the selection of increased reality innovation-based training and aid the improvement of the innovation.

There are different recommendations in which future examination is required. The research could be reproduced in other Arabic nations to see whether Augmented Reality on e-learning frameworks in Saudi Arabia colleges would be figured it out. Its replication could likewise help extend the discoveries or discredit them. Moreover, future exploration may duplicate these elements in other nations' setting to guarantee the legitimacy of the proposed calculated model. Additionally, an alternate information investigation technique could likewise be adjusted to test the legitimacy of the ebb and flow research. The attention on the various territories of exploration would assume a focal part in guaranteeing a more extensive viewpoint of the examination that has been distinguished. Future exploration can complete a longitudinal report rather than a cross-sectional examination to researching how enlarged reality impacts e-learning frameworks in Saudi Arabia colleges. Such an examination is a commendable heading and requires future exploration endeavors. It would give another point of view on the exploration subject and accordingly giving extra information on the zone of study.

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