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Exploring the Acceptance of Augmented Reality Among Tesl Teachers and Students and its Effects on Motivation Level: A Case Study in Kuwait

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INTRODUCTION

The utilization of technology tools and facilities has induced increasing improvement in teaching various subject matters in general and Teaching English as a Second Language (TESL) in particular. Advanced technologies have yielded plenty of gains in terms of TESL pedagogy by means of its interactivity, immediacy, collaboration, and numerous functional teaching/learning tools (Derakhshan, Salehi & Rahimzadeh, 2015). TESL practices have utilized diverse software programmes for maximising the learning outcomes of students particularly about language acquisition skills (listening, reading, speaking, and writing). Educational technology plays an outstanding role in delivering knowledge content and improving learning skills by engaging learners in collaborative, enriching learning experiences with fun and enjoyment (Andrade, 2014; Nomass, 2013).

The term Augmented reality (AR) denotes a concept of technology that allows both actual and virtual items to coexist in real-time while also providing real-time interactivity (Azuma, 1997). In other words, AR is a platform that creates a fusion of virtual world and real-world settings by adding additional data, such as text, audio, video, 2D picture, or animation, to make an integrated, creative experience. AR mixes three-dimensional (3D) computer-generated items (images, videos, and animations) that are superimposed on a real-world scenario (Gopalan, Zulkifli, and Bakar, 2016).

Over the years, Augmented Reality (AR) technology has taken its hype in education. Godwin-jones (2016) asserted that language educators have realised the craze of Pokemon GO among school students which inspired them later to explore the AR potentials to trigger better motivation and interactions. Originally connected to the Internet, now AR applications have advanced to held hand gadgets in a more handy and simpler way. According to Sdk, Amin, and Govilkar (2015), AR consists of three sequential stages: recognition, tracking and mixing. The first process of the recognition stage starts with the AR-enabled tracker which triggers through the device camera. This is followed by an AR-enabled tracker that responds to the designed and installed AR software. Finally, the mixing stage takes place when multimedia and animation are overlaid over the real-life scenes; and then the users can interact with the object. Thus, AR becomes a blend of computer-generated digital objects with real-world scenarios that can be infused in language teaching and learning to add more quality to the process.

Recent research has shown that AR integration can establish an effective and meaningful learning setting; as well as overcome several challenges ranging from poor motivation to low achievement among students in TESL classrooms (Lazar Stošić, 2015; Rahimi & Hosseini, 2015). Thus, the evolution of technology in education has called upon the Ministry of Education in Kuwait to keep abreast with the standards and quality of education around the globe. Many efforts and investments have been poured into the education system. Highlighting a new dimension of pedagogy, this study attempted to explore AR use in the TESL setting in primary schools in Kuwait. The objectives were designed to explore i. the perceived acceptance of teachers and students, ii. the strategies used by teachers in planning and executing the AR-aided lessons, iii. students' and teachers' motivation from the ARCS model, and iv. student engagement.

LITERATURE REVIEW

Previous research has explored the Theory of Acceptance Model (TAM) in understanding the utilization of technology. This theory is originated from the Theory of Reasoned Action (TRA) by Ajzen and Fishbein (1980) which explains attitude and behaviour as the component of motivation that drives a certain action. TAM has examined the action based on how a user accepts the technology. However, human behaviour is complex especially in highlighting the technology use in education. Thus, the researcher attempted to highlight the evolution of TAM and how it relates to the present research.

Technology Acceptance Model (TAM)

The early version of TAM has forwarded two main factors in triggering the acceptance of the technology. The first is perceived usefulness (PU) referring to the extent users feel and are aware of the technology benefits when using it. The second factor is perceived ease of use (PEOU) which denotes the seamlessness and simplicity of using a technology tool or system from the standpoint of the user. TAM is significant to explain the behavioural change in relation to technology acceptance that positively affects the system actual use (Davis, 1993). Besides, TAM was further extended by Venkatesh and Davis (2000) to model (TAM 2) where they added the subjective norms on behavioral intentions. In TAM2, the subjective norm is able to explain the importance of a specific technology according to the expectation of the environment, be it teachers, peers, or social community.

TAM has been successfully adopted as a research framework (Rauschnabel & Ro, 2016). Despite the extensive use in many studies to investigate technology acceptance (Bagozzi, 2007), TAM is not free from criticism. Thus, the Unified Theory of Acceptance and Use of Technology (UTAUT) was proposed by Venkatesh and Davis (2007) as an enhanced version of TAM. It efficiently reflects a kind of unification of earlier findings of theories and models (e.g., TRA, TAM, social cognitive theory, theory of planned behaviour, and others). UTAUT incorporates social factors (e.g., norms, images), perceived usefulness (performance expectancy), perceived ease of use (effort expectancy), and facilitating situations (supportive organizational and technical infrastructure).

However, many previous studies have also employed the model for examining the technology acceptance of AR. TAM was utilized by Rese et al. (2014) and Spreer and Kallweit (2014) to investigate the acceptance of AR technology among different user groups. TAM is still relevant despite the evolution of technological advancement in education. Nevertheless, Leue et al.

(2014) claimed that TAM requires some modification based on other additional factors; for example, the use expenses to be aligned with AR applications. In short, TAM has proved its popularity in AR-related studies because of the driving factor of using the technology (Alkhattabi, 2017; Cheng, 2017; Mikusa, 2015; Rauschnabel & Ro, 2016; Yilmaz, 2016). For this study, the main point is to highlight TAM's predictors by focusing on the aspect of user usage rather than the system quality and management support.

Situated Learning Theory

Situated Learning Theory (SLT) is based on the belief that the situation or context for interactivity of participants in learning is based on real-life scenarios. This is also contributed from the perspective that SLT assumes that learning is merely an unintentional process by which learners construct several connections through authentic experiences and learning activities. (Lave and Wenger, 1990). These connections are rooted in pairing students in practicing physical activities and the cognition they use and receive. Brown, Collins, and Duguid (1989) have claimed that Situated Learning Theory (SLT) becomes the genre in AR research. Additionally, the AR sense of presence allows learners to remember previous knowledge and engage in an interactive real-life context (Cuendet et al., 2013). Thus, the learners become experts, taking charge of the learning process in explaining and leading the lesson. Thus, the two main theories of TAM and SLT have been incorporated to underpin this research framework as a guideline for the findings and discussions.

Previous Research of AR

Previous studies of AR have looked into interactions between learners and learners, and learners with the technology. These findings centered around the term of meaningful interactions, student engagement, and inspiring learning environment (Wojciechowski & Cellary, 2013; Ibanez et al. 2014) and also enhancing student attention (Chang et al., 2014; Saltan & Arslan, 2017). Most importantly, AR is connected to the progress in pedagogical aspects which include problem-solving and collaborative learning (Civelek, Ucar, Ustunel & Aydın, 2014; Estapa & Nadolny, 2015).

On discussing the success of AR integration in the classroom, researches have also included the aspect of higher knowledge retention and faster learning progress as compared to their fellow students from traditional learning (Holland, 2016; Li, Chen, Pérez-López & Contero, 2013). Students can also receive more improvement in problem-solving and collaborative learning by using AR (Dunleavy et al., 2009). All these indicated a notable surge in exploring the affordances of AR in the educational domain. However, despite the success stories of AR integration in education, there is still a pressing need for teachers and students to have a positive attitude towards the technology and their readiness to embrace the technology in the TESL classroom. The main key success of AR technology integration in the TESL classroom is the students' attitude (Chen, Liu, Cheng & Huang, 2017; Martin-Gonzalez et al., 2015). Secondly, the success relates to the interface elements that bring AR integration in TESL settings with the real scenes and target content enabling visualizations and other interactive 3D elements to the abstract data settings. Due to these factors, the students become more involved, autonomous, and able to take ownership in learning. Moreover, it was claimed that AR has improved the tools and strategies of teaching (Saidin, Dayana, Halim, and Yahaya, 2015). This proposition needs to be validated in terms of a set of associated factors such as the subject matter, grade, student level, and many others.

Nevertheless, there have been debates on the failures of AR integration. The reason can be the school curriculum which does not support AR integration (Devaney, 2010). This is more apparent if the strategies of integration are not well planned, followed by the feeling of difficulty in handling the AR technology and supported learning stuff (Lee, K., 2012). Teachers' perceptions can also undermine the success of AR integration. This notion is shared by Harris (2015) where he finds that teachers who have lack of training and the attitude of not willing to adopt new types of technology can negatively affect AR utilisation in the classroom. Opposed to this view, Martins, Gomes, and de Paiva Guimarães (2015) are optimistic that consistent efforts and research are needed to understand AR utilisation. This view is the core of the current study for investigating more related factors on AR integration in TESL settings.

With regard to the theories applied, the AR previous researches have used learning theories such as Constructivist and Situated learning (Crandall et al., 2015), and strategic pedagogical guidelines such as game-based learning (Cabero & Barroso, 2016; Hwang et al., 2015). Meanwhile, other learning theories need to be attempted in the context of AR integration to ensure effective research to be carried out.

RESEARCH DESIGN

The study is concerned with investigating the integration of AR in educational practices in the TESL contexts. For that, the current study proposed an instructional module for integrating the AR integration into the classroom activities to help enhance the TESL setting, as well as to examine the level of motivation among teachers and students when using AR. Hence, it incorporated a set of questions to underpin the research work. The research questions are as follows:

1. To what extent do students and teachers accept using AR-based materials in the TESL context?
2. How do AR-based materials elevate the motivation level of TESL teachers and students and foster students' engagement?
3. To what extent do teachers able to plan and deliver AR-aided TESL lessons?

For providing answers to the research questions, the methodology of the study adopted a qualitative approach using multiple data collection methods. It incorporates using semi-structured interviews and classroom observation for reaching in-depth findings on the case study variables. There were two rounds of semi-structured interviews with two primary school teachers and eight third graders, as well as four observations of two TESL classrooms while administrating the AR proposed model. For obtaining rigorous and reliable results, all collected data received a systematic, accurate multi-step analyses process which comprises transcribing the interviews, arranging, and pinpointing categories from obtained raw data, forming and refining exploratory themes for open coding and axil coding an iterative manner, and finally drawing connections between the created themes and propositions and research questions to report results by the inductive analysis.

FINDINGS AND DISCUSSIONS

The study has drawn in depth insights based on teachers' and students' interactions with the AR applications in the classroom settings. Upon analysing the data collected from the interviews and observations, the following themes provide the landscape to address the research questions.

Teachers and Students Acceptance of AR

The two main predictors of TAM model, which are perceived usefulness and perceived ease of use (PU & PEOU), were assumed to predict their actions. The findings indicate that teachers and students have achieved the acceptance in using AR. In terms of the usefullness predictor, teachers could perceive the AR through realising the difference in their instruction which reflected on the whole classroom setting. Using the AR tools could allow teachers to manage the classroom better and achieve the lesson objectives seamlessly. In addition, the usefulness of AR in students' learning is also reported through the possibility of using it at school and home alike. By having AR-designed learning materials, students' learning is not only confined to the classroom setting but can trigger continuous learning at home with other family members. Most students were interested to proceed using the AR applications and interact with the 3D objects. Besides, having immediate feedback and guidance, students were willing to pursue reading the animated English stories much more than they previously used to do before.

For the factor of the ease of use, AR was clearly perceived by teachers through experiencing the seamlessness of applying the various AR-based materials throughout the stages of the TESL lessons. Teachers have revealed that the AR technology makes their teaching easier than before. They affirmed that neither intensive training nor complicated preparations is needed to be incorporated in daily teaching practices. During the observations, it was highly apparent how easy and seamless the class was managed by teachers who were able to reach most of the students and offered support in various tasks. Within the AR-aided setting, the class teachers were able to refresh students' previous at the beginning of the lesson by recalling the English alphabet in an interesting, interactive and engaging manner. During the group work, students were highly involved and focused in reading related tasks which allowed teachers to reach and support students much better than they used to do in previous lessons. Besides, the ease in teaching with AR was not only materialised in teachers' instruction, but also reflected in teachers' willingness to continue using it in subsequent classes. For the students who were assumed to be technology savvy, they seemed to be so comfortable with the easiness of AR during the classroom practices. This seamlessness and familiarity helped students to develop a favourable attitude towards the AR integration.

Furthermore, effectiveness is another new factor emerged from the acceptance framework of the TAM model. According to the objectives of the TESL lesson that included improving the reading skill of third graders, teachers found that AR could stimulate students to read much better than with traditional learning style as more enthusiastically as they expected beforehand. It was observed that the AR-aided reading activities were so effective in helping passive or reluctant learners to participate in reading and communicate with their peers. Using the AR could help teachers to effectively boost the level of interactions among students and extend the time span of attention during the learning tasks.

Besides, the students have shown positive reactions while and after using the AR indicated by their courage to inquire, join peer-working, and eager to use the AR features such as voice over and subtitles overlaid on the storybooks. Based on the observations, most of the students were able to read the 3D animated stories within an immersive and inspiring environment. All these aspects led teachers to express their acceptance of AR and intention to use it in the future; while students' reiterative demands to keep using the AR applications more frequently may affirm their increasing acceptance of AR.

Upon perceiving the predictors of TAM model, the AR acceptance was achieved. Such prevailing sense of acceptance can be displayed via a change in behavioural intention for teachers and students. Both of them liked to adopt the AR when they realised how easy, useful, and effective the AR is in terms of uplefting the instrctional quality and learning outcomes. As a consequence, they developed a favourable attitude and proceed to use AR and explore its increasing wonders. All the elements of ease of use, usefulness, effectivenss and enjoyment have caused to have a grounded evidence of actual use of the AR tools among teachers and students in the classroom context.

Planning and Executing the TESL Lessons Using AR

The proposed AR-aided module to TESL classroom learning included an adapted version of Gagné's Model of instruction by adding an initial stage (planning) to its nine events scheme. The module also incorporated certain pedagogical strategies and some AR-designed learning materials. It was also designed in alignment with the school plan and addressing the objectives of the TESL curriculum. Upon examining all the details about the different stages in the module, all teachers responded positively in interviews and described the module as a real guidance to administer the AR-aided lessons systematically and more competently which indicates teachers' acceptance of the AR module. For teachers, the module could provide the necessary outlines for planning daily lessons that yielded considerable levels of effectiveness and efficiency of the AR in achieving the lesson objectives.

Teachers' Motivation

The aspect of motivation generally indicates the attribute that inspires people proceed with or refrain from doing something; while for teachers entails the drive that makes the teacher feels willing to proceed effectively doing their teaching innovatively. The aspect of teacher motivation was examined against the factors of Keller's ARCS Model (1983) to determine the perception of teachers when AR is adopted. Based on the teachers' performance and feedback, the four factors of the ARCS Model (Attention, Relevance, Confidence & Satisfaction) were fairly perceived to enhance teachers' motivation.

i. Attention

Teachers could develop better understanding and interest in the newly presented approach of AR particularly despite their earlier misconception and ambiguity. Based on teachers' responses in the interviews, they reported some awareness of the numerous benefits of the AR that can revolutionise their teaching practices in the classroom. Teachers could perceive how relevant the AR in terms of the school plan and students' learning needs which led them to feel fairly comfortable with utilising AR.

ii. Relevance

Teachers were capable to realise to what extent the AR was supportive and beneficial to their instruction. They revealed increased comfort with the AR diverse uses during the class time. The teachers also showed high level of familiarity and efficiency in using the AR applications with all 3D interactive experiences. This helped teachers to engage all students diverse and appealing learning activities and helped them to achieve the learning objectives.

iii. Confidence

Having perceived all the privileges of using AR, the observation indicated teachers' higher confidence levels and reflected promoted sense of satisfaction. With the AR, students were not only so active and energetic but also systematic and focused which granted higher level of confidence to the teachers and allowed them to manipulate the lesson more competently.

iv. Satisfaction

As the result of the rising confidence, teachers revealed a higher level of satisfaction in terms of the overall teaching experience. Particular feelings of happiness and gratification prevailed among teachers who expressed their utmost satisfaction with the AR integration. Additionally, by the end of the implementation stage, teachers revealed a higher level of self-efficacy towards their own potentials. Self-efficacy denotes a positive change in the way the teacher views and believes in his/her own performance. This positive change could be evidenced by the broad difference between the teachers thought about their ability to incorporate the AR apps in the daily TESL classes in the very beginning of the study and that enhanced attitude they could develop by the end. That is to say, despite the novel AR concept in the classroom settings with all its challenges and technical hiccups emerged during application, all participants affirmed the strong impetus of being confident and satisfied with the AR-aided teaching which created a motivating and engaging environment.

Students' Motivation

The concept of student motivation involves the willingness and rationale to be involved in learning. According to Bacca & Baldiris (2018), being motivated means to be personally derived for doing something. As a result, a student who lacks inspiration to continue studying is regarded unmotivated, whereas a student who is empowered to learn is deemed motivated. Similar to the method used for examining the motivation of TESL teachers, the ARCS components were applied to evaluate the students' motivation.

i. Attention

During the classroom observation, the component of attention was indicated by the intense levels of students' attention while interacting with AR. Teachers reported that almost all students, including the low achievers, were extremely focused and attentive as long as the AR interactive activities were incorporated. Students seemed as attentive and immersed as they were in video game session with all enjoyment and fun. Thus, the attention level of students has been immensely improved in both strength and time span.

ii. Relevance

As for relevance, despite the different learning abilities of students, teachers affirmed the potentials of AR in accommodating the different learning needs of students. Based on the observation, the AR-aided learning setting seemed relevant to all students diverse learning styles in a way each student could find AR so adequate and appealing by its multisensory and interactive features.

iii. Confidence

The confidence factor has been conceived while students attempting the immersive AR experiences. Students seemed more responsible and confident through exchanging roles and supporting each other in multiple learning activities. According to class teachers, students

showed increasing level of autonomy in dealing with several reading tasks that had not been achieved in the TESL classroom before which reflects the high confidence level students achieved.

iv. Satisfaction

Students' learning has been positively impacted within the AR-aided learning which appeared in the prevailing sense of satisfaction among all learners. During observation, satisfaction was mirrored on the thrilled faces of students taking photos with the computer-generated animation during the AR-enabled activities. Hence, it can be claimed that students' motivation has been elevated by means of their exposure to AR-based learning tools.

As a consequence of the realisation of the ARCS components in relation to the students' feedback and performance, the teachers' motivation has been positively affected. Teachers developed higher levels of motivation when they found a surge in their students' motivation all along the classroom context. Such a reciprocal connection between students' and teachers' motivations marks a real momentum for reinforcing the learning outcomes.

Students' Engagement

Engagement can be viewed from the perspectives of interest, passion, and desire that students show while learning or being taught (Balca & Baldaris, 2018). Educationists take student engagement level as a key indicator of the education quality and a proof of achieving an active learning in classes. Engagement also marks students' transition from dependent to autonomous learners by means of developing a sense of emotional commitment to learning. and face-to-face learning environments, there are various indications of student engagement, including learning enthusiasm, time and effort devoted in learning, interaction, participation in collaborative work, satisfaction, and a sense of belonging. The distinction between engagement and motivation can be seen as motivation is more comprehensive that involves the willingness and mental tendency to engage in learning whether getting to have the opportunity to be involved or not; whilst the term engagement describes the extent of interest and emotional aspect already invested in a learning action. Thus, it can be conceived that motivation is a fundamental factor for student engagement in learning which is considered to be both the optimal target and a means to maximise students' academic outcomes (Ryan & Deci, 2009; Russell et al., 2005).

In this study, engagement was observed within the AR-supported learning context. Students were increasingly engaged in multiple interactive learning activities. Most students seemed to be immersed in game-like atmosphere to the extent that they wanted to have the lesson time extended more longer. The fun and enjoyment perceived by students highlighted a creative level of learning that stimulated them to develop better interaction skills through asking questions and writing simple statements. This quick improvement has held the class teachers surprised to see their students became interested to proceed reading stories supported by voice over reading and subtitles which led to enhancement of engagement level. Besides, students' autonomy was effectively promoted through showing more independent learners during using AR in classroom settings. That is to say that TESL students could develop better engagement level in collaborative AR-based learning activities through means of interpersonal work and peer coaching context.

Contributions of Study

The study findings broadly contributed to the literature on the potentials of using modern technology tools for enhancing the overall classroom environment. What makes this study clearly distinctive is the method of examining the key research theme of *motivation*. The majority of literature on this crucial concept in education is concerned with explaining the learning and behavioural attitude of students from a psychological perspective. The current study looked at motivation from a socio-cultural perspective, focusing on how it is derived from active interaction between people and cultures. Furthermore, despite the fact that research into the use of augmented reality in TESL learning has increased in recent years, there is still a significant gap between the many benefits of AR and its practical implementation in classroom practices.

With regard to investigating the influence of new technologies on the variable of motivation in multiple classroom settings, the focus of previous research work was mainly focused on one party, either students or teachers, but not all together. Yet, the current study managed to investigate the influence of using AR in reinforcing both teachers' and students' motivational levels from the perspectives of ARCS Model and Situated Learning Theory. The idea of bringing together students and teachers into one scope helps to enrich the research outcomes and contribute active participation and interactions when using AR in the TESL classroom context. Having investigated both of teachers' and students' perception in terms of the potentials of AR gives this study a distinctive approach and clearly contribute to enrich the literature for upcoming research works.

The proposed module of integrating the AR-based learning materials in TESL classrooms can be seen as a key contribution in this study. For teachers, the module provides clear guidelines on how to plan for and implement new technologies in general and the AR in particular. Moreover, aligning with the pedagogical approaches in a systematic, efficient framework, teachers could perceive the benefits to deliver daily lessons with using the AR. Besides, the creative AR applications suggested in this module can be adaptatively used to accommodate other grade levels and subject matters.

The study has added up to the TAM model for exploring the user's acceptance of technology. TAM basically includes two basic factors forming the model (perceived usefulness and perceived ease of use); yet the third potential factor (perceived effectiveness) can be presented as an extension to the model. This emerging factor is likely to strengthen the framework of the model and promote its fidelity in measuring the acceptance level of technology users.

In terms of the ARCS model, another substantial contribution has been made. The ARCS model's primary goal is to analyse students' motivational levels; however, in this study, the model was also used to investigate teachers' motivation levels. This novel utilisation of the ARCS model distinguishes this study over other similar studies which immensely marks a new contribution to the literature of teacher motivation and opens for further research on this regard.

All in all, these contributions are extremely pivotal in uplifting the current teaching and learning practices in today's schools, as well as informing the the way in which researchers design, conduct, analyse, and report future studies.

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