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## Augmented Reality Game (ARG), 21<sup>st</sup> century skills and ESL classroom

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### ABSTRACT

The rapid advancement of technologies is irrefutable with the emergence of the 4th Industrial Revolution. Various industries have employed technologies in aiding their daily tasks, including the educational field. In Malaysia, the Ministry of Education proposed the integration of technology in the classroom. However, with the rising of technologies, graduates lack the soft skills and English language proficiency for the 21st-century jobs. To further curb the problem, Augmented Reality Game (ARG) is recommended for ESL classroom. Thus, this paper aims to identify the 21st-century skills enhanced through ARG and find out the benefits of ARG in English as a Second Language (ESL) learning. Based on the reviews of previous studies, it can be summed up that ARG can enhance the 21st-century skills, which are collaboration, communication, critical thinking and problem solving and at the same time, improves the English language of students. Additionally, motivation and Personal Learning Environment (PLE) are some of the contributing factors for the success of ARG. Therefore, to enhance the 21st-century skills in students, technological tools, such as ARG is deemed to be beneficial.



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## Introduction

Aligning with the invasion of the Fourth Industrial Revolution, technologies are rapidly advancing in various industries and the educational field is not exempted from embedding technology in its industry (Mudin, Eng, Rahman, Ibrahim & Jopony, 2018, p. 3). The development of technology is seen to be beneficial, especially in increasing productivity, competitiveness, flexibility, quality and innovation, while reducing staff cost (Mudin et al., 2018, p. 1). With the abundance of technologies to be chosen from, the Internet has a variety of tools suited to the classroom context. "Emerging technology such as cloud computing, Augmented Reality (AR) and 3D printing are paving the way for the future of education" (Hashim, 2018, p. 1). Due to that, Yunus (2018, p. 33) emphasized that it is essential for teachers to know which online tool is effective to be used in the classroom context.

In Malaysia, the National Philosophy of Malaysian Education (NPME), aims to produce a holistic individual through the implementation of 21st-century learning (Ministry of Education, 2015, p. 1-10). In line with the digital era, the term 21st century suggests the development of 21st-century skills such as critical thinking, problem-solving and creative thinking (Laar, Deursen, Dijk & Haan, 2017, p. 578). It is equally crucial to develop these soft skills alongside academic achievement (Yunus, 2018, p. 34). More employers are

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demanding well-rounded graduates possessing various skills, aside from portraying academic excellence (Rasalingam & Embi, 2018, p. 254). Nordin and Norman (2018) further supported the claim by stating that "graduates should be equipped for the new dynamics of the 21st-century workplace in which a wide variety of skills are needed for the ever-evolving job market" (p. 2). Therefore, a graduate must be equipped with necessary skills for their future career.

Nevertheless, there are issues regarding graduates who do not have the skills required by employers. "Employers report that graduates lack the critical thinking and communication skills, and the language proficiency (especially in English) that are essential for success in the 21st century" (Ministry of Education, 2015, 1-6). This is because schools focus more on academic development. Hirsch (2017) claimed that most education portrays the image of preparing high school leavers with the necessary skills and intellect, both for jobs and higher education respectively, but in reality, education focuses more on academics rather than skills (p. 12). Hence, with the paradigm shift in the digital era, it is important to utilize technology in classrooms to improve the students' English language and develop their 21st-century skills. One of the current technologies which proves to be effective in emerging soft skills and language learning is the Augmented Reality Game (ARG) as proposed by Liu, Holden, and Zheng (2016, p. 370). This paper will review related past studies which aims to identify the 21st-century skills enhanced through ARG learning and find out the benefits of ARG in education and English as a Second Language (ESL) learning.

### **From Augmented Reality (AR) to Augmented Reality Game (ARG)**

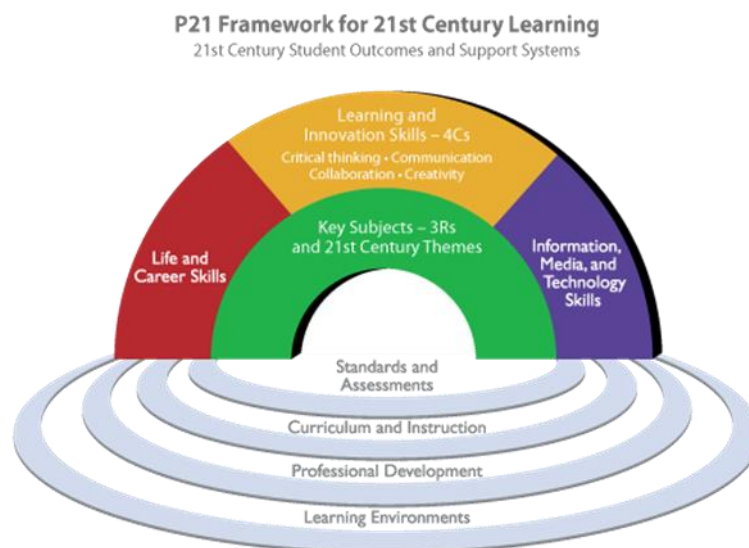
The usage of technology or the Information Communications Technology (ICT) in the educational field has been increasing. Mohammad, Ghazali and Hashim (2018) claimed that "Malaysia has already passed the two critical stages in implementing the integration of ICT and is now at the stage of consolidating and stabilizing this integration" (p. 224). Technology evolved according to time and there is now a term known as Education 3.0, which integrates the technologies in the domain of Web 3.0 (Demartini & Benussi, 2017, p. 4). One of the notable features in Web 3.0 is, it provides a platform for multi-users to interact virtually (Choudhury, 2014, p. 8099). Among the technologies for e-learning in Web 3.0 are cloud computing, 3D visualization, semantic web and augmented reality (Dominic, Francis & Pilomenraj, 2014, p. 10).

Augmented reality (AR) is defined as the application which creates a virtual scene based on the real scene (Cabero & Barroso, 2016, p. 44). In enhancement, Hashim (2018) mentioned that printed materials or objects can be digitized using AR (p. 3). This brings the meaning that AR can visually portray something real. Another popular tool in the educational field is game-based learning (GBL). Chun, Kern and Smith (2016) stated that games vary in types, which ranges from individual to large group mode, and there are different categories as well, from educational to fantasy (p. 72). Regardless of the different nature of these two technologies, AR and games can be fused to promote a better learning outcome.

Augmented Reality Game (ARG) incorporates both the AR and GBL. Tobar-Munoz, Baldiris and Fabregat (2017) suggested that AR and GBL should be combined as "AR adds to games the ability to play with real-world learning objects (maps, books, and tools), and games add a playfulness layer to the AR application, thus turning the real-world visualization into a playful learning experience" (p. 3). ARG has developed significantly whereby one of the popular ARGs is Pokemon Go, a game with the real world interface, which requires players to walk around in real life to search for Pokemon (Ruiz-Ariza, Casuso, Suarez-Manzano & Martínez-López, 2017, p. 23). In the educational field, ARG has been said to promote language learning (Liu et al., 2016, p. 374) as well as the 21st-century skills such as collaboration (Morschheuser, Riar, Hamari, & Maedche, 2017, p. 179).

### **The Framework for 21<sup>st</sup>-Century Learning**

21st-century skills are vital skills required to build a well-rounded individual. The Framework for 21st-century learning was proposed by The Partnership for 21st-century skills (P21) in 2009 (Figure 1). 21st-century skills are defined as the skills required for a student to be successful, such as collaboration, critical thinking, communication and problem solving (P21, 2009, p. 1). The organization further categorized the 21st-century skills into three important skills, namely, the learning and innovation skills, information, media and technology skills, and life and career skills. Each category in the 21st-century skills framework is important. As mentioned by Soulé and Warrick (2015), living in the technology-driven world, an effective worker is graded based on his or her innovative, ICT and career skills (p. 181).



**Figure 1 Framework for 21st-century learning**  
(resource: P21, 2009)

With the proposed framework, Malaysian Education aspires to produce a balanced individual in terms of knowledge, skills, ethics and morality (Ministry of Education, 2015, p. 1-9). In a study by Fong, Sidhu and Fook (2014), critical and creative thinking, communication, entrepreneurial and English language skills are some of the attributes required for 21st-century jobs (p. 137). The importance of these skills is not only directed towards an individual's future career, but also in their personal life (Soulé & Warrick, 2015, p. 178). Laar et al. (2017) further claimed that 21st-century skills should align with the digital skills because ICT is no longer an alienated tool in the educational field (p. 582). Therefore, the importance of developing 21st-century skills in an individual is irrefutable and the implementation of ICT-based learning can enhance those skills.

### Learning ESL Through ARG

When it comes to education, integrating suitable tools to enhance learning is considered to be necessary. ARG is more beneficial to be used in language classroom because most ARG like Guardians of the Mo'ois conducted in the English language, whereby instructions and tasks in the game are all in English (Liu et al. 2016, p. 374). One of the notable features in the success of language learning is to create a Personal Learning Environment (PLE) which allows students to be involved in the learning (Reinders, 2014, p. 19). As mentioned by Bonner and Reinders (2018), the nature of AR allows students to be actively involved in the learning process while playing because AR encourages students to move around and construct knowledge independently (p. 37). They also stated that ARG "bridge formal and informal learning contexts" which means that language learning can be serious and fun at the same time (p. 37). This shows that ARG will be able to promote independent learning in an ESL classroom because ARG is conducted in the English language.

With the aid of ARG, students are also able to learn the English language better. As supported by Liu et al. (2016), ARG has been an effective tool in promoting second language learning (p. 374). In a study conducted by Li, Chen, Whittinghill and Purdue (2014), they found out that ARG was able to help university students in recalling the meaning of words in English and at the same time, solve the problems in the game (para. 24). ARG was also proven to be beneficial for younger students in learning the second language. Silva, Roberto and Teichreib (2015), who conducted a study on pre-school students' language achievement using ARBlocks and based on the post-test result, the ARG managed to improve students' English language skills (p. 585). Similarly, in a study by Limsukhawat, Kaewyoun, Wongwatkit and Wongta (2016) on pre-school students, found out that students' phonics learning performance increased with the use of ARG (para. 29). Based on these previous studies, it can be said that ARG is a beneficial tool to be used in an ESL classroom as it enriches the language of students.

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The usage of ARG has been explored in the educational field and recognized to bring benefits in an ESL classroom. The reason why ARG should be used in the language classroom because ARG is motivating and able to promote 21st-century skills like collaboration, communication, critical thinking and problem-solving in language learning (Liu et al., 2016, p. 374).

Additionally, the success of learning ESL through ARG is because of motivation. In education, motivation is the pushing force that drives a student to successfully learn something (Nicholson, 2013, p. 284). ARG motivates students as they are having fun while learning (Liu et al., 2016, p. 374). A fun learning environment increases students' participation in the learning process. Tobar-Munoz, Fabregat and Baldiris (2015) mentioned that AR overall depicted a fun experience towards learning as students "interact with something physic" (p. 48). Additionally, they further carried out a similar research in 2017 and stated that the gaming nature is motivating, especially in achieving goals and completing quests (p. 30). On the other hand, Thorne, Hellermann, Jones and Lester (2015) claimed that students are motivated to learn using ARG because they feel engaged in the activity, aside from feeling happy learning outside of the classroom (p. 281). Therefore, ARG can be utilized in classrooms as it motivates students to learn the language in a more fun and relaxing way.

Motivation brings to better retention of the knowledge learned. Stephen Krashen's Affective Filter Hypothesis of Second Language Acquisition (SLA) proposed in 1989 further explained the motivational factors, which influenced the success of second language acquisition. Krashen (1989) claimed that it is vital to create a suitable learning environment, which could lower the filter of students (i.e. anxiety) towards learning and maximize the acquisition of the second language (p. 32). As technology evolves, using ARG in ESL classroom can reduce the filter in students and promotes better retention of the language. Li et al. (2014) supported the notion by stating that students manage to acquire new vocabularies with the aid of ARG because ARG is entertaining and provides a new learning environment for them (para. 35). Furthermore, Ibrahim et al. (2017) mentioned that "Another possible benefit to learning in the AR condition is that it can facilitate the so-called 'memory palace' technique" (para. 32). This shows that using ARG can cater to better retention of knowledge in ESL because the fun nature of ARG lowers the anxiety of students in learning a second language.

In the Malaysian context, the four main 21st century skills highlighted in education are collaboration, communication critical thinking and problem-solving. ARG managed to enhance students' teamwork or collaboration as they play the game in smaller groups, which manages to stimulate their interaction with peers (Thorne et al., 2015, p. 282). In a study by Liu et al. (2016), they found out that students were tested on their teamwork when they faced an obstacle, which obstructed their gameplay and they had to negotiate and agreed on a solution, despite having different opinions, which indirectly improved their teamwork skill (p. 373). Hence, when students play in a group, they will develop their teamwork skills, as they need to work together to complete the tasks. This is further supported by Morschheuser et al. (2017) who claimed that collaborative and language learning can be inculcated through ARG (p. 179). Thus, with the integration of ARG in the ESL classroom, the collaboration skill can be enhanced.

In line with collaboration, communication skill is also an important skill, which ARG can develop. Students are more communicative and enthusiastic in communicating with their friends and the AR system, which improves their social relationships (Perry, 2015, p. 2314). Moreover, Ruiz-Ariza et al. (2017) found out that students are more sociable when playing ARG (p. 23). This is because the nature of ARG requires students to interact with their peers or the system to complete tasks in the game. As Thorne et al. (2015) mentioned, ARG can encourage the use of the second language because students need to communicate in order to complete their quests in the game (p. 282). In relation to this, Perry (2015) mentioned that when using ARG, the higher proficiency students will help the lower proficiency students in correcting the latter's second language, which also enhances the language of the former (p. 2313). Hence, students not only gain collaborative skills through ARG, but they also improve their language proficiency, especially in correcting their peers.

Critical thinking and problem-solving are two inseparable skills, whereby in order to solve problems, critical thinking is necessary. These skills are naturally developed when playing ARG. As mentioned by Liu et al. (2016), students are able to think maturely in overcoming obstacles in the game by negotiating their options with each other, in order to proceed to the next level (p. 373). In situations where students encounter an obstacle or challenge in a game, they need to think critically and sometimes creatively, by judging which options suit the context best, to solve the problem. Tobar-Munoz et al. (2015) supported the notion by stating that students interpret the problems first and then they communicate with their friends to find out the solutions for their ARG (p. 281). In another study by Tobar-Munoz et al. (2017), they suggested that ARG is a suitable tool to be used in language classrooms because it encourages students to debate and argue for the solutions,

which in return promotes their critical thinking and language development (p. 27). Thus, ARG can be implemented in language classrooms as it enhances the students' ability to think critically in finding solutions for their problems.

## Conclusions

Learning is a continuous process whereby effective learning will ensure longer retention of knowledge. Undeniably, the usage of ARG can be beneficial with proper implementation by teachers in the classroom. The diverse benefits of ARG cater to academic achievement and enrich essential skills for the digital era education. ARG can enhance students' language skills such as vocabulary acquisition because most ARGs are designed and developed in the English language. Plus, when using ARG, students will interact with other people in the game (or objects) just to complete or win the game. Winning a game motivates students to be more alert in learning through ARG. However, it is crucial to note that only by choosing the right ARG can promote a better outcome in terms of language learning. A fun-based learning environment should be highlighted in the Malaysian education system to ensure that students are willing to learn something by themselves. Though ARG depicts a considerable amount of benefits, it should not be seen as a panacea to solve all issues in English as a Second Language (ESL) learning.

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