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PowerAR: A Tool for Improving ESL Year Six Pupils' Reading Comprehension

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Abstract
There is a growing concern about the level of reading skills in the English language, specifically among primary school pupils in Malaysia. The integration of technology in language learning had proven to facilitate the reading process and indirectly enhance reading comprehension. This study intends to investigate the integration of technology, specifically, Augmented Reality (AR) combine with PowerPoint (i.e., PowerAR) as a learning tool to improve reading comprehension among primary school pupils. A total of 17 primary Year six pupils participated in this study. An intervention was designed to focus on reading lessons that used PowerAR as a learning tool to facilitate reading comprehension among pupils. According to the data analysis of the pre-test and post-test, the PowerAR intervention has somewhat improved the pupils' reading comprehension skills. The results also showed that the participants had reaped many technological benefits, but some of them needed more assistance and collaborative learning to be implemented in reading classrooms. Theories that emphasised active learning, constructivism, and self-directed learning were key elements of the PowerAR intervention. Reading comprehension improves when students make sense of the reading material by connecting it to prior knowledge and building connections to it. PowerAR demonstrates the versatility of using technology in the language classroom that amplifies language learning. The findings provide insights to teachers, academics, and other interested parties with information on how to employ technology, particularly augmented reality (AR), to enhance reading comprehension and other language skills.

Keywords: English as a Second Language, PowerAR, reading classroom, reading comprehension, technology

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Introduction

Reading in a second language is a daunting task for many English as a Second Language (ESL) learners. Specifically, for young ESL learners, reading texts that are different in terms of orthography, morphology, and phonology from their First Language (L1) might be cognitively challenging for them. Reading comprehension is difficult because it is an interactive process between the reader and text in which the reader simultaneously extracts and constructs meaning. According to a study conducted by Chandran and Shah (2019), the majority of Malaysian students are reluctant readers and unable to completely comprehend reading materials, which hinders their progress in language learning. There are too many cognitive processes running concurrently to make reading comprehension effortless. Skilled readers would find the process quite simple, and their comprehension would develop naturally as they read. However, the process is rather contradictory for less-skilled readers causing frustration during reading.

In Malaysian education context, English is taught as a compulsory subject at primary and secondary schools; where reading skill is an integral component in the syllabus. With the advancement of technology in the education context, students are geared to be competent in the new literacies of 21st-century technologies. Consequently, the Malaysian government has made necessary changes to the syllabus to address such issues by introducing the Malaysian Education Blueprint 2013-2025 under Shift 7 which incorporation of Information and Communication Technology (ICT) and the Common European Framework of References (CEFR) to equip pupils with the basic language skills including reading comprehension and introduced for more meaningful and purposeful learning (Sivalingam, 2020). The Ministry of Education has recognised the potential of technology integration in education, but the implementation is still an ongoing process. These technological modifications have brought numerous advantages to language classrooms which cause major effects on second language acquisition (Tour, 2020). The significance of technology for the benefit of learners during the teaching and learning process occurs both within and outside the classroom. Teachers are transformed into facilitators, while students become active language learners, as a result of the incorporation of technology into the classroom (Ahmad & Reza, 2018; Hashim, 2018). According to Pazilah, Hashim, and Yunus (2019), the adoption of technology has revolutionized language learning and created a new opportunity with the introduction of multimedia tools and social media platforms. Augmented Reality (AR) is at the forefront of the social-technological evolution of modern society. Gamification and role-playing techniques in Augmented Reality have been used to increase motivation and a sense of authenticity. More research is required to determine the potential of technology such as AR for primary school pupils of language learning, particularly in terms of enhancing language skills.

This study intends to investigate the integration of technology, specifically AR in helping primary school pupils improve reading comprehension skills. The result of the study would provide an understanding of the impact of technology in improving reading comprehension skills and at the same time offer opportunities to adapt AR in the classroom. The information eventually would

aspire teachers to explore the use of technology, specifically AR in improving reading comprehension and other language skills. Specifically, this study aimed to investigate the effectiveness of PowerAR in improving reading comprehension skills among English as a Second Language (ESL) primary Year six pupils. In this study, the term PowerAR is intervention used in the study, which is the coined term for Powerpoint and Augmented Reality.

Literature Review

Benefits of integration of ICT tools; Powerpoint and Augmented Reality (AR)

Technology is considered a tool to revolutionize learning, enrich the curriculum, develop pedagogy, as well as improve students' learning. Integrating technology helps improve pupils' thinking skills, ultimately developing their reading comprehension skills in the process (Singh &Shaari 2019). This is further supported by a study by Vanduhe, Nat, and Hasan (2020) where the findings illustrated using a gamification platform in education technology improves students' motivation and learning engagement.

According to Qureshi et al. (2021), review, much research has pointed out that digital technologies are a significant element for educational transformation, holistically impacting the process of language learning and developing language skills. Augmented Reality (AR) is one of the multimedia tools that provide enhanced versions of the real physical world via the use of digital visual elements, sounds, or other sensory stimuli to enable teachers to create an interactive learning experience in language classrooms. The application of AR in classrooms offers the potential to transform learning and improve learning outcomes (Parmaxi& Demetriou, 2020). Hence, more comprehensive research is needed to investigate the potential of AR as a tool to increase language abilities (Dalim, Sunar, Dey &Billinghurst, 2020).

According to Hockly (2019), AR is used through the overlay of virtual information onto the real world which immerses the user in the virtual world. Blending a virtual world with reality by adding digital information such as photos, videos, and audio enhances immersive learning through authentic sensory experience and elevates the learning process to the next level (Taksiran, 2018). This is mostly due to the capabilities of this technology that enable 3D learning content, which improves learners' perceptions of presence and immersion and enables them to visualize the invisible (Galati et al., 2019). AR has many educational benefits including improved attention and motivation, increased interaction, and enhanced creative thinking and problem-solving skills (Galati et al., 2019; Taksiran, 2018; Yilmaz, 2018). The findings of a study conducted by Huang, Zou, Cheng &Xie (2021) indicated that augmented reality (AR) technologies were useful for promoting learning and enhancing student motivation and their attitudes toward the use of technology.

In the same vein, numerous studies on PowerPoint have demonstrated its user-friendliness and effectiveness in language learning (Baker, Goodboy, Bowman & Wright, 2018). Baker et al. also remarked that Powerpoint's characteristics make language learning more engaging and meaningful. When combined with audio and video, PowerPoint is a technology tool that makes

language learning more engaging and relevant. Powerpoint allows for displaying static images, animations, and videos and adding transition effects between images, information, or slides, and at the same time embedding sound effects and music into Powerpoint assists in attracting and retaining the attention of learners (Solikhah, 2018). In addition, Drahman and Hashim (2020) in their research revealed that teachers perceived PowerPoint as a positive way to teach subject-verb agreement due to the user-friendly attributes of Powerpoint. According to the conclusions of Sahadevan and Mohamad's (2020) study, PowerPoint makes teachings plain and comprehensible while sustaining students' interest and enhancing their comprehension. Hence, combining two tools, namely AR and PowerPoint would provide a more engaging experience among language learners through discovery learning.

More research is required to determine the potential of technology such as a combination of AR and PowerPoint for primary school pupils of language learning, particularly in terms of enhancing language skills (Dalim, Sunar, &Billinghurst 2020). Moreover, little research has been conducted that could serve as a guide for instructors and educators regarding reading approaches, strategies, and techniques for enhancing reading comprehension skills among Malaysian elementary and secondary school students (Kiu&Yamat 2020; Zakaria, Azmi, & Hadi, 2019). In this study, the research gap is addressed by implementing intervention utilising AR and PowerPoint (named Power AR) for improving pupils' reading comprehension skills. Furthermore, the perceptions of the primary pupils in using technology during language learning are also investigated.

Autonomous learners; A key toward self-directed learning

In this era of teaching and learning processes, the pervasive use of technology is becoming more apparent as a means of fostering student autonomy. According to Esfandiari and Gawhary (2019), the primary objective of the inclusion of technology in teaching and learning is the enhancement of student autonomy as a result of the options presented by the incorporation of technology. Khan, Ali andAlourani(2022) noted that the incorporation of technology can assist students to become more independent in their learning because classes will be more student-centered. Developing autonomous students is essential for assisting students in becoming more self-directed in their learning (Khan, Ali, & Alourani, 2022). Lee (2019) observed that learner autonomy is a disposition to act, embracing activities with enthusiasm and exercising independence across disciplines. In a study, Reswari and Kalimanzila (2021) discovered that fostering skills such as teamwork, information search, and student readiness is essential for promoting autonomous learning, which will also benefit students across subjects, demonstrating the transferability of what has been learned to a broader context, as proposed by Lee.

Autonomous learning contributes to the growth of self-directed learning in which students are acutely aware of their own learning processes. According to Khan and Umair (2018), students learn to assume responsibility for their own learning processes and teachers can promote their active participation by monitoring and supervising students' technology use. Cong-Lem (2018)

found that teachers can take a backseat in the classroom by enabling students to direct their own learning. This conclusion is consistent with Chang, Song, and Fang's (2018) concept of a "guide on the side". As the driving force behind the growth of teaching and learning processes, technology plays a crucial role in influencing numerous facets of the teaching and learning process, including the transformation of student's responsibilities in the classroom as they learn to take ownership of their learning (Bikowski&Casal, 2018).

PowerAR has been designed to foster and cultivate autonomous, self-directed learners. As the pupils learn the story through animations and videos, pupils will participate actively in the learning process. According to Geng, Law, and Niu(2019), the active participation of students through classroom tools or instructional strategies enhances the learning process and performance. Hiver, Al-Hoorie, Vitta, and Wu (2021) also noted that self-directed learning only results from the active participation of students in the learning process, even though students may seek support from teachers.

Developing self-directed learning presents its own challenges. According to Geng et al., (2019), the qualities of students and their drive to study have a significant impact on their tendency and propensity toward self-directed learning. In addition, Morris and Rohs (2021) asserted that students may be swayed toward self-directed learning if teachers provided the right instruction and direction to foster the skill development required for self-directed learning. These few difficulties can be solved through the PowerAR intervention, which requires teachers to assist pupils in comprehending the material. Without effective guidance from teachers, pupils will be unable to engage in the learning process, which is the primary purpose of the PowerAR intervention. Sumuer (2018) highlighted that learning tools, motivation, and supervision are crucial components for assisting pupils in becoming more self-directed learners. Teachers play a crucial role in the successful implementation of PowerAR and in helping pupils comprehend short stories.

Methods

This study used an experimental research design, specifically a one-shot pre-test, and post-test research design. This research methodology offers the advantage of enabling the researcher to determine whether there is a difference between the tests and how much change or development occurred between the pre-test and post-test (Baldwin, 2018). Only 17 Year Six ESL primary school pupils chose to participate in this study. Pre and post-tests were employed to investigate the effectiveness of PowerAR as a tool to improve pupils' reading comprehension. The reading comprehension level was determined by comparing the pre-test and the post-test scores. The test was based on the Year Six Academy Stars CEFR textbook. A minor modification was made to the number of questions when a Year Six teacher reviewed the test paper. The test consists of two sections, the first section of the test consists of objective questions and the second consists of subjective questions.

Participants

The participants were involved in two lessons. The first lesson was taught through shared reading and the pre-test was conducted. After that, the pupils were introduced to PowerAR to familiarise themselves with technology. Introducing PowerAR in a lesson would take time for pupils to operate and use the intervention for reading activities. The second lesson was the PowerAR reading lesson and the post-test was administered.

Research Instruments

The development of PowerAR involves the combination of Powerpoint and AR apps. The AR app used in PowerAR is CoSpaces. This AR is available for free and allows users to design the AR layout and the desired marker that would activate the AR. The teacher demonstrated how to use PowerAR to ensure that pupils have a clear understanding. A short story is selected prior to the lesson and divided into several parts, then followed by designing using PowerAR. The first part of the story is created according to the suitability of the pupils with the incorporation of videos or images. This first part of the story is designed using Powerpoint where the slides can be played automatically when pupils click on the link. The link can be shared via Google Slides for easy access. The dialogues between characters in the first part are designed using the CoSpaces app. The interaction between characters, movements, and environment design depends on the scenario of the story. Clicking on the CoSpaces app will direct pupils to the app where pupils can rotate the environments, watch videos and read the dialogues at the same time. Then, pupils were given a link to go to Powerpoint to answer questions from the first part. Pupils can decide to read the first part of the story again before answering the questions. Then, pupils proceed to the second part by clicking on another link provided. These steps are repeated until the story ends.

Results

To investigate to what extent PowerAR improves Year six pupils' reading comprehension, the difference between the mean scores of the reading comprehension tests as pre and post-tests were analysed.

Pupils' pre-test scores

Table one shows the range of pre-test scores and the number of pupils who achieved the scores within the respective range. The range of scores is also classified into reading comprehension categories to indicate the level of pupils' achievement.

Table 1**.** *Classification of reading comprehension categories of pupils' pre-test scores*

Range of scores	Number of pupils	Percentage (%)	Reading comprehension strategies
80-100	0	0	Excellent
65-79	5	29.4	Good

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50-64	6	35.3	Fair
40-49	0	0	Poor
<40	6	35.3	Fail
Total	17	100	

There were six pupils (35.3%) who fell under the fail category and fair category respectively. Both of these categories have the highest number of pupils recorded. There were five pupils (29.4%) in the good reading comprehension category. The mean score for the pre-test was 49.12. The standard deviation was 17.432 with a variance of 303.860. A high standard deviation indicates the data is more spread out resulting in a bigger variance figure. The highest score recorded was 75 while the lowest score was 20.

Pupils' Post-test Scores

In the distribution of data frequency, Table two. illustrates the results of post-test scores. Table two shows the range of scores and the number of pupils within the range of scores. The range of scores is also classified into reading comprehension categories to demonstrate pupils' achievement in the test.

Table 2.*Classification of reading comprehension categories of pupils' post-test scores*

Range of scores	Number of pupils	Percentage (%)	Reading comprehension strategies
80-100	3	17.6	Excellent
65-79	6	35.3	Good
50-64	5	29.4	Fair
40-49	2	11.8	Poor
<40	1	5.9	Fail
Total	17	100	

The number of participants recorded is 17 based on Table three. The highest range recorded is between 65 to 79 which is six pupils (35.3%) in the good category. The lowest number of pupils is one (5.9) who got scores below 40 in the fail category. Two pupils (11.8%) got scores in the poor reading comprehension category. Five pupils (29.4%) have obtained the fair category. Three pupils (17.6%) managed to get scores in the excellent reading comprehension category. Table four exhibits the descriptive statistics of pupils' post-test scores where the total number of samples was 17 pupils. The mean score for the post-test was 62.06. The standard deviation was 16.014 with a variance of 256.434. The highest score was 90 while the lowest score was 35.

Differences in pre and post-test scores

This study used paired sample t-tests to measure the significant improvement in pupils' reading comprehension skills scores taught by using PowerAR intervention before and after treatment. The result of the paired sample t-test is shown in Table three.

Table 3. *Differences in test scores*

	Mean	Reading Comprehension level	Standard Deviation	T value	Df	Sig. (2-tailed)
Post-test scores	62.06	Fair	16.01	3.996	16	0.01
Pre-test scores	49.12	Poor	17.43			

The mean for pre-test scores is 49.12 while the mean for post-test scores is higher which is 62.06. The mean score for the pre-test reflects a poor reading comprehension level while the mean score for the post-test shows a fair reading comprehension level. The standard deviation for the pre-test (17.43) is higher than the standard deviation for the post-test scores (16.01). It was also found that the results show df= 16 with a t-value = 3.996. The sig value is 0.01 which is lower than 0.05 and the t-value (3.396) was higher than the t-table (2.120). Hence, it could be concluded that there was a significant improvement in pupils' reading comprehension scores using PowerAR intervention.

Discussions

The findings indicated that there was a significant improvement in pupils' pre-test to post-test scores in reading comprehension skills when the PowerAR intervention is applied. The results indicated that PowerAR intervention is a good tool for improving pupils' reading comprehension skills. It can be inferred that the use of technology such as PowerAR can impact pupils' learning process and enhance reading comprehension skills. This is in line with the result of a study carried out by Sahadevan and Mohamad (2020) where the integration of technology has significantly improved pupils' understanding of the lesson while maintaining interest. Similarly, a study by Kalangi, Liando, and Maru (2019) showed that using technology accompanied with the appropriate selection of teaching strategies to teach reading comprehension skills improves pupils' learning.

The results of the pre-test signify that the participants mostly were lacking in reading comprehension skills although two pupils managed to score better results. The reason for such a difference in the scores of pre-test ranging from good to fail reading comprehension category is due to many elements that greatly influence reading comprehension such as vocabulary skills, decoding skills, prior knowledge, linguistic abilities, and lack of reading strategies. These findings are similar to a study by Talwar, Tighe, and Greenberg (2018) where it was noted that many factors affect comprehension in struggling readers. Some of the factors discussed are employing different strategies in understanding a text, decoding skills, reading proficiencies, and having more prior knowledge which influences pupils' reading comprehension. In a parallel study, Elleman and Oslund (2019) supported that reading comprehension is a multifaceted skill that involves text

complexion, reading instruction strategies, activating background knowledge, linguistic abilities, and decoding skills which undergird reading comprehension that complicates the teaching of reading comprehension and acquiring reading comprehension skills.

The post-test was then administered to the same participants to study if there is a difference in pre and post-test scores that would indicate the effectiveness of the PowerAR intervention. The post-test was conducted after the PowerAR was taught during the intervention lesson. Participants were allocated 30 minutes duration to answer individually which was the manner the pre-test was administered. There are six pupils reported in the good reading comprehension category while one pupil was in the fail category. The six pupils who scored under the good reading comprehension category were influenced by the implementation of PowerAR. This finding implies that PowerAR has helped pupils in developing their reading comprehension skills through the use of technology which has changed the learning experiences in the classroom by increasing motivation with the use of photos, videos, and audio. This finding is synonymous with Taksiran (2018)'s study where the integration of AR has enhanced learning experiences and provides immersive learning through an authentic sensory experience that elevates the learning process to the next level. Likewise, the findings of Galati et al., (2019) and Yilmaz (2018) support the findings of this present study where the implementation of technology in the classroom improves motivation and promotes thinking skills that support reading comprehension. These findings also emphasize the impact of technology in developing reading skills that align with the TAM model. When TAM is implemented appropriately, it can produce beneficial outcomes including a better comprehension of educational background associated with the usage of aims and the ability to foresee activities that will forward these objectives. A study by Vanduhe, Nat, and Hasan (2020) showed that integrating technology with the basis of the TAM model enhanced students' participation and development of skills.

However, the data analysis also reveals some pupils showed no difference between the performance of pre and post-tests which signifies that the PowerAR intervention did not improve their reading comprehension skills. These pupils required more guidance in comprehending the reading material. Nonetheless, based on the overall result, PowerAR intervention has somewhat improved pupils' reading comprehension skills. The findings affirm the theories, concepts, and teaching strategies underlying PowerAR intervention. Further, the findings of this study are also echoed in Samat et al. (2019), which state that primary school students grasp reading content with an emphasis placed on activating preexisting knowledge through the assistance of technology. These findings are also reflected in the study by Drahman and Hashim (2020), where teachers found the use of technology very beneficial in enhancing pupils' learning processes due to the ability to display static images, animations, and videos that assist in attracting and retaining the attention of learners. According to these findings, one of the most effective ways to assist pupils in the reading classroom is to activate students' existing schemas and provide them with scaffolding while they read which is achieved through PowerAR intervention.

Conclusion

A positive result from the implementation of PowerAR indicates that the intervention has a positive effect on the English reading skills of primary school pupils. The PowerAR was developed carefully based on the relevant underlying learning theories and teaching strategies that involve guidance to enhance comprehension of reading materials. The PowerAR intervention can be readapted to suit the teaching of reading skills or other language skills. The strategies applied through the PowerAR intervention can be applied to suit pupils' of different levels of proficiency, to teach other reading skills, or to teach other language skills. The adaptation towards PowerAR intervention would express the versatility of using technology in the language classroom that amplifies language learning. Teachers can learn and adapt techniques used in PowerAR to develop contextual clues techniques that are advantageous for second language learners.

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References

Baker, J. P., Goodboy, A. K., Bowman, N. D., & Wright, A. A. (2018). Does teaching with PowerPoint increase students' learning? A meta-analysis. *Computers & Education, 126,* 376–387. doi:10.1016/j.compedu.2018.08.003.

Baldwin, L. (2018). Research Designs and Their Limitations. In L. Baldwin (ed.), *Research Concepts for the Practitioner of Educational Leadership* (pp. 37-48). Brill.

Bikowski, D., &Casal, E. (2018). Interactive digital textbooks and engagement: A learning strategies framework. *Language Learning & Technology*, *22*(1), 119-136.doi:10125/44584

Chandran, Y., & Shah, P. M. (2019). Identifying learners' difficulties in ESL reading comprehension. *Creative Education*, *10*(13), 3372-3384.

Chang, Y. H., Song, A. C., & Fang, R. J. (2018, July). The study of programming language learning by applying flipped classroom. In *2018 1st IEEE International Conference on Knowledge Innovation and Invention (ICKII)* (pp. 286-289). IEEE.

Cong-Lem, N. (2018). Web-based language learning (WBLL) for enhancing L2 speaking performance: A review. *Advances in Language and Literary Studies, 9*(4), 143-152.

Dalim, C. S. C., Sunar, M. S., Dey, A., & Billinghurst, M. (2020). Using augmented reality with speech input for non-native children's language learning. *International Journal of Human-Computer Studies*, *134*, 44-64.

Ebrahimi, S. S., &Jiar, Y. K. (2018). The use of technology at Malaysian public high schools. *Merit Research Journal of Education and Review*, *6*(3), 54-60.

Elleman, A. M., &Oslund, E. L. (2019). Reading comprehension research: Implications for practice and policy. *Policy Insights from the Behavioral and Brain Sciences*, *6*(1), 3-11.

Esfandiari, M., &Gawhary, M. W. (2019). Is technology paving the way for autonomous learning? *World Journal of English Language*, *9*(2), 64-73.

Galati, F., Bigliardi, B., Deiana, A., Filippelli, S., & Petroni, A. (2019). Pros and cons of augmented reality in education. *Edulearn19 Proceedings*, 9165-9168.

Gamble, C. (2018). Exploring EFL university students' acceptance of e-learning using TAM. *KwanseiGakuin University Humanities Review*, *22*, 23-37.

Geng, S., Law, K. M., & Niu, B. (2019). Investigating self-directed learning and technology readiness in blending learning environment. *International Journal of Educational Technology in Higher Education*, *16*(1), 1-22.

Hashim, H. (2018). Application of Technology in the Digital Era Education. International*Journal of Research in Counseling and Education, 2,* 1-5.https://doi.org/10.24036/002za0002

Hiver, P., Al-Hoorie, A. H., Vitta, J. P., & Wu, J. (2021). Engagement in language learning: A systematic review of 20 years of research methods and definitions. *Language Teaching Research*,*1*, 1-29.https://doi.org/10.1177/13621688211001289

Huang, X., Zou, D., Cheng, G., & Xie, H. (2021). A systematic review of AR and VR enhanced language learning. *Sustainability*, *13*(9), 4639-44667.https://doi.org/10.3390/su13094639.

Hockly, N. (2019). *Technology for the language teacher: augmented reality. ELT Journal, 73* (3), 328-334.doi:10.1093/elt/ccz020

Kalangi, M., Liando, N., & Maru, M. (2019, November). The Effect of Applying Internet Browsing in Improving Students' Reading Comprehension Skill. In International Conference on Social Science 2019 (ICSS 2019) (pp. 861-865). Atlantis Press.

Khan, R. M. I., Ali, A., &Alourani, A. (2022). Investigating Learners' Experience ofAutonomous Learning in E-learning Context. *International Journal of Emerging Technologies in Learning*, *17*(8), 4-13. https://doi.org/10.3991/ijet.v17i08.29885

Khan & Umair. (2018). *Handbook of Research on Mobile Devices and Smart Gadgets in K-12 Education*, IGI Global.

Kiu, C. S. L., &Yamat, H. 2020. Reading strategy use among good and poor primary English as a second language learner. *International Journal of Academic Research in Business and Social Sciences*, 10(1), 318–330.

Lee, L. (2019). Review of autonomous language learning with technology beyond the classroom. *Language Learning & Technology, 23*(1), 40-43.

Maryuningsih, Y., Hidayat, T., Riandi, R., &Rustaman, N. Y. (2020). Profile of information and communication technologies (ICT) skills of prospective teachers. In *Journal of Physics: Conference Series*, *1521*(4), 042009. IOP Publishing.

Mokhtar, M. A., & Noordin, N. (2019). An exploratory study of Industry 4.0 in Malaysia: a case study of higher education institutions in Malaysia. *Indonesian Journal of Electrical Engineering and Computer Science*, *16*(2), 978-987.

Morris, T. H., &Rohs, M. (2021). The potential for digital technology to support self-directed learning in the formal education of children: A scoping review. *Interactive learning environments*, 1-14.

Parmaxi, A., & Demetriou, A. A. (2020). Augmented reality in language learning: A state-of-the-art review of 2014–2019. *Journal of Computer Assisted Learning*, *36*(6), 861-875.

Pazilah, F. N. P., Hashim, H., & Yunus, M. M. (2019). Using technology in ESL classroom: Highlights and challenges. *Creative Education*, *10*(12), 3205-3212. doi: 10.4236/ce.2019.1012244.

Qureshi, M. I., Khan, N., Raza, H., Imran, A., & Ismail, F. (2021). Digital Technologies in Education 4.0. Does it Enhance the Effectiveness of Learning? A Systematic Literature Review. *International Journal of Interactive Mobile Technologies*, *15*(4), 31-47.

Reswari, G. P. A., & Kalimanzila, J. (2021). Re-Promoting autonomous learning for university students: A lesson from Pandemic Covid-19. *JurnalIlmiahProfesi Pendidikan*, *6*(1), 38-47.

Sahadevan, S. R., & Mohamad, M. (2020). The Use of PowerPoint (PPT) PiWoCa Technique in the Form of Bubble Map in Helping Year 2 ESL Pupils' Simple SentenceConstruction: A Literature Review. *Creative Education*, *11*(9), 1602-1616. doi: 10.4236/ce.2020.119117.

Samat, M. S. B. A., Ghaffar, M. B. A., Manickam, R., &Yunus, M. M. 2019. Virco to enhance reading comprehension. *Multilingual Academic Journal of Education and Social Sciences*, *7*(1), 71-83.

Sivalingam, A. D. (2020). *History of Malaysian Education System: Year 1824 to 2025*. Available at SSRN 3735372.

Solikhah, A. S. (2018). Teacher's use of Powerpoint in the classroom: Observing the benefits and challenges.

Sumuer, E. (2018). Factors related to college students' self-directed learning with technology. *Australasian Journal of Educational Technology*, *34*(4), 29-43. https://doi.org/10.14742/ajet.3142

Talwar, A., L. Tighe, E., & Greenberg, D. (2018). Augmenting the simple view of reading for struggling adult readers: A unique role for background knowledge. *Scientific Studies of Reading*, *22*(5), 351-366.

Taskiran, A. (2018). Augmented reality games and motivation in language learning. In Taskiran, A., (ed.), *EdMedia+ Innovate Learning* (pp. 892-898). Association for the Advancement of Computing in Education (AACE).

Tour, E. (2020). Teaching digital literacies in EAL/ESL classrooms: Practical strategies. *TESOL Journal*, *11*(1), 1-18.https://doi.org/10.1002/tesj.458.

Vanduhe, V. Z., Nat, M., & Hasan, H. F. 2020. Continuance intentions to use gamification for training in higher education: Integrating the technology acceptance model (TAM), Social motivation, and task technology fit (TTF). IEEE Access, 8, 21473-21484.

Yilmaz, R. M. (2018). Augmented reality trends in education between 2016 and 2017 years.In N. Mohamudally, (ed.), *State of the art virtual reality and augmented reality knowhow* (pp. 81-97). London: IntechOpen.

Zainal, A. Z., & Zainuddin, S. Z. (2020). Technology adoption in Malaysian schools: An analysis of national ICT in education policy initiatives. *Digital Education Review*, *37*,172-194.

Zakaria, N. Y. K., Azmi, N. E., & Hadi, N. A. A. (2019). Improving reading skills using language learning strategies. (1), 1-5. Available at: https://doi.org/10.32698/0271.