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# The Impact of Digital Game-Based Learning Towards Arabic Language Communication

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ABSTRACT

The digital game-based learning has the potential to enable new forms of learning concept which could enhance student's communication. Therefore, this study aims to determine the impact of digital game-based learning on students' communication performance. Participants were 611 non-Arabic students enrolled in an Arabic language course. This study uses a quasi-experimental design. The students were chosen through a random sampling technique to be part of the control group and treatment group. Pre-test and post-test were used to assess the students' performance before and after the digital game-based learning intervention. The intervention took place over a period of four weeks in which students in the treatment group used educational digital games during Arabic language class. On the other hand, students in the control group underwent the traditional Arabic language instruction. At the end of the intervention, several students were selected through purposive sampling technique to participate in a semi-structured interview. The result found that students in the treatment group were significantly outperformed in Arabic communication knowledge compared to the control group and the digital game-based learning affected many aspects of their communication performance. In addition to this, the students demonstrate a favorable acceptance of practising Arabic communication through educational digital games, which helps them to grow their self-confidence, polish their critical thinking, and improve their learning environment.

**Keywords:** *Arabic language, academic performance, digital game-based learning, DGBL, teaching and learning.*

## INTRODUCTION

A language's vocabulary is made up of words that form the lexical system. Vocabulary is a lexicon and is defined as the speaker's knowledge of basic words that can be used in a variety of language contexts. The first step in learning a first, second, or foreign language is to expand one's vocabulary. Arabic is primarily recognised as a second language in Malaysia. While it is considered a foreign language by some (Zawiah et al., 2017). In this regard, vocabulary acquisition is critical in Arabic learning. This is due to the fact that lack of vocabulary knowledge impedes communication and, as a result, the acquisition of other language skills and grammar rules. The vocabulary size of a person is the number of words he or she owns. According to research, all words have the same value and priority for native speakers. While second language learners tend to concentrate on high-frequency words that they frequently use.

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According to studies, second and foreign language students require at least 2000 high frequency words or vocabs to achieve an 80% understanding of the text. In this regard, acquiring 2000 vocabulary items is realistic when learning Arabic in a higher learning setting. This will assist them in comprehending the text, communicating with teachers and peers, and completing the tasks assigned to them (Zainur & Rosni, 2018). As a result, many academics advocate for the use of digital game-based learning to increase students' vocabulary size in an interactive manner. Previous research has also shown that game-based learning can improve students' second language acquisition (Amna et al., 2017; Hamizul & Nik Mohd Rahimi, 2015) as well as their motivation to learn (Azman et al., 2018; Amna et al., 2017; Siti & Zuliana, 2017; Tsai, 2017). One of the educational approaches that has a positive impact on students' content knowledge as well as their engagement in the learning process is digital game-based learning (Siti & Zuliana, 2017; Amna et al., 2017). As a result, the use of digital games as a strategy for teaching digital natives has enormous potential.

Furthermore, studies have shown that digital games can help students transition from the school learning environment to tertiary education. The use of digital game-based learning in Malaysian universities is gaining more prominence (Noor et al., 2019). It has garnered the interest of many researchers. It has slowly become a significant focus among researchers due to the advancement of technologies as well as people's reliance on them. Digital game-based learning has presented itself as a new tool and strategy in language learning and teaching. Besides, it also has the potential to increase learners' engagement and develop communication skills, thinking skills as it is an interactive platform for second or foreign language learning. Therefore, this study aims to investigate the effectiveness of educational digital games on students' communication performance in the Arabic language at the tertiary level.

## RESEARCH BACKGROUND

### *Arabic Language*

Mastery of vocabulary is an important aspect of language communication. However, it has been reported that students are hesitant to practise language skills due to a lack of vocabulary (Mohd Zaki et al., 2016). The phenomenon of vocabulary acquisition has piqued the interest of second language acquisition researchers as well as teachers. Because of this importance, researchers and practitioners have devised a variety of strategies for effective vocabulary instruction.

The current Arabic language teaching and learning process is still primarily teacher-centered, with the chalk and talk approach being widely used by Arabic teachers. Furthermore, they remain heavily reliant on dictionaries, direct translation, and rote learning (Nur & Harun, 2017). These strategies, according to Second Language Acquisition research, deprive students of the opportunity to actively participate in the lessons. Students are also unmotivated to learn Arabic because they see it as a burden. Students believe that they must memorise Arabic words and only study Arabic as a subject to pass the exam. The dominance of rote learning and the exam-oriented system prevents students from mastering the language in this regard (Janudin et al., 2017).

Numerous studies have found that Malaysian students have low to moderate Arabic communication skills (Zainur et al., 2016; Abdul Razif et al., 2021; Siti Aisyah & Zamri, 2016). This could be due to the fact that Arabic is still taught in traditional ways, with fewer

interactions and student engagement in class (Nur & Harun, 2017). As a result, students are disinclined to learn the language because it is not enjoyable for them. Students should be taught in an interactive manner to improve the learning environment (Zaid et al., 2016) by exposing them to digital materials for self-learning practices as well as by creating excitement and enjoyment in practising Arabic communication.

*Digital Game-based Learning*

Digital Game-based Learning is a method of appealing to students by incorporating educational content or learning theories into educational games. The philosophy of constructive learning underpins the implementation of digital game-based learning. Based on Constructivist Education Theory, digital game-based learning connects educational materials to computer or video games. It is applicable to almost any subject and at any level of proficiency. Several scholars, including Prensky (2001) and Bober (2010), advocate for digital game-based learning as a well-established instructional design in higher education courses. While computer and video games are commonly thought of as pure entertainment, it is critical to recognise that they are also a tremendously powerful learning tool. This provides successful new learning experiences through the digital game, which engages students in immersive teaching and allows them to participate in the globalised, technological society of the twenty-first century.

Several scholars have researched and visualised the comparisons between gaming and education terminologies such as game-based learning, gamification, and educational games over the years. Game-based learning is the use of gamification, gameful interaction, and gameful design to encourage students to participate in class activities (Hartt et al., 2020). The growing acceptance of entertainment gaming as a mainstream leisure activity has undoubtedly benefited game-based learning. Gamification, on the other hand, emphasises the addition of game features to an otherwise uninteresting, repetitive, or boring activity (Plass et al., 2015).

An educational game, on the other hand, is one that is created and used for teaching and learning purposes (Al-Azawi et al., 2016). Fun and education can be combined in educational games to increase students' motivation and engagement. According to many studies, using game-based learning is superior to traditional lecture instruction, producing better learning effects and higher learning motivation (Azman et al., 2018; Siti Nazleen & Zuliana, 2017; Amna et al., 2017; Al-Azawi et al., 2016). Because all approaches promote learning in a game-like manner, the terms "game-based learning," "gamification," and "educational game" are used interchangeably to describe this intention. Table 1 summarises game-based learning, gamification, and educational games as a result (Al-Azawi et al., 2016).

Table 1: Comparison between game-based learning, gamification, and educational game

| Comparison Point | Game-Based Learning | Gamification | Educational Game |
|---|---|---|---|
| Concept | Use of games to enhance the learning experience | Gamification is the idea of adding game elements to a non-game situation | The educational game is designed to help students for learning purposes |
| Objective | To achieve in the game motivate students | Learn motivation from game | For teaching purpose |

| | | | |
|---|---|---|---|
| Content | Usually morphed to fit the story and scenes of the game | Features are added to the LMS or other system | A structured, competitive activity, game played within a context of a story or a created history |
| Challenge | Challenges that are part of the game must be solved | Looking for a new way to approach the challenge | Maybe exist or not |
| Character | Character situation | Player avatar weak story | Narrative |
| Techniques | 1. Motivation<br>2. Relevant practice<br>3. Specific timely<br>4. Story, emotional<br>5. Game goal, challenge | 1.Progressing to different levels<br>2. Scores<br>3. Avatars<br>4. Virtual currencies<br>5. Competition with friends | 1. Learning<br>2. Problem solving<br>3. Adaptation<br>4. Interaction<br>5. Enjoyment and pleasure |
| Benefits | 1. Increases a student memory capacity<br>2. Computer simulation fluency<br>3. Helps with fast strategic thinking and problem solving<br>4. Develop hand-eye coordination | 1. Better learning experience<br>2. Better learning environment<br>3. Instant feedback<br>4.Prompting behavioural change<br>5. Can be applied for most learning needs | 1. Motor skills<br>2. Social development<br>3. Focus and memory<br>4. Self-esteem<br>5. Creativity |
| Reward | 1. Intrinsically rewards<br>2. Losing may or may not because the aim is to motivate people to take action and learn. | Earn experience points and level up | Scoring point |
| Level | Hard | Easier | All level |

Based on the comparison above, digital game-based learning can be considered a new model of electronic learning (e-learning) with enormous potential in the educational process. As an alternative learning exercise, it could be extended to classroom lecturing. The goal of game-based learning is to demonstrate new methods in learning practices and to provide opportunities for learners to acquire skills and abilities. According to Bober (2010), digital game-based learning experiences are based on activities that have a digital game at their core, either as the main activity or as motivation for other related matters. It also describes events that may occur in a formal classroom or informal learning environment and result in learning, either intentionally or unintentionally.

Game-based learning is a gameplay method that has determined the learning outcomes and has been adopted in the traditional classroom in order to practice active learning, active problem solving, enhance understanding, increase motivation, sustain engagement, and improve student achievement (Amna et al., 2017; Tsai, 2017; Khaleel et al., 2016). Digital game-based learning incorporates digital games into educational tasks that are

designed to help students achieve the specific objectives of a given piece of educational content. This phenomenon must be observed in an educational and technological study (Tsai, 2017).

According to Prensky (2001), digital game-based learning is the use of computer games' creative power to fulfill a role in education. Digital game-based learning has also been defined as a method in which students engage in a rule-defined artificial conflict that results in a measurable outcome (Salen & Zimmerman, 2004). Juul (2003) describes digital games as a rule-based system with a predetermined and measurable effect, where different outcomes are assigned different values, the player tries to influence the outcome, the player feels bound to the final result, and the effects of the activity are discretionary and negotiable.

Digital game-based learning can be used for edutainment or entertainment purposes. It refers to the use of entertainment media such as television to support educational purposes. It is also known as an e-learning subcategory in which learning resources are electronically distributed to distant learners via a computer network. Digital game-based learning is also a subcategory of serious game, which is a broader term with implications outside of education, such as games for health, where game-based learning without the qualifier 'digital' is also a more general term and can also refer to learning using board games. Figure 1 depicts an overview of digital game-based learning and the concepts of instructional media that are closely related (Breer & Bente, 2010).

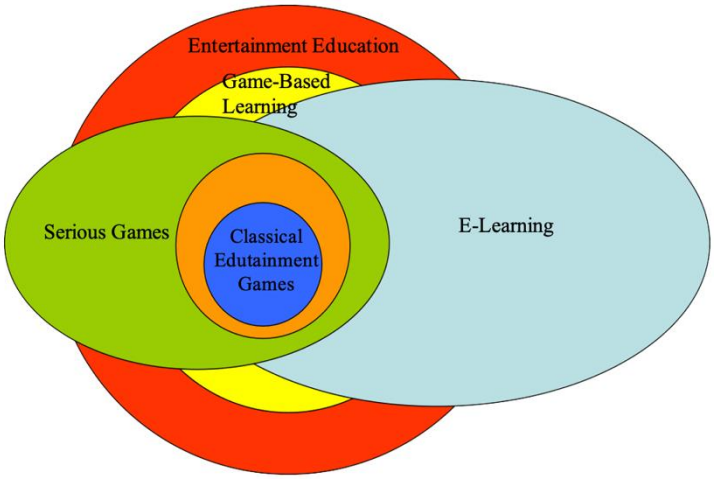


Figure 1: Relationship between DGBL and similar entertainment education concept

A digital game may be considered an appropriate and efficient learning medium. That is because it has some characteristics and features that can positively affect the learner's motivation to begin and continue with the learning engagement. For decades, digital game-based learning has been used in a variety of tasks, practices, participation, and motivation in learning (Cojocariu & Boghian, 2014). Digital game-based learning connects the instructional process to emerging digital technology to promote cognitive improvement while also providing children with interactive content and a fun environment.

## METHODOLOGY

### *Research Design*

The method used in this research is a quasi-experiment method with pretest-posttest non-equivalent multiple group design (Sekaran & Bougie, 2016). Here, in Table 2, O refers to the process of measurement, and X represents the group's exposure to the treatment.

Table 2: Research design

| Group | Pre-Test | Treatment | Post-test |
|---|---|---|---|
| Control Group | $O_1$ | | $O_3$ |
| Treatment Group | $O_2$ | $X_1$ | $O_4$ |

### *Research Procedure*

Participants in the treatment group practised Arabic conversation using the instructional digital game. In this way, lecturers serve as facilitators for the course of the treatment. The instructors assisted students who encountered difficulties practising Arabic communication through an educational digital game. The participants in the control group, on the other hand, received standard Arabic communication teaching, where the lecturers taught the subject using conventional methods, which mostly centred on chalk and talk and lectures. The duration of the experimental procedure was four weeks. The participants were given a pre-test prior to the treatment and a post-test after the treatment in order to examine the accomplishment differences between those who learnt using the educational game and those who did not receive therapy.

Several students were then selected from the treatment group to participate in semi-structured interviews. The researcher conducted a semi-structured interview to study students' perceptions of educational digital games for practising Arabic communication (Velan et al., 2019) and to validate the quantitative data and minimise biases (Samokhvalova, 2017). The collected data will be analysed using thematic coding techniques and organised according to the themes that emerge from the responses. The researcher then produced an interview protocol, which included the interview technique, interview questions, a consent form, and an interview space. The semi-structured interview was conducted using the focus group method. The semi-structured interviews typically lasted between 45 and 60 minutes. The interview was semi-structured, and the researcher took handwritten notes and audio recordings to document the material gleaned from the interview.

### *Sampling Technique*

This study's population covers 18 Peninsular Malaysian public universities that offer Arabic as a foreign language course. Cluster sampling was utilised for this study. Here, the population was divided into various clusters that were mutually exclusive. First, the target population was separated into groups, then a basic cluster sample was drawn at random. In this step, the 18 universities were separated into four clusters based on their geographic locations: the centre region cluster, the northern region cluster, the east coast region cluster, and the southern area cluster. After splitting the population into their separate groups, a simple random sampling was conducted in each cluster, with one university picked at random as the study's sample.

Using a strategy of purposive sampling, the researcher selected 16 students from the treatment group for the semi-structured interview. The primary purpose of the purposive sampling method is to concentrate on the specific characteristics of a population that will help the researcher comprehend the problem and research topic (Creswell & Creswell, 2018). The researcher is able to cease data collection when the categories or themes are exhaustive (Magdalene, 2020). In other words, no new insights or properties are disclosed once the researcher has collected the data. After gathering information from 16 pupils, the researcher found that the findings were exhaustive.

*Participants*

This study included 611 undergraduate students engaged in Arabic language classes at their respective universities. Due to university regulations, the researcher was unable to conduct a random sample among the students. Instead, a random sample was conducted within intact groups of students. Each group was separated into two subgroups: a control (n=240) and an experimental (n=371) group. The researcher then selected groups at random to serve as the control group and treatment group.

*Sample Size*

In this study, a priori power analysis using G*Power 3.1.9.2 was used to examine the difference between two independent group means. This analysis used 0.5 alpha, a medium effect size (d = 0.50) and a two-tailed test. The research shows that a minimum sample of 236 participants in two non-equivalent sized groups (n1 = 64 and n2 = 157) will generate a power of .95, which is required to obtain a sufficient and acceptable statistical power. Thus, this study has surpassed the minimum respondent requirement to employ a t-test analysis.

*Research Instrument*

The adjusted items of the research instrument were evaluated for their content validity, face validity, and criterion validity in this study. Several academicians and practitioners who are considered to be experts in the subject were consulted in order to determine the content validity and face validity. In addition, language specialists were recruited to verify the accuracy of the translated surveys' language. Criterion validity or measurement validity is another type of validity. This procedure involves skilled statisticians deciding if the scales used to measure the data are suitable for utilising statistical analysis for testing hypotheses. After preliminary testing, the researcher modified the items depending on the feedback of the experts.

The primary instrument is the vocabulary test in Arabic. The questions represented four revised levels of Bloom's taxonomy: understanding (C2), applying (C3), analysing (C4), and producing (C5) (C6). Each examination consisted of 35 multiple-choice questions (MCQs), matching, filling in the gaps, rearranging, and sentence construction questions, with a total score of 100. Participants had 60 minutes to respond to the questions. Table 3 provides a summary of the questions.

Table 3: Research instrument outline

| Question number | Type of question | Level of Bloom's Taxonomy | Total Question | Marks |
|---|---|---|---|---|
| Question 1 | Multiple choice questions | C2 | 10 | 20 |
| Question 2 | Matching | C3 | 10 | 20 |
| Question 3 | Fill in the blanks | C3 | 5 | 20 |
| Question 4 | Re-arrange | C4 | 5 | 20 |
| Question 5 | Construct sentences | C6 | 5 | 20 |
| | **Total** | **35** | **100** | |

A series of interview questions were utilised during the semi-structured interview session. All semi-structured interviews were guided by the three primary questions, and follow-up questions were utilised to obtain extra contextual information as needed.

*Ethical Consideration*

There are four guidelines that overlap in the codes of ethics of numerous organisations. Consent, deceit, privacy and confidentiality, and accuracy are these criteria. Throughout the research procedure, the researcher adhered to these four standards. Participants were permitted to withdraw from this research study at any moment, as participation is entirely voluntary. Students were told that their identities would remain anonymous and that the obtained data would be kept strictly confidential. In addition, the collected data will not be used for any other purpose outside this study.

## RESULTS AND FINDINGS

*Quantitative Results*

The inferential analysis was conducted through paired sample t-test to analyse the data obtained from the pre-test and post-test. The t-test was used to reinforce the probability of the p-value measured. In regards to this matter, there are four null hypotheses tested. The null hypothesis will be rejected if the p-value is below 0.05 ($p < 0.05$). Meanwhile, if the p-value is above 0.05 ($p > 0.05$), the null hypothesis is failed to reject.

**$H_{01}$**: There is no significant difference in students' achievement between the pre-test score and post-test score of the treatment group.

**$H_{02}$**: There is no significant difference in students' achievement between the pre-test score and post-test score of the control group.

A normality test is used to determine whether the sample data has been drawn from a normally distributed population. The assumption of normality is a prerequisite for many inferential statistics techniques, including t-test (Hair et al., 2019). Therefore, for this study, the normality test was obtained using skewness and kurtosis values. The range value of skewness and kurtosis obtained were within range ±2.0, which indicates the data is normally distributed (Tabachnick & Fidell, 2013). Therefore, the data set met the assumption to perform the t-test analysis.

A paired sample t-test was conducted to determine the significant difference between the pre-test and the post-test score of the treatment group and control group. The results are illustrated in the Table 4.

Table 4: Significant difference of pre-test and post-test score of treatment group

| Variable | Test | n | M | SD | df | t | p |
|---|---|---|---|---|---|---|---|
| Score Treatment Group | Pre | 371 | 45.89 | 14.708 | 370 | -92.509 | 0.00 |
| | Post | 371 | 54.60 | 15.460 | | | |

Table 4 presents the result of the t-test for pre-test and post-test of the treatment group. A paired sample t-test illustrates that the difference in pre-test (n = 371, M = 45.89, SD = 14.708) and post-test score (n = 371, M = 54.60, SD = 15.460) of treatment group after four weeks of digital game-based learning intervention is statistically significant t (370) = -92.509, and p = 0.00, which below than alpha value. Therefore, the second null hypothesis, $H_{02}$: There is no significant difference in students' achievement between the pre-test score and post-test score of the treatment group, is rejected.

Table 5: Significant difference of pre-test and post-test score of control group

| Variable | Test | n | M | SD | df | t | p |
|---|---|---|---|---|---|---|---|
| Score Control Group | Pre | 240 | 46.70 | 23.421 | 239 | -1.566 | 0.119 |
| | Post | 240 | 46.95 | 22.141 | | | |

The data tabulated in Table 5 show the result of the t-test for the pre-test and post-test of the control group. A paired sample t-test shows that the difference in pre-test score of control group (n = 240, M = 46.70, SD = 23.421) and post-test score (n = 240, M = 46.95, SD = 22.141) after four weeks of traditional pedagogical practice is statistically not significant t (239) = -1.566, and p = 0.119, which is greater than alpha value. Therefore, the third null hypothesis, $H_{03}$: There is no significant difference in students' achievement between the pre-test score and post-test score of the control group, is rejected.

## SEMI-STRUCTURED INTERVIEW RESULTS

The findings from the semi-structured interview are divided into three major themes, which are pedagogy, individual enhancement and game feature. The results on students' opinions are presented according to themes and sub-themes, as shown below.

*Theme 1: Pedagogy*

*Sub-theme 1: Acquisition*

After playing the educational digital game, the majority of the students agreed that their Arabic communication performance had improved. As one student put it, "*…through this game, learning becomes more interesting and can expand Arabic vocabulary (1:79)*". They also said that "*…there is an increase in Arabic vocabulary (1:3)"*. The students were also able to understand the meaning of the vocabulary in a simple sentence and improve their communication skills. They agreed that they had been exposed to a lot of Arabic vocabulary and interactive learning; as they indicated, *"…the game has interactive features and helps us to understand the meaning of words and use them in sentences (1:16)"*. As a result, the educational digital game aided students in their vocabulary learning. The students felt that the educational digital game had assisted in the expansion of their vocabulary for basic

communication purposes. They are able to compose a correct simple statement utilising the vocabulary learnt at the end of the intervention.

*Sub-theme 2: Environment*

The majority of the pupils agreed that they had been exposed to innovative teaching and learning methods. The students were more engaged in class, thanks to the educational digital game, which created an enjoyable learning environment for them. The student stated, *"…class is more fun and active when using this app (1:9)",* and *"…through this game, the learning process becomes more interesting and active (1:91)"*. When a student said that, *"…don't stress too much when we do not understand the meaning of the word (1:62)"*, it demonstrated that the students were enjoying the process of learning Arabic and were content through the use of the digital game. The digital game also helped them to overcome monotony and tiredness. It encouraged them to be more active in order to earn a full score for each game and level, as well as build a competitive environment among them, as they quoted that, *"…more excited to achieve full score to compete with friends (1:51)"*. In addition, this digital game has changed the domination of textbooks, worksheets, and whiteboards. A student mentioned, *"…can replace the textbook because the content is about the same (1:135)"*. The perceived usefulness of this digital game can help both students and teachers. They can practise Arabic outside of the classroom, compete with one another in hostels, and continue to improve their grades.

*Sub-theme 3: Performance*

The findings of the interviews revealed that the pupils agreed that their grades had improved as they mentioned, *"…this game helped me improve my achievement in the test (1:48)"*. They became more active and engaged in a competitive manner to attain a perfect score. After learning through the use of the educational digital game, the majority of the students saw a beneficial impact on post-test results. Students with no prior knowledge of Arabic also performed well. This was elaborated by a student without Arabic language background who remarked, *"…this game helped me achieve a good score even though this was my first time learning Arabic (1:75)"*. They were able to increase their scores by using the gameplay template on a regular basis. This educational digital game created a competitive and challenging environment in the classroom among friends, and they were able to complete the objectives within the time limit. This educational game has assisted students in practising the Arabic language in a pleasant and dynamic setting while also enhancing their understanding, improving their scores, and expanding their vocabulary.

*Theme 2: Individual Enhancement*

*Sub-theme 1: Perceived Acceptance*

Since the digital game was able to enhance their enthusiasm to continue the learning process, a majority of the students had a positive attitude and preferred to adapt to the digital game-based learning strategy in their Arabic language classroom, according to the interview results. Quoting a student, *"…I like and am positive about using this game in Arabic class (1:32)",* and they also remarked that, *"…I want to use this kind of game in the classroom) (1:22)"*. As they come from various Arabic language backgrounds, several of them acknowledged that the educational digital game's content satisfied their different degrees of competency.

Furthermore, they discovered that the learning materials are consistent with their primary source; as they said, *"…can replace the book because the content is about the same (1:135)"*. So, this will enhance their confidence and satisfaction towards the relevancy of the digital game. The students also suggested employing the digital game throughout the semester. Besides, the game score may be transferred as their quiz or assessment marks as they expressed that, "*…games like this should be used in class and scores can be used as the marks for one of the quizzes (1:44)"*. Only a few of them were comfortable and able to adopt the digital game approach in the Arabic class since their preferences and perceptions of the digital game application differed.

*Sub-theme 2: Motivation*

The students acknowledged that the digital game technique had increased their interest in competing among themselves in order to complete each game with a perfect score. The majority of students advised that the digital game be used in their Arabic language lesson since it helped them maintain their enthusiasm to keep learning. They said that "*…more excited and motivated to learn Arabic (1:67)"*, and *"…the concept of the game motivates us to keep playing to the last level (1:28)"*. The students also indicated that their gaming scores and achievements boosted their drive to study Arabic, independent of their prior language knowledge. The digital instructional game also helped to pique students' interest in the Arabic language as well as the new teaching style.

*Sub-theme 3: Soft Skills*

Students felt that the digital instructional game helped them build soft skills, including strategy planning, decision-making, higher-order thinking, and language skills. The digital game helped students develop their creativity by allowing them to compose a simple statement based on the game concept as they quoted that, *"…the game improves some skills such as listening and reading skills and develops the ability to construct simple sentences (1:55)"*.

*Sub-theme 4: Individual Learning Strategy*

Drill and practice, which incorporates the repetition method, is used in the educational digital game. It provides students with the opportunity to enhance their grades in a fun and relaxing environment. They were able to increase their scores and language acquisition process by drilling and practising in the educational digital game. One of the students said, "*…this game concept allows me to set the strategy to achieve a full score (1:30)"* and *"…more excited to achieve a full score to compete with friends (1:51)"*. This method was implemented in Arabic classes to keep students interested in the digital game. The students became more active due to the digital game, and they were able to experience the learning process completely. They had fun playing the game as well as learning Arabic simultaneously. The game is able to reduce anxiety among students, particularly those who do not speak Arabic. This was remarked by a student who said, *"…this game concept has allowed me to replay each game I did not master (1:43)".* They get motivated to learn Arabic due to the drill and practise technique, which keeps them engaged in class. This technique also allows the students to practise memorising the meanings and functions of the terminology in an enjoyable environment. All students are

also given equal opportunities to play until they increase their score, learn till they build confidence in the learning topic, and be satisfied with their scores – learning gains and vocabulary acquisition. The digital game has made the teaching and learning process more engaging and effective.

*Theme 3: Game Feature*

*Sub-theme 1: Game Principle*

According to the student, the semi-structured interviews revealed, *"…the structure of the game is suitable for level 1 (1:23)"*. Besides, they also said, *"…rewards for the right answers make us more motivated to learn (1:75)"*. These data showed that the learning objectives of the educational digital game corresponded to their expertise and course levels. In reality, they were rewarded for their achievements and penalised for their failure in this digital game. Students' engagement was increased due to the feedback, and they were motivated to continue the learning process by playing the game. They felt in control of their learning, thanks to rapid and interactive feedback offered by the digital game's visual and aural effects. They also said, *"…the game gives us a clear instruction, and makes it easier for us to play and achieve the objectives provided (1:78)"*. In this sense, they stated that the digital instructional game gives explicit instructions and a clear goal to attain. Students will be able to fine-tune and focus their goals for each game and level as a result of this. Furthermore, the digital game, based on the requirement analysis process, presents an appropriate challenge that is suited for the student's level of capabilities, allowing them to accomplish the assignment and complete the level.

*Sub-theme 2: Multimedia Element*

According to the interview sessions, multimedia features, notably audio recording, have greatly aided the students in improving their listening and speaking skills. The students expressed that, *"…this game has audio pronunciation that can help me spell the word correctly. On top of that, the game also has clear font, easy-to-read writing and a simple and engaging interface (1:11)"*. The digital game provides them with a simple and straightforward language to help them comprehend it better and enjoy reading. This application will assist students in improving their Arabic communication abilities while taking their linguistic background into account. Aside from that, the digital game employs a proper colour palette to enhance clarity, with low contrast colours for the background and high contrast colours for characters and gameplay elements. The game likewise features a simple layout, with the item appearing in the same area on each page. These aids in the improvement of the game's visible and invisible interactions with the players.

## DISCUSSION AND IMPLICATION

This study assessed academic performance following the use of a digital game-based learning method in learning Arabic communication. The pre-test was initially administered to participants in both the control and treatment groups. Following the intervention, the participants took a post-test. The paired sample t-test analysis revealed that participants in the treatment group scored significantly higher on the post-test than on the pre-test. Participants in the control group, who were taught Arabic communication using traditional methods, had nearly identical scores in the pre and post-test. Based on this result, one null

hypothesis was rejected, while the other failed to be rejected. These findings are supported by the semi-structured interview session. As a result, the findings of this study provide empirical evidence that the use of educational digital games improves students' academic performance.

The study's findings indicate that the educational digital game can significantly improve students' communication performance, as measured by their short- and long-term cognitive outcomes. This study's evidence on the effectiveness of digital games is consistent with previous research (Azman et al., 2018; Amna et al., 2017; Tsai, 2017). Furthermore, this study shows that using an educational digital game is one of the most effective language learning strategies. According to previous empirical studies, interactive language learning strategies frequently help increase students' learning achievement, particularly in communication skills (Nadhilah & Kamarul Shukri, 2018).

According to other studies, such a significant improvement in students' communication performance could be influenced by the educational game's unique characteristics, such as elements of enjoyment and fun, challenging levels, and the novelty of learning through a digital game (Ibrahim et al., 2017; Siti Nazleen & Zuliana, 2017). The educational digital game in this study was designed using digital game principles and multimedia principles. Additionally, several interactive customisations have been included to assist students in expanding their Arabic knowledge. The principles of digital games create a fun and enjoyable learning experience in Arabic class. At the same time, the participants felt that the multimedia elements had improved their practice. Another appealing aspect of the game is the provision of immediate and interactive feedback, allowing users to check their scores and compete with their friends in real-time. Because of the simple and straightforward game flow, users were able to achieve the learning goal in each game. This study's findings demonstrate the critical role that educational digital games play in encouraging learners to actively participate in the learning process (Azman et al., 2018; Siti Nazleen & Zuliana, 2017; Amna et al., 2017).

They learn with the help of several built-in features in the educational digital game, such as audio pronunciation and transliteration. The audio helps students articulate Arabic vocabulary, and the transliteration option helps them become more comfortable with the language. This is consistent with Tan and Low (2017), who stated that the digital game should take a different approach and include a transliteration option to help students improve their reading skills in Arabic vocabulary rather than focusing on grammar (Ashinida, 2016).

Previous research has also shown that one of the most effective ways to boost student achievement and maintain learning engagement is to use a digital game-based educational strategy (Azman et al., 2018; Amna et al., 2017; Tsai, 2017). As a result, incorporating educational digital games into the educational process has the potential to improve students' learning outcomes, create an engaging and stimulating learning environment, and assist students in developing soft skills (Paiva et al., 2016). This is consistent with previous research that found a link between educational digital games and improved student learning outcomes. Thus, educational games have robust features that can optimise students' learning gains interactively. They also participate more actively in class activities because they are more motivated to learn Arabic both inside and outside of the classroom.

Furthermore, regardless of gender, the educational digital game is capable of treating all students equally. Although gender preferences vary, this digital game can be beneficial to both men and women. Several empirical studies support the qualitative findings of this study on gender inequalities (Philip et al., 2015; Ugyen et al., 2015). The students also expressed their opinions on the educational digital game's ability to reduce anxiety, particularly among students who did not have a background in Arabic. Some students may feel stressed or anxious because they are learning Arabic for the first time, which will demotivate their learning interests. The educational digital game, on the other hand, alters their learning perception of the Arabic language.

In addition, during the semi-structured interview sessions, the majority of students stated that they had been exposed to a new teaching and learning environment. Students were also more active in class (Azman et al., 2018; Siti Nazleen & Zuliana, 2017; Amna et al., 2017), because the educational digital game provided a fun challenge and introduced variety into their learning environment (Kamaruzzaman et al., 2022; Ibrahim et al., 2017; Siti Nazleen & Zuliana, 2017). As they strive for a perfect score in each game and level, students become more enthused and optimistic, creating a competitive environment among them. They enjoyed learning Arabic, and this learning environment assisted them in overcoming boredom and fatigue (Azman et al., 2018; Amna et al., 2017; Tsai, 2017). Furthermore, they stated that learning the Arabic language through a digital game is a beneficial practice and method, particularly for beginners (Nadhilah & Kamarul Shukri, 2018).

Digital games intrinsically motivate them to engage in the activity which can benefit their learning by developing a sense of competition with each other to achieve a full score in each game (Travis, 2018; Wu, 2018). It can also develop and enhance their soft skills such as strategy planning, decision making, higher-order thinking skills as well as language skills (Mohd Amir et al., 2020; Paiva et al., 2016).

## CONCLUSION

The purpose of this study was to determine the effectiveness of an educational digital game in improving communication performance among tertiary-level non-native Arabic students. The study discovered that using educational digital games improves students' learning performance in Arabic communication, and thus increases their vocabulary size for communication purposes. Students in the treatment group who play the educational digital game outperform those in the control group in terms of learning achievement. Furthermore, after several weeks of digital game-based learning intervention, students in the treatment group showed a significant post-test improvement. This study opens up exciting possibilities for future research. In this regard, future research could conduct a survey to examine the factors influencing students' acceptance of digital game-based learning in teaching and learning. Because students have different learning strategies preferences, it is interesting to investigate the factors.

## DECLARATION

This article is part of the author's doctoral studies at Sultan Idris Education University on the effectiveness of digital games in the Arabic language. This study would like to thank everyone who was involved in it.

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