Effects of the Digital Game-Based Learning (DGBL) on Students Academic Performance in Arabic Learning at Sambas Purbalingga

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Abstract
Arabic has been an official language of the United Nations since 1971. However, infrastructure, availability of technology by either students or teachers and professional training for teacher's technological usage in Arabic teaching are still lacking. This paper presents the effectiveness of Digital Game-Based Learning as media towards students' academic performance in Arabic learning. DGBL was designed by ADDIE model. Quasi experimental Design was used as the method for the implementation phase. The sample of this study was 72 students of the first grade of junior high school. They were divided into two groups of 36 respectively: Group A as the experimental group and Group B as the control group. Group A was treated with DGBL method whereas Group B treated with The Non-DGBL method. The learning results showed that Group A performed significantly higher than Group B cause the results of t table is smaller than the result based on t-Test value (1,67 < 3,244). The Digital Game-Based Learning (DGBL) suggested being used as a tool to increase student's academic performance in Arabic learning for high school students. [Bahasa Arab sudah menjadi bahasa

internasional yang disahkan oleh PBB sejak 1971. Namun, sarana dan keberadaan teknologiyang dimili baik oleh siswa maupun guru dan penggunaan teknologi dalam pembelajaran bahasa Arab masih kurang. Penelitian ini memaparkan efektivitas penggunaan DGBL terhadap prestasi akademik siswa dalam pembelajaran bahasa Arab. DGBL dirancang dengan model ADDIE. Quasi Experimental digunakan untuk uji implementasi. Dalam penelitian ini dipilih sampel 72 siswa kelas VII. Sampel dibagi menjadi dua kelas dengan masing-masing jumlah 36 siswa: kelas A adalah kelas eksperimen dan kelas B adalah kelas kontrol. Kelas A menggunakan media pembelajaran DGBL. Sedangkan kelas B melakukan pembelajaran tanpa media DGBL. Hasil penelitian menunjukkan bahwa Kelas A memiliki hasil belajar yang jauh lebih tinggi dibandingkan dengan Kelas B karena nilai t tabel lebih kecil daripada nilai t hitung berdasarkan perhitungan *t-Test* (1,67<3,244). Digital Game-Based Learning disarankan dapat digunakan sebagai media pembelajaran bahasa Arab yang mampu membantu peran guru untuk meningkatkan hasil belajar siswa.]

Keywords: digital game-based learning; game development; arabic learning; junior high school; academic performance

Introduction

On the contemporary international stage, Arabic has been an official language of the United Nations alongside English, French, Spanish, Russian, and Chinese since January 1971. Arabic is also the language of Islam's holy book, the Koran, and such is the religious and liturgical language of all Muslims, regardless of origin.[1] The most natural way to learn the language is to listen to it first and then to repeat what the learner has heard. Audio-visual aids are the next important step in teaching, especially in teaching languages to speakers of other languages.[2] Variety of motivations can play an important role in a

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[1] Clive Holes, *Modern Arabic : Structure, Function and Varieties*. (Washington D.C.: Georgetown University Press, 2014).

[2] B.A.S. Dajani, S. Mubaideen, and F.M.A. Omari, "Difficulties of Learning Arabic for non-native speakers," *Journal of Procedia - Social and Behavioral Sciences* (2014), doi: 10.1016/j.sbspro.2013.12.808.

student's decision to learn Arabic.[3] Language learners with higher motivation level possess a richer repertoire of strategies and employ strategies more frequently than less motivated learners.[4] Obstacles to Arabic pedagogical and technological reform include poorly maintained or non-existent infrastructure, limited availability of technology by either students or teachers and poor professional training for teacher's technological usage.[5] This era of advanced information and communication requires creative language teaching skills which are commensurate with the requirements of the burst knowledge and technological progress. There is a need to increase the use of educational technology in the lesson's activities and evaluation. Software which is specifically designed for the purpose of teaching Arabic language is needed to improve the teaching method-based technology.[6]

Nowadays, digital games have been used in education that called educational games. Entertainment software, including video games, were able to add knowledge, teach life skills, and reinforce students' positive habits of any age. 26% users of video games in the United States under the age of 18 years which is the active learning age.[7] Educational games are used as teaching and learning tool in some

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[3] Hezi Brosh, "Motivation of American College Students to Study Arabic," *International Journal of Humanities and Social Science*, (2013). http://www.ijhssnet.com/journal/index/2128, accessed April 10, 2018.

[4] K.M.S.M. Teh, et al, "Language Learning Strategies and Motivation among Religious Secondary School Students," *The International Journal of Language Society and Culture* (2009). https://www.researchgate.net/publication/ 254644986_ Language_Learning_Strategies_and_Motivation_among_Religious_Secondary_ School_Students, accessed April 10, 2018

[5] Sultan Almelhes, *"Teaching of Arabic language proficiency (pronunciation) to non-native speakers: Designing interventions using ICT," Thesis, Western Sydney University, Australia*, (2016).

[6] A.A. Musawi, A.A. Hashmi, and A.M. Kazem, 2014. "Perception of Arabic Language Teachers toward Their Use of Technology at The Omani Basic Educational School," *Educational and Information Technologies*, 21, no. 1(2014)

[7] ESA, *"2011 Sales, demographic and usage data essential facts about the computer and video game industry,"* (Washington DC: Entertainment Software Association, 2011)

subjects, such as mathematics, science, history, and language learning[8]. Student's enjoyment when playing the educational game could have remarkable effects on student's learning performance.[9] A Survey by Gamevision, one of European games industry, revealed that on average 25.4% of Europeans aged above sixteen were 'gamer' who played games in the preceding six months.[10] In the US, gaming is reported to be even more popular and more demographically equalized than in Europe.[11] The benefit of Digital Game-Based Language Learning (DGBLL) has increased significantly in recent years and has received considerable attention in recent computer-assisted language learning (CALL) studies[12]. Students who used computer games or interactive simulations showed better results in cognitive gains and attitudes toward learning than those who experienced traditional instruction.[13] Divjack and Tomic reviewed studies that adopted computer games to promote mathematics learning and found positive impacts of the games on students' outcomes and their motivation and attitude towards mathematics.[14] Digital games were also found to be helpful in

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[8] Nor Azan Mat Zin, Azizah Jaafar, and Wong Seng Yue, "Digital Game-based Learning (DGBL) model and development methodology for teaching history," *WSEAS Transaction on Computers* 2 no. 8 (2009). https://ukm.pure.elsevier.com/ en/publi cations/digital-game-based-learning-dgbl-model-and-development-methodology, accessed April 10, 2018.

[9] Bassam Zafar, Ahmed Mueen, and Mohammad Awedh, "Game-based Learning with Native Language Hint on Student Academic Performance in a Saudi Arabia Community College," *Journal Computer of Education* 1 no.4 (2014), doi: 10.1007/s40692-014-0017-7

[10] Gamevision. *Video Gamers in Europe*. Brussels: Interactive Software Federation of Europe. http://www.isfe.eu/sites/isfe.eu/files/video_gamers_in_europe_2010.pdf. (2010)

[11] F. Cornillie, S.L. Thorne, and P. Desmet, "Digital Games for Language Learning," *European Association for Computer Assisted Language Learning* 24 no. 3 (2012), doi: 10.1017/S0958344012000134.

[12] Hayo Reinders and Sorada Wattana, Affect and Willingness to Communicate in Digital Game-Based Learning," *European Association for Computer Assisted Language Learning* 27 no. 1 (2015), doi: 10.1017/S0958344014000226.

[13] J.J. Vogel, et al, "Computer Gaming and Interactive Simulations for Learning: A Meta-Analysis," *Journal of Educational Computing Research* 34, no. 3 (2006), doi: 10.2190.

[14] B. Divjack and D. Tomic. "The Impact of Game-Based Learning on The Achievement of Learning Goals and Motivation for Learning Mathematics-Literature

improving spatial cognition, visual attentional processing, perceptual-motor skill, and problem-solving skills.[15] Hence, the DGBL can be used as a tool to increase students' academic performance in Arabic learning.

There is some research in which computer game had been used to improve teaching and learning. The first research used game-based learning with native language hint to improve student's academic performance in a Saudi Arabia community college.[16] They compared the effectiveness of two learning methods: game-based learning and nongame-based learning. They also observed the effectiveness of providing important terms' Arabic meaning during the learning process. Both learning methods are designed and applied to teaching a computer networking course in community college. The samples of this experimental was 44 community college students; they were randomly assigned to two groups of equal size (N=22). Both groups were observed with and without native language hint. Data analyses showed that the game-based learning with native language hint demonstrated good performance as compared to nongame-based learning without native language hint. The results showed that students who used game-based method perform better and are more motivated than those who use the nongame-method. The results suggest that computer game and native language hint can be used in education as a tool to increase student's academic performance and motivation in non-English speaking countries. Furthermore, Katmada also did a research about implementing a game for supporting learning in mathematics.[17] The particular computer game was created in an attempt to facilitate the teaching of mathematics, a subject that is often regarded as complicated by students of all ages. Apart from the game, an administration website was also constructed, so that the educator can configure the game, without that requiring any programming skills. More specifically, the

Review," *Journal of Information Organization Science* 35 no.1 (2011). https://jios.foi.hr/index.php/jios/article/view/182, accessed April 10, 2018.

[15] R.E. Mayer and C.I. Johnson."Adding Instructional Features that Promote Learning in A Game-Like Environment," *Journal of Educational Computing Research* 42 no.3, (2010), doi: 10.2190/EC.42.3.a.

[16] Bassam Zafar, et al, "Game-based Learning with Native Language Hint,"

[17] A. Katmada, A. Mavridis, and T. Tsiatos, "Implementing a Game for Supporting Learning in Mathematics," *The Electronic Journal of e-Learning* 2 no. 3 (2014). http://www.ejel.org/ volume12/issue3/p230, accessed April 10, 2018.

educator can use the administration website in order to alter several of the game's parameters, such as the content and a total number of its questions. The game was evaluated in real school settings, both through a pilot study with 12 students and a long-term intervention with 37 students that lasted 14 weeks. The results indicated that the students' opinion about the game was positive, and suggest that with some extensions the game could be used as an effective learning tool. Finally, some corresponding conclusions and future improvements to the game are being discussed on the basis of the findings.

Most of the studies related to game-based learning were conducted in developed countries.[18] In the United States, Video game industry approaches yearly revenues of 15 billion, with the game playing population falls between the ages of 10-34 years old, the majority are between 14-19 years.[19] According to Indonesia, the research about The Development of Indonesian Online Game Addiction Questionnaire[20] showed that the estimated online game addiction cases (10.15%) among Indonesian school students that currently played online games are quite alarming. Therefore, the purpose to conduct this study to gain knowledge of how to designing and make a digital game-based learning for supporting Arabic learning. Furthermore, researcher purposed to addresses the question of whether computer games do help student learn effectively. It was designed on the basis of Arabic language learning for first-grade junior high school curriculum.

The purpose of this study was to identify the effectiveness of the use of the DGBL that has been adapted to the curriculum in Indonesia in improving students' academic performance compared to Non-DGBL learning model on Arabic learning. The focus of this study was to determine the benefits of using the DGBL on learning activities at school. Especially, the study was conducted in an Islamic school environment where all students are Muslim. From this work, it is known the potential use DGBL as an alternative tool for learning Arabic. In addition, it can provide insight into the benefits DGBL on

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[18] Bassam Zafar, et al, "Game-based Learning with Native Language Hint,"

[19] L.A. Anetta and Meng-Tzu Cheng, *Why Educational Video Games? In. Anetta, L.A. Serious Educational Games from Theory to Practice* (Rotterdam: Sense Publisher, 2008).

[20] Tjibeng Jap, et al. "The Development of Indonesian Game Online Addiction Questionnaire," *PLos ONE* 8 no. 4 (2013), doi: 10.1371/journal.pone.0061098

students in terms of academic achievement, especially in the Islamic environment.

Methods

1. Research Design

The researcher used Quasi-Experimental Design Method to test the effectiveness of DGBL. Summative evaluations are conducted by using an experimental design.[21] In the present study, we focus on summative evaluation and will concordantly discuss experimental design. Experiments conducted on two groups. The sample is chosen randomly based on Two-group simple randomized experimental design. The requirement of this design is that items, after being selected randomly from the population, be randomly assigned to the experimental and control groups.[22] In a diagram form, this design can be shown in Fig. 1.

Figure 1. Diagram form Two-group simple randomized experimental design

The experimental group uses Digital Game-Based Learning (DBGL) for learning Arabic while the control group using a Non-DGBL method. Both groups were given a pretest to measure their initial (learning outcomes). This research will be continued if the results of the pretest did not significantly different. Hereafter, the DGBL method was given to the experiment group and Non-DGBL method for the control group. Students' academic performance measured by the result of the test to get the quantitative data. Both groups were given the same

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[21] Tom Hutchinson and Teresa Woodbridge, *Project 2 Second Edition: Teacher"s Book Level 2* (Oxford: Oxford University Press, 1999).
[22] C.R. Kothari and Gaurav Garg, *Research Methodology: Methods and Techniques Third Edition* (New Delhi: New Age International Publisher, 2014).

posttest. The t-test and Gain Test was used to compare the score of both groups.

2. *Development methodology for Arabic learning game design*

Digital game-based learning (DGBL) for Arabic learning development process focused on the development method to produce an educational game based on multimedia application. The researcher used ADDIE model as the research and development method. This model consists of five phases: Analysis, Design, Development, Implementation, and Evaluation. In accordance with ADDIE model, the product of each working phase was subjected to formative evaluation and revision.[23]

The quality and validity of DGBL will be tested before the implementation phase. The test involved some experts in Arabic learning material, such Arabic teachers and some experts in the educational game or multimedia. The DGBL can be used in implementation phase if pass the test without revision. After the quality test phase, we will launch the game to the students to determine the usability and effectiveness of the game. We do not go back in the design phase, but we just do some modification based on the revision to improve the game quality since it takes a long time to re-design the game, determine specification, implement and testing again.[24] Figure 2 show the development process in designing DGBL with ADDIE Model.

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[23] Katmada, "Implementing a Game,"
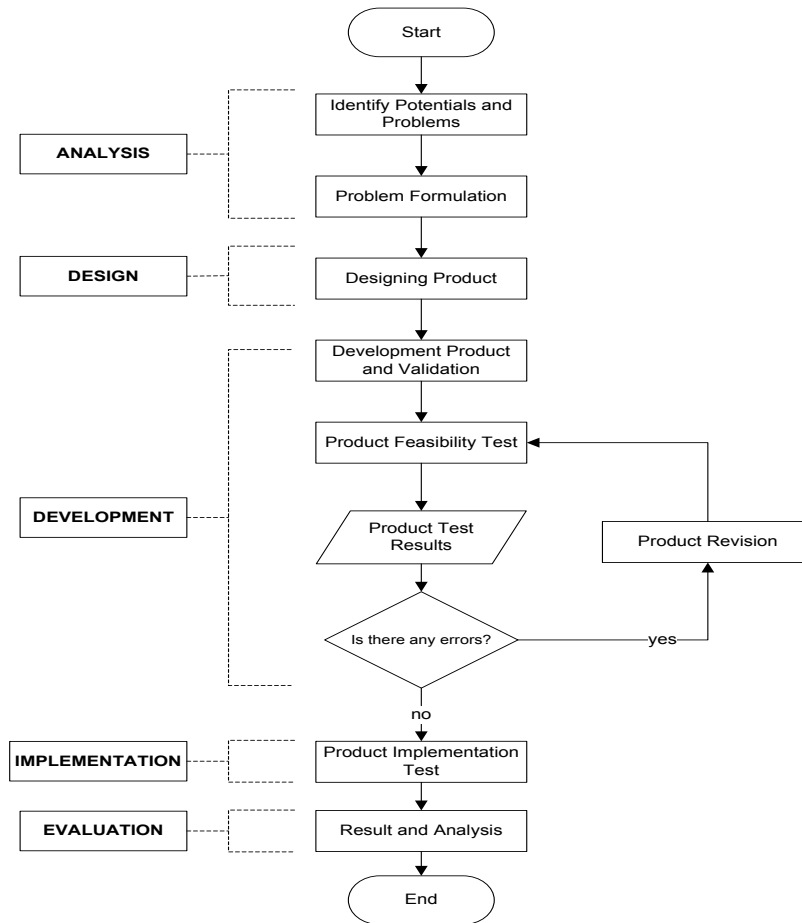[24] Zin, "Digital Game-based Learning (DGBL),"

Figure 2. ADDIE Model for Designing Digital Game Based Learning for Arabic Learning

3. *Procedure*

A total 72 Junior High School first grade students were involved in this study. They were divided into two groups of equal size (N=36). One of which used game-based learning method and the other one used nongame-based learning method. Student's academic performance measured by pretest and posttest. This study was conducted over 4 meetings. The Pretest was executed at first meeting. The second and third meeting, both groups were treated by different treatment, the DGBL one, and the Non-DGBL one. Posttest was given in the last

meeting. Pretest and posttest used the similar instrument, 45 questions in total, which consist of multiple choice, true-false, translate and fill in the blank. The procedure of the experimental design in this study showed in Fig. 3.
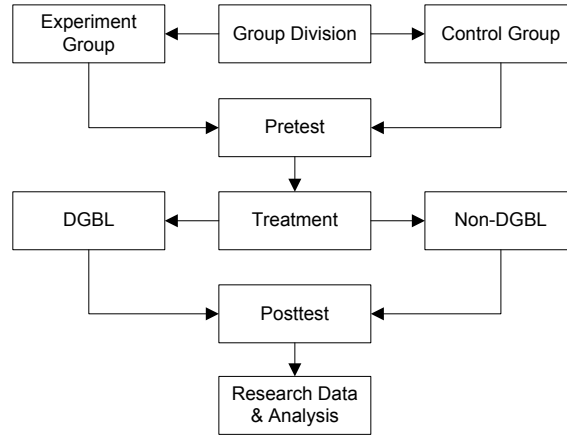

Figure 3. Experimental Design for Implementation Phase DGBL

4. *Materials*

Two similar applications constructed by the researcher were used in this study: (a) a game one called "Zaki and School", and (b) a non-game one called "Learn Arabic".

a) DGBL Application

Digital game-based learning was created based on the curriculum of Arabic learning in the first grade of junior high school. DGBL was applied by Group A to study "School" subject. The material focused on reading skill of Arabic learning, such as identifying vocabulary (mufradat) in a passage, identifying the main idea from passages or dialogues, translating the sentence, re-arrange some random words into an appropriate sentence. The Cognitive Theory of Multimedia Learning (CTML) is based on the idea that people learn more profoundly from a combination of words and pictures than words alone.[25] Computer games, in particular, contain the following three elements that make them so interesting and can be used in order to

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[25] Zafar, "Game-based Learning,"

motivate the learner: challenge, fantasy, and curiosity.[26] In accordance with these guidelines, the game should have clear goals, uncertain outcomes, feedback, and gradually increasing the difficulty level.[27] Some points that should be considered: (i) DGBL should be easy to learn and easy to play, (ii) Simple graphic-based human-computer interface, (iv) Easy and simple rules for the DGBL. The game should also be given some limitations: (i) The game should be a stand-alone apps without additional software, (ii) The game should be in Windows platform, as most of the computers using this platform, (iii) The students should be able to finish the game within one learning session, (iv) the development and the editing of the game can be handled by one person (the researcher), to deal with any type of situation. The user interfaces of DGBL are shown in Fig 4, 5, and 6.
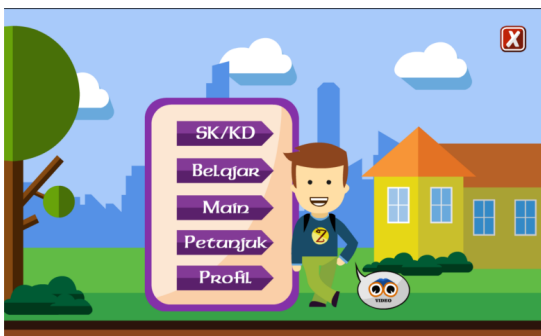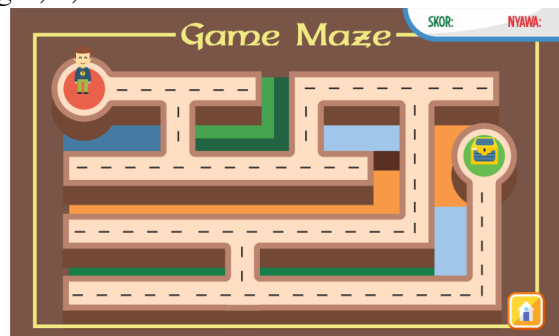

Figure 4. Main Menu Display

Figure 5. Game Maze Display

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[26] T.W. Malone, *What makes things fun to learn? A study of intrinsically motivating computer games* (California: Technical report, Xerox Palo Alto Research Center, 1980).

[27] Katmada, "Implementing a Game,"

Figure 6. Game Stage Display

The start menu includes Syllabus, Learn, Play, Help, and Profile. The Syllabus Menu showed that DGBL was made in accordance with the current Arabic learning curriculum for the first grade of junior high school. The Learning Menu is a menu to learn the material from the curriculum. There is only view mode in the Learning Menu, there is no interaction. The Play Menu is the main menu in DGBL. Students will interact with the game here. The game interface is an adventure maze. The main role in this game should finish the adventure to reach the goal. Each level has its challenges, scores, and difficulties. The DGBL consist of four levels until reach the goal. One role player, named Zaki, who played by a user will pass through several levels with different difficulties. Stage 1 in the game menu is the maze which can be an adventure map. Four checkpoints in that maze show the game level. Level 1 is about the dialogue about greeting (taaruf). Players will choose the best answer from three for the answer of the dialogue. Next level showed the classroom with the content inside. The player should choose an appropriate object based on words that were shown in the top right corner. The third level is about number identifying in Arabic. The last level showed the illustration. The player should arrange a sentence based on that illustration.

To make the game more lively, some different background music determined in the different situation, such in the beginning of the game, when failure the mission, or when congratulation the player. Every level has a passing so the game can be more challenging. Player has remaining lives and score based game playing. The game was developed using Adobe Flash CS6 with ActionScript 2.0.According to

Prensky, the game elements of challenge and opposition are problems the players are trying to solve.[28] These elements make the game more engaging. However, they should be equivalent to the player's abilities. The game will end in the Congratulation Stage if the player can finish the game with the certain score and time limits. Otherwise, if the player failed to complete the mission, the Game will end in Game Over Stage. Helps menu shows the rules and goals of the game. The Profile menu contains the game developers' profile.

b) Non-DGBL Application

"Learn Arabic" is applied by the Group B to study focused on Reading skills in Arabic learning. "Learn Arabic" is an educational interactive media for learning Arabic Learning reading skills. This media was developed by the researcher using Adobe Flash CS6 and ActionScript 2.0. Its learning content is similar to those of Zaki & School, Habits in School (Adawatul Madrasah). The difference between "Learn Arabic" and Zaki & School is on the Play Menu. There is no Play Menu, a gaming phase, in "Learn Arabic". The learning material divided into 4 units: (i) Introduction (*taaruf*), (ii) Vocabulary (*mufradat*), (iii) Number (*arqam*), and (iv) Proposition (*hurf jar*).

5. Research Samples

The research was conducted at the first grade of junior high school in Indonesia. The samples were taken from 72 students who study the introduction to Arabic learning. They will focus on reading skill with the "School" subject. Two groups were formed by randomly selected students. The first group was the Group A (experimental group) and the other was Group B (control group). The two groups consist of an equal number of students.

6. Instruments

For this study, some papers based questionnaires were arranged: (i) a pretest consist of questionnaire of needs, (ii) a pretest of subject knowledge test, (iii) a questionnaire for Arabic material experts, (iv) a

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[28] Mark Prensky, "Students as Designer and Creators of Educational Computer Games: Who else?," *British Journal of Educational Technology* 39 no. 6 (2008), doi: 10.1111/j.1467-8535.2008.00823_2.x.

questionnaire for media or game experts, and (v) a posttest of subject knowledge test. The instruments were divided by two, Test Instruments and Non-Test Instruments. Test Instruments consist of pretest and posttest about subject knowledge test. The questionnaire instruments belong to Non-Test Instruments. The test instruments' aim was to measure the students' cognitive abilities in reading skills. The test would be held in the objective written test with multiple choice. The content questions about the reading skills Arabic learning for first-grade junior high school with the subject matter in the school, identifying Arabic introduction dialogue between 2 people, vocabulary about school, Arabic number introduction, and preposition. The questionnaire of needs produced the data about students: age, motivation learning Arabic, problematic about Arabic learning, liking computer games, type of game, and favor of game-based learning, media needs for reading skills, the color interface for media, the interesting interface, the music background and game sound, and the language which used in DGBL. Questionnaire for Arabic experts consists of following subject: (i) the feasibility of content, and (ii) the feasibility of contextual aspect. Questionnaire for media design expert based on ISO 9126 standard: (i) functionality, (ii) reliability, (iii) usability, (iv) efficiency, (v) maintainability, and (vi) portability of the DGBL. The researcher used the Likert Scale for filling the questionnaire with four indexes: (1) strongly disagree, (2) disagree, (3) agree, and (4) strongly agree.

Results
1. Result of validity test for DGBL development

The validity test through questionnaire produced some data about the validity of DGBL by material experts and educational media experts. The results of Questionnaire of feasibility test from Arabic material experts shown in table 1.

Table 1. Result of validity test from Arabic Material Experts

Aspect	Total Item	Score (%)	Validity
Learning Material Content	10	80	Valid
Learning Contextual Standard	8	87,5	Strongly Valid
Mean		83,75	Valid

The results of Questionnaire of validity test from educational game or media experts shown in table 2.

Table 2. Result of validity test from Educational Game Experts

Aspect	Total Item	Score (%)	Validity
Design	2	62,5	Valid
Interface	2	75	Valid
Quality	2	100	Strongly Valid
Reliability	2	75	Valid
Efficiency	2	75	Valid
Mean		81,25	Valid

The result of validity test from material experts gets 80% in learning material content, 87,5% in learning contextual standard and get 83,75% relatively. The result of validity test from educational game or media experts get valid category in four aspects (Design=62.5% Interface=75%, Reliability=75%, Efficiency=75%) and strongly valid from quality aspect (100%). The results showed that DGBL is valid to be an educational media for Arabic Learning by the judgment of material and media experts.

2. Comparison of students' subject performance

The results of the pre-test and post-test are presented in Table 3 and Table 4.

Table 3. The result of Pretest activity

Variable	Group	
	DGBL	Non-DGBL
Participants	36	36
High Scores	94	93
Lowest Scores	36.25	40
Mean	68.38	66.382
Variance	212.205	199.512
Standard of Deviation	14.56	14.12

Table 4. The result of Posttest activity

Variable	Group	
	DGBL	Non-DGBL
Participants	36	36
High Scores	100	96
Lowest Scores	71	65
Mean	84.125	79.806
Variance	28.329	35.496
Standard of Deviation	5.322	5.957

Bartlett's test is used to test if k samples are from populations with equal variances or homogeneity of variances. The sample used a significance level of 0,05, degrees of Freedom (df) is 70, and the Chi-Square (x2) performed by Bartlett Test is 0,033. If a significance level of 0,05 and degrees of Freedom (df) is 70, Chi-Square (x2) table obtained 90,53. So, the pretest results of the two groups can be concluded equivalent or homogenous cause the results of Chi-Square (x2) Bartlett Test smaller than the Chi-Square (x2) table (0,033 < 90,53).

The T-Test is an inferential statistical test that determines whether there is a statistically significant difference between the means in two groups. Using a t-test of the two groups, DGBL group (M=84.12, SD=5.32) and Non-DGBL group (M=79.8, SD=5.95) a statically significant main effect was found. The sample used a significance level of 0,05, degrees of Freedom (df) is 70, and the t performed by t-Test is 3,244. If a significance level of 0,05 and degrees of Freedom (df) is 70, t table obtained 1,67. So, the results of the two groups indicate that the students who had used the game performed significantly higher in the posttest than those who had not used the game cause the results of t table is smaller than the result of t-Test value (1,67 < 3,244).

Gain Score conducted in order to determine the learning outcome of the value pretest and posttest from experimental class and control class. The results of Gain Score shown in Table 5.

Table 5. Gain Scores table

Variable	Group

	DGBL	Non-DBGL
Pre-Test Mean	68,381	66,381
Post-Test Mean	84,125	79,805
Gain Score	0,497	0,399
Categories	Medium	Medium

Discussion

There were 72 students involved in the experiment. Before and after playing a game, a performance test was used to measure students' performance. In each of the subject knowledge test: pretest and posttest, the student's number of correct answers were measured as his/her score in the respective test. The scores in each tested student can obtain ranged from 0 to 100 points. The test is about reading skills Arabic learning for the first-grade students of junior high school based on the syllabus. An independent samples t-test was conducted to compare the performance between two groups. It is important to validate the homogeneity of variance and the normality of the sample distribution for the small sample size before applying t-test.[29] Therefore, Kolmogorov–Smirnov was applied to check normality distribution and Levene's test to evaluate the homogeneity of variance.[30] Bartlett Test is used to test the homogeneity of pre-test of DGBL Group and Non-DGBL Group, to ensure that both groups scored an average equivalent. Besides t-test, Gain Score also used to measure the students' improvement after receiving treatment in both groups.

This paper presents the effectiveness of Digital Game-Based Learning as media towards students' academic performance in Arabic learning. DGBL was designed by ADDIE model. The DGBL was tested by validity test by the experts. The DGBL was evaluated by some experts in Arabic material and educational media. The results showed that DGBL can be used as a learning tool. The validity test results show overall 83,75% from material experts and 81,25% from educational media experts which indicates that the DGBL is fit to be implemented

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[29] C.S. Nam, and T.L. Smith-Jackson, "Web-based learning environment: a theory based design process for development and evaluation," *Journal of Information Technology in Education* 6 no. 23 (2007), doi: 10.28945/200.

[30] M. Evie, "Which is the correct statistical test to use?," *British Journal of Oral and Maxillofacial Surgery* 46 (2008): 38-41, doi: 10.1016/j.bjoms.2007.09.002.

in teaching and learning Arabic. This study also evaluates the effectiveness of using the game in learning. To proof the concept, we conducted our experiment in teaching Arabic in reading skill on two groups of students: one group uses the game-based learning method (Group A) and the other group uses the nongame-based learning method (Group B). The study showed that Group A demonstrating the better understanding of subject and enjoyment than Group B. This is proved by the Gain Score result that the increase of Mean value in DGBL group (Gain Score=0,497) is higher than the increase of Mean value in the Non-DGBL Group (Gain Score=0,399). Same results also showed by t-Test that t table (t=1.67, df=0.05) is smaller than t-Test value (3,244). This finding supports the results of previous studies by Ke and Grabowski[31] and Papastergiou[32], which exhibit that using games in education increases the academic achievement and motivation of students compared to the traditional teaching methods in many disciplines such as Mathematics and Science. This study is different from previous studies in four aspects: (i) this study uses modern interactive e-learning method on both groups, (ii) the participants are Indonesian first-grade of junior high school students , (iv) the study is applied on complex subject (Reading skills) whereas the previous studies applied on subject like computer programming.[33] The game developed for this study is relatively simple and contains simple graphics.

One of the major findings of this study is that students (junior high school in our study) had a big enjoyment during the learning process and have a big effect on students' learning performance. Arabic teachers would like to use this DGBL as a teaching tool and use this DGBL as a reference to create a more creative and fun learning method. The study also opens new opportunities for future work in game development especially Digital Game-Based Learning.

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Conclusion

This study has been successfully accomplished in order to determine the effectiveness of using The DGBL towards students' academic performance. The results of the test from the experimental group performed better than those who use the nongame-method. The Digital Game-Based Learning (DGBL) suggested being used as a tool to increase student's academic performance in Arabic learning for high school students compared to the traditional method or non-game media. Hence, it is hoped that the DGBL concept will become an effective educational tool and highly recommended for learning process rather than the traditional one.

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