

Online Vocabulary Games For Teaching And Learning Arabic

Muhammad Sabri Sahrir

muhdsabri@iium.edu.my

*Kuliyah of Islamic Revealed Knowledge and Human Sciences
International Islamic University Malaysia*

Ghazali Yusri

ghazaliy@salam.uitm.edu.my

*Academy of Language Studies
Universiti Teknologi MARA*

Abstract

Arabic vocabulary learning is in dire need for additional teaching and learning aids, especially with the integration of advanced multimedia application such as digital or online games. This article reports on the findings of a study on the implementation of an online Arabic vocabulary learning games prototype among teenage learners in the Centre for Foundation Studies (CFS), International Islamic University Malaysia (IIUM). The evaluation on the usability, practicality and effectiveness of the game's prototype was conducted by various experts of Instructional Designers and Subject Matter Expert, and the different users among learners and lecturers. The formative evaluation is divided into three main phases: pre-formative evaluation, formative evaluation one and formative evaluation two. Findings from the evaluation process show that the online game enhances learner's perceived perception, concentration, immersion and knowledge improvement. Positive reports are also gathered from qualitative data from the implementation of open-ended surveys, interview sessions, think-aloud methods, class observations, and testimonials. This study has indicated usability, practicality and effectiveness of online games in its application in Arabic language learning among elementary learners with suggestions and comments for further improvement of the game's prototype. The study indicates that students personally feel that they are able to learn Arabic vocabulary through this online game's application and this data will provide directions for further research.

Keywords: design and development; online games; Arabic language learning; formative evaluation; game evaluation

Introduction

The application of instructional teaching and learning aids in vocabulary learning is crucial in order to enhance and improve language learning and acquisition, especially for second language learning process. However, the lack of supportive instructional teaching and learning aids, especially in Arabic is of major concern and under the discussion of many researchers in an effort to improve the situation. In fact, the teaching and learning of Arabic language is facing problems due to several factors: Arabic language is described as following the trend in using instructional technology rather than finding and

creating new invention and innovation. In addition, the nature of Arabic materials is described also to be among the factors (Mohd Feham, 2006). The low frequency in using computer-based and web-based instructional aids in teaching and learning Arabic is found to be affected by reasons such as: (a) preference in using traditional and non-computer instructional aids among teachers, (b) poor computer literacy, especially among the veteran educators, (Zawawi, 2008), (c) the incapability of handling a computer (Mohd Feham & Isarji; 2000) and (d) lack of computer training (Ashinida, et. al, 2004).

Thus, this paper investigates the use of online games as one of the potential computer-assisted teaching and learning aids in enhancing Arabic vocabulary learning. A study conducted among pre-university Arabic learners in the Centre for Foundation Studies (CFS), International Islamic University Malaysia (IIUM) reveals that the weakness in memorizing Arabic vocabularies and negative attitude among learners are among the factors contributing to vocabulary learning problems among learners in CFSIIUM (TEMU, 2005-2009). This paper seeks to present the findings of a study on the implementation and evaluation of an online Arabic vocabulary learning games prototype among those learners, specifically focusing on the game's prototype as a tool for effective teaching and learning of Arabic vocabulary. The research in educational games, or online games or digital games has attracted researchers, educators and instructional designers from all over the world to invest their effort in the development of this mode of teaching and learning tool. This promising learning technology is described as a new model of e-learning (Squire, 2005) and stands among the existing multimedia instructional tools attracting researchers' attention for its integration within the teaching and learning process (Prensky, 2001; Squire, 2005; Zarina & Hanafizan, 2005; Zarina, 2008; Roslina & Azizah, 2008; Noor Azli, et al., 2008; Nor Azan & Wong, 2009; Whitton, 2010).

In tunnelling through the potential of online games, the researchers have channelled much effort in exploring and exploiting the potential use of this multimedia application in the teaching and learning process. Various research have been conducted in fields of knowledge such as a design model of educational adventure games (Amory, 2001), gender reactions towards educational and commercial computer games (Chu, 2004), motivating learners in educational computer games (Tuzun, 2004), teacher's perception of towards online games learning (Can & Cagiltay, 2006) and computer game theory for designing motivating educational software (Ang & Rao, 2008). In addition, positive evidence on effects of educational games was observed in enhancing performance among students in math, science and military (McFarlane, 2002).

However, challenges are commonly encountered in convincing the educators and of the potential use of computer games in a learning environment. Pivec, Koubek, and Dondi (2004) reported of the high perception of positive expectations and usefulness of computer games in the learning environment among teachers. There are also negative or neutral perceptions about the usefulness of computer games in educational situations. Some educational practitioners claimed that educational computer games are only suitable for children. On the contrary, they are used with two different types of learners and learning situations, such as for younger children in elementary and middle schools,

while another with college and professional students in business courses (Alessi & Trollips, 2001, p. 270).

Related Research of Digital Game-Based Learning (DGBL) in Malaysia

The Malaysian research scenario in the investigation of language learning through online digital games is still in its early stages and requires for further research activities to be conducted. There are attempts to integrate the digital game's technology within the educational perspectives and practices. As such, terms such as 'edutainment environment' was coined through an integration and combination of 'education' and 'entertainment' elements in a learning environment (Zarina and Hanafizan, 2005). The researchers attempted at integrating online games learning environment in Malaysia specifically focusing on the design of the implementation framework of educational electronic games in the teaching of science and mathematics. Related research in DGBL was also steered by Zarina (2008) who studied the educational customizations tools and Roslina (2008) who proposed a framework of web-based games that can be adapted into teaching and learning process. Other similar researches investigate the historical aspects of educational game's design (Nor Azan & Wong, 2009) and the design of game-based learning for children (Nor Azli, et. al, 2008). The early investigation on the use of online games, particularly in Arabic language was conducted in discussing the design and development aspects and how the design and development research methods were employed in these research activities (Muhammad Sabri & Nor Aziah, 2009).

Evaluating the Educational On-line Games

In evaluating the effectiveness of educational online games, various instruments can be found from the related review of literature, based on the purpose of the study conducted. Some of the researchers conducted the evaluation for the online or digital games by evaluating the usability and effectiveness of online or digital games to users. For example, Garzotto (2007) described his evaluation by a set of characteristics for evaluating the effective of educational games under content, enjoyment and social interaction, as shown in Figure 1.1 below:

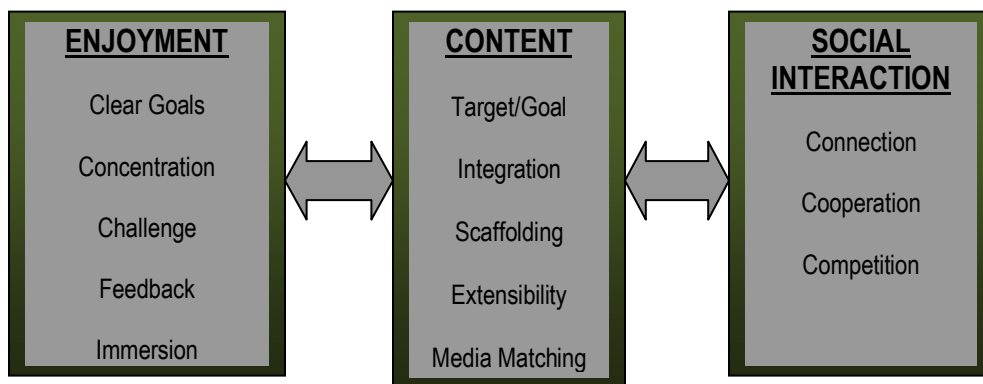


Figure 1: The characteristics of effective educational games modified from garzotto (2007)

In addition, Holsapple and Wu (2008) also proposed an evaluation framework for evaluating the effectiveness of online game by investigating the nine elements as follows: a) Online game quality, b) Website service quality, c) Perceived website security, d) Website interface design, e) Trust in online game websites, f) Attitude toward playing online games, g) Intention to play online games, h) Perceived usefulness of playing online games, i) Perceived ease of use of the online game website.

Lee, Cheon, and Key (2008), on the other hand, developed a specific instrument to investigate the learners' perceptions of video games for second/foreign language learning environment. Fu, Su & Yu (2008) constructed a particular scale to measure learners' enjoyment of e-learning games by measuring the eight following items: a) Concentration, b) Goal Clarity, c) Feedback, d) Challenge, e) Autonomy, f) Immersion, g) Social Interaction, and h) Knowledge Improvement.

Research Methodology

This paper employs mixed-method approaches and multiple instruments as suggested by Richey and Klein (2007) in the design and development research methods (DDR) in order to evaluate the usability, practicality and effectiveness of this online Arabic vocabulary learning games prototype. This methodology was first proposed by Brown and Collins in the early 1990s as further extension of other educational research methods (Wang & Hannafin, 2005). The evaluation was conducted among the different participants of experts, lecturers and learners as shown below in Table 1. The details of the instruments used in this evaluation process are shown in Figure 2. Some of the instruments used were modified from the above-mentioned instruments to fit the research questions, participants and the nature of surveys, and have been validated by several experts in the survey design.

The determination of sampling sizes and procedures for this formative evaluation phases were determined based on suggestions by Tessmer (1993). The selection purposely included pre-university IIUM students from Centre for Foundation Studies (CFS), IIUM in Petaling Jaya campus due to the Arabic course's syllabi and textbooks used in the learning content of this online Arabic vocabulary game's prototype. The participants were purposely selected to evaluate this game's prototype according to their computer skills, available time and venue for participating as well as their willingness and ability to work with the research team (Nor Aziah, 2006).

The design and development of this game prototype was a final product of a prior front-end analysis that was conducted among 115 learners and 13 lecturers. This analysis elicited learners' attitude towards Arabic language learning, their attitude towards playing ordinary video games and perceptions of utilizing online games in Arabic language learning (Muhammad Sabri & Nor Aziah, 2011).

Framework of Formative Evaluation Used

The framework used for the formative evaluation of this online Arabic vocabulary learning game's prototype was based on Tessmer (1993), Heineke and Willis (2001), and Richey and Klein (2007). Tessmer (1993) defined the evaluation process as a judgement of the strengths and weaknesses of its instruction in its developing stages, for purposes of revising the instruction to improve its effectiveness and appeal. There are four classically recognized types of this evaluation:

- a) expert review – experts in terms of content, technical, designer or instructor, with or without the presence of an evaluator.
- b) two-on-one evaluation – the review of two learners towards the instruction and giving his or her comments upon it with the evaluator.
- c) small-group test – the session in trying out the instruction between the evaluator and a group of learners to record their performance and comments.
- d) field test – the observation of an evaluator towards the certain instruction when it is tried out in a realistic situation with a group of learners.

The formative evaluation process conducted in this study was distributed into three phases of pre-formative evaluation, formative evaluation 1 and formative evaluation 2 as shown in Figure 2 below:

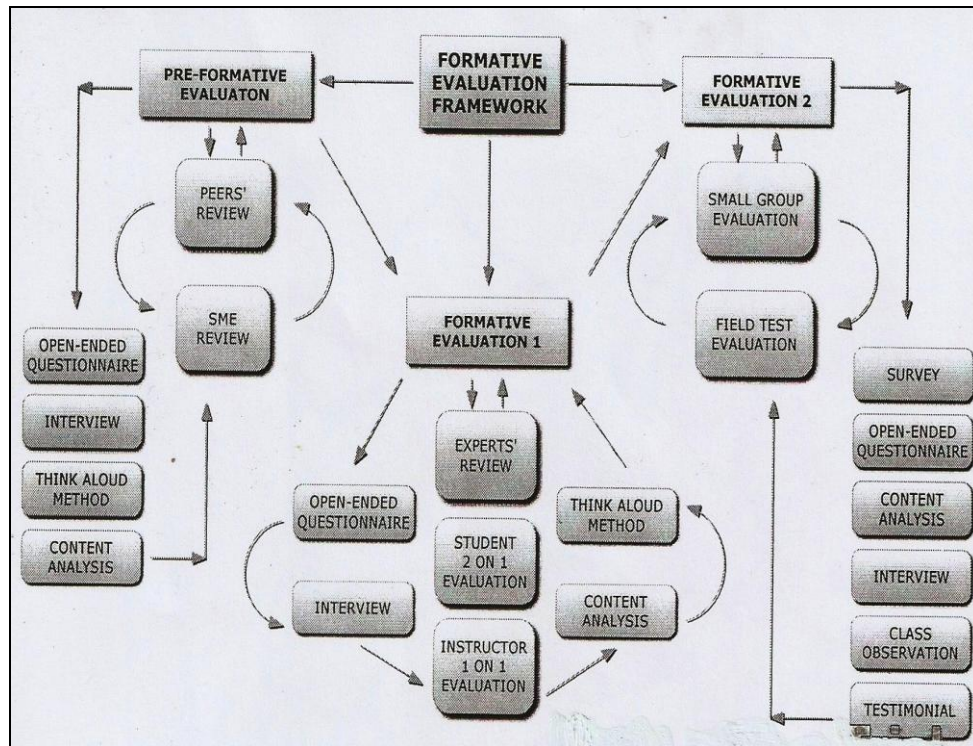


Figure 2: Adapted framework of formative evaluation

Research Questions and Distribution of Participants

Table 1 below displays the overall tabulation of all the participants at each stage of concerned formative evaluation in this paper.

Table 1: Research questions and distribution of participants

Research Questions	Participant
1- What are the characteristics of a valid and practical Arabic vocabulary learning games prototype?	a) Pre-Formative Evaluation - Peer review (1 lecturer) - SME in Arabic language (1 expert)
2 -To what extent will the implementation of online games learning improve learners' perception towards learning Arabic?	b) Formative Evaluation 1 - Experts' review (6 experts) - Learners' review (2 learners) - Evaluator's review (1 peer lecturer / asst. coordinator)
3- To what extent does the implementation of on-line games improve learners' concentration, immersion and knowledge improvement in learning Arabic as perceived by the users?	c) Formative Evaluation 2 - small group testing (16 learners) - field testing 1 (35 learners)
4- What are the strengths and weaknesses of the online Arabic vocabulary game as perceived by the users?	- field testing 2 (49 learners)

Results and Discussion

The results and discussion in this paper are based on the size and non-random selection of samplings that do not justify the use of any statistical test. Hence, all findings reported will be descriptive but sufficient to answer the research questions posed.

a) Evaluation of usability and practicality

The evaluation of usability and practicality of this online game's prototype was conducted among mix-participants of experts, peer lecturers and learners. The results are shown in Table 2 below:

Table 2: The Evaluation of usability and practicality
(Based on 1 – 10 Likert Scale)

Criterion(s) Evaluated	Pre-Formative Evaluation 1		Formative Evaluation 1 (Experts' Review)						Formative Evaluation 1 (2 on 1)		Formative Evaluation 1 (Peer Lecturer)
	Peer	SME	1	2	3	4	5	6	Stud. 1	Stud. 2	
Website Interface	5	9	6	7	8	6	5	8	7	7	8
Webpage Navigation	6	10	10	7	7	7	7	9	8	10	8

Table 2: Continued

Games Interface	8	9	9	7	10	7	7	9	8	9	8
Ease of Use	5	9	8	7	7	7	6	9	9	8	8
Level of Vocabulary Difficulty	8	10	NA	9	7	7	NA	9	10	10	7
Arabic Language Content (expert only)	6	10	NA	9	8	8	NA	8	NA	NA	7
Adherence of Design Principles (expert only)	NA	7	6	9	8	7	NA	8	NA	NA	NA
Level of Motivation	NA	10	8	7	8	6	NA	8	8	10	8
Level of Vocabulary Improvement (expert only)	7	9	NA	9	9	7	NA	7	8	10	8
Overall Practicality	NA	10	8	9	9	7	NA	8	NA	NA	NA
Average Scores	6.4	9.3	7.9	8.0	8.1	6.9	6.3	8.3	8.3	9.1	7.8

The NA (none available) responses indicate that certain questions have not been answered by some participants and users as they are of no relevance to the expertise of the various targeted participants and users.

b) Evaluation of perceived effectiveness

The results of descriptive statistical data for measuring learners' perception, concentration, immersion and knowledge improvement in using this online games prototype as perceived by learners are shown in Table 1.3 below :

Table 3: Mean score and interpretation of descriptive statistical data in measuring learners' perception, concentration, immersion and knowledge improvement

User Testing Session	Mean Score and Interpretation			
	Perception	Concentration	Immersion	Knowledge improvement
Small Group Evaluation	4.09 (High)	4.01 (High)	3.48 (Moderate High)	4.56 (High)

Field Test Evaluation 1	3.98 (Moderate High)	4.01 (High)	3.27 (Moderate High)	4.48 (High)
Field Test Evaluation 2	3.89 (Moderate High)	3.78 (Moderate High)	3.28 (Moderate High)	4.37 (High)

The interpretation of the previous mean scores was done based on categorization of interpretation as shown in Table 4 below.

Table 4: Categorization of interpretation

Mean Score	Interpretation
4.1– 5.0	High
3.1– 4.0	Moderate High
2.1– 3.0	Moderate Low
1.0 - 2.0	Low

Adapted from Zawawi (2008) & Norasikin (2009)

The previous results indicate the learners' perception, concentration, immersion and knowledge improvement as perceived by them between high and moderate high mean scores. The descriptive data is triangulated with the non-descriptive and qualitative analysis of data as discussed below.

c) Non-descriptive and Qualitative Analysis

The qualitative analysis of the responses gathered from the participants provides an insight into their most pressing concern for the evaluation of this online game's prototype, based on mix-instrumentations as shown below:

i) Interview protocols and Think-Aloud method:

The verbal responses were obtained through an interview protocols and think-aloud method. The responses could be categorized into several themes as the followings:

Games Design and Interface

- 1- *“Mmm it was interesting, but some games require immediate answer, the statements just disappeared quickly and lead to a mismatch of the answers, it was difficult to read the long sentences, it is OK if it is just a little bit slower.”* – FAST TIMER
- 2- *“I feel that it is ok ustaz, it was much more helpful and it is much easier to remember longer when we visually see the image.”* – IMPROVE VISUAL LEARNING

- 3- *“It is better if developed with a story narrative, just like in the maze (game), just change it a little bit, with beautiful graphics ...”* – DESIGN AND INTERFACE
- 4- *“Make the fonts larger, the games were just fine, improve the graphics to be more attractive, and some striking colour.”* – ARABIC FONTS
- 5- *“...Include some animations, perhaps”* – ANIMATION
- 6- *“The one (game) that requires clicking on top and bottom to match the game, because it can actually get me to give-up, for me la...”*. – GAMES ACTIVITIES

Technical Support

- 1- *“The internet connection was poor, no other problems”*. – INTERNET CONNECTION
- 2- *“No, I didn’t know how to use it (the dictionary), just appeared but I didn’t know (how to use), cannot understand, he he”*. – ONLINE DICTIONARY

Ease of Use

- 1- *“Before playing the games, I didn’t know what to do with the games. After playing it, then I know the games were helpful in what we know and have in our mind”*.

Effects on Learners’ Motivation

- 1- *“I feel surprised and excited, he he”*.
- 2- *“I want to play it again, it is enjoyable”*.
- 3- *“No problem, just need to add more Arabic words, but there were words that cannot be understood”*.

Reinforcement of Vocabulary Learning

- 1- *“I feel that it is ok ustaz, it was much more helpful and it is much easier to remember longer when we visually see the image.”* – IMPROVE VISUAL LEARNING
- 2- *“It seems enjoyable because we can find things that have been learnt in these games”*. – REINFORCEMENT OF PREVIOUS KNOWLEDGE
- 3- *“I understand the Arabic language that I never understood before, now I know it, it’s ok”*. – ACQUISITION OF NEW KNOWLEDGE
- 4- *“It seems like learning new words, I get to know new things, and find them hmm...”* – ACQUISITION OF NEW KNOWLEDGE

Suggestions for Further Improvement

- 1- *“It is better if developed with a story narrative, just like in the maze (game) , just change it a little bit, with beautiful graphics ...”* – DESIGN AND INTERFACE
- 2- *“Make the fonts larger, the games were just fine, improve the graphics to be more attractive, and some striking colour.”* – ARABIC FONTS
- 3- *“...Include some animations, perhaps”* – ANIMATION

ii) Open-ended Questionnaires

The responses gathered from the open-ended questionnaires were reported and summarized according to the following themes:

Initial and General Impressions

The participants expressed their positive responses and feedbacks on the first and general impression of the game's prototype. They found it an interesting, attractive, fun, the impressive, helpful, and beneficial way to learn Arabic. Negative responses described the words games as boring and monotype and childish, and another suggested for the games to include funny images and sounds.

Degree of Learners' Acceptance Towards Various Games

The responses have shown a mixed degree of learners' acceptance towards various games in this prototype.

Problems Faced By the Learners During Games Playing

The learners reported that the slow internet connection was the main problem during the evaluation session. Other mentioned difficulties were related to the understanding of new words and meanings, getting used to game's activities and could not read the Arabic instructions on the computer.

Positive Aspects in This Game's Prototype

The learners mentioned several categories of feedbacks in their views on the positive aspects of the game's prototype. The most mentioned criteria were the ability of this game's prototype to improve and enhance learners' knowledge in Arabic language, helpful in memorizing Arabic words, reflecting and applying previous knowledge, easy, enjoyable and fun learning approach and learning new words. It was also described as an easily accessible learning tool and helpful in measuring the degree of vocabulary knowledge among learners.

Negative Aspects and Weaknesses In The Game's Prototype and Suggestions For Further Improvements

The most mentioned weakness of this prototype is the slow internet connection in CFSIIUM. The connection problem may be due to high-traffic internet browsing usage by learners and staff. Other suggestions mentioned were related to creating more variety and challenging game's activities with updated features from time to time, improving

several learning objectives and clearer clues, designing a more interesting website interface, avoiding redundant colours, adding more sounds and graphics and designing games based on topics from the learning contents or text book.

Overall Influence of This Game's Prototype To Learners' Learning Attitude And Motivation

The responses show positive results on the overall influence of this game's prototype to learners' learning attitude and motivation. It is described as an increasing, interesting, motivating, easy, simple, enjoyable, and attractive learning tool that increased their tendency, motivation, confidence, and self-esteem in learning Arabic language.

iii) Class observation

There are four criterions observed during the implementation of this game's prototype. The analysis was based on video recordings taken during the sessions as in the followings:

Classroom Management and Facilities

The students' attendance during the two field-test evaluation sessions was very excellent with 13 out of 14 for the first class and 22 out of 23 learners from the other. The lab facilities were in good condition and ready for use as usual.

Learning Methods and Activities

It was observed that the learners were actually learning Arabic through the games played through employment of different methods such as in following learning instructions in the games and website, seeking help from instructors and researcher, discussion among users, utilizing connected tools available in the website such as the on-line dictionary and translator and referring to the game's glossary. One particular student was observed to constantly refer to her text book throughout the duration of the game and reveal her happiness and excitement in seeing the contents of the text book appearing on the game screen.

Problems Occurred During Implementation of Arabic Games Learning

There was no technical problem observed other than the slow internet connection. The games itself were in good condition after a prolonged period of changes and corrections made in several phases of formative evaluation conducted.

Practicality of Arabic Games Learning from Think-Aloud Method

The think-aloud method shows that the learners are motivated and interested in learning Arabic through games. In addition, they found the learning contents in the games as suitable for a fun vocabulary playing and learning session.

iv) Testimonials from teachers

The first teacher who participated in the implementation session of the games wrote:

“Some students take (some) time to refer to vocabulary (meanings) through online dictionary. So they have to share the games (play) with their friends to understand the games. Overall, all students are very happy to have (games learning) activity in the lab. They got new approach and the approach is very interesting”.

While the second teacher commented:

“The session is very attractive and can encourage the students to learn more about Arabic. It provides them with new alternative in learning new language”.

The above testimonials were indicative of the promising potential in using this online games prototype in encouraging learners in CFSIIUM to learn a new language.

Implications to the Current Situation of Arabic Language Learning

This paper depicts a research conducted in the design and development of an online Arabic vocabulary game's prototype in an institution of higher learning in Malaysia. Based on the previous discussions of results, this paper proposes the following suggestions for further research:

- a) ID THEORY: Using a modified ADDIE model for game-based research.
- b) ARABIC LANGUAGE LEARNING & LEARNING CONTENTS: Extension of game-based learning to other levels and fields of study in the Arabic language.
- c) TECHNICAL REQUIREMENT & GAME DESIGN: Improvement of Raptivity software – other software and IT facilities.
- d) GAME GENRE: Further exploration of using games in Arabic teaching & learning by using more attractive and futuristic games, e.g., Web 3.0 application, avatars, etc.
- e) ROLE OF LEARNING INSTITUTIONS: More supportive roles from educational institutions.
- f) EDUCATOR’S ROLE: More efforts in training educators with computer skills and literacy and roles in game-based learning.
- g) GAMES INTERFACE AND COLLABORATIVE LEARNING: Investigating the potentials of existing social-networking games.
- h) GAMES PLATFORM: Design and development of the game's prototype in other games console (mobile game-based learning, CD-based, web 2.0, web 3.0, simulation).
- i) EVALUATION OF GBL: Extension to summative evaluation and inferential statistical data analysis.
- j) IMPLEMENTATION OF GBL: Investigating other aspects during implementation, e.g.: interactions, learning strategies, achievement effects and supportive tools.
- k) SPECIFIC DESIGN OF GBL: Investigating the suitable theories on design and development of GBL to different learners, settings and contexts, e.g.: unique need's learners.

Samples Of Screenshots From The Online Games Prototype

The samples of screenshots for the evaluated online game's prototype are shown in the following Figure 3.



Figure 3: Samples of screenshot of online Arabic vocabulary learning games prototype

This game-based learning prototype allows lecturers and students access to additional Arabic language learning aid, in a gaming application, complementing the traditional learning methods. It facilitates vocabulary enhancement through a compendium and variety of games (34 games) in the on-line environment and supported with open sources of connected dictionary, online translator and game's glossary (in English and Arabic). The prototype provides a new learning experience for students who have been through a traditional Arabic teaching and learning methods, by immersing into the attractive, interesting and interactive game-based learning environment.

Conclusion

This paper presents a research evaluation that was conducted formatively in the design and development of an online Arabic vocabulary game's prototype among various participants of experts, teachers and learners through mix-method instruments. This research suggested an evaluation framework of mixed methods instruments to investigate the usability, practicality and effectiveness for an educational game specifically in Arabic language learning. The findings from various participants of experts, lectures and learners indicate that this online games application has the ability to improve and enhance learners' attitude, motivations and vocabulary acquisition in learning Arabic.

The researchers have successfully implemented the theoretical and practical framework evaluation of game-based learning among actual users and within authentic learning environments even though the game's prototype did not manage to meet the full ISSN: 1675-8021

expectation of learners and lecturers in the teaching and learning of Arabic language. However, a different set of evaluation framework may be necessary in other research setting because this study was specifically aimed at elementary-level Arabic learners following a specific course outline and most of the learners involved in this study were non-native speakers of Arabic language.

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Award and Recognition

This online Arabic vocabulary game's prototype also participated in several research exhibitions in IIUM (2010, 2011 & 2012), UiTM (2010) and Karnival Inovasi Islam at Putrajaya (2010). This game prototype won 2 silver and 1 bronze medals in research exhibitions organized by in UiTM (2010) and IIUM (2011 & 2012).

References

- Ashinida Aladdin, Afendi Hamat & Mohd. Shabri Yusof (2004). Penggunaan PBBK (Pembelajaran bahasa berbantuan komputer) dalam pengajaran dan pembelajaran bahasa Arab sebagai bahasa asing: Satu tinjauan awal. *GEMA Online™ Journal of Language Studies*, 4(1), 1-16.
- Alessi, S. M., & Trollip, S. R. (2001). *Multimedia for learning, methods and development*. Previous edition on 1991 was published under the title *Computer-Based Instruction: Methods and Development*. (3rd ed.) Massachusetts, USA: A Pearson Education Company
- Amory, A. (2001). Building an educational adventure game: theory, design and lessons. *Journal of Interactive Learning Research*, 12(2/3), 249-263.
- Ang, C.S., & Rao, R.K. (2008). Computer game theory for designing motivating educational software: a survey study. *International Journal on E-Learning*, 7(2), 181-199.
- Can, G., & Cagiltay, K. (2006). Turkish prospective teachers' perceptions regarding the use of computer games with educational features. *Journal of Educational Technology & Society*, 9 (1), 308-321.

- Chu, K.C. (2004). *Gender reaction to games for learning among fifth and eighth graders*. MA dissertation, Michigan State University, USA.
- Fu, F.L., Su, R.C., & Yu, S.C. (2008). EGameFlow: A scale to measure learners' enjoyment of e-learning games. *Science Direct E-Journals*, 52(1), 101-112.
- Garzotto, F. (2007). *Investigating the educational effectiveness of multiplayer online games for children*. Paper presented at the Interaction Design and Children (IDC 2007), Aalborg, Denmark
- Heineke, W. F., & Willis, J. (2001). *Methods of evaluating educational technology*. Connecticut, USA: Information Age Publishing
- Holsapple, C. W., & Wu, J. (2008). Building effective online game websites with knowledge-based trust. *Higher Education*, 10(1), 47-60.
- Lee, Y., Cheon, J. & Key, S. (2008). Learners' perceptions of video games for second/foreign language learning. In K. McFerrin et al. (Ed.), *Proceedings of society for information technology and teacher education international conference 2008* (pp. 1733-1738). Chesapeake, VA: AACE.
- McFarlane, A., Sparrowhawk, A., & Heald, Y. (2002). Report On Educational Use Of Games, An Exploration By TEEM Of The Contribution Which Games Can Make To The Education Process. (Online) Retrieved 31 December 2008 from, http://www.teem.org.uk/publications/teem_gamesined_full.pdf
- Mohd Feham Md Ghalib & Isarji Sarudin (2000). On-line Arabic: Challenges, limitations and recommendations. *Proceedings of National Conference on Teaching and Learning in Higher Education*, Universiti Utara Malaysia, Kedah, 231-239.
- Muhammad Sabri Sahrir & Nor Aziah Alias (2009). A design and development approach to researching online Arabic vocabulary games learning in IIUM. In Posiah Mohd Isa, et. al. (Ed.), *International Conference on e-Learning 2009 e-Proceedings/ i-Learn Centre, UiTM*. Electronic Form: 310. Joint publisher: i-Learn Centre with University Publication Centre, UiTM
- Muhammad Sabri, Sahrir & Nor Aziah, Alias (2011). A study on Malaysian language learners' perception towards learning Arabic via online games. *GEMA Online™ Journal of Language Studies*, 11(3), 129-145.
- Norasikin Fabil (2009). *Aplikasi teknik graph view dalam pemvisualan maklumat Sanad domain Ilmu Hadis. (Application of graph view techniques for visualizing information of Sanad in domain science of Hadith)*. Unpublished PhD Dissertation, Universiti Kebangsaan Malaysia, Bangi.

- Nor Azan Mat Zin, & Wong, Seng Yue (2009). History Educational Games Design. (Online) Retrieved 5 May 2012 from, <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5254775&isnumber=5254768>
- Nor Aziah Alias (2006). *Design and development of a 'learning console' to scaffold the adult online distance learners' motivational self-regulation and self-direction*. Unpublished doctoral dissertation, International Islamic University Malaysia (IIUM).
- Noor Azli Mohamed Masrop, Nor Azan Mat Zin, & Shamsul Bahri Che Wan (2008). Digital games-based learning for children. (Online) Retrieved 7 May 2012 from, <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5254775&isnumber=5254768>
- Pivec, M., Koubek, A., & Dondi, C. (2004). *Guidelines for game-based learning*. Germany: PABST Science Publishers.
- Prensky, M. (2001). *Digital game-based learning*. Edition 2007, USA: Paragon House
- Richey, R.C., & Klein, J.D. (2007). *Design and development research*. New Jersey, USA: Lawrence Erlbaum Associates, Inc.
- Roslina Ismail & Azizah Jaafar (2008). *Web-based educational games as a learning tool: Issues and challenges on design and development perspective in Malaysia*. Proceeding in the 4th International Conference on University Learning and Teaching, 421-432, on 20-21 October 2008 organised by UiTM Shah Alam, Malaysia in collaboration with University of Hertforshire, UK
- Squire, K. (2005). Game-based learning: Present and future of state of the field. (Online) Retrieved 7 May 2012 from, http://www.masieweb.com/dmdocuments/Game-Based_Learning.pdf
- Wang, F., & Hannafin, M.J. (2005). Design-based research and technology-enhanced learning environments. *ETR&D*, 53(4), 5-23.
- Whitton, N. (2010). Learning with Digital Game, A Practical Guide To Engaging Students: Present And Future Of State Of The Field. (Online) Retrieved 7 May 2012 from, http://www.masieweb.com/dmdocuments/Game-Based_Learning.pdf
- TEMU. (2005-2009). *Report of percentage failure in Arabic subjects and reasons*. Source: Testing and Measurement Unit (TEMU), Quranic Language Department (QLD), Centre for Foundation Studies (CFS), International Islamic University Malaysia (IIUM).

- Tessmer, M. (1993). *Planning and conducting formative evaluations, improving the quality of education and training*. London: Kogan Page Limited.
- Tuzun, H. (2004). *Motivating learner in educational computer games*. Doctoral dissertation, Indiana University, USA. Retrieved from ProQuest Theses, UMI number in higher education. New York and London: Routledge Taylor & Francis Group.
- Zarina Che Embi & Hanafizan Hussain (2005). Analysis of local and foreign edutainment products - An effort to implement the design framework for an edutainment environment in Malaysia. Multimedia University, Malaysia. *The Journal of Computers in Mathematics and Science Teaching*, 24(1), 27-42.
- Zarina Che Embi (2008). The implementation of framework for edutainment: Educational games customization tool. (Online) Retrieved 7 May 2012 from, <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4631554&isnumber=4631524>
- Zawawi Ismail (2008). *Penilaian pelaksanaan kurikulum kemahiran bertutur bahasa Arab komunikasi di Sekolah Menengah Kebangsaan Agama. (Evaluation of implemented curriculum of speaking skill in Arabic communicative subjects in religious secondary schools)*. Unpublished PhD Dissertation, Universiti Kebangsaan Malaysia, Bangi

About the authors

Muhammad Sabri Sahrir (Ph.D) is currently an academic staff at Department of Arabic Language and Literature, KIRKHS, International Islamic University Malaysia (IIUM). His research interests are curriculum development and evaluation, educational technology, and teaching Arabic as a foreign language.

Ghazali Yusri (PhD) is currently an academic staff at Academy of Language Studies, Universiti Teknologi MARA Shah Alam. His research fields are Arabic language teaching, curriculum evaluation, educational psychology, language learning strategies, testing and evaluation.