

# **Arabic Language Learning (ALL) for Kids**

**TRIGUI Mohamed Salim**

**Universiti Utara Malaysia**

**2009**

# **Arabic Language Learning (ALL) for Kids**

**A thesis submitted to college Arts & Sciences  
in partial fulfillment of the requirement for the degree  
Master of Science (Information Technology)  
University Utara Malaysia**

**By**

**TRIGUI Mohamed Salim**

**@TRIGUI Mohamed Salim, April 2009. All rights reserved**

# PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirements for a postgraduate degree from University Utara Malaysia, I agree that the University Library may make it freely available for inspection. I further agree that permission for copying of this thesis in any manner, in whole or in part, for scholarly purpose may be granted by my supervisor(s) or, in their absence by the Dean of the Graduate School. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to University Utara Malaysia for any scholarly use which may be made of any material from my thesis.

Requests for permission to copy or to make other use of materials in this thesis, in whole or in part should be addressed to:

Dean of Graduate School

Universiti Utara Malaysia

06010 Sintok

Kedah Darul Aman

Malaysia

# ABSTRACT

Arabic Language has an exceptional position in Islam. It is the language of Quran, thus the need to learn and understand Arabic amongst Muslims is of paramount importance. For countries where their native language is not Arabic, the language is only taught in special schools. Arabic language needs to be introduced to children at early ages such as in the kindergarten. With the advent of computer technology, various kind of multimedia tools have been developed for the purpose of language learning. Since children are attracted to computer applications especially those that involve multimedia, there is a need to develop Arabic language learning applications for them. Even though there are few applications available in the market for that purpose, most of them do not fully utilize the multimedia elements. The prime objective of this study was to propose an Arabic Language Learning (ALL) for kids of ages between 4 to 6 years old that enable them to learn the language. In the process, an interactive field-tested ALL for kids has been developed as an alternative to the traditional learning tools. The results of user evaluation on the ALL indicate that it has good usability in terms of Learnability, Usefulness, Ease of Use and Outcome/Future Use. The results also indicate that there is a significant difference between novice and expert users for Usefulness and Ease of Use, while no significant difference for learnability and Outcome/Future Use.

# ACKNOWLEDGEMENT

*By the Name of Allah, the Most Gracious and the Most Merciful*

Alhamdulillah, thanks to Allah SAW that finally this project was finally complete. I would like to acknowledge the following person whose support has been very significant in ensuring the successful completion of this project.

First and foremost, I am grateful to my supportive and helpful supervisor Assoc. Prof. **Abdul Nasir Zulkifli** for assessing and guiding me in the completion of this research. With all truthfulness, without them, the project would not have been a complete one. They have always been my source of motivation and guidance. I am truly grateful for them continual support and cooperation in assisting me all the way through the semester.

Finally, I wish to thank all my dearest family members, especially Dad, Mum, and my great brothers and sister for being by my side since I left home. For their continuous support, understanding and encouragement until this project has finally finish. I am indeed very grateful to have all of you around me thus given me courage and energy to complete this project. Also thank to all my lecturers and friends who help me and give me emotional support during my study, Thanks to all.

Thank you UUM

# TABLE OF CONTENT

PERMISSION TO USE.....	<b>Error! Bookmark not defined.</b>
ABSTRACT.....	<b>Error! Bookmark not defined.</b>
ACKNOWLEDGEMENT.....	iii
TABLE OF CONTENT.....	iv
LIST OF TABLES.....	<b>Error! Bookmark not defined.</b>
LIST OF FIGURES.....	vii <b>Error! Bookmark not defined.</b>
LIST OF ABBREVIATIONS.....	x
<b>CHAPTER 1: INTRODUCTION.....</b>	<b>Error! Bookmark not defined.</b>
1.1 Background.....	<b>Error! Bookmark not defined.</b>
1.2 Problem Statement.....	4
1.3 Research Question.....	4
1.4 Objective.....	4
1.5 Scope and Limitations.....	5
1.6 Significance of the Study.....	5
1.7 Organization of the report.....	6
1.8 Summary.....	7
<b>CHAPTER 2: LITERATURE REVIEW.....</b>	<b>8</b>
2.1 Concepts and definitions.....	8
2.1.1 Multimedia.....	8
2.1.2 Interactivity.....	9
2.1.3 E-Learning.....	9
2.2 New technologies and language learning.....	10
2.3 Technology integration in teacher education.....	12
2.4 The instructional relationship.....	<b>Error! Bookmark not defined.</b>
2.5 Interactive multimedia research.....	<b>Error! Bookmark not defined.</b>
2.6 Multimedia CALL.....	<b>Error! Bookmark not defined.</b>
2.7 Arabic as a foreign language.....	<b>Error! Bookmark not defined.</b>
2.8 Some examples of Arabic language learning that have been done in Malaysia.....	20
2.9 Comparison between some different arabic language software.....	21
2.9.1 Arabic FlashCards.....	21
2.9.2 Read/Write Arabic.....	22
2.9.3 Marhaba for Arabic language learning.....	23
2.10 The advantages of implementing multimedia educational applications.....	24
2.11 Summary.....	26

<b>CHAPTER 3: METHODOLOGY</b> .....	27
3.1 Background of SDRM .....	27
3.2 Conceptualization .....	28
3.3 Information Gathering .....	29
3.4 Prototype Design .....	30
3.4.1 The architecture of the application .....	31
3.4.2 Creating Application Flowchart .....	34
3.4.3 Designing navigation .....	<b>Error! Bookmark not defined.</b>
3.4.4 Designing storyboard .....	36
3.4.5 Designing the interface .....	37
3.5 Prototype Development .....	39
3.6 Evaluation .....	44
3.7 Summary .....	47
<b>CHAPTER 4: DATA ANALYSIS AND FINDING</b> .....	48
4.1 Introduction .....	48
4.2 Requirements of the system .....	49
4.3 Requirements of the prototype design .....	<b>Error! Bookmark not defined.</b>
4.4 Development of prototype .....	50
4.5 Usability evaluation .....	61
4.6 Validity and reliability .....	63
4.7 Comparison between Novice and Expert groups .....	66
4.8 Summary .....	67
<b>CHAPTER 5: DISCUSSION OF RESULTS</b> .....	68
5.1 Introduction .....	69
5.2 Discussion .....	69
5.3 Conclusion.....	70
5.4 Summary .....	71
<b>CHAPTER 6: CONCLUSION AND RECOMMANDATION</b> .....	72
6.1 conclusion .....	72
6.2 Future works.....	74
6.3 Summary .....	74
<b>REFERENCES</b> .....	76
<b>APPENDIX A: USER MANUAL FOR ALL</b> .....	85
<b>APPENDIX B: STORYBOARD FOR ALL</b> .....	86
<b>APPENDIX C: SURVEY QUESTIONNAIRE</b> .....	93

# LIST OF TABLES

<b>NO</b>	<b>NAME OF THE TABLE</b>	<b>PAGE</b>
2.1	Examples of Arabic language software	20
2.2	Highlighting the interests in Arabic FlashCards. ( <i>Source: Adopted from Declan, 2008</i> )	22
2.3	Highlighting the interests in Read/Write Arabic. ( <i>Source: Adopted from Declan, 2008</i> )	23
2.4	Highlighting the interests in Marhaba for Arabic language learning ( <i>Source: Adopted from Almeske, 2009</i> ).	24
3.1	Likert Scale Classification	49
4.1	Description of main page	51
4.2	Description of page songs	52
4.3	Description of page coloring	53
4.4	Description of page geometric	54
4.5	Description of page Arabic language	55
4.6	Description of page colors	56
4.7	Description of page games	57
4.8	Description of page numbers	58
4.9	Description of page projects	59
4.10	Demographics Data Summary	62
4.11	Cronbach Alpha Values for All Dimensions	64



4.12	Descriptive Statistics for All Measures	65
4.13	Descriptive Statistics for All Items	66
4.14	Mean, Standard Deviation and Paired t-test for all measures	67

# LIST OF FIGURES

<b>NO</b>	<b>NAME OF THE FIGURE</b>	<b>PAGE</b>
1.1	E-learning concept (Australian Flexible Learning Framework, 2008)	2
2.1	The instructional relationship between the teacher, students and technology in the conventional and multimedia mediated constructivist learning modes	13
2.2	The main page of Arabic FlashCards software	21
2.3	The main page of Read/Write Arabic software	22
2.4	The main page of Marhaba software	23
3.1	System Development Research Methodology (SDRM)	31
3.2	: Alternative frameworks based on ten putative nodes	35
3.3	Structure of the system: hierarchical mode	35
3.4	Structure of the system: Linear mode	36
3.5	Combination between Mode Linear and hierarchical mode with backspace	36
3.6	The Flowchart of the Application	37
3.7	The Navigation Scheme of the Application	39
3.8	An example of blank storyboard document	40
3.9	Multimedia Interface Cycle (source: Yoshinobu, 1997)	42
3.10	The Prototyping Processes Adapted from (Laudon & Laudon, 2000)	44

4.1	Use case diagram for ALL	50
4.2	Home Screen	60
4.3	Interface of the main menu	60

# LIST OF ABBREVIATIONS

ALL	Arabic Language Learning for kids
DL	Distance Learning
E-Learning	Electronic Learning
CD ROM	Compact-Disk ROM
IEM	Interactive Educational Multimedia
PC	Personnel Computers
IMM	Interactive Multimedia
PUEU	Perceived Usefulness and Ease of Use
SPSS	Statistical Package for the Social Sciences
UML	Unified Modelling Language
CALL	Computer Assisted Language Learning
WWW	World Wide Web
AFL	Arabic as a Foreign Language
SDRM	System Development Research Methodology
UUM	University Utara Malaysia
WML	Wireless Markup Language

# Arabic Language Learning (ALL) for Kids for ICIT 2009

TRIGUI Mohamed Salim  
Universiti Utara Malaysia, Malaysia  
mstrigui@yahoo.com

ABDUL NASIR Zulkifli  
Universiti Utara Malaysia, Malaysia  
nasirzul@uum.edu.my

## ABSTRACT

Arabic Language has an exceptional position in Islam. It is the language of Quran, thus the need to learn and understand Arabic amongst Muslims is of paramount importance. For countries where their native language is not Arabic, the language is only taught in special schools. Arabic language needs to be introduced to children at early ages such as in the kindergarten. With the advent of computer technology, various kind of multimedia tools have been developed for the purpose of language learning. Since children are attracted to computer applications especially those that involve multimedia, there is a need to develop Arabic language learning applications for them. Even though there are few applications available in the market for that purpose, most of them do not fully utilize the multimedia elements. The prime objective of this study was to propose an Arabic Language Learning (ALL) for kids of ages between 4 to 6 years old that enable them to learn the language. In the process, an interactive field-tested ALL for kids has been developed as an alternative to the traditional learning tools. The results of user evaluation on the ALL indicate that it has good usability in terms of Learnability, Usefulness, Ease of Use and Outcome/Future Use. The results also indicate that there is a significant difference between novice and expert users for Usefulness and Ease of Use, while no significant difference for learnability and Outcome/Future Use.

Key Words: Arabic language, foreign language, interactive, multimedia

## 1. Introduction

With technological advances, multimedia has become a new medium that provides interactivity on new media. It affects the way we learn, work, and play such as websites, multimedia software compact-disk ROMs (CD ROMs), and encyclopedias [1]. In the 21<sup>st</sup> century, the use of multimedia software CD ROMs has increased rapidly [2]. The changes in multimedia technology definitely had resultant effects on all aspects of our life. We use this technology in many domains such as commercial, promotional, education and training applications [3]. It provides highly effective utilization for

people that can get the information that they need, when they need it without matter where they are located [4]. One of the basic types of e-learning is using Interactive Educational Multimedia (IEM) support. It means this supports are used to be an instrument of learning. Tutorials and exercises are done virtually using this support. The kids will undergo learning process, which comprises of audio, visual and interactive features via the supports.

The overall intention of this study is to provide non-Arabic speaking kids with a tool to learn the language in attractive and enjoyable ways. This study may be used by

teachers in kindergartens to introduce the children to a foreign language and can be done with minimum supervision.

## **2. New Technologies And Language Learning**

There seemed to be many new media technologies that have the possibility to assist in language learning [6]. Examples of paper-based language technologies include dictionaries and books, through language laboratories, audio tapes, television programs, Interactive CD ROMs, Internet and mobile technologies [7]. Some of these technologies have satisfied their promise, while others are considered as limited or complete failures [8]. The reasons for the failure of a technology to make a mark are diverse. For instance, their pedagogical effectiveness may be doubtful [8]. In fact, new language teaching technologies have too often tended to be accompanied by a step backwards in pedagogy, with developers showing an inclination to put too much trust in the originality factor [9]. This study concerned with "learner acceptance", i.e. the readiness of the learner to use the technology as part of their learning strategy. While "captive learners", such as children in school, may have to accept their teacher's choice of technologies. This study reports on the approaches that a number of independent learners have adopted towards their language learning and their attitudes towards a range of language technologies. The aim is to understand their motivations, the methods that they found useful and the problems they met. This should help to recognize opportunities for matching the abilities of using interactive software to the real needs of language learners [6].

Learning with multimedia is promising and growing. It has changed teacher's perception as well as learner's about learning. A study by [10] indicates that multimedia mediated based instruction motivates learners to work

in a couple and create their own solutions to problems. Multimedia motivates learners to continue learning and obtain knowledge faster and above all sustain the knowledge gained [11].

## **3. Related Research On Online Learning**

### **3.1 Research on language learning**

Based on study by [30], Bahasa Arab Interaktif Kurikulum (BAIK) and Traditional method of teaching the Arabic as foreign language learning for children in the classroom generally had positive effects on students' comprehension skills. However, it is interesting to note that learners taught via BAIK significantly outperformed the students taught via traditional methodology. *Bahasa Arab Interaktif Kurikulum* (BAIK) and Traditional method of teaching the Arabic as a foreign language learning in the classroom generally had positive effects on students' comprehension skills. However, it is interesting to note that learners taught via BAIK significantly outperformed the students taught via traditional methodology.

*T*-test results revealed that there is a significant increase in students' comprehension skills compared to that of the traditional method of learning the Arabic language [30]. This indicates that learners in BAIK increased their comprehension skills significantly compared to the traditional teaching method. The Arabic vocabulary delivery method helped them to achieve significant comprehension skills. The Arabic vocabularies were supported by sounds, pictures, repetition and Malay translation for an effective learning. This is in conformity with Mayer's Multimedia learning principles stating that students learn better with pictures, animation and sound rather than words alone [30].

A study conducted by [12] reports a French language learning designed for the students

at City university in London. The platform of the study used a WebCT. It was run together with face to face courses for lower intermediate level students. Moreover, the main objective of the online course was to investigate whether independence could be achieved by collaborative learning and self-assessment. The objective was to apprehend the students' assessment on the level of competence and their linguistic progress online. The feedbacks were collected and analyzed to examine whether the online course could smoothen the progress of their learning process and their learning autonomy. The result proved that the students' learning style could explain their degree at autonomy in learning. That is, the students who showed more independent skills in their studies were likely to be more autonomous than the students who preferred face to face learning.

### **3.2 Interactive Multimedia (IMM) Research**

The probable of IMM for education has been considered widely in the 90's and continued to be investigated. For example, [13] found that multimedia to be an effective approach for providing pre-service teachers with pre-observational experiences. In a similar area, [14] studied the utility of understanding teaching (an IMM program) for pre-service teachers. His study showed that the program was extra effective for using multimedia system than the standard book.

More studies discussed the effect of multimedia and their potential for learning and teaching have concentrated on students' knowledge gains as well as on issues concerning the effective design of interactive multimedia environments [15]. Some of these studies focused on specific multimedia programs that were developed to achieve specific goals. Findings from a study by [16] indicated that IMM had a significant effect on both students' achievement and their problem solving skills. Similarly, [17] found that the experimental group had significant

improvement gain in self-learning ability apart from of other variables. Experimental treatment included use of the interactive multimedia module. His conclusion was the program is instructionally effective and feasible for use. The interactive multimedia program is an effective, self-sufficient source for individualized education.

Based on study by [18], the relative usefulness of two instructional media (an IMM CD-ROM, and a videotape) for helping users learns ESL (English For Second Language) teaching strategies. Results showed that a significant differentiation among the two groups in understanding gain of ESL strategies. Users were able to recognize more strategies than Videotape users.

A study by [20] on a Japanese language learning tutor program showed that students' accomplishment enhanced tremendously and their approach indicated an interested student response. All aforementioned studies shared one common finding which is the effectiveness of IMM for learning and teaching and its potential for enhancing teaching methods and learners' knowledge gain if designed and used perfectly. [18] concluded that IMM may always be effective. Its effectiveness depends on many factors such as the nature of IMM, the students' who used it, the way of instruction, and the time span of using it.

## **4. Arabic Language Learning (ALL) For Kids**

ALL consists of five main sections which include i) letters learning, ii) letters writing, iii) letters order, iv) structure words and v) structure sentences. Fig 1 (a), (b), (c), (d) and (e) show snapshots of the main sections. The methodology for this study was adapted from the System Development Research Methodology (SDRM) [23]. The adapted methodology consists of five phases; i)

Conceptualization, ii) Information gathering, iii) Prototype design, iv) Prototype development and v) Evaluation.



Fig 1 (a): Snapshots of the letters learning



Fig 1 (b): Snapshots of the letters writing



Fig 1 (c): Snapshots of the letters order

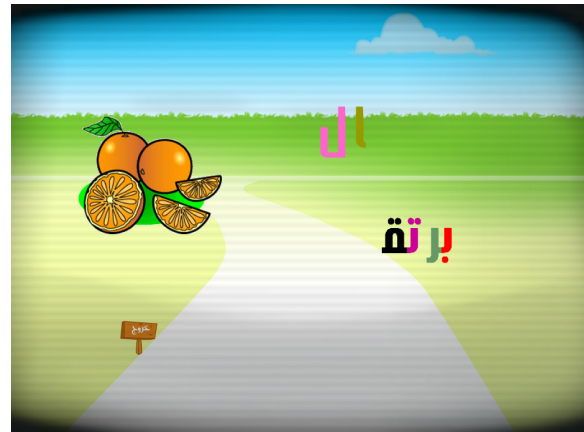


Fig 1 (d): Snapshots of the structure words



Fig 1 (e): Snapshots of the structure sentences

## 5. User Evaluation of ALL

User evaluation was conducted to determine users' perception on the usability aspect of the ALL prototype. The instrument was adapted from [24] and [25]. The instrument covers three dimensions: *Learnability*, *Usefulness*, *Ease of Use* and *Outcome/Future Use*.

### 5.1 Instrument For User Evaluation

For user evaluation, a set of questionnaire which comprises of General Information and User Evaluation sections was used. The General Information section functions as a mechanism to collect users' demographic data and users' experience and knowledge with the computer. The user evaluation section is intended to collect data on users' opinion regarding the ALL prototype



usability aspects. A 5-point Likert scale anchored by "Strongly Disagree" (1) and Strongly Agree (5) was used.

## 5.2 Method For User Evaluation

The ALL user evaluation was conducted on thirty respondents and they were selected using convenient sampling technique. Respondents consist of parents and teachers. Each respondent was given brief explanation regarding the usage and the user interface of the ALL prototype. Each user was allocated ample time to try and explore the content of the prototype. Once they were done, users were given a questionnaire for user evaluation.

## 6. Results

Descriptive statistics, reliability analysis and t-test were used in this study. SPSS version 13 for Windows was used to analyze the data. Results from the descriptive, reliability, and t-test analyses will be discussed in the following section.

As far as the gender is concerned, 18 (60.0%) of the respondents were males and 12 (40.0%) were females. Based on the race, 18 (60%) were Asian, 6 (20%) were Arabs, and 6 (20%) were from others. For their native language, 12 (40%) of them is Malay, 6 (20%) is Arabic, 10 (3%) Chinese, and the rest 9 (30%) is various languages. The respondents' experience and knowledge with computer were assessed in order to be grouped as novice or expert. 16 (53.3%) were categorized as novices and 14 (46.7%) as experts. The percentages tell that the respondents' computer experience would not change their preference and expectation. A minimum of eight users are required for reliable measures for each variance in the data. Thus, there is sufficient number of participants for each group [26].

Both validity and reliability were addressed for the usability evaluation questionnaire. The validity of a questionnaire is the degree

to which the questionnaire is actually measuring or collecting data about what the researcher thinks it should be measuring or collecting data about. One of the most commonly reliability coefficient used is Cronbach Alpha [27]. The reliability of a questionnaire is the ability of the questionnaire to give the same results when filled out by like-minded people in similar circumstances. It is usually expressed on a numerical scale from zero (very unreliable) to one (extremely reliable) [29].

Thus, Cronbach alpha values were calculated using SPSS 13.0 to determine the data inter-item reliability which assesses the degree of internal consistency between multiple measurements of a dimension. Table 1 presents the Cronbach alpha value for each measure. The *Learnability*, *Usefulness*, *Ease of Use* and *Outcome/Future Use* measures have Cronbach alpha of greater than 0.7, thus, these measures satisfy the internal reliability criterion.

**Table 1:** Cronbach Alpha Values for All Dimensions.

Measure	Number of items included	Cronbach Alpha
Learnability	8	0.738
Usefulness	6	0.723
Ease of use	6	0.736
Outcome/ future use	4	0.775

Usability evaluation from users' perspective is important in obtaining users' opinion towards the usability of the ALL. The descriptive statistics for all the measures are presented in Table 2. A one-way Chi-Square test of homogeneity was conducted on the responses for all the items. A significant p-value indicates that the responses are not equally distributed across the items. As shown in Table 2, the results are positive with p-values significant at 0.01

for *Learnability, Usefulness, Ease of Use and Outcome / Future Use*.

**Table 2:** Descriptive Statistics for All Measures.

Measure	N	Mean	Std. Deviation	P (Chi-Square)
Learnability	30	4.06375	0.837625	.000*
Perceived Usefulness	30	3.9583333	0.8948333	.083*
Perceived Ease of use	30	4.1566667	0.83	.006*
Outcome / future use	30	3.915	0.8475	.057*

\*: Significant at the 0.01 level.

Table 3 shows the descriptive statistics for all the items. Twelve items with means more than 4 are bolded which indicate that most of the participants agreed on these items and just neutral on the rest of the items that are related to the ALL. Overall, the results indicate that the participants agreed that ALL has good usability.

**Table 3:** Descriptive Statistics for All Items.

	Item	Mean	Std. Deviation
<b>(ALL) LEARNABILITY</b>			
1	It was easy to learn to use ALL.	3.97	0.928
2	The information provided by ALL was easy to understand.	<b>4.27</b>	0.907
3	The information provided in ALL helped me in teaching process.	3.93	0.868
4	It provides clarity of wording.	<b>4.27</b>	0.785
5	Data grouping is reasonable for easy teaching.	3.80	0.847
6	The ordering of information is logical.	3.80	0.961
7	The command names are meaningful.	<b>4.20</b>	0.714
8	It provides no penalty teaching.	<b>4.27</b>	0.691
<b>(ALL) PERCEIVED USEFULNESS</b>			
9	Using (ALL) would enable me to accomplish tasks more quickly	<b>4.01</b>	0.860
10	Using (ALL) would improve my job performance	3.87	0.923
11	Using (ALL) in my job would increase my	3.93	0.973

	productivity		
12	Using (ALL) would enhance my effectiveness on the job	3.97	0.910
13	Using (ALL) would make it easier to do my tasks	<b>4.20</b>	0.805
14	I would find (ALL) useful in my job	3.77	0.898
<b>(ALL) PERCEIVED EASE OF USE</b>			
15	Learning to operate (ALL) would be easy for me	<b>4.50</b>	0.682
16	I would find it easy to get (ALL) to do what I want it to do	3.97	0.850
17	My interaction with (ALL) would be clear and understandable	<b>4.10</b>	0.803
18	I would find (ALL) to be flexible to interact with	<b>4.13</b>	0.973
19	It would be easy for me to become skillful at using (ALL)	3.97	0.765
20	I would find (ALL) easy to use	<b>4.27</b>	0.907
<b>(ALL) OUTCOME/FUTURE USE</b>			
21	I was able to complete my teaching quickly using ALL	<b>4.23</b>	0.728
22	I could effectively complete my teaching using ALL	3.70	0.915
23	I was able to efficiently complete the teaching using ALL	3.53	0.986
24	From my current experience with using ALL, think I would use it regularly	<b>4.20</b>	0.761

### 6.1 Comparison between Novice and Expert Groups

Independent samples t-test was used to compare the mean values between novice and expert groups for all the measures in order to signify the differences statistically. Table 4 shows the means, standard deviations and paired t-test for all the measures. Based on the paired t-test, as the significance values are less than 0.05 [28], there was significant difference between novice and expert groups for usefulness and ease of use. However, there was no significant difference between novice and expert groups for learnability and outcome/future use.

**Table 4:** Mean, Standard Deviation and Paired t-test for all measures

Measures	Group	N	Mean	Std. Deviation	Std. Error Mean	t	df	Sig
Learnability	Novice	16	4.0562	0.84475	0.21125	0.4859	28	0.48
	Expert	14	4.07125	0.826125	0.220625	0.501	26.95	
Usefulness	Novice	16	4.05333	0.90216	0.2255	2.039	28	.001
	Expert	14	3.84667	1.01333	0.2706667	1.992	25.9165	
Ease of use	Novice	16	4.13833	0.80667	0.2016667	3.484	28	.002
	Expert	14	4.178333	0.88	0.235	3.645	26.4875	
Outcome/ Future Use	Novice	16	3.7675	0.924	0.23125	4.121	28	.609
	Expert	14	4.0925	0.794	0.21225	4.202	27.5095	

## 7. Conclusion

Arabic Language Learning for kids was developed to help children to learn Arabic language. The prototype was evaluated and the results indicate that it was designed with good usability. The *Learnability*, *Usefulness*, *Ease of Use* and *Outcome/Future Use* measures have Cronbach alpha of greater than 0.7, thus, they satisfy the internal reliability criterion. Results of user evaluation on the ALL indicate that there is a significant difference between novice and expert users for *Usefulness* and *Ease of Use*, while no significant difference for *learnability* and *Outcome/Future Use*. Results from this study indicate that the multimedia learning environment such as ALL motivated kids to continue learning the Arabic Language at home. The findings of this study concur with other numerous studies in the field of multimedia language learning [29], [14] and [30]. It is hoped that the findings of this study will encourage kindergartens to incorporate ALL into their curriculum for teaching and learning in order to improve and enhance the children understanding and knowledge regarding Arabic language.

## References

- [1] W. Hudetz and M. Friedewald, "Multimedia Product Documentation-User Requirements," 2002.
- [2] T. Vaughan, *Multimedia: Making it Work*, seventh ed: McGraw-Hill Osborne, 2006.
- [3] C. Barry and M. Lang, "A survey of multimedia and Web development techniques and methodology usage," *Journal of Multimedia, IEEE*, vol. 8, pp. 52-60, 2001.
- [4] T. Taguchi, T. Umemoto, M. Naniwada, A. Garden, T. Amano, and K. Tabata, "A case study of the effectiveness of distance learning materials in higher education and suggestions for improvement," presented at Systems, Man, and Cybernetics, Tokyo, Japan, 1999.
- [5] A. Sharpe and L. Gharani, "Trend Productivity in the New Economy: A Survey," vol. Master degree. Montreal, Quebec: McGill University, 2001, pp. 65.
- [6] S. Fallahkhair, J. Masthoff, and L. Pemberton, "Learning Languages from Interactive Television: Language Learners reflect on Techniques and Technologies," presented at World conference on Educational Multimedia, Hypermedia and Telecommunications Switzerland, 2004.
- [7] L. Pemberton, "The Potential of Interactive Television for Delivering Individualized Language Learning," presented at Educational Multimedia, Hypermedia and Telecommunications (EDMEDIA), Vancouver, Canada, 2007.
- [8] M. R. Salaberry, "The Use of Technology for Second Language Learning and Teaching: A Retrospective," *The Modern*

- Language Journal*, vol. 85, pp. 39-56, 2001.
- [9] M. Warschauer and D. Healey, "Computers and language learning: An overview," *Journal of Language Teaching*, vol. 31, pp. 57-71, 1998.
- [10] M. Neo, "Engaging Students in Group-based Co-operative Learning-A Malaysian Perspective," *Journal of Educational Technology & Society*, vol. 8, pp. 220-232, 2005.
- [11] Q. Faryadi, "Bye, Bye Verbal-Only Method of Learning: Welcome Interactive Multimedia," vol. PhD Candidate: UITM Malaysia, 2006, pp. 5.
- [12] I. Marcoul, "Language On-Line and Learning Independence Development," presented at Use of New Technologies in Foreign Language Teaching, Compiègne, France, 2005.
- [13] H. L. Carlson and D. R. Falk, "Effectiveness of Interactive Videodisc Instructional Programs in Elementary Teacher Education," *Journal of Educational Technology Systems*, vol. 39, pp. 41-48, 1991.
- [14] B. I. Clark, "Understanding Teaching: An Interactive Multimedia Professional Development Observational Tool for Teachers," vol. Unpublished doctoral dissertation. Tempe, AZ: Arizona State University, 1995.
- [15] A. Ioannou, S. Brown, H. Gehlbach, M. Boyer, A. Niv-Solomon, L. Janik, and D. Maneggia, "Incorporating Multimedia in Social Studies Instruction: Does it Improve Students' Performance, Interest, and Instructional Effectiveness Attitude?," presented at Educational Multimedia, Hypermedia and Telecommunications, Vancouver, Canada, 2007.
- [16] V. Frear and J. J. Hirschbuhl, "Does interactive multimedia promote achievement and higher level thinking skills for today's science students?," *British Journal of Educational Technology*, vol. 30, pp. 323-329, 1999.
- [17] E. W. Wydra, "The effectiveness of a self-care management interactive multimedia module," *Journal of Oncology Nursing Forum*, vol. 28, pp. 1399-1407 2001.
- [18] A. G. Almekhlafi, "The Effect of Computer Assisted Language Learning (CALL) on United Arab Emirates English as a Foreign Language (EFL) School Students," *Journal of Interactive Learning Research*, vol. 17, pp. 21, 2006.
- [19] K. Al-Seghayer, "The Effect of Multimedia Annotation Modes on L2 Vocabulary Acquisition: A Comparative Study," *Journal of Language, Learning & Technology*, vol. 5, 2001.
- [20] N. Nagata, "BANZAI: An Application of Natural Language Processing to Web-based Language Learning," *JOURNAL of Computer Assisted Language Instruction Consortium*, vol. 19, pp. 583-600, 2002.
- [21] C. J. Hitch and R. N. McKean, *The economics of defense in the nuclear age*: Harvard University Press, 1960.
- [22] J. A. Hoffer, J. F. George, and J. S. Valacich, *Modern systems analysis and design*: Addison-Wesley Reading, Mass, 1999.
- [23] J. F. Nunamaker Jr and M. Chen, "Systems development in information systems research," presented at System Sciences, Kailua-Kona, HI, USA, 1990.
- [24] F. D. Davis, "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," *International Journal of Human-Computer Interaction*, vol. 7, pp. 57-78, 1989.
- [25] J. R. Lewis, "IBM Computer Usability Satisfaction

- Questionnaires: Psychometric Evaluation and Instructions for Use," *International Journal of Human-Computer Interaction*, vol. 7, pp. 57-78, 1995.
- [26] J. Nielsen, *Usability engineering*. San Diego: Morgan Kaufmann Publishers, 1993.
- [27] S. Coakes, "SPSS Version 12 for Windows: Analysis Without Anguish," *Sydney: John Wiley & Sons Australia*, 2005.
- [28] J. Kirakowski, "Basic Concepts in Questionnaire Design", [Accessed September 12; 2007], Available: [http://www.keysurvey.com/basic\\_concepts\\_in\\_questionnaire\\_design.jsp](http://www.keysurvey.com/basic_concepts_in_questionnaire_design.jsp)
- [29] E. R. Mayer, "Nine Ways to Reduce Cognitive Load in Multimedia Learning, *Educational Psychologist*," vol. 38, pp. 43-52, 2003.
- [30] Q. Faryadi., Z. A. Bakar., and H. Maidinsah., "Determining a Theoretical and an Empirical-Based Interactive Multimedia Arabic Language Courseware to Teach Arabic as a Foreign Language: Malaysian Experience," presented at 2nd International Conference on science and Mathematics Education (CosMEd). Penang, RECSAM., Malaysia, 2007.

# CHAPTER ONE

## INTRODUCTION

The project is initiated to develop multimedia application for kids that provides electronic learning (e-learning) in Arabic language. This chapter briefly explains the background of the study that mainly involves the growing of e-learning technology in the spreading of language education environment. The problem statement, objectives, significance and scope of the project will also be introduced.

### **1.1 Background:**

With technological advances, multimedia has become a new medium that provides interactivity on new media. It affected the way we learn, work, and play such as websites, multimedia software compact-disk ROMs (CD ROMs), encyclopedias (Hudetz, & Friedewald, 2002). In the 21<sup>st</sup> century, the use of multimedia software CD ROMs has increased rapidly (Vaughan, 2006). The changes in multimedia technology definitely had resultant affects on all aspects of our life. We use this technology in many domains such as commercial, promotional, education and training applications (Barry & Lang, 2001). It provides highly effective utilization for people that can get information that they need, when they need it without matter where they are located (Taguchi, Umemoto, Naniwada, Garden, Amano & Tabata, 1999).

In recent years, information technology has played a significant role in our life. Today people immersed in changing environment need to rapidly adapt their knowledge

The contents of  
the thesis is for  
internal user  
only

# REFERENCES

- Adiele, C., Adiele, C. E., & Rana, M. (2006). *Web Interact: An e-Learning Support System*. Paper presented at the Web Intelligence and Intelligent Agent Technology, Hong Kong.
- Adrien, C., Nicolas, L., & Damien, M. (2004-2005). *CD-ROM interactif pour decouvrir le rugby*. Unpublished Projet de Multimédia, Université de Marne-la-Vallée, Cité Descartes.
- Al-Batal, M. (1995). *The Teaching of Arabic as a Foreign Language: Issues and Directions*: American Association of Teachers of Arabic.
- Almekhlafi, A. G. (2006). The Effect of Computer Assisted Language Learning (CALL) on United Arab Emirates English as a Foreign Language (EFL) School Students. *Journal of Interactive Learning Research*, 17(2), 21.
- Almeske. (2009). Marhaba for Arabic language learning. Retrieved February 11, 2009, from <http://www.almeske.net/vb/showthread.php?t=20374>
- Al-Seghayer, K. (2001). The Effect of Multimedia Annotation Modes on L2 Vocabulary Acquisition: A Comparative Study. *Journal of Language, Learning & Technology*, 5(1).
- Arkün., S., & Akkoyunlu., B. (2008). A Study on the development process of a multimedia learning environment according to the ADDIE model and students' opinions of the multimedia learning environment. *Journal of Interactive Educational Multimedia*, 1-19.
- Australian Flexible Learning Framework. (2008, 15/9/08). Designing and Implementing e-learning. Retrieved January 31, 2009, from <http://designing.flexiblelearning.net.au/index.htm>
- Azarmsa, R. (1996). *Multimedia: Interactive Video Production*: IPT An International of Wadsworth Publishing Company.
- Babbitt, B. C. (1993). Hypermedia: Making the Mathematics Connection. *Journal of Intervention in School and Clinic*, 28(5), 294-301.
- Bacon, J., Martin, R., & John, R. (1999). *Director 7 and Lingo Bible*: IDG Books Worldwide, Inc.
- Barker, D. (2000, October). *Requirements modeling technology: A vision for better, faster, and cheaper systems*. Paper presented at the VHDL International Users Forum Fall Workshop (VIUF'00), Orlando, Florida.
- Barry, C., & Lang, M. (2001). A survey of multimedia and Web development techniques and methodology usage. *Journal of Multimedia, IEEE*, 8(2), 52-60.



- Bass, R. (2003). A brief guide to interactive multimedia and the study of the United States. Retrieved January 15, 2009, from [www.georgetown.edu/faculty/bassr/multimedia.html](http://www.georgetown.edu/faculty/bassr/multimedia.html)
- Bennett, S., McRobb, S., & Farmer, R. (2005). *Object-oriented Systems Analysis and Design Using UML*: McGraw Hill Higher Education.
- Bernhaupt, R., Schwaiger, D., Riegler, S., & Enthaler, D. (2007). *Evaluating children's gaming experiences*. Paper presented at the Advances in Computer Entertainment Technology.
- Borys, B. B., Tiemann, M., & Kassel, G. (2006). *The DIADEM Software Development Methodology Extended to Multimedia Interfaces*: Univ.-Bibliothek.
- Bosco, J. (1990, March 20-22). *An Analysis of Evaluations of Interactive Technology*. Paper presented at the Computers and Education, Brussels, Belgium.
- Boyer, T. (2008). Multimedia types for storytellers. Retrieved January 10, 2009, from <http://www.innovativeinteractivity.com/2008/10/08/multimedia-types-for-storytellers/>
- Carlson, H. L., & Falk, D. R. (1991). Effectiveness of Interactive Videodisc Instructional Programs in Elementary Teacher Education. *Journal of Educational Technology Systems*, 39(3), 41-48.
- Carr, A. A., & Bromley, H. (1997). Technology and Change: Preservice Perceptions on Agency. *Journal of Teaching Education*, 8(2), 15-22.
- Clark, B. I. (1995). *Understanding Teaching: An Interactive Multimedia Professional Development Observational Tool for Teachers*. Arizona State University, Tempe, AZ.
- Coakes, S. (2005). *SPSS Version 12 for Windows: Analysis Without Anguish*. Sydney: John Wiley & Sons Australia.
- Common Front Group. (1995). provide guidance in the process of designing and developing user interfaces. Retrieved January 30, 2009, from <http://cfg.cit.cornell.edu/>
- Crossley, K., Les, G., Barchechath, E., & Perraudin, A. (1990). *Le design des didacticiels: guide pratique pour la conception de scénarios pédagogiques interactifs*: ACL éd.
- Crutzen, C. K. M. (2006). Invisibility and the Meaning of Ambient Intelligence. *Journal of International Review of Information Ethics*, 6, 12.
- Curtis, G., & Cobham, D. (2005). *Business Information Systems: Analysis, Design and Practice*: Financial Times Prentice Hall.
- Daily, B. (1994). Multimedia and Its Impact on Training Engineers. *International Journal of Human-Computer Interaction*, 6(2), 191-204.

- Dark, M. J., York, C. S., Popescu, V., & Nita-Rotaru, C. (2007). *Evaluating interactivity and presence in an online distance learning system*.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *Journal of Human-Computer Interaction*, 3(13), 319-340.
- Davis, F. D. (1993). User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. *Journal of International Journal of Man-Machine Studies*, 38(3), 475-487.
- Dennis, S. (2008). How to design a questionnaire / survey.
- Education, e. (2008). How to Evaluate Homeschooled Children. Retrieved January 12, 2009, from [http://www.ehow.com/how\\_2062512\\_evaluate-homeschooled-children.html](http://www.ehow.com/how_2062512_evaluate-homeschooled-children.html)
- Ellis, A., & Sims, R. (1994). *Multimedia authoring: Developing effective training programs*. Paper presented at the Asia Pacific Information Technology in Training and Education Conference and Exhibition., Brisbane
- Fallahkhair, S., Masthoff, J., & Pemberton, L. (2004). *Learning Languages from Interactive Television: Language Learners reflect on Techniques and Technologies*. Paper presented at the World conference on Educational Multimedia, Hypermedia and Telecommunications Switzerland.
- Faryadi, Q. (2006). *Bye, Bye Verbal-Only Method of Learning: Welcome Interactive Multimedia*. UiTM Malaysia.
- Faryadi, Q., Bakar, Z. A., & Maidinsah, H. (2007). Determining an Effective Interactive Multimedia Arabic Language Courseware for Malaysian Primary School Children: An Alternative Paradigm for Learning in the Classroom. *Online Submission*, 12.
- Fetaji, B., & Fetaji, M. (2007). *Evaluation of e-Learning Content and Analyses of Learning Process*. Paper presented at the International Conference on E-learning, USA.
- Fitzroy, T. (2007). How To Evaluate E-learning Software. Retrieved November 24, 2008, from <http://www.articlesbase.com/software-articles/how-to-evaluate-elearning-software-163098.html>
- Fletcher, J. D. (1990). *Effectiveness and Cost of Interactive Videodisc Instruction in Defense Training and Education* (Final report): Institute for Defense Analysis, Arlington, VA.
- Frear, V., & Hirschbuhl, J. J. (1999). Does interactive multimedia promote achievement and higher level thinking skills for today's science students? *British Journal of Educational Technology*, 30(4), 323-329.

- Garrison, D. R., & Anderson, T. (2003). *E-Learning in the 21st Century: A Framework for Research and Practice*: Falmer Press.
- Golden, S. (2006). *Impact of E-learning in Further Education: Survey of Scale and Breadth*: Department for Education and Skills.
- Hanna, L., Risdien, K., & Alexander, K. (1997). Guidelines for usability testing with children. *Journal of interactions*, 4(5), 9-14.
- Hitch, C. J., & McKean, R. N. (1960). *The economics of defense in the nuclear age*: Harvard University Press.
- Hoffer, J. A., George, J. F., & Valacich, J. S. (1999). *Modern systems analysis and design*: Addison-Wesley Reading, Mass.
- Holmes, B., & Gardner, J. (2006). *E-learning: Concepts And Practice*: Sage.
- Hudetz, W., & Friedewald, M. (2002). *Multimedia Product Documentation-User Requirements*.
- Ioannou, A., Brown, S., Gehlbach, H., Boyer, M., Niv-Solomon, A., Janik, L., et al. (2007). *Incorporating Multimedia in Social Studies Instruction: Does it Improve Students' Performance, Interest, and Instructional Effectiveness Attitude?* Paper presented at the Educational Multimedia, Hypermedia and Telecommunications, Vancouver, Canada.
- Jackson, G. (2000). How to Evaluate Educational Software and Websites (Vol. 2, pp. 57-58): TechKnowLogia.
- Jacobson, I., Christerson, M., Jonsson, P., & Overgaard, G. (1992). *A use case driven approach*: Addison-Wesley Pub.
- Jiang, G., Lan, J., & Zhuang, X. (2001, 6-8 August). *Distance Learning Technologies and an Interactive Multimedia Educational System*. Paper presented at the International Conference on Advanced Learning Technologies Wisconsin, USA.
- Jimenez, M. (2008, 10-14 August). *Interactive multimedia on CD-ROM*. Paper presented at the WORLD LIBRARY AND INFORMATION CONGRESS, Québec, Canada.
- Judd, T. (2001). *Navigation Systems, Architects and Engineers*. Paper presented at the 18th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education, Melbourne.
- Krajcik, J. S., Berger, C., & Czerniak, C. L. (1983). *Teaching children science* (2nd ed.): McGraw-Hill College.
- Kulik, J. A. (1985). Effectiveness of Computer-Based Education in Elementary Schools. *Journal of Computers in Human Behavior*, 1(1), 59-74.

- Kulik, J. A., Bangert, R. L., & Williams, G. W. (1983). Effects of Computer-Based Teaching on Secondary School Students. *Journal of Educational Psychology*, 75(1), 19-26.
- Kulik, J. A., Kulik, C. L. C., & Cohen, P. A. (1980). Effectiveness of Computer-based College Teaching: A Meta-analysis of Findings. *Journal of Review of Educational Research*, 50(4), 525.
- Kung, E. (2002, March 18-23). *Case Studies of Primary School Teachers' Portfolios on Information Technology Competency Training Program - A Reflection on Information Technology Education for Teachers*. Paper presented at the Society for Information Technology and Teacher Education International Nashville, Tennessee, USA.
- Landoni, M. (2008, 1-5 July). *Evaluation of Interactive Systems Involving Special Need Children and Experts*. Paper presented at the Advanced Learning Technologies, Santander, Cantabria.
- Laudon, K. C., & Laudon, J. P. (2000). *Management Information Systems: Organization and Technology in the Networked Enterprise*: Prentice Hall.
- Le Marec, J., & Topalian, R. (2003). Évaluation et interactivité. Un modèle peut en cacher un autre: L'interactivité: attentes, usages et socialisation. *Journal of Communication et langages*(137), 77-87.
- Lieberman, D. A., & Linn, M. C. (1991). Learning to Learn Revisited: Computers and the Development of Self-Directed Learning Skills. *Journal of Research on Computing in Education*, 23(3), 373-395.
- Liu, M. (2005). *How Pre-kindergarten Children Use the Interactive Multimedia Technology: Implications for Multimedia Software Design* (Research/Technical). Austin: University of Texas at Austin.
- Lutz, R. R. (1996). Targeting safety-related errors during software requirements analysis. *Journal of Systems & Software*, 34(3), 223-230.
- Marcoul, I. (2005, 24-26 March). *Language On-Line and Learning Independence Development*. Paper presented at the Use of New Technologies in Foreign Language Teaching, Compiègne, France.
- Markopoulos, P., Read, J., Hoysniemi, J., & MacFarlane, S. (2008). Child computer interaction: advances in methodological research: Introduction to the special issue of cognition technology and work. *Journal of Cognition, Technology & Work*, 10(2), 79-81.
- Marks, J. W., Ngo, J. T., & Shuman, A. W. (1998). Method and apparatus for producing complex animation from simpler animated sequences: Google Patents.

- Masters-Wicks, K., Postlewate, L., & Lewenthal, M. (1996). Developing Interactive Instructional Software for Language *Foreign Language Annals*, 29(2), 217-222.
- Mayer, R. E. (2001). *Multimedia Learning*. United States: Cambridge University Press.
- McGriff, S. J. (2000). instructional system design: Using the ADDIE Model. Retrieved January 29, 2009, from <http://www.seas.gwu.edu/>
- Moore, D., & Taylor, J. (2000). Interactive Multimedia Systems for Students with Autism. *Journal of Educational Media*, 25(3), 169-177.
- Moreno, R., Mayer, R. E., Spires, H. A., & Lester, J. C. (2001). The Case for Social Agency in Computer-Based Teaching: Do Students Learn More Deeply When They Interact With Animated Pedagogical Agents? *Journal of Cognition and Instruction*, 19(2), 177-213.
- Morris, M. G., & Dillon, A. (1997). How user perceptions influence software use. *Journal of Software, IEEE*, 14(4), 58-65.
- Murch, G. M. (1983). The effective use of color: Physiological principles. *Journal of IEEE Computer Graphics and Applications*, 7(14), 13-16.
- Murch, G. M. (1984a). The effective use of color: Perceptual principles. *Journal of IEEE Computer Graphics and Applications*, 8(1), 4-9.
- Murch, G. M. (1984b). The effective use of color: Physiological principles. *Journal of IEEE Computer Graphics and Applications*, 4(11), 49-54.
- Nagata, N. (2002). BANZAI: An Application of Natural Language Processing to Web-based Language Learning. *JOURNAL of Computer Assisted Language Instruction Consortium*, 19(3), 583-600.
- Najjar, L. J. (1990). Using color effectively (or peacock's can't fly). *Journal of IBM Corporation*.
- Najjar, L. J. (1996). Multimedia information and learning. *Journal of Educational Multimedia and Hypermedia*, 5(2), 129-150.
- Neo, M. (2005). Engaging Students in Group-based Co-operative Learning-A Malaysian Perspective. *Journal of Educational Technology & Society*, 8(4), 220-232.
- Neo, M., & Neo, K. T. K. (2001). Innovative teaching: Using multimedia in a problem-based learning environment. *Journal of Educational Technology & Society*, 4(4), 19-31.
- Nielsen, J. (2006). Quantitative Studies: How Many Users to Test? Retrieved November 29, 2008, from [http://www.useit.com/alertbox/quantitative\\_testing.html](http://www.useit.com/alertbox/quantitative_testing.html)
- Nielsen, J. (1993). *Usability engineering*. San Diego: Morgan Kaufmann Publishers.

- Nunamaker Jr, J. F., & Chen, M. (1990, 2-5 Jan). *Systems development in information systems research*. Paper presented at the System Sciences, Kailua-Kona, HI, USA.
- Oliver, R., & Herrington, J. (1995). Developing Effective Hypermedia Instructional Materials. *Australian Journal of Educational Technology*, 11(2), 8-22.
- Onestopenglish. (1999). 4 - 6 year olds. Retrieved December 26, 2008, from <http://www.onestopenglish.com/section.asp?docid=146642>
- Orlich, D., Harder, R., Callahan, R., & Gibson, H. (1998). Teaching strategies: A guide to better instruction (pp. 56–100): USA: Houghton Mifflin Co.
- Pemberton, L. (2007, June 25). *The Potential of Interactive Television for Delivering Individualised Language Learning*. Paper presented at the Educational Multimedia, Hypermedia and Telecommunications (EDMEDIA), Vancouver, Canada.
- Pruengkarn, R., Praneetpolgrang, P., & Srivihok, A. (2005). *An Evaluation Model for e-Learning Websites in Thailand University*. Paper presented at the Advanced Learning Technologies, Thailand.
- Rafaeli, S. (1988). Interactivity: From new media to communication. *Journal of Sage Annual Review of Communication Research: Advancing Communication Science*, 16, 110-134.
- Raphan, D. (1996). A Multimedia Approach. *TESOL Journal*, 6(2), 24-28.
- Rowson, J. A., & Sangiovanni-Vincentelli, A. (1997, June 9-13). *Interface-based design*. Paper presented at the Design Automation, Anaheim, California, USA.
- Salaberry, M. R. (2001). The Use of Technology for Second Language Learning and Teaching: A Retrospective. *The Modern Language Journal*, 85(1), 39-56.
- Sanchez, J. (2007). A model to design interactive learning environments for children with visual disabilities. *Journal of Education and Information Technologies*, 210, 149-163.
- Schnackenberg, H. L., Luik, K., Nisan, Y. C., & Servant, C. (2001). A Case Study of Needs Assessment in Teacher In-Service Development. *Journal of Educational Research and Evaluation*, 7(2), 137-160.
- Sedgeman, J. (1997). *Conceptualization: The Route to Relevance and Depth*. Paper presented at the Psychology of Mind Annual Conference, San Jose, CA.
- Sharpe, A., & Gharani, L. (2001). *Trend Productivity in the New Economy: A Survey*. McGill University, Montreal, Quebec.
- Shuman, J. E. (1998). *Multimedia in Action: ITP* An International Thomson Publishing Company.

- Shuman, J. E. (2003). *Multimedia Concepts: Illustrated Introductory*: Thomson/Course Technology.
- Sims, R. (1994). *Seven levels of interactivity: Implications for the development of multimedia interactivity and training*. Paper presented at the Asia Pacific Information Technology in Training and Education Conference and Exhibition Australia.
- Siribodhi, T. (1995). *Effects of three interactive multimedia computer assisted language learning programs of elementary level EFL students*. University of Kansas.
- Software, D. (2008). Learn Arabic with Declan Software's Arabic Language Learning Software. Retrieved February 11, 2009, from <http://www.declan-software.com/arabic/>
- Soloway, E., Jackson, S. L., Klein, J., Quintana, C., Reed, J., Spitulnik, J., et al. (1996). *Learning theory in practice: case studies of learner-centered design*. Paper presented at the Human Factors in Computing Systems, Vancouver, British Columbia, Canada
- Spencer, T. E., Jenster, G., Burcin, M. M., Allis, C. D., Zhou, J., Mizzen, C. A., et al. (1997). Main navigation. *Journal of Nature*, 389, 194-198.
- Steen, R. (1999). The First Years of School- 4-6 Years Old. Retrieved January 24, 2009, from <http://www.suite101.com/lesson.cfm/17939/1376>
- Taguchi, T., Umemoto, T., Naniwada, M., Garden, A., Amano, T., & Tabata, K. (1999). *A case study of the effectiveness of distance learning materials in higher education and suggestions for improvement*. Paper presented at the Systems, Man, and Cybernetics, Tokyo, Japan.
- Tse-Kian, K. N. (2003). Using multimedia in a constructivist learning environment in the Malaysian classroom. *Australian Journal of Educational Technology*, 3, 293-310.
- University of California Consortium for Language Learning and Teaching. (2004). Arabic Without Walls Retrieved January 28, 2009, from <http://arabicwithoutwalls.ucdavis.edu/aww/>
- Vaughan, T. (2006). *Multimedia: Making it Work* (seventh ed.): McGraw-Hill Osborne.
- Warschauer, M., & Healey, D. (1998). Computers and language learning: An overview. *Journal of Language Teaching*, 31(2), 57-71.
- Weeks, M., Batatia, H., Sotudeh, R., Maierhofer, M., & England, U. K. (1998). Assessing the Feasibility of Using a Media I/O Processor in a VOD Server. *Journal of Technologies for the Information Society: Developments and Opportunities*. IOS Press, Amsterdam, 521–528.
- White, C. (2006). Distance learning of foreign languages. *Journal of Language Teaching*, 39(04), 247-264.

- Wikipedia. (2009). Computer-assisted language learning (CALL). Retrieved January 07, 2009, from [http://en.wikipedia.org/wiki/Computer-assisted\\_language\\_learning](http://en.wikipedia.org/wiki/Computer-assisted_language_learning)
- Wood, J. (2001). Can Software Support Children's Vocabulary Development? *Journal of Language, Learning & Technology*, 5(1).
- Wydra, E. W. (2001). The effectiveness of a self-care management interactive multimedia module. *Journal of Oncology Nursing Forum*, 28(9), 1399-1407
- Xiao, L., & Dasgupta, S. (2002). *Measurement of User Satisfaction with Web-based Information Systems: an Empirical Study*. Paper presented at the Americas Conference on Information systems, America.
- Zhao, Y., Lei, J., Yan, B., Lai, C., & Tan, H. S. (2005). What makes the difference? A practical analysis of research on the effectiveness of distance education. *Journal of Teachers College Record*, 107(8), 1836-1884.