

Integration of an Interactive Program in Learning Arabic Language for Non-Native Speakers via Virtual Tutor

Ahmed Ragheb Ahmed Mahmoud

ragheb@ium.edu.my

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

Muhammad Sabri Sahrir

muhdsabri@ium.edu.my

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

Rahmah bt Ahmad H. Osman

rahmahao@ium.edu.my

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

ABSTRACT

This research presents the integration process of an interactive program specifically dedicated in teaching Arabic language to the non-native speakers. This program is established based on the complete awareness of the language contents and its four levels of language study (phonological, morphological, syntactical and semantic) with distinct focus on prominent foundations and theories concerned with academic accomplishment as derived from the e-learning data system. The research is established on textual and phonological database involving vocabulary comprehension and its manners of pronunciation and inferring to the most highly expected errors from the non-native speakers of Arabic. More than 120 users participated in the process, under the supervision of a specialized teamwork between the administrative, linguistic, educational and engineering departments. The tentative results statistically reflect the program's efficiency and its distinctive role in prompting the academic process and the increase in the cognitive outcome among the students who are assigned as the experimental sample group in comparison to the results of the realizable control sample from similar conventional education. This program garners practical and academic features ensuring more worth in studying it compared to other e-learning programs. In essence, Virtual Tutor does not only embody theoretical foundations which are supported with modern methodological designs, but it also simultaneously ensures efficient participatory role of the users.

Keywords: e-learning; Arabic language learning; interactive program; non-native speakers; Virtual Tutor

INTRODUCTION

This universe is especially unique in its established diversity of tongues and different languages. The difference in world languages should not, however, present an obstacle that seeks to separate one nation from another. This study is aimed at effectively bridging the cultural gap between multi-tongued people of different nations through the introduction of an interactive program that contributes to a major development in Arabic language teaching for the non-native speakers. The effort is not dependent upon the linguistics and educational

sectors per se as it fuses available technical tools and applications into the Arabic and Islamic environments, upon believing that the modern technology is an indispensable aspect of the educational process. The research addresses the issues of the importance of learning Arabic among non-native speakers, purposes of learning, and learning tools and aids from the western perspectives. The use of technology and literacy among people is often described in relation to one another and which are specifically known as information literacy and multimedia literacy (Warschauer, 2006).

COMPUTER APPLICATIONS IN TEACHING AND LEARNING OF THE ARABIC LANGUAGE

The earlier Islamic nation was very much concerned with the spread of the Arabic language. The linguistics sciences then in turn has come around to preserve and safeguard the Arabic language from errors and distortions by describing its linguistics theoretical concepts beginning with el-Khalil bin Ahmed el-Faraheedi in his theory of “the overview” to Sibawayh in his theory of “the complete model” as discussed in “the book” and finally to Ibn Jinny in his theory of “theoretical concepts consistency of Arabic language sciences” as mentioned in his books “the secret of syntax” and “the properties” (Ragheb, 2011). The spread of Islam all over the world also encourages the spread of the Arabic language; the language of the holy Quran and its prophetic texts. Thus, the Arabic language has been learnt and taught by different races and tribes from all over the world involving various teaching and learning methods including computational technologies. In the case of Africa, the spread of Islam also encourages the mastery of the Arabic language because it is considered a sacred language in order to understand the Holy Qur’an for fear of subtracting from or adding to the sacred original text (Adewuni Salawu, 2007). Nowadays the use of computer and its applications have become an integral part of the modern societies’ life. Changes within the different aspects of life happen in rapidly and it is the duty of every society to keep up with the information era, especially in embracing the computer and its applications which would then individuals as qualified and well-armed in bracing the rapid changes of this era (Al-Harak, 2003). Learning through multimedia is becoming the focus of researchers in computer-assisted language learning in order to enhance the effectiveness of learning process. The term ‘multimedia learning’ can be defined as the presentation of material using both words and pictures (Mayer, 2001). In addition, Mayer and Mereno (1998) found that the learner’s understanding while watching animated images of a certain phenomenon (the lightning phenomenon) accompanied with an auditory explanation is much better than the learner’s understanding of the similar animated images while verbally reading an onscreen-text explanation. These technical developments are now synchronized within the stages of self-learning development. This involved the use of multi-medias and computer-assisted learning method which increasingly activated the role of computer in language learning as exhibited in the Arabic language.

Based on Mohd Feham and Isarji (2000), Mohd Feham (2006), Ashinida, Afendi and Mohd Shabri (2004) and Zawawi (2008), there is still lack of use of computer-assisted technology in the Arabic language teaching and learning. Furthermore, Mohd Feham (2006) mentioned that there are few inventions and innovations available in the field of Arabic language learning, due to several reasons that pose a limit to the number of Arabic language educational software and courseware. The majority of Arabic language teachers are also found to be incompetent in using the computer and courseware in the teaching process due to poor computer literacy, especially among the senior generations (Zawawi, 2008) and also lacking computer training (Ashinida, Afendi & Mohd Shabri, 2004). In addition, the technological production of machinery for Arabic language teaching and learning is also

being dominated by the American-English language, be it in terms of software or hardware as pointed out by Ditter (2006). Thus, this study presents the process of designing an interactive computer-assisted Arabic language teaching and learning web-based courseware that is to be used as complementary learning aids in place of traditional Arabic textbooks. Studies have reiterated that multimedia applications have the ability in assisting the process of teaching in the classroom in enabling more flexibility and effectiveness (Zamri & Nur Aisyah, 2011) as well as in providing better learning experience compared to the face-to-face environment (Vincent et al., 2005). A particular study in learning Arabic using multimedia found that the audio with images mode was an important aid to learning as compared to text with images mode (Aldadallah, Fong & Ababneh, 2010).

EXPLORING LEARNING CONTENTS IN TEXTBOOK TOWARDS INTEGRATION IN TECHNOLOGY

The acquisition of a foreign language – or any language – is a process that is extremely complex because of its relation to cognitive, cultural and psychological factors. With the growing interest in teaching foreign languages specially the Arabic language, concerned institutions start to take an interest in this field by developing various learning aids such as readable books, audio tapes, CDs or specialized sites on the internet. For instance, there are educational online games that have been specifically developed as the instructional aids for the traditional textbook by Muhammad Sabri and Ghazali (2012) based on the front-end analysis of the needs of learners, teachers, educational institutions and information technology (IT) facilities (Muhammad Sabri & Nor Aziah, 2011) using the design and development research methods and approaches (Muhammad Sabri, Nor Aziah, Zawawi and Nurulhuda, 2012). A similar attempt at integrating educational technology tools in supporting an online academic reading environment was conducted by Noorizah et al. (2011), in the design of a prototype known as Interactive English Language Literacy System (i-ELLS). In addition, the use of traditional textbook in classroom is undergoing transformation of becoming digital textbook and courseware due to widespread computer applications among the digital generation (Lewin, 2009). In this paper, every Arabic language courses involves linguistics subject that the student needs to acquire through a pre-determined method. The courses are considered the real embodiment of the Arabic academic program and are regarded as important courses developed. They are widely used to teach the Arabic language for the non-native speakers such as:

a) The Arabic language book for the youth (كتاب العربية للناشئين) – (Siniy, 1983)

This book provides an overview of the language and presented it in an integrated way with the Arabic sounds for example not separated from the language levels. The book handles ten major educational topics that reflect the interest and love of the youth with a goal for the students to learn the language structures and vocabularies. These topics are presented through 30 conversational texts and 8 reading texts that contain 110 of the basic structures of the Arabic grammar and 445 of the vocabularies and real expressions. The topics include a systematic and continuous study that spreads the spirit of joy and happiness among students and allows them a chance to express their ideas and interests in Arabic as they would express it in their native language. The situations present in the book have an important and relevant connection to their lives in the school and the home by providing them with a fair group of vocabularies and linguistic patterns that would assist them in expressing themselves.

b) The series of “I love Arabic” (سلسلة أحب العربية) – (Siniy, 1980)

These series are composed of four stages, each stage consisting of a book for the student, a book of exercises, a book for the teacher, with a number of audio recording aids and visual aids to be used with the book including cue cards, paintings, records and a manual for the teacher. Its approach enables the learner to practice the four skills (listening, speaking, reading, and writing) equally and provides training of the language elements such as phonemes, vocabularies and structures. The series' topics are based on the Arabic Islamic culture and the world cultures and it is also concerned with the child's world and his interests such as: hobbies, play time, life at home and school, relationships with relatives, friends and neighbours; it discusses the world of animals and plants, and the external universe through various modes such as in conversations, stories, songs, narrations, linguistic games, and meaningful entertainment to state the etiquette and basic scientific facts. The series contains approximately 1500 words spread across the four levels; the basic Arabic vocabularies are concentrated in the first two books also containing the Arabic phonetic system with all its different phenomena.

c) The series of teaching Arabic for the non-native speakers (سلسلة تعليم اللغة العربية (للناطقين بغيرها) – (Group of Authors, 1980)

This series is published under the supervision of the institution for Arabic language education in the Islamic university of Imam Muhammad bin Saud; this series is considered as a complete course to teach Arabic and the concepts of the Islamic science. More than fifty teachers, experts and specialists have contributed in writing this series composing of a definitional introduction and thirty seven texts for the learner with five manuals for the teachers and eight lexicons. This series is an encyclopedic work involving a big team of specialists. The book is made up of levels beginning from the primary introduction of the language and its letters to the linguistics descriptions. The book aimed to qualify the learner to join Arabic universities in studying the Islamic law 'sharia', Arabic language, and the literature.

d) The Arabic language in your hands (العربية بين يديك) – (Al-Fawzan, et. al., 2004)

This series come in seven books; three of them meant for students in three varying levels; beginner, intermediate, and advanced. This series too does not ignore the teacher's role so that it includes three books containing the structures and guidelines in teaching language for the non-native speakers. The seventh book is, however, considered as the lexicon of vocabularies used in the book with an addition of about eight hours of phonetic appendix for each of the student's three books.

METHODS OF TEACHING THE ARABIC LANGUAGE AND SAMPLES OF INTERACTIVE LEARNING PROGRAMS

There are several ways practiced in teaching the foreign languages, and the methods have been developed because of the continuous growth to learn foreign languages. The need to learn and study foreign languages have increased especially among those whose lives requires the learning of these languages as well as other diverse needs or purposes in learning a non-native language such as for travelling, work, and studying. Al-Khuliy (1989) mentions several Arabic language teaching methods practiced such as: a) traditional method or also known as “grammar and translation”, b) communicative method, c) directive method, d) audio visual method and (e) selective method. It is apparently noticeable that all previously mentioned series vary among themselves in interests, aims and the ways the courses are presented. Concerns in teaching Arabic for non-native speakers are not only addressed in

educational books but also available in designated sites on the internet. Among the most important sites are:

- 1- <http://www.rosettastone.com>
- 2- <http://afl.ajeeb.com>
- 3- <http://www.arabicsp.com>
- 4- <http://www.horoof.com>

However, all the previously discussed methods existed without accurate and specialized electronic techniques to ease the learning and ensure the learners' continuity in the learning process. It is suggested for teachers to search for a program based in specialized techniques that help to achieve the expected aims through quick, attractive and simple manner.

RESEARCH METHOD, PARTICIPANTS AND MILESTONE OF INTEGRATION PROCESS

More than 120 users have participated in the present study, under the supervision of specialized administrative, linguistic, educational and engineering teamwork. Details can be viewed at the URL: <http://www.rdi-eg.com/projects/VirtualTutor.htm>. The tentative results have statistically reflected the program's efficiency and its distinctive role in prompting the academic process and the increase in the cognitive outcome for the students subjected as the experimental sample as compared to the results of the realizable control sample that went through the similar conventional education.

CONCEPTUAL FRAMEWORK IN INTEGRATING AN INTERACTIVE ARABIC LEARNING PROGRAM

The purpose of this paper is to present a sample of an Arabic computational mechanism in teaching Arabic language to the non-native speakers through a rich and attractive course that employs specialized techniques in its educational production. This course adopted an advanced electronic format enabling activities through the internet and laser cylinders and reinforcing it with the different learning mediums to ease the learning process and elicit great results on the learner. This was possible due to the experience of the specialized team in educational projects and their in-depth knowledge of modern techniques for teaching. The role of this team is not only restricted to the linguistic, administrative, engineering and technical work but also in deciding on the educational strength of the course and its appropriateness to the age of the learners. The technical models and rephrasing take into consideration the psychological side and the educational dimension of the learner resulting in a mixed group of methods for evaluation and available correct answers. These characteristics are in accordance to the most highlighted modern educational theories (Ragheb, 2011a; Ragheb, 2011b).

THE GOALS OF THE PROGRAM

Among the major goals of the program are its aims in:

- i) The employment of modern techniques in teaching that would have impact on the non-native learner's emotion, involving the processes of search, uploading, analysis, and connection of mechanisms.
- ii) The flexibility in using this program for persons, associations, or universities from all over the world.
- iii) Extending cultural connections and civilized communication with persons of the non-Arab institutions.

- iii) Enabling the learners to acquire the linguistic, communicative, and cultural aspects efficiently.
- iv) Spreading the Arab culture through the objective processing of the course.
- v) Strengthening the connection between people of the world.

THE TECHNICAL SPECIFICATIONS

The program presents two levels of Arabic learning:

- i) The basic level: The level contains 16 units; each unit composes of 6 lessons, so the level contains 96 lessons. The units' is as the followings:
 - a) The first lesson: interactive conversations
 - b) The second lesson: vocabularies
 - c) The third lesson: syntactic structures
 - d) The fourth lesson: listening and comprehension
 - e) The fifth lesson: speech
 - f) The sixth lesson: reading and writing
 - g) Four general tests are available for each level.
- ii) The advanced level: The level contains 18 units; each unit composes of 6 lessons, so the level contains 108 lessons. The unit's design is as the followings:
 - a) The first lesson: conversation + comprehension exercise + vocabularies + sounds + syntactic notice + audio comprehension + speech.
 - b) The second lesson: listen and read + comprehension exercise + vocabularies + syntactic notice.
 - c) The third lesson: interactive conversation+ comprehension exercise + vocabularies + sounds + syntactic notice + listen and comprehend + speech.
 - d) The fourth lesson: listen and read + comprehension exercise + vocabularies + syntactic notice.
 - e) The fifth lesson: directed writing + calligraphy + dictation.
 - f) The sixth lesson: free reading + comprehension exercise + vocabularies exercise.
 - g) Four general tests are available for each level.
- iii) Ways and method of presentation for the basic level:

INTERACTIVE DIALOGUES

The program presents a collection of dialogues that aims to equip the beginner with a group of basic everyday expressions. The dialogues are presented in full animation between two parties having a conversation. The user is able to listen to the whole dialogue and imagine the real situation as performed by the two parties. The subtitles are shown in a clear diacritized font and the speech sound of each party is distinct. The user could benefit from listening to the dialogues and enhanced the ability to listen to new words and other benefits include:

- a) Listening to the dialogue phrases discontinuously (phrase by phrase) with the ability to repeat and move to the next or the previous phrase, the goal of this ability is to enable the user to listen, and examine every phrase well and also get used to hear it.
- b) Students are also able to choose one particular party from the two dialogue parties to listen to (individual listening) aiming at deepening the user's awareness of the expressions he is receiving, and to increase the ability to

simulate and discriminate between the parties' roles and to develop the ability of role playing as the receiver end of a conversation.

Audio training tools

There are two ways in training the user to practice the expressions he has listened to:

- a) The first way: recording the pronunciation of Arabic letters and words and the program assumes the teacher's role in correcting the user's pronunciation (speech verification).
- b) The second way: recording the different phrases and expressions and the ability to replay the recording to compare between the model dialogues and user's accomplishment (user's progress and ability in using the new expressions (Ragheb, 2007).

The visual-audio presentation of the vocabularies:

The program presents a collection of simple words that the learner could utilise in daily life according to the attempted level.

The program begins with the presentation of a collection of photos; a click on the photos would produce the audio expression of the photos.

The audio training for the vocabularies

The student is able to record the vocabularies he learned and listen to them in his own voice as the program is able to correct his pronunciation in order to allow the user to keep track of his pronunciation level and learning achievement.

Vocabulary bank

The excellent language user or user desiring to learn more vocabularies could be exposed to other words that do not exist in the lesson (but belonging to the same level of the words) by developing large groups of different vocabularies. This vocabulary bank could also facilitate user's cognition, achieve the reality, or be able to understand the lesson's vocabularies as the countries' names could be linked with the world map and highlighting the desired country on the map (Yaseen et. al, 2006).

Vocabulary training

The training is one of the effective ways that increases the interactive value of the program and measures the learner's success in the learnt or acquired concepts. This training is also concerned with vocabularies learnt from the previous presentations. At the beginning of the training session, two photos would appear on the screen with one word pronounced and the user would have to decide and choose the correct photo described.

In the case of a wrong choice, a mark (x) appears with a voice message to notify that the user's choice is wrong. A right choice would display a mark (✓) appearing with a message to indicate correct answer. The training presentation is done in an enjoyable manner that is hoped to entertain the user and motivates him to continue the exercises.

The writing training through writing verification

The writing verification is one of the specialized techniques under the development of a group of Arab institutions. The technique works through a device called the Tablet PC using the Touch screen pen that the learner could use for training in writing Arabic letters and words. Another method available in mastering Arabic writing is through printing out some exercises and practicing writing them. In the case of operating the program through LMS, the

user will enter the papers through the optical scanner and send to the supervising teacher through the internet to correct these papers and to return to the user with notes and feedback.

WAYS AND METHODS OF PRESENTATION FOR THE ADVANCED LEVEL

There are several presentation methods used for the advanced levels such as:

Readable texts: The program displays the reading texts in order to teach the reading skill, increase vocabularies and also provide a scientific benefit. The texts are presented in the following manner:

- a) The user could listen to the text and controls the volume.
- b) The complete text appears in a clear font and with full diacritics.

The lexicon service: The user enjoys the benefit of a prepared lexicon by just a right click at the mouse on the word and the lexicon displays the following options (Attia et. al., 2008):

- a) The meaning of the proposed words
- b) The root word
- c) Prefixes
- d) Suffixes
- e) The morphological form of the word.

Advanced explanation of the grammatical rules

The program presents grammar lessons through animated cartoon followed by a voice explanation flash tutorial of the grammatical rules. The user has control to re-play, pause or stop the tutorial.

The advanced search

- a) The user could conduct a search under the following characteristics:
- b) The search scope is extended to all the vocabularies of a single level.

The user could choose different types of search as the following:

- a) on the order of all the words.
- b) on all the words within the same sentences.
- c) on all the words within the same page.

Connection services: The user could be connected to a number of additional services through the “assisted vocabularies” icon. The services are:

- a) Additional vocabularies.
- b) The unit’s vocabulary bank.
- c) The world map.

The interactive exercises and tests: An audio message would play with the right or wrong symbols to indicate the right and wrong answers. The user is also allowed access to the accumulated grade at the end of the exercises. An audio message accompanied the exercises to create an interaction between the user and the presented material. A timer is made available for a more interactive environment presenting the user a real educational mood and to complete the exercises well.

The writing training through writing verification: as mentioned in the basic level discussion.

Text to speech service: This is one of the distinguished techniques that enable the learner to enter any text and read it automatically.

The training of right pronunciation: As mentioned in the audio training tools section for the basic level.

Supporting options

This program presents the methods that allow the user to learn without any teacher assistance. The help and also the questions' headers in the first level are in English (or any other language) and in the future may provide more than one language option. The advanced level uses only the Arabic language for the help option.

The help icon is available to demonstrate the tasks to the user. Some of these services could be hidden or be made to appear for the advanced levels depending on the user's necessities.

PHASES OF INTEGRATION OF THE INTERACTIVE ARABIC INTERACTIVE LEARNING PROGRAM AND CHARACTERISTIC FEATURES

Figure 1 shows the phases of integration of the interactive Arabic interactive learning program with explanation of technical characteristics in Virtual Tutor as listed below:

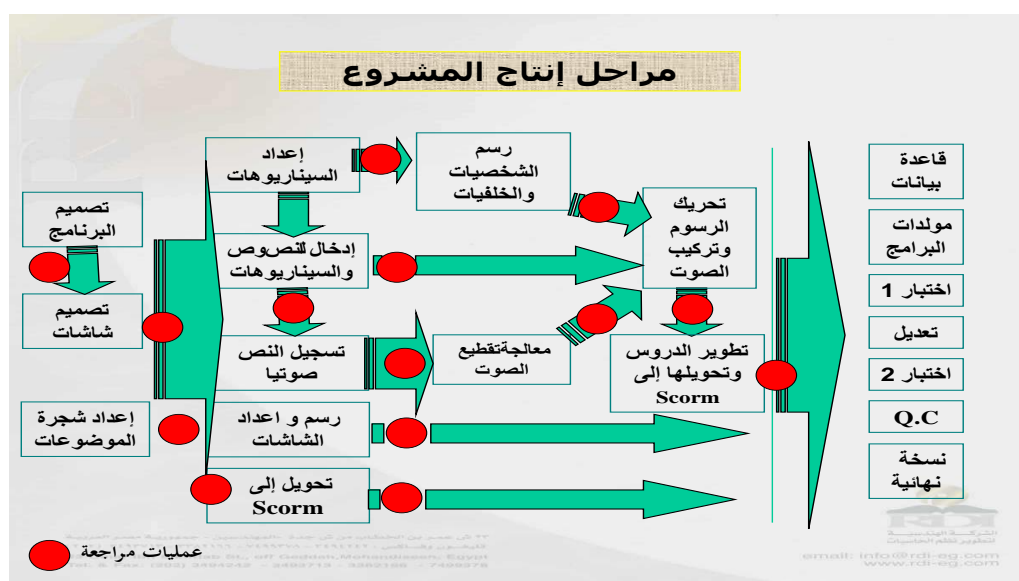


FIGURE 1. Integration Phases and Flow for Virtual Tutor

ARABIC DERIVATIONAL SEARCH MECHANISM

The search of three million words takes a part of second on a windows operating PC with 128 mega bit internal memory. This technique is implemented completely by using (ANSI C++) that could be prepared to work easily with any operating system (Microsoft windows, UNIX, mac, or etc.) The ability to index all the texts needed to be searched for at one time (total indexing) plus the ability to add or delete any pages from the already prepared index (Differential Indexing).

TEXT TO SPEECH MECHANISM T.T.S. (ARABIC TEXT-TO-SPEECH (TTS))

This Arabic TTS from RDI has a hybrid concatenated/parametric speech synthesizer which affords a compact system within few tens of megabytes of space. Moreover, RDI's automatic large-scale Arabic phonetic transcriber (diacretizer) is the other distinctive corner stone of ArabTalk©. Along with several discretization options, many speech effects in both male and female voices are available for flexibility and high performance in real-time. SDK's for desktop applications, web services, as well as client-server applications are also available for developers. Moreover, male/female Arabic TTS speaker data bases can be built for certain real-speakers chosen. For more detailed information: <http://www.rdi-eg.com/technologies/speech.htm>. A high quality TTS is almost similar to the natural human voice. It contains a discretization application to adjust the Arabic text. It consists of high speed speech generation similar to the speed of the natural human pronunciation and can work with any computer operating system easily. It is also found to be functioning well on mobile applications (Hifny, et. al., 2004).

AUTOMATIC WRITING (WRITING VERIFICATION)

The Tablet PC device enables the learner to use this training technique in the writing style of the Arabic letters and words.

SPEECH VERIFICATION MECHANISM

It is an automatic system that easily and promptly recognizes the phonetic properties of the new learner (Speaker adaptation). It provides instant response to the learner in discovering his mistakes in reading and clarifying the mistakes in detail. This new technique was developed to completely work with the different and diverse Arabic dialects. It also adapts well to all types of computer operating system.

THE LEXICON SERVICE FOR THE ARABIC WORDS

The lexical semantic analysis of the Arabic words offers many applications such as searching by synonyms or antonyms, the generation of semantic fields, or general semantic analysis in the text (Attia, et. al., 2008). The sample of screenshot for this interactive learning program in Arabic is shown in Figure 2 below:



FIGURE 2. Sample of interface screenshot for Virtual Tutor

BRIEF OVERVIEW OF RESULTS AND FINDINGS

The tentative results of this project have statistically reflected the program’s efficiency and its distinctive role in prompting the academic process and the increase in the cognitive outcome among the students specimen assigned as the experimental sample group in comparison to the results of the realizable control sample group from the similar conventional education. The study result confirms the feasibility of technical programs in rapidly teaching the Arabic language; that poses a significant impact on achieving better results for special language teachings as seen through the following:

a) The students’ results showed an improvement for both the traditional method and the experimental groups. The group that utilised the program showed a percentage of improvement of 17% and 46% and as shown in following Table 1, Table 2, Figure 3 and Figure 4 based on results from the experimental and control groups.

TABLE 1. Results for experimental group

	Written	Listening	Oral	Total	%
Preflight averages	9.00	23.00	27.50	59.50	59.50%
	45%	77%	55%	60%	
Final test averages	18.33	29.50	39.17	87.00	87.00%
	92%	98%	78%	87%	
Rate of improvement	104%	28%	42%	46%	

TABLE 2. Results for control group

	Written	Listening	Oral	Total	%
Preflight averages	13.33	20.50	31.67	65.50	65.50%
	67%	68%	63%	66%	
Final test averages	15.67	24.00	37.00	76.67	76.67%
	78%	80%	74%	77%	
Rate of improvement	18%	17%	17%	17%	

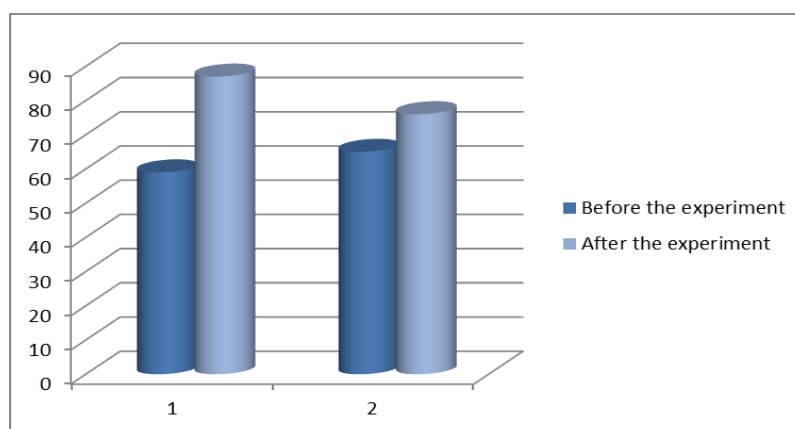


FIGURE 3. Demonstration of the high index level of the experimental sample control

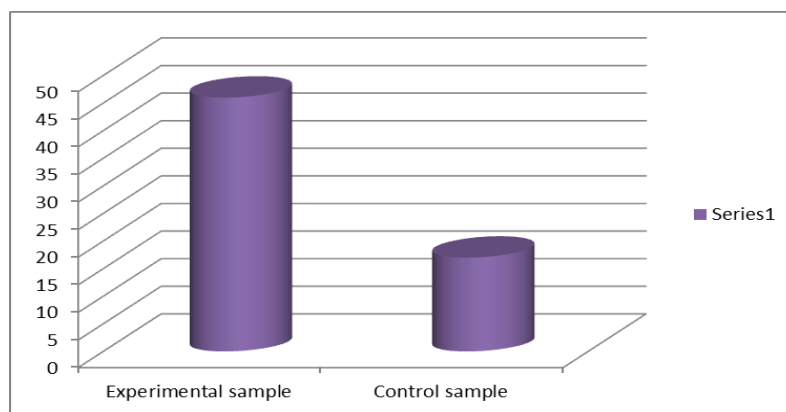


FIGURE 4. Illustration compares the percentage of improvement between technology and the traditional way

- b) Technology tools are the current attraction especially in an era with information and communication technology as the common denominator among its members.
- c) The realization of the principle of equal opportunities which arise from varying levels of Language Learners.
- d) To address the problems caused by individual differences that force teachers to accommodate to the needs of some learners while unintentionally neglecting other participants, but with this software the student has the opportunity to learn well either in the classroom or from home.
- e) Greater opportunity to communicate with supervisors and parents to report on students, improvements especially with the installation of case management system, Learning Management System (LMS) and linked to a central server for the educational center.

CONCLUSION

The focus of this paper is to emphasize on the integration process and framework of Virtual Tutor, and presenting some of technical characteristics and brief results and findings from an experimental study for this interactive programme among Arabic learners. This paper discussed and presented the integration processes and stages of an interactive Arabic learning program known as the Virtual Tutor. It features an integration of learning contents into several traditional and contemporary text books with several open source web-based applications as a proposed theoretical and practical sample of design framework. This conceptual framework may be useful in integrating an interactive Arabic learning tool in other educational settings and environment. Its benefits include in contributing towards increasing the motivation and positive perception among non-native speakers in learning Arabic. Findings in this study support results reported in studies on multimedia applications (Zamri & Nur Aisyah, 2011) in that multimedia assists in the process of classroom teaching as well as providing more flexibility and effectiveness.

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ABOUT THE AUTHORS

Ahmed Ragheb Ahmed Mahmoud (Ph.D) is currently an academic staff at the Department of Arabic Language and Literature, KIRKHS, International Islamic University Malaysia (IIUM). His research interests are computational linguistics, educational technology, research methodology, and teaching Arabic as a second language.

Muhammad Sabri Sahrir (Ph.D) is currently an academic staff at the 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

Rahmah bt Ahmad H. Osman (Ph.D) is currently an Associate Professor and academic staff at the Department of Arabic Language and Literature, KIRKHS, International Islamic University Malaysia (IIUM). Her research interests are curriculum development and evaluation, educational technology, Arabic and Malay literature and teaching Arabic as a foreign language.