Implementation of Self-assessment approach to Enrich Arabic Vocabulary

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Abstract

Electronic dictionaries represent the building block for vocabulary building in second language acquisition as well as improving the skills for first language acquisition. The focus in vocabulary for second language acquisition is natural since it is the way a child learns. Same case implies for an Arabic language learner that needs a large vocabulary in process of learning. A way to encourage the learners to enrich the vocabulary is by an attractive electronic Arabic dictionary. Therefore, this paper proposes an enhancement of the vocabulary builder method by developing an online Arabic dictionary based on the root word arrangement concept attached with self-assessment approach. Since Arabic language is described as a derivative language, the arrangement of the Arabic words will be based on root. In spite of the internal arrangement which is based on root, learners can freely search for the meaning of any word. The root word information is still given for any word search method since it is the key to learn Arabic language pattern. Other than offering the meaning for each word, the information about the root word derivation form, derivation words and its usage examples are also provided. Self-assessment that is supported in this dictionary is online quizzes. The designed quizzes are focusing in facilitating learners to improve their vocabulary knowledge along with developing their engagement with the dictionary. Consequently, this electronic Arabic dictionary is not just a dictionary but also a self-assessment vocabulary builder.

Keywords: self-assessment, Arabic, root word, electronic dictionary

1. Introduction

Nielson (2008) described a dictionary as a lexicon of words characterized by three main features: (1) it has been prepared for one or more functions; (2) it contains data that have been selected for the purpose of fulfilling those functions; and (3) its lexicographic structures link and establish relationships between the data so that they can meet the needs of users and fulfill the functions of the dictionary.

Earlier dictionary is only available in printed form. As the technology changes, electronic dictionaries are invented. Due to the easy access and portability, an electronic dictionary becomes highly demanded by the user rather than printed dictionary [Aladdin et al., 2004; Midlane, 2005]. Most common use of electronic dictionary is the online dictionary because of the daily use of the internet. Therefore, there are many software developed using online application including language learning software.
As for this paper, the concern is on the Arabic language learning as a second language. Arabic language is a Semitic language and used in twenty Middle East countries as an official language of hundreds of millions of people. Furthermore, it is also considered as the religious language for all Muslims of various ethical and cultural backgrounds. Although there is much care of Arabic language traditionally, and a lot of dictionaries and linguistics books in paper format and electronic versions exist, surprisingly little has been done in the field of computerized language and lexical resources as complete and finalized products [Black et al.,2006]. Arabic as second language also is becoming more important for culture exchange, business and politics.

For the Arabic dictionary, commonly the arrangement is based on the first letter of the words according to the Arabic alphabet sequence. The other form of arrangement is based on the root word firstly, then these root words are arranged alphabetically to make the accessibility easy. Although, root-based arrangement contribute clearly in enhancing the language skill of the learners, unfortunately, since new learners need to extract the root word as a prerequisite to search for the meaning, the use of these kind of dictionaries will not be convenient. Thus, the aim of this paper is to enhance the vocabulary of learners by developing a self-assessment Arabic electronic dictionary based on the root word arrangement that can enable the learner to search for the meaning of any word regardless whether it is root or not. It also focuses on enhancing the memorization for meaning via variety of self-based quizzes.

To enhance the process of teaching and learning of Arabic language for non-Arabic speakers and maximize the benefits to other interested people, the system will be publicly available through the internet with a user friendly interface. Furthermore, the arrangement of the dictionary is combined between alphabetical form and root-based arrangement.

2. Literature Review

2.1 Problem with Paper based Dictionary

The main problem of the paper based dictionary is basically the size [Pecher, 2009]. As portable paper based dictionary is published, the issue of content rose. A complete and interactive printed dictionary that is filled with graphic information caused the size of the dictionary become thicker. Therefore, the big size dictionary is hard to be carried around. On the practicality side, a user often needs to know an answer anywhere and anytime. This is impossible with paper based dictionary.

Paper dictionary cannot be updated frequently [Pecher, 2009] [Gilles, 2003]. One of the reasons is due to high publishing cost. In publishing a dictionary it will involve cost for human resource for updating material, handling machine and the other sources for printing process. Therefore, the online application is a way to overcome this problem. The process of updating data is easier and can be done in a short of time without involving so much cost.
From the environmental point of view paper based dictionary usage should be abolished because it will affect our world ecological system because the use of paper. As cited in Gilles (2003), using electronic dictionary is a way to achieve paperless way of life.

For Arabic language the important information is Arabic verb morphology. In Arabic verb morphology, root word can be derived to generate many other related words, which represents an expansion of the root. Some expansions are lexical derivations which will result in “new words”, and others are variation of the verb’s conjugation [Bilmas, 2009]. Western scholars have assigned Roman numerals to the various patterns of derivation, which are called “forms”. The root is designated “Form I”. The main drawback in using the paper root word based dictionary is that the user is required beforehand to extract the root word which may be difficult or impossible for non Arab learners without basic knowledge of Arabic. Therefore, in our implementation, the software will manage the link between compound words murakkab and their roots as well as derivative words. That means the user can search for any word regardless whether it is in root form or otherwise. In addition, this system will also include an interactive interface.

2.2 Related Work

The development of Arabic to Arabic electronic dictionaries has already taken place with state-sponsored programs. The most popular examples are the Interactive Arabic Dictionary on the web (IAD) sponsored by King Abdul-Aziz City for Sciences and Technology (KACST) [KACST, 2011], and the Arab League Educational Cultural and Scientific Organization (ALECSO) (Arab League Educational) with the cooperation with linguists and scholars from Higher Institute for Applied Sciences and Technology (HIAST) [HIAST, 2011]. These are successful implementations of interactive Arabic to Arabic dictionary [Rebdawi et al., 2011] that cater the needs of Arab learners. Many contributors were involved such as linguistics specialists, scholars as well as computer professionals to produce online versions of the dictionaries.

Albaheth Alarabi [Hashemi and Azizinezhad, 2011] represents a rich Arabic to Arabic dictionary. It extracts the meaning of the Arabic word from different famous dictionaries such as Lisanu Alarab, Algamous Almoheet and Alsahah. Although electronic Arabic dictionaries have been around and used by students, a self-assessment for vocabulary improvement has not been developed and integrated. If there exists, it may appear as a small part of an Arabic language exam.

On multilingual electronic Arabic dictionaries, Sakhr [Chalabi, 1998] implemented a translation system from Arabic to several other languages. Other researchers in this field are making efforts of designing an Electronic Arabic Dictionaries [El Abbadi et al., 2011; Al Dakkak and Zein, 2008; Hajjar et al., 2010; Bilmas, 2009]. This shows that a multilingual electronic Arabic dictionary is still an open issue of research and development.
3- Methodology

This system is an electronic dictionary that attached with self – assessment material to help user to enrich their vocabulary. As first step, a user needs to open the web site or the installed software to use the system.

There are two part in the system; dictionary part and vocabulary builder part. Figure 1 depicts the overall system. Three main elements are needed in the system; databases that stored all the data, graphical user interface (GUI) to be used as interaction module for the user to the system.

Users are classified into two category; learners and administrator. Users need to login into the system before they can access the application. For the user login as ‘Learner’, at first they need to register. Then, after the registration process they can access the application. But for the user that login as ‘Administrator’, they will need to enter their given password. For the assigned administrator, they are responsible to prepare all the data for the dictionary records and self-assessment materials. Besides, they are also responsible to update the material and manage the account for each learner. Other than that with this system, administrator can check the results and monitor the learners learning progress.

In general, the users can access the system which consists of two main application; dictionary application and self-assessment application. Since there are two applications in the system, the database also consists of two parts. The first part of the database is for the dictionary that stored all the data of words and their meaning. The second part is being used to store the self-assessment material. There are three main parts in self-assessment data storage; quizzes answer and result. All questions of the self-assessment material are stored in quizzes. The answer in stored in answer part and the achievements for each user is stored in the result.

![Figure 1: Overall system architecture](image)

3.1 System operational mechanism

This system consists of dictionary application and self-assessment application which is applied as a separate operational mechanism. Learners need to enter any Arabic word. If the entered word is wrong, an error message will be displayed along with a list of suggestion words. If the word is valid, the meaning as well as the pronunciation of the word will be displayed. The root word will also be displayed along with other option of information such as the derivation words which is referred
to the same root word of the entered search word and the example of words. The operational mechanism can be simplified and shown as in Figure 2.

![Figure 2: Learners enquiry flowchart for the dictionary](image)

For the self-assessment application, the module starts with MCQs (multiple choice questions), then matches list_A with list_B, and finally, directs question and answer (Q&A). The assessment module allows the learner to explore the correct model answers for the wrong ones. The materials are self-based assessment module, that is designed for improving and enriching the learner’s vocabulary. This module can be integrated with any system for teaching Arabic as a second language. The module is designed to be learner aware in operation, so as to adapt to the level of the learners vocabulary with the progressed lessons. The operational mechanism of the self-assessment application is depicted as in Figure 3.

![Figure 3: Operational flow of the self-assessment system](image)
3.2 Database Structure

The system is implemented as platform independent; meaning not requiring one particular hardware or software platforms. It is developed using an open source tool; MySQL which is a RDBMS (relational database management system) for the dictionary database and PHP (Hypertext Preprocessor) for the web based interface. It can be easily modified, maintained, and upgraded since it is based on open source code.

Three (3) tables are designed for the dictionary part and the other two tables are designed for the self – assessment part. The three tables for the dictionary part are root table, word_meaning table and example table. The table structure is shown as in Figure 4.

Root ID is the primary key and it is the unique value of Word_ID that is representing self join relationship Root_ID and the Word_ID. When the Root_ID is same with Word_ID (Root_ID = WORD_ID), it means that the word is a root word. Thus, if someone needs only the root words, it can be achieved by simple query according to the above condition. Table 1 to 3 show the example of the table content.

Table 1: Example of the content of root table

<table>
<thead>
<tr>
<th>Root_ID</th>
<th>Root</th>
<th>meaning</th>
<th>Pronounce</th>
</tr>
</thead>
<tbody>
<tr>
<td>56</td>
<td>بت</td>
<td>To cut off</td>
<td>batta</td>
</tr>
<tr>
<td>111</td>
<td>بذل</td>
<td>To give or spend freely, generously</td>
<td>Bazhala/bazhl</td>
</tr>
<tr>
<td>25</td>
<td>كتب</td>
<td>To write</td>
<td>kataba</td>
</tr>
</tbody>
</table>
Table 2: Example of the contents of word_meaning table

<table>
<thead>
<tr>
<th>Word_ID</th>
<th>word</th>
<th>meaning</th>
<th>Pronounce</th>
<th>Root_ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>ركب</td>
<td>Ride</td>
<td>rakiba</td>
<td>22</td>
</tr>
<tr>
<td>25</td>
<td>كتب</td>
<td>Write</td>
<td>kataba</td>
<td>25</td>
</tr>
<tr>
<td>29</td>
<td>مركب</td>
<td>Boat</td>
<td>morkab</td>
<td>22</td>
</tr>
</tbody>
</table>

Table 3: Example of the contents of Example table

<table>
<thead>
<tr>
<th>Example_ID</th>
<th>Word_ID</th>
<th>Example</th>
<th>Example_meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>46</td>
<td>مكتب البريد</td>
<td>post office</td>
</tr>
<tr>
<td>2</td>
<td>46</td>
<td>مكتب السفريات</td>
<td>travel agency</td>
</tr>
<tr>
<td>3</td>
<td>32</td>
<td>كتاب الزواج</td>
<td>marriage contract</td>
</tr>
</tbody>
</table>

For the self-assessment database, there only one tables for each type of self-assessment module. Basically, the table will store the questions and the answers that are given by the learners. The answer by the user will be compared with the data in the model answer column. Then, the result will be stored and displayed in grade column. Table 4 shows the MatchAB tables as an example of the table’s structure for self-assessment database.

Table 4: Table structure for MatchAB module
4- Result

Figure 5 represents an example of a user seeking for the meaning of the word كتاب in the ‘Input Interface’. Figure 6 shows the quick output and more options output. Figure 7 shows the detailed output interface if the user chooses second options as in the Figure 6. Figure 8 and 9 which represent the learner’s tasks and the administrative tasks respectively.

Figure 10 shows a snapshot of exam questions (match list_A with list_B and how the student can display the exam and answer it). Figure 11 shows how the student can check the awarded grades and at the same time maximize the learner’s knowledge by displaying the model answer so that the learner can manipulate the wrong answered questions.
5- Conclusion and Discussion

The main goal of this system is to accommodate self-tutoring from the self-assessment module on the electronic Arabic dictionary at different learner levels. Therefore, the structure of the user interface to the dictionary is designed not to rely only on the root word as a keyword to search. The system also maintains the relationship between root word and its corresponding derivative words which is an important dictionary structure to enhance the vocabulary of Arabic language students [Madkur et al., 1985].

The framework has been designed to be online on a portable and platform independent tools by using PhP and MySQL. Since the implementation is based on table look up, the testing accuracy will be 100% if the requested word exists. The implementation is already multilingual in framework and has hook-up points to expand from Arabic to English to other languages such as Malay, Chinese and Tamil by just changing the output language. In future, special purpose dictionaries can be created such as Quran, Medical, Engineering, and other arts and sciences.
References


Midlane, V. (2005). Students’ Use of Portable Electronic
Dictionaries in the EFL/ESL Classroom; A Survey of Teacher Attitudes. Master Thesis. University of Manchester.

