A Way of Supporting Non-Arabic Speakers in Identifying Arabic Letters and Reading Arabic Script in an E-Learning System

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Abstract. This paper reports how a new e-learning system for Arabic language supports the beginners of non-Arabic speakers in identifying each Arabic letter in a word and reading/pronouncing Arabic script. In Arabic, letters forming a word are connected to each other. Each Arabic letter has three different figures according to its position in a word (beginning, middle or end). Users' studies were conducted with 77 examinees in Japan to find which one is preferable for identifying letters of two alternatives: coloring letters or separating letters with spaces. Results showed that colored alternative is preferable. We are developing an e-learning system that incorporates the coloring way and our right-to-left phonetic to support learners in identifying and reading/pronouncing Arabic script by themselves.

Keywords: E-Learning \cdot Arabic learning \cdot Multimedia \cdot Roman phonetics \cdot Mirrored form

1 Introduction

Arabic specific features may be obstacles for non-Arabic people to learn Arabic. Arabic script runs from right to left, as opposed to the other languages. There are 29 letters which are connected in a word, not only in hand writing but also in printed materials. Letters change their figures in the script depending on their position in a word: at the beginning, in the middle, or at the end, as exemplified in Table 1, as for the letter "", which represents the consonant "B".

Table 1.	Example of	the three	figures for	the le	etter " ب "
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Position			The letter
End	Middle	Beginning	
÷	-÷		ب

Each Arabic letter represents its specific consonant. A word consisting of only letters does not show its pronunciation Usually letters appeared in Arabic script are attached with one of 10 diacritics to show how that letter be pronounced with/without

one of three Arabic vowels, as exemplified in Table 2. Thus, once one can identify each letter appearing in a word as it is, one can easily read/pronounce the word.

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Pronunciation	Arabic script
BaBiBu	بَـبِبُ
BuBiBa	بُبِبَ
BiBaB	بِبَبْ

Table 2. Arabic script with diacritics

Children may start reading in traditional way of repeated drilling on Arabic script as it is. Grown-ups find difficulty in reading/pronouncing Arabic script, especially in identifying each letter and recalling its pronunciation, since they do not endure simply repeating drilling. Learning materials, especially of e-learning ones, should provide support for learners to get used to right-to-left reading, and identify letters of a word to recall their pronunciation when intended learners may include grown-ups.

2 How to Identify Letters in a Word

2.1 Two Ways to Identify Every Letter

There are two existing alternatives or ways, found in our surveying of Arabic teaching materials [1-3, 10], to show every letter in a word for readers; first one is coloring each letter alternating two colors, and second one is inserting spaces between each two letters, as shown in Fig. 1. E-learning system should be designed and developed depending on effective multimedia to support the learning and its activities [4]. So in our developing e-learning system, one of the alternatives of identification should be used according to the learner request as a multimedia support.



Fig. 1. Two ways of identifying letters in a word

2.2 Investigation of Users' Preference

To find out possible users' preference, a user study was conducted in Japan with 77 non-Arabic examinees in Arabic classes, culture exchange meetings and laboratory activities. Examinees were Arabic students in the Islamic center, volunteers from Muslims with different nationalities and from students of the computer Science department at Waseda University. They were of 7 nationalities and had difference in their speaking ability (only one language, two or three languages). They were 44 male and 33 female. Among 77 examinees, 66 were interested in Arabic learning and 49 have experience in Arabic language. Examinees are covering wide range of personal prosperities, profiles and ages. Some of them are university students and others are graduated.

Examinees were taught about Arabic letters and their changing figures depending on their positioning in a word. Then examinees were shown a card, like Fig. 2, exemplifying two ways of helping identification of letters in a word, and asked which one they prefer: (A) by coloring each letter one after another with alternating colors, or (B) by putting a space between adjacent letters.



Fig. 2. A card showing two ways of letter identification

2.3 Results of the Questionnaire on Users' Preference

Among 77 examinees, 60 preferred the coloring more than separating. Namely a great percentage (78 %) of the examinees in all prefer coloring to spacing, as seen in Fig. 3.

As the examinees are categorized on their gender, interest in Arabic and experience in Arabic, statistics by those attributes are shown in Tables 3, 4, and 5. There are no significant differences, in any of those three categories, between preference percentages of coloring on the two attribute values: male 75 % vs. female 82 %, interested 78 % vs. not interested 72 %, and experienced 84 % vs. not experienced 68 %.



Fig. 3. Preferences of identification way

	Male	Female	Total
Coloring	33	27	60
Spacing	11	6	17
Total	44	33	77

Table 3. Gender

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	Interested	Not interested	Total
Coloring	52	8	60
Spacing	14	3	17
Total	66	11	77

Table 4. Interest in Arabic

Table 5. Experience in Arabic

	Experienced	Not experienced	Total
Coloring	41	19	60
Spacing	8	9	17
Total	49	28	77

3 Designing an Interactive Support

3.1 Mirrored Roman Phonetics Representation

Arabic letters are unfamiliar to the novices, and Arabic letters with diacritics represent the pronunciation. There are lots of combinations, and some consonants have quite different sound comparing to sounds in other languages. It is important to have phonetics shown time to time for novices. Arabic is written right-to-left. It is also hard for the novices to get used to the right-to-left reading. Phonetics are written left-to-right in available and common transliterations systems [12]; those phonetics themselves are easy to read, but may obstruct the novices to get used to right-to-left reading. Phonetics for Arabic shall be also right-to-left. If we use Roman letters as phonetics arranged right-to-left, the novices may read them left-to-right since Roman letters are usually read left-to-right.

We decided to use Roman letters in mirrored form right-to-left along with the direction of Arabic script. Roman upper-case letters are for Arabic letter and Roman lower-case letters are for diacritics [6, 7]. Phonetics will be displayed under Arabic script, and as far as possible phonetics are in the same length to the Arabic script, as far as possible, in order to help learners to see easily and to feel correspondence between Arabic letters and their phonetics [8, 9], as shows in Fig. 4.



Fig. 4. Roman phonetics along with Arabic script

3.2 Support on Demand

We decided to provide supports discussed above for users in our e-learning system for Arabic learning: letter identification in a word and mirrored Roman phonetics [11]. Our philosophy for providing supports is: any support shall be provided on a user's demand, and be provided only while a user is demanding in action: [5]. When a system provides some support for users automatically or unconditionally, users get used to the environment and might become lazy enough and could not live in the actual world without the support by the system.

First support on demand is displaying Arabic letters in two colors as long as the learner is pressing down the button for letter identification help. Once he/she releases the button, the script turns back to all the black, in order to let him/her identify the letters of the script. The system, then asks the learner to submit his/her writing (hand writing/keyboard writing), as shown in Fig. 5, to receive instructor feedback/judgment.

Second support on demand is displaying the mirrored Roman phonetics (right-toleft) corresponding to the Arabic script [7, 8], as long as the learner is pressing down the read/pronounce button, according to his/her need. Once he/she releases the button, mirrored Roman phonetics disappear, in order to let him/her to read/pronounce the script, and then the system asks the learner to submit his/her recorded reading/pronouncing (Audio/video), as shown in Fig. 6, to receive instructor feedback/judgment.



Fig. 5. Identifying Arabic letters by coloring



Fig. 6. Reading/pronouncing Arabic letters using colored mirrored phonetics

4 Discussions

We are developing an e-learning system for Arabic learning called ETaJWa, with user supports on demand described above. A course is designed on this system for novices, to learn daily life conversation, such as common Arabic greetings, introduction of themselves and talking about their families [11].

In the main window of this system, the learner can explore the lessons menu, choose a lesson to study and ask for support and explanation, as well as he/she can press button to study Arabic alphabet. Moreover, he/she can press the button for services on demand to obtain feedback from the instructor to guide him/her in improving his/her skills and can press a button for online and/or offline contact.

Every lesson is displayed in a window of the same format, as seen in Fig. 7. A learner can see, on the top line, Arabic sentences/expressions that shall be studied in that lesson. A learner can press a button to tell the system if he/she already knows it, and then a learner should practice the required activities. A learner can press a button for support on demand to know the meaning and the usage of the sentence/expression. Moreover, a learner can press a button of reading to identify and/or read/pronounce Arabic letters. Also, a learner can press a button of pronouncing in order to show the right-to-left mirrored phonetics helps. A learner can ask for a support for listening to the correct pronunciation. As well as a learner can ask for a support for practicing writing using his/her handwriting and/or keyboard and submitting his/her writings to the instructor. A learner can practice skills and activities which enable him/her in reading/pronouncing and submitting his/her recorded voices as audio/video file. Also, learner can press a button for communication with the instructor and/or the other learners as synchronous/asynchronous learning by skype, chatting and emails.

Assessment and/or evaluation of usability, effectiveness, et al., of our supporting methods and ETaJWa as a whole system will be conducted to assess how those features promote learning of Arabic.



Fig. 7. Facilities of ETaJWa for every lesson

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