

# Chapter 8

## Utilizing Adaptive and Intelligent Systems for Collaborative Online Learning

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### ABSTRACT

*The purpose of this chapter is to present an Adaptive and Intelligent model for online Qur'anic Arabic learning. The goal of this model is to make the learning process easier by extracting frequently used words and collocation in Qur'an with different contextual connotations and then applying a periodic reminding system via online. The target is to make occasional learning easier for the subscribers. The work focuses on non-native speakers of Arabic among the Muslims because it is an obligation for them to memorize and recite a part of the Qur'an during the five daily prayers. While for native Arabic speakers, it is relatively easy to understand, this approach of ours aims at achieving a level of understanding of the recited Arabic words even for the non-native users. The power of Social Media, thus Information and Communications Technology (ICT) has been effectively used in this domain. A part of this project has already been implemented. Alongside the description of our base learning model, we also present the technical details and obtained results from our implemented prototype.*

### INTRODUCTION AND PROBLEM FORMULATION

About 80 percent of the World's Muslim populations are non-native speakers of Arabic; according to Pew Research Center, this constitutes almost one billion people (Lugo, 2011). The Qur'an is considered by the Muslims (the followers of Is-

lam) as the divine revelation, compiled in a book which was recited and recorded in original Arabic language. It is obligatory for every capable Muslim to recite and listen to the Qur'an in Arabic during their formal prayers (salat). This ruling must be followed by the Muslims as translated version of Qur'an in any other language or even with any kind of alternation in any part is not considered as

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Qur'an. Hence, Muslims are required to memorize or learn at least a part of the Qur'an in Arabic. While some chapters (surah) in Qur'an are commonly memorized, any verse (ayah) in Qur'an can be recited within the prayers. Consequently, an extraordinary social phenomenon has taken place in some parts of the Muslim world - Muslims, men and women, are taught the complex phonological rules of the Arabic language in the context of the Qur'an. All these rules are learnt by them and they recite the "sounds" of the Qur'an often understanding very little of what they are reciting. Similarly, when listening to the Imam (the person who leads a formal prayer) reciting the Qur'an in prayer, many of them barely understand what they are listening to (Moore, 2006). This has given rise to a demographic segment, who is consumer of Arabic language classes, language learning books, and software to overcome this specific language barrier. Some resources have been developed to address this particular challenge, which include books, courses, and lexical resources focusing primarily on teaching the Arabic language in the context of Qur'an. It should be noted that Qur'anic Arabic is considered as the highest form of Arabic eloquence and grammar; hence, many grammatical rules come from that. However, there are sometimes differences between spoken (or locally used) Arabic and Qur'anic Arabic. Hence, the same word in Qur'an may mean different things based on the context and period of revelation.

In the field of second language learning, four basic language skills are distinguished. These are ordered along two dimensions (Byrnes, 1984):

- Modality, which is the difference between the auditory language mode versus the visual mode, and
- Processing activity, which is the process of either encoding or decoding.

The learning outcome of the Target Demography (TD) in question is to perform decoding of the visual and auditory modalities - in other

words, reading and listening comprehension. Partial visual decoding skills, ability to correctly generate a phonological representation of each word, are present in our TD to the effortless level of automaticity. The learner has to comprehend a new lexical item by assigning meaning to it, thus establishing a new form-meaning connection. Comprehension problems are often caused by a form-meaning mismatch sometimes caused by faulty word-boundary identification or by insufficient lexical knowledge (Bransford & Johnson, 1973). Even if a learner identifies the form of a word correctly, if s/he does not have enough knowledge of its meaning, the recognition process will also fail. According to schema theory (An, 2013), the TD has been exposed to *formal schema* and *content schema* from their childhood by listening to Friday sermons and religious speeches. So, the essential component missing is the linguistic schema which is the primary impediment to comprehension.

The listening comprehension is a bit more challenging than the reading comprehension because a characteristic of continuous speech is that speech contains no clear auditory equivalent of the inter-word white spaces that are found in written text (Buck, 1995). The lack of explicit word boundary markers and the distortions of word sounds due to assimilation and reduction are the reasons why words that are known by the language user when presented visually, are often not recognized when they are part of continuous speech. Although there are 10 ways of reciting (in Arabic called Qira'at) the Qur'an, the most common is *Hafs* on the authority of Asim, which has been used all over the Muslim world (Razak et al., 2008). This wide spread adaptation of Hafs eliminates the complexity of diverse dialects associated with second-language acquisition for the TD.

The main learning goal of the TD is recalling a closed set of syntactic rules and vocabularies only in the context of the Qur'an, so that they can create a lexical form-meaning connection to reconstruct a meaning in their native-language (for

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