

# ARC '16

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## Information Communications Technology Pillar

<http://dx.doi.org/10.5339/qfarc.2016.ICTPP3331>

### A BCI m-Learning System

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#### Abstract

Mobile learning can help in evolving students learning strength and comprehension skills. A connection is required to enable such devices communicate between each other. Brain-Computer Interface (BCI) can read brain signals and transform them into readable information. For instance, an instructor can use such device to track interest, stress level, and engagement of his students. We propose in this paper a mobile learning system that can transpose text-to-picture (TTP) to illustrate the content of Arabic stories and synchronize information with connected devices in a private wireless mesh network. The device of the instructor can connect the internet to download further illustrative information. It shares Wireless and Bluetooth connection with at least one student. Therefore, students can share the connection between each other to synchronize information on their devices. BCI devices are used to navigate, answer questions, and get to track students' performance. The aim of our educational system is to establish a private wireless mesh network that can operate in a dynamic environment.

#### Keywords

Mobile Learning, Arabic Text Processing, Brain Computer Interface, Engineering Education, Wireless Mesh Network.

#### I. Introduction

Nowadays mobile devices and collaborative work opened a new horizon for collaborative learning. As most people own handheld private portable smart phones, this has become the main means of connectivity and communication between people. Using smart phones for learning is beneficial and more attractive as learners can access educational resources at any time. Different eLearning systems available provide different options for collaborative

**Cite this article as:** Karkar A, Mohamed A. (2016). A BCI m-Learning System. Qatar Foundation Annual Research Conference Proceedings 2016: ICTPP3331 <http://dx.doi.org/10.5339/qfarc.2016.ICTPP3331>.

classroom environment. However, they do not consider effective needs to adapt learning performance. They do not provide dynamic communication, automatic feedback, and other required classroom events.

## II. Backgrounds

There are several collaborative learning applications have been proposed. BSCW [1] enables for online sharing of workspaces between distant people. Lotus Sametime Connect [2] also provides services for collaborative multiway chat, web conferencing, location awareness, and so. Saad et al. [3] proposed an intelligent collaborative system that can enable small range of mobile devices to communicate using WLAN, and uses the Bluetooth in case of power outage. The architecture of the proposed system is central where client can connect the server. Saleem [4] proposed a Bluetooth Assessment System (BAS) to use Bluetooth as an alternative to transfer questions and answers between the instructor and students. As many systems have been proposed in the domain of collaborative learning, several of them support mobile technology while others do not. BCI is not considered as part of the mobile educational system that can surround the environment with reading mental signals.

## III. The proposed system

Our proposed system provides educational content and and synchronize it in a Wireless and Bluetooth wireless mesh network. It can be used in classrooms independent from the public network. The primary device broadcasts messages to enable users follow the explanation of the instructor on their mobile devices. The proposed system covers: 1) the establishment of wireless mesh network between mobile devices, 2) reading BCI data, 3) message communications, and 4) performance analysis between Wireless and Bluetooth technologies through device-to-device communication.

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