

# Design and Implementation of an Efficient Interactive Class Room (ICR) in AOU Bahrain

Abdulrahman Al-Awadhi  
Arab Open University, Kingdom of Bahrain  
Email: a.awadhi@aou.org.bh

**Abstract**—This article discusses the design and implementation of Interactive Class Room (ICR) system as an efficient tool to be integrated in the Arab Open University (AOU) Learning Management System (LMS). ICR initially implemented for android platform but will be enhanced in the near future to support other platforms as well. It is a classroom teaching aid that was established to execute an effective learning process to facilitate a productive interaction between the learner and the tutor using tablet devices. It is developed to use WI-FI technology as a network infrastructure-connecting tool. It also helps to build an environment that combines conventional and technical aspects of teaching for the benefit of the learners. ICR is a new generation application allows the learners study online, and help them to have an easy way to communicate with their tutor inside the class. Through this application, a lot of problems can be resolved in terms of cost, satisfaction, time management and communication. One of the enhanced features of the system is MOOCs Test [1], in which, tutor can create different type of exam and publish them.

**Index Terms**—interactive classroom, blended learning, classroom management, mobile learning, customized tablet to tablet interaction, MOOCs

## I. INTRODUCTION

The learning pyramid researched and created by the National Training Laboratories in Betel, Main, USA shown in “Fig. 1”, illustrates the percentage of learner recall that is associated with various approaches.

Therefore, it is best to design courses and activities with this information in mind to insure the learners are actively engaged in the learning process [2].

Traditional E-Learning systems developed for laptop and desktop computers were based on stand-alone software application or through websites and lack the ability to provide a comprehensive ubiquitous learning environment [3].

The technology landscape, from tablets and e-readers to learning management systems and multimedia digital textbooks, continues to evolve and bring new opportunities for educators. The widespread adoption of tablets, mobile applications, social networks and digital content has led learners to expect more interaction via software and digital content as they learn. As such,

education investments need to focus on tools that not only provide value by motivating learners to be active participants in their own education but also increase collaboration and connections in the learning environment [4].

Learners in interactive classroom learn through their participation in the attainment of knowledge by gathering information and processing it by solving problems and articulating what they have discovered through interactive software tools within the learning management system LMS. The system discussed in the article will eliminate some of the limitation in existing LMS systems [5].

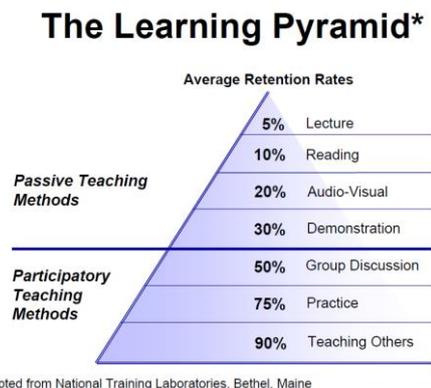


Figure 1. The learning pyramid.

## II. METHODOLOGY

This article is to give suggested proposal to be implemented in the Arab Open University (AOU) learning management system by integrating the newly developed application for mobile and tablet devices within the LMS system. Main objective of this research work summarized in the following:

- The main aim is to design and develop an environment that implements the classroom teaching aid using Wi-Fi technology as a network infrastructure-connecting tool. And to help tutor and the learner to communicate with each other inside the class in easy way.
- ICR is to develop an environment that combines conventional and technical aspects of teaching for benefit of college.
- The application includes tablet-to-tablet interaction, tablet to Wi-Fi projector interaction,

and file sharing using Wi-Fi with tutor (admin) tablet and interactive learner response system.

The acceptance of mobile learning by learners and educators is critical to the successful implementation of mobile learning systems therefore it is important to understand the factors that affect learner intentions to use mobile learning [6]. The current LMS is really not an interaction system between the learner and the tutor, but through the developed application the interaction between the tutor and the learners will be more efficient. This is the solution for the problem that should be linked to real need of the application.

ICR is a step forward towards advanced teaching process as well as reducing unnecessary paperwork and fast interaction between the tutors and the learners which will result in time saving and efficient way of learning.

ICR would be a great help for the educational institutes and universities to communicate easily and gathering data with unnecessary wastage of time and spending less effort to attain information or posing questions through chatting feature. The file sharing feature of this application would make both tutors and learners able to send and receive files which will result in a better and efficient studying environment. It also has projector feature which would be a great help for tutors all over the world to present and brief the learners while moving freely.

ICR surely have a huge scope in educational field for it is the first application of its kind in the middle east market and covers the general teaching issues faced all over the world in teaching institutions specially as the technology has stepped in to a new era and modern studies demands a solution to acquire fast efficient up-to-date learning and teaching techniques.

The system been developed as to be integrated within the LMS to make it accessible from anywhere. No longer would have to be seated in a same place or in a Wi-Fi connection area to access the files, it could be made one global system of learning by expanding it to be inter-school communication means and professors of different institutions could address the learners by means of live video feature. enhancing the user languages would be the top most priority in advancement field ensuring that it can be used by people in different zones and speaking different languages making it user friendly and simple as possible.

### III. QUALITY ASPECTS OF ICR AS AN EFFICIENT SYSTEM

- 1) Minimized the cost of time and materials
- 2) Easy way of conversation between the learners and the tutor.
- 3) Having an efficient education system that help as below:

- For learners: ICR providing an easy, interesting and enjoyable ways of interactions between the learners and the tutors rather than the traditional learning system by changing the old education routine.

- For Tutors: ICR providing smooth features that can help tutors to teach and organize (Materials, Tasks, classes etc.).
- 4) Efficacy of learning process.
  - 5) Using new technology platform in the university education system.
  - 6) Reduce the cost for learners and university by replacing the normal hard copy materials into soft copy.
  - 7) Improve the environmental challenges of globalization.

ICR is an application for the learners and as well as for tutor usage. It's a latest way of interaction between tutor and learner. This is an Android based application for 10 inch and 12 inch tablet. It will be new revolution in teaching. It will increase communication between tutor and learner.

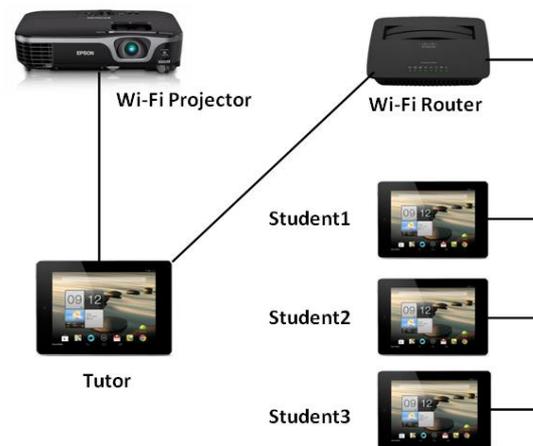


Figure 2. Shows ICR communication design.

“Fig. 2” shows the setup of the system. First user need to login through login screen. When user opens then home screen will be browsed. In this app two types of registration forms are available, first for learner and second for tutor. After successful registration user can login in the app. In this app there are different views for both learner and tutor. Tutor will be able to take attendance, create exam, send alert message.

After successful login to ICR home page it will be opened as you shown in “Fig. 3”, on the left side the main menu button is available, all other icons are available on top. On the right side user name will appear.



Figure 3. Shows ICR home page of tutor.

“Fig. 4” below shows the learner home page with all buttons on the top. On the right side user name will appear.



Figure 4. Shows ICR home page of learner

#### IV. DISCUSSION OF SYSTEM FUNCTIONALITY

Interactive Classroom system (ICR) is an android application that can be downloaded from the university site and used by all authorized people. It comprises of three main interactions:

- Customized tablet to tablet interaction; in this application tablet to tablet helps to create a bond between tablets using Wi-Fi connection. It also builds an open flow conversation between learner and the tutor. Using this application, two users can chat and share images, files.
- Tablet to Wi-Fi projector interaction; tablet to Wi-Fi projector creates a connection between a tablet and Wi-Fi projector. This will help tutor to move freely in the class while presenting the lecture. This feature will help in improving the interaction between tutor and learners.
- File sharing using Wi-Fi; file sharing is performed by this application using one-to-one or one-to-many methodology. The tablet, which required the data, can send a request to the other tablet, and then other tablet may or may not accept the request. Once the request is accepted, all the files will be stored in tablet in shared folder of memory card.

These three interactions have their own different capabilities and functions to help every individual to be more efficient and convenient with their duties and responsibilities as a tutor and learner. Some of these functions listed below:

- Communication: Tutor and learner can open chat window and send request to each other. Here learner can ask a question during ongoing lecture and when the tutor finished the explanation he or she can see the message on his device of learners and will reply to learner queries. learner can also chat with each other and share files.
- Projector Controller: Tutor will manage and control the projector display through his tablet. This will allow the tutor to move freely in the

class room since no need to stay in front of the laptop to control the projector display.

- Comment: Tutor can also write some comments on the displayed files in the projector from his tablets.
- Alerting: Tutor can send "Quick Alert" to one or all learners through his/her tablet. This feature lets learner know that tutor has asked them to be quiet in class for example; this feature has been postponed to the next development stage of ICRA since its need server base structure interactive development.
- Attendance: Attendance module will do away with the need of registering the attendance of learner manually. This module will mark learner as "Attended" if they are connected with the class network.
- MOOC Test: In this module, tutor can create exam and publish them to the learners. Two types of exam options available. MCQ's and true/false questions. Tutor can create exam and publish it to learners as shown in “Fig. 5”. The system will be developed further to include other types of exams. A Massive Open Online Course (MOOC) is an online course aimed at unlimited participation and open access via the web.



Figure Shows ICRA MCQ exam type.

#### V. CONCLUSION

ICR was designed and implemented practically with all functionality tested. As discussed earlier the system will enable the learners during the lectures to post their queries or chat between each other. The tutor can send alert message to learners and can take attendance without delaying the lecture. Tutor may create different type of assessments such as MOOCs and post them for the learners to measure their understanding of the lectures. The second objective was to integrate the application within the LMS system in AOU. It could be helpful to learners and tutors to communicate in an interactive environment. ICR also provides a high Quality facility service to all learners and tutors. Designing of such application helps them to be more interactive and efficient with each other. Overall research is about developing an efficient interactive communication over Wi-Fi connection inside AOU campus.

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**Abdulrahman Al-Awadhi** was born in Kingdom of Bahrain in 1963. He studied in Bahrain for all school grades and continued Diploma in Bahrain University. He received Bachelor degree in Electrical and Electronic Engineering from Roger Williams University, RI, USA in 1987, and Ph.D. degree in Electrical and Electronic Engineering from Bradford University, Bradford, UK in 1994.

He started his professional work in 1995 by establishing his own American franchised IT training center in the name of "New Horizons computer Learning Center" in Kingdom of Bahrain. In March 2007, he started his academic carrier by joining Arab Open University AOU as lecturer then promoted to assistant professor within the first year. In 2010, he promoted as head of IT department in AOU Bahrain Branch. He appointed as Acting Director in AOU Bahrain from January 2011 to September 2013. His main interest of research is IT and E-learning technology.

Dr. Al-Awadhi, Assistant Professor, is currently head of research committee in AOU Bahrain. He is also member of few consulting committees in some of the private universities in Bahrain.