Re-engineering Iraqi Higher Education with the E-Education Solutions

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Abstract: - Any educational institution that hopes to move toward e-education either reactively or proactively relies on how stake holders, particularly faculty, embrace such changes. The real obstacle is how to react to such changes in the education environment with strategic modernisation by examining new concepts and models. Iraqi higher education (IHE), specifically, and all the countries, in general are ranked by the UN agencies in the zone of weak using of ICT. A real lack for all types of ICT information can be discovered easily. IHE is in an urgent need for e-education system to solve all the sectors problems. This paper present an e-education technological road map for how to design an e-education systems in any Iraqi university. The design builds upon an in depth investigation for the IHE case using Q square research approaches. The final ICT design was welcomed in IHE in view of the comprehensive solutions for the educational and managerial problems of the IHE universities.

Key-Words: - Iraqi Higher Education, E-Education, Blended Learning, Q Square, Management Information System

1 Introduction

The theory of e-education revolves around the use of ICT to speed the achievement of national education objectives. E-Education is about combining learners to other learners, teachers to professional support services and management affairs, effective combinations of pedagogy with technology, and providing platforms of information to better learning and good education institutions.

Interesting in e-education proceeds to increase, and a lot of higher educational institutions have been increasing possibilities for testing with a variety of synchronous and asynchronous communication lines, as well as increasing possibilities for testing with blending face-to-face and electronic communication. The possibilities for increased access to expertise as well as the possibilities for developing new types of collaboration are frequently adopted to be two ways that e-education can transform the nature, the structures, and the methods of teaching and learning at many levels.

E-education means e-teaching and e-learning together with the different managerial and strategic measures required to support teaching and learning in an Internet environment. It will include a local, regional, national and international view of education. The current Iraqi education framework is a souvenir of the country uprising in mid of the seventieth of the last century is progressively out of touch, especially after the war's damages and the needs of society and the learners it serves.

The old traditional model of education, where a teacher tells knowledge to learners through a lecture, and learners recite remembered facts and solve basic math and science problems to sketch understanding of the information, is no longer suitable given the context of today's successively dynamic society, and it is wasting time, money and human efforts [1].

The Internet and effective global communications have mainly changed how individuals approach information. Today's generation of learners is growing up in the digital environment with computers, laptops, broadband speed, wireless connectivity, mobiles phones, iPods, and other tools and successively, more and more it becomes parts of their lives, and it does not stop here but their life topics become also digitized and are made available through this daily up to date digital devices, and information is available anywhere and anytime on any topic imaginable. Today's learning approaches used by schools in the extreme opposite with how they learn and interact outside of the classroom.

Professor Tim Birtwhistle said: "*Today's learners are completely different from learners previously. They know how the multi-task and their learning skills are different from those of their*

predecessors," and professor François Fourcade added *"They can type faster than I can speak.*[2]

2 Iraqi Higher Education after 2003

After the devastation of most of the Iraq facilities and infrastructures following the United Nations Security Council economic sanctions (from 1991 to 2004) and the last war (Mar-Apr 2003), the whole of the country infrastructures was affected and damaged (*On March-April 2003 started the war on Iraq and delivered nearly (1750) tons equivalent to 400000 a nuclear bomb similar to the bomb dropped on Nagasaki Japanese and the equivalent of 5.5 times as much as the quantity, which was thrown in 1991 in the first Gulf war on Iraq*) , the higher education sector, directly or indirectly, disrupted the primary, secondary and higher education activities.

After April 2003, the demand for all types of higher education (Bachelors, Masters, and PhD) in Iraq has increased as a result of the social development process and due to the increase in family's incomes and the re-growth of the Iraqi economy. However, there were many sectors that suffered technical, secure, violence, political and financial problems, which delayed the construction, rebuilding, rehabilitation, capacity building and provision of the necessary requirements and supplies and higher education and education for sure is one of them [3].

The traditional approaches of managing the higher education sector in Iraq have been rendered useless in the need to rebuild the educational environment with high academic standards. E-education with e-learning is identified as a student centered approach to teaching and learning and requires a conducive and good ICT infrastructure, communication technologies to build a rich learning environment.

3 Current ICT Initiatives in Iraq

In Iraq, we cannot say that the government does not pay attention to ICT , but the efforts paid in the budget that is funded for is not what ICT needed or the benefits that will come from it [4]. A lot of good efforts have been contributed by the Ministry of Science and Technology [5], and ICT initiatives are currently in well progress in Iraq. ICT starts to work even in e-government in Iraq, but in very difficult conditions (Baghdad ranked (214) the world's least safe city) [6].

Iraq is located in the level that is characterised by poor use of ICT applications in Government, weakness or absence of e-commerce and related legislation, limited usage of ICT in education , inferior usage of ICT in health care, and barely perceptible use in the employment sector [4]. It is roughly estimated that Iraqi universities needed at least more than 250,000 computers to start rebuilding its ICT infrastructure again. Iraqi has to transfer the technology from the advanced countries in this field, and use the relationship among the Iraqi universities and other world advanced universities to design its infrastructure and implement the ICT networks.

3 E-Education Capacity

The challenge is to excel the mere exchange of information and to convert e-Education into a range of learning activities that converge with educational goals. E-Education is more than improving computer learning and the abilities required to operate different types of information and communication technology. It is the capacity to:

1- Address ICT skills to approach, analyze, evaluate, integrate, present and transfer information.
2- Produce knowledge and new information by changing, applying, designing, designing and authoring information.
3- Improve teaching and learning through communication and collaboration by using ICT, and function in a knowledge society by using suitable technology and learning communication and cooperation skills.
4- E-Education views ICT as a resource for reorganizing education and as a tool for development, and it includes ICT as a tool for control and management, a tool for resource for the curriculum combination, a tool for communication, the cooperative tools for teachers and learners and learning environment that advances innovation, communication, cooperation and engagement.

ICT when successfully merged into teaching and learning can secure the meaningful interaction of learners with information. ICT can progress towards cognitive skills such as understanding, analysis, problem-solving and creative view.

Success in the extract of ICT into teaching and learning will guarantee that all learners will be equipped for full participation in the knowledge society before they leave a further education institution. E-education designers need to find new ways of improving e-learning technologies and systems to encounter global standards, and made them interoperable with other systems, and

encourages the pedagogical affluence which considers a full range of philosophical and epistemological views.

4 Blended Learning in IHE

Any first step in e-education project in IHE must start from the blended learning procedures and it is difficult to adopt a completely free online learning directly, whatever the learning institution's strength are and equipped with whatever technologies. Besides, IHE is a traditional university facing heavy problems. The harmonizing of the learning activities and environments in e-education system is the key to the success in blended learning, because it is a very complex mix between two different virtual and physical environments. In order to reach the target of blended learning which would incur less cost and more effective learning in IHE, we suggests that the appropriate procedures would be:

1- Build a real IT environment in all of the academic affairs in IHE and start using MIS for harmonizing the learning activities for both students and academic staff.

2- Adopting e-education and online learning activities officially in IHE learning activities.

The blended approach for IHE is focused on a mix between the traditional face to face courses and online courses (Fig.1), because Iraq are still required for certain face to face courses in IHE (Fig.2).
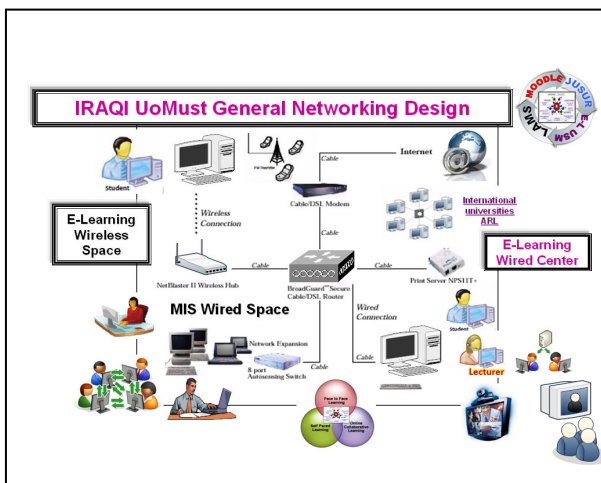

Fig.1: the e-education approach in IHE with the activities details.

It is very difficult to change all the learning system in IHE directly. It is found and observed that blending in higher education are common occurring at the degree (BA or B.Sc) program level [7].
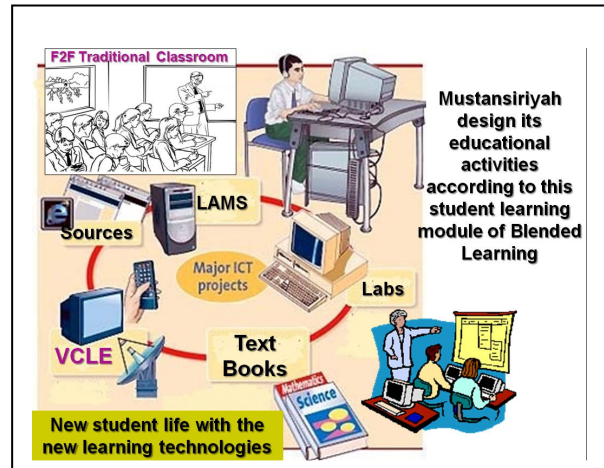

Fig.2   The e-education with the students activities details.

5 The IHE IT Designs

For the stated reasons, we found it is better to achieve the research goal which is proposed an up to date ICT design for the e-education centre for the Iraqi universities similar to the same centers designes in the developed universities. Since IHE is an empty and completely clear area, the start will be from the beginning without any trial to upgrade the university infrastructure (in general there is no real infrastructures to be upgraded) . We starts from the software since there is no real IT or MIS used in IHE, and to achieve that a set of e-learning software have been chosen after long survey of its capabilities and simple ways of usage. They are Moodle, LAMS and JUSUR.

The harmonization between the software and hardware was the big challenge that faced the researcher in the design and development of technological methodology part of the research

6 Software Structure Required

The types of software that can be selected for use in the e-education process in IHE depends on the e-education framework that has been proposed for the university, taking into consideration that the first important step must be easy and suitable for the staff and students there.

6.1. Infrastructure Software

The software that will be used inside the university e-education framework and e-learning environment software (Moodle, LAMS, and JUSUR) are free for use and others are for rental. In our framework, it is all free software in general and easy to use without any kind of complexity, well structured software

that does not need special equipment to run, like expansion of computers memories or others. They provide multiple options and capabilities to control the learner activities, and easy to connect between different e-education software. Some forward selection of e-learning environment software for use will depend on university policies and standards and ministry policy and probably the funding available. Also, we have to take into consideration the future steps of the e-education environment software which will include Blackboard, and other programs.[8], [9-11].

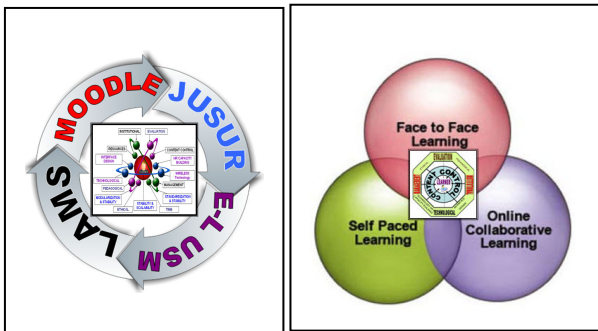Fig.3 presents the software's that will be used in IHE e-education system.

Fig. 3 The software structure proposed for the IHE e-education centers

6.2 Help Desk System And Maintenance

At the beginning of any project and in ICT field specifically, it is very important to provide a kind of assistance and help to the end users. Nowadays, there are several methods to provide this help service. They even use the mobile phones to provide this important service and deliver quick answers and solutions for all end users problems. In our focus, the high percentage of end users will be the learners. The main responsibility from the top university management is the fast response from the technician to resolve the learners' problems which are very important to e-education performance. A special center will be established and created for this system where the top e-education management can seek advice related to e-education process. This system in e-education is very necessary because of the limited direct communications between the learners and the teachers and if the learners require anything related to their e-learning process, there is always someone to help. For example, if the network is off, lost password, labs being occupied, top e-education management would need explanation from whoever is concerned. The help center can attempt the task of linking the top e-

education management with other administrative units.

6.3 Management Information System (MIS)

The general definition of MIS is a system that provides information needed to manage organizations effectively .It is a very important feature in a dynamic university education environment. Today, Information Communication Technology (ICT) is very useful in academic activities and administration. It is very difficult to believe that most of Iraqi universities work without real Information Management systems. The main objective of the Management Information System (MIS) components is to develop and deploy tri-level Management Information System (MIS) architecture, as follows:

6.3.1 IHE Operational Level:

To support, facilitate and improve the services and activities that are performed at all functional levels of public IHE, to include Students Information, Financial Systems, Library systems, Personnel and Payroll, and Asset Management.

6.3.2 IHE Executive Level:

To support the management and the decision making process within each university college as well as to enable adoption of Total Quality Management (TQM). The level will provide aggregate information to University management on all aspects of operational level systems.

6.3.3 Higher Education Ministry Level:

To support the activities of higher education and improve its decision making process as well as to enable more effective management of higher education, by providing aggregate information for all Iraqi public universities.

7 IHE Hardware Requirement for the Infrastructures

Success in an e-education system involves a systematic process of planning, designing, evaluating, and implementing online learning environments where learning is actively fostered and supported [12].

The infrastructure of the IHE ICT must have the ability to support the e-education activities that universities are embarking on, but the universities

do not have it. IHE is in urgent need for establishment of a robust network infrastructure with special hardware components. As a word of truth, the universities does not have any network or its components, which means that they must start from the zero point by finding a good and suitable place for the computer centers first of all. Then, supply it with all its required needs from the various application servers and its accessories and, a mix of shared and switched network technologies, storage devices, high-speed fiber optic lines, electric supply, air conditioning systems and others. In addition, establish and develop an Inter-University Wide Area Network, increase Internet access speeds (bandwidth) available to each user. It is very important to take into consideration that the hardware components are designed specifically for multi-media processing which includes e-education, with video conferencing systems for E-education and communications, other IT works like the Library System and the Management Information System (MIS).

At the start, it is better for IHE to establish different networks for the e-education purpose (local area network (LAN) and wide area network (WAN)). IHE can decide that the e-education environment is only accessible within its premises (local network) or ubiquitously (wide area network). Such policies have to be discussed before the initialization of the e-education process. The researcher suggests that IHE must start at the beginning only with local area networks, till it tests and examines all its networks implemented designs and then start widely.

8 HOW TO DO IT

IHE must design and implement its e-Education Information Technology Network (EDITN) because they do not have any kind of real networking inside the university. The EDITN objective is to create the e-education network to support all the academic activities and the e-education activities within the pedagogical learning environment. Students will have access to required resources regardless of their geographic location, if they are in university or not. This will allow the students to remotely access to IHE network, whenever they need to without any time constraints, or any other personal constraints.

The researcher thinks that IHE network design must be a multi-tiered, logically centralized hierarchical topology, which will provide high availability, reliability, manageability, scalability, and sustainability. The researcher suggests that these network servers will likely be located in the special center in IHE, because the university does

not have such place now and they have to build it or reform a place for it. The core of the thoughts of the researcher's designs have been built around this concept which is not a new concept at all in the field of ICT networks designs [13].

We suggests the university recreates the scale model of the entire framework of proposed IHE e-education network design network, equipment such as servers (installed with various programs), Cisco switches, Cisco routers, micro-routers, and Ethernet cables used to simulate the network and test the environment of the virtual network before it is implemented. It will provide the researcher and the university management staff with the results needed to fulfill the proposed network design requirements.

The equipment used in the design will consist of eight servers that comprise the required network infrastructure of the ICT needed to establish a CIT for e-education in any Iraqi university (all Iraqi universities have the same managerial structures and they follow the Iraqi higher education ministry structure and the data collected shows us very clearly there is no differences between the universities). Fig.4 present the proposed design of the CIT e-education center.
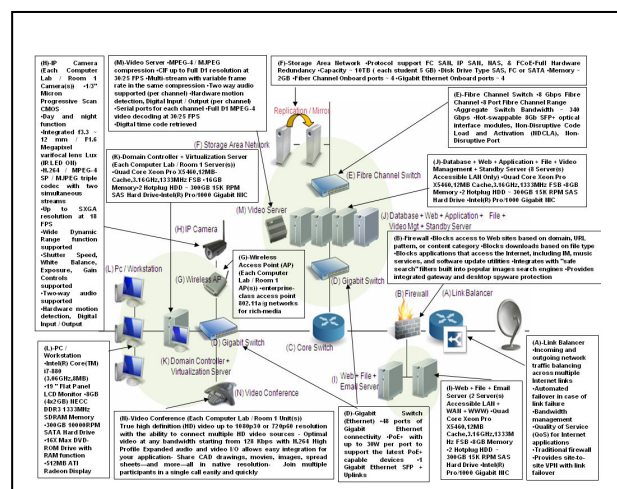

Fig.4: the proposed CIE for e-education centers with the specifications

The numbers of the computers in the CIT e-education centers in the design is 150 computers while the numbers of the computers connected to the center is depends on the universities sizes and the numbers of the students studying in it (in general it was designed to serve a university sized of around 10000 student and ten colleges as minimum).

9 Conclusion

The ICT technology transfer is very important to the Iraqi higher education sector, especially in the field of hardware and MIS to reduce the time and money required rebuilding this Middle East country

The blend between the educational experience and the technological needs was the trade mark of this research. Iraqi education in general suffered from huge losses in the ICT fields and the brain drain from the country.

In general, the Iraqi communications infrastructure is weak and old [4] and it needs a huge budget to fix and repair it. As such, the use of the wireless technology to connect the universities campuses would make a cost-effective solution.

In order to gain the most benefits of the internet, it requires massive investment in fiber optics infrastructure and this is absent in many universities. Supplying education through technology and with up-to-date technologies needs the development of a public education policy.

Supplying each university campus or college with its video conferencing system and also a direct video activities system and server is very important in learning environment like Iraq today. It was calculated that the required storage space for each student as 5 GB as min. - 10 GB as maximum.

It is envisaged that two Internet providers at least are required for each of university e-education centers and it must be at least 100 Mbps for the maim campus center ,60 Mbps for the sub-main centers in colleges and of 30 Mbps in the other centers. The post evaluation was conducted on the project in Iraq, where the end user has showed us very clearly the great motivations towards the complete solution as it covers the educational and technological needs for the e-education.

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