

## Knowledge Based Information and Communication Technology (ICT): Framework for Distance Learning Education: A Case Study

Salman Qadri<sup>1</sup>, Nazir Ahmed<sup>2</sup>, Mutiullah<sup>3</sup>, Muhammad Shahid<sup>4</sup>, Ejaz Ahmed Rehmani<sup>5</sup>, Muzammil ul Rehman<sup>6</sup>, Syed Shah Muhammad<sup>7</sup>, Rabia Ejaz<sup>8</sup>, Syed Furqan Qadri<sup>9</sup>

<sup>1, 3, 6, 8</sup> Department of CS and IT, the Islamia University of Bahawalpur, Pakistan

<sup>2, 9</sup> Department of CS, Govt College University Faisalabad (Layyah Campus), Pakistan

<sup>4, 5</sup> Department of Physics, the Islamia University of Bahawalpur, Pakistan

<sup>6</sup> Department of CS & E, UET Lahore, Pakistan

Corresponding Author: [salman.qadri@iub.edu.pk](mailto:salman.qadri@iub.edu.pk)

**Abstract:** Technological changes impacts society as a whole or partially in different manners but change will ultimately show its results which can be positive as well as negative. Information and communication technology brought a dramatic change because it is relatively easy to access information in the electronic form and comparatively easy for its users to analyze. Within the last few years, distance learning has become a focal point in several universities, while much research has been devoted to produce e-content, describing it with metadata, and constructing e-learning platforms. It is observed that less attention has been paid on usage of technology to improve the learning process in terms of its effectiveness. This research aim to fill this gap by considering learning support by the usage of information and communication technology and knowledge based resources (intelligent system) perspective. Our research investigates how information and communication technology, knowledge base learning and quality focus can be brought together to get the best result. This research focuses on the case study of literacy rate in Bahawalpur, Pakistan which is the area wise largest division of Punjab[Pakistan] province and worst case in literacy condition. We also proposed a frame work for distance learning education to improve the literacy ratio by utilizing the successful blend of information and communication technology with knowledge base distance learning. [Salman Qadri, Nazir Ahmed, Mutiullah, Muhammad Shahid, Ejaz Ahmed Rehmani, Muzammil ul Rehman, Syed Shah Muhammad, Rabia Ejaz, Syed Furqan Qadri. **Knowledge Based Information and Communication Technology (ICT): Framework for Distance Learning Education: A Case Study.** *Life Sci J* 2014;11(9s):385-390]. (ISSN:1097-8135). <http://www.lifesciencesite.com>. 81

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### 1. Introduction

Now a days E-learning is a hot issue since the term E-Learning is used consistently. E-Learning is content and instructional methods delivered on a computer (whether on Web, the Internet, or an intranet) and designed to build knowledge and skills related to individual or organization (Rahimi and Yadollahi, 2010). it is true that internet is a source of sharing knowledge that is why it is utilizing for learning, training and exchange of new ideas in different fields. For E-learning there can be involved a greater variety of equipment for online training and education, Internet, audio-video simulation results can be used for better learning process (Ssekakubo et. al., 2011). Distance education provides a platform for e-learning which further developed to "willful" learning. It reduces timing, attendance and travelling difficulties. E-learning is a term to describe the fields of online learning like web-based training, internet or intranet or audio and video conferencing. The basic purpose of this technology is to improve organizational performance by building job-relevant knowledge, skills and trainings (Faraz et. al., 2009) but different factors also effective on e-learning

process. For example, instructional strategies should be facilitate to the technology like software and hardware, and by environmental factors such as budget, time, and organizational culture also depend upon the performance of individual or whole organization (Ruth, 2002). When we have to measure the performance, important elements of E-Learning are e-lecture and audio-video conferencing via internet, it brought a revolution in e-learning. But performance compares learning from one medium such as the fiber optic cable to another medium like land line generally demonstrates significant advantages for any particular environment. A person who participated in many poor training sessions in the classroom with compared to the efficient computer base training (e-learning) workshop, it can be seen that his/her performance cannot be effected by the medium but depends upon design pattern of the delivered lesson (Ssekakubo et.al., 2011). E-learning environment suggested that we should design course that accommodate human learning and with the usage of intelligent system (knowledge based learning) regardless of any issue with the

collaboration of information technology can play a vital role in distance learning.

## **2. Material and Method: Performance based information and communication technology frame work.**

We will discuss basic three parameters for effective distance learning framework

- a) Information and Communication Technology
- b) Methodology (Knowledge Based Learning)
- c) Quality Focus

### **a) Information and Communication Technology**

Information Technology plays a vital role in distance learning environment. It is medium through which learner and instructor communicate with each other (Gupta, 2006). Through information technology infrastructure contents or material is sent to the desired location. Information Technology is a success factor (Lisa et.al., 2004) for creating effective online learning environment. However usability and accessibility of technology is more effective than a system structure that operates it. Technology supports efficiently for access of tools, and programs that are designed for effective purposes. More important, designers and developers must familiarize the learners to the new environment. For better understanding there must be included simulation results and graphical view for learners (Faraz et. al., 2009).

#### **i) Software and Hardware Facility**

Almost the most obvious hurdle for online learning is the technology, software and hardware. If we ask trainers, learners, and IT folks about what is the hurdle in e-learning, usually environment first on their list (Prakash et. al., 2010). Although technology is making steady advances (for example, more bandwidth is available, hardware and software are becoming less expensive), there are still many obstacles like time, cost, quickness that need to be overcome on these issues.

#### **ii) Effects of Information Technology:**

Technology affects the performance on different ways some are discussed here.

##### **Quickness:**

Learners can speed up their learning according to their own requirements and they can learn during different intervals of time, Learners and instructors communicate with each other (quick request and response).

##### **Timing:**

The speed of e-Learning becomes an important factor in some situations: First, if there are different group of learners they may spend more time traveling towards the instructor but with the help of technology it is available on their desktop. Second, the time will be reduced for learners who already know some of

the material, as they can read quickly what they already know.

##### **Cost:**

The cost is the most important factor for e-Learning because it reduces the traveling expenses of the learners and availability of resources etc.

#### **b) Methodology (Knowledge Based Learning)**

E- Learning is playing an important role in different fields. At the forefront of the current technologies are intelligent e-learning systems (Derntl, 2004) that assess the environment in which such learning will occur and are adaptive by nature to the individual needs of the user. Knowledge base learning provides a wide range of innovative approaches of e-learning with a special emphasis on inter-disciplinary approaches. The carefully selected contributions report on research, development and real-time experiences of e-learning such as intelligent e-tutoring, web-based adaptive learning systems, video conferencing or using artificial intelligence simulation techniques helps to the learners. Knowledge based learning mechanism provide a unique platform for learners to gain knowledge of blend versions. It is a shareable platform for instructors to contribute their valuable knowledge for better performance, in spite of all these there must be an intelligent system which defines alerts with the importance of events for corresponding individuals and departments (Wang et.al., 2009). With the help of web semantic techniques we can retrieve required information and irrelevant data can be blocked. We proposed a quick Request –Response Management System for better performance in this frame work.

#### **i) Quick Request-Response Management System (QRRMS):**

For the better performance it is necessary to alarm the learners and instructor for their duties and roles. The traditional system performs slow and involves lengthy procedures (Paraskeva et. al., 2006). Arrangement and maintenance of content material is a real headache for learners and instructors. So situation has become worse when information regarding existing records had to be retrieved. So a system is suggested that can simplify all the procedures and retrieve the record fast and efficiently. All these hindrances are tackled by Quick Request-Response management system; which is proposed for rapid, fast and reliable results of any e-organization.

##### **Quality:**

The basic objective is to achieve the quality education where resources are not sufficient especially in third world countries where educational institutions are not available for people. By using the e-learning frame work literacy rate of developing country can be raised.

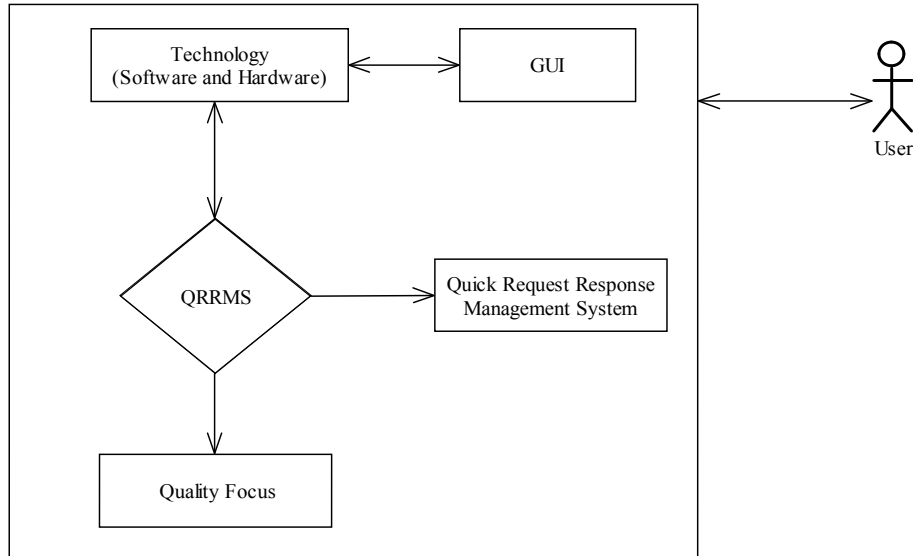


Fig.1 Performance based Information and communication Technology (ICT) frame work

Case Study:

We have discussed the case study in Bahawalpur (Pakistan) region regarding literacy rate and available resources and found some facts and figures. Bahawalpur is the largest area wise division

of Punjab while 35 percent literacy rate and 49:1 student-teacher ratio in primary education while higher education is also suffering in worst case.

Proposed ICT- Distributed Network Model

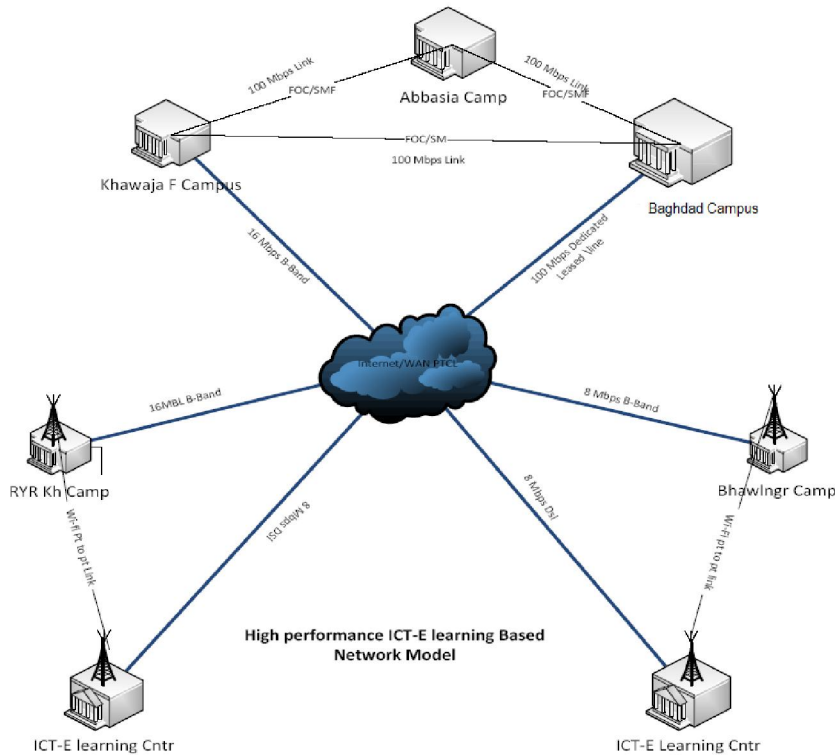


Fig.2 ICT- Distributed Network Model

Since the beginning of time technology has helped us out as a human race. From the invention of

the wheel to the Internet, technology has been a great factor on the way our civilization has grown. With

more and more technological advances just around the corner, our civilization will continue to grow faster and faster than ever before. Keeping in mind we have a data Network, the high performance ICT – E learning Network Model give the frame work to improve the quality of Network model (ICT-Network Model). This model is based on the Islamia University Bahawalpur Infrastructure model. The Model is based on three campuses which are interconnected to each other at the different bandwidth link (Abbasia 100Mbps fiber optic cable with single mode fiber optic cable, Baghdad Camp 100 Mbps Dedicated Line, Khawaja Farid Campus 100Mbps fiber optic cable with single mode fiber optic cable link is directly connected to the cloud of internet Service Provider i.ePTCL.(Pakistan Telecommunication limited) The media used for the main campuses is SMF (single mode fiber optic) give the connectivity for three campuses. on the basis of FOC(Fiber Optic Cable) the network improvement is quite fine where the Bhawalnagar campus and Rahim YaR Khan campuses are also connected to the same cloud. The dedicated bandwidth for the both campuses is 16Mbps for Rahim Yar Khan and 8Mbps for broad band for Bhawalnagar campus. Two ICT e-learning based centers are connected to them. The dedicated bandwidth link is available for them is 8Mbps for the both centers.. The main idea for this connectivity is to give a reliable, faster, quick response, easiness and authenticated network for the ICT Based e-learning Center.

### 3. Results and Discussion

Due to lack of resources major field of education is now suffering in bad way. Only one university the Islamia University of Bahawalpur is working in the entire division with two main districts Bahawalnager and Rahim yar khan. Islamia University can play a vital role in the development of this region and can improve the situation in this major field. We purposed distance learning

framework which would be spread over the whole division. Information and communication technology centers called E-centers can be opened in different remote areas where professionals are reluctant to go there. Through video conferencing e-training workshops and refresher courses can be started and different subject experts have to give a task to communicate through video conferences and provide the latest information through this platform to learners. For this purposes, we have selected the lowest literacy wise sub district of Bahawalpur division and established an information and communication center where at least one room is available, one computer system, multimedia and almost fifty chairs for audience where they can listen and participate in different trainings workshops in different fields. These ICT centers can be established over the country provinces, district, sub district, union council and on village level and establish network where learner could be assisted to get the solution of their hot and complex issues. By implanting this frame work there can be made revolutionary changes not only in education but also many others fields like health, agriculture, commerce and self defence etc. We have discussed the literacy ratio in Punjab district level bases (Khan, 2009) which shows the results in such manner that Bahawalpur which is largest area wise Punjab division but lies almost at tail on literacy wise

Table: 1 Area Wise Punjab (Pakistan) Division

Division	Capital	Area (km <sup>2</sup> )
Bahawalpur	Bahawalpur	45,588
Dera Ghazi Khan	Dera Ghazi Khan	38,778
Sargodha	Sargodha	26,360
Rawalpindi	Rawalpindi	22,255
Multan	Multan	21,137
Faisalabad	Faisalabad	17,917
Gujranwala	Gujranwala	17,206
Lahore	Lahore	16,104
Sahiwal	Sahiwal	10,302

Area wise Punjab (Pakistan) division representation is shown below in graphical way

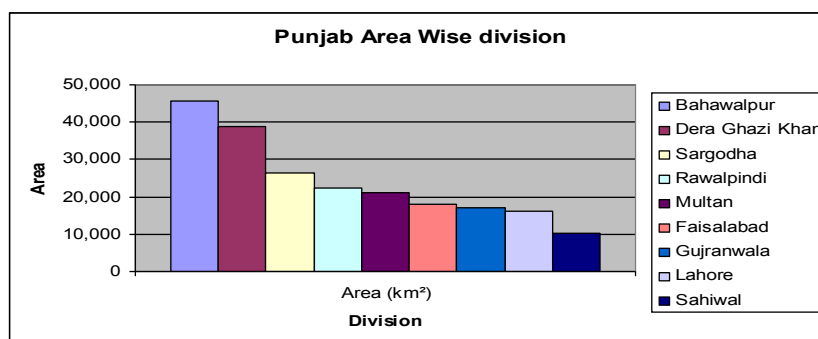


Figure.2 Area wise graph Division of Punjab (Pakistan)

Table 2. Literacy wise Division of Punjab (Pakistan)

Division	Capital	Literacy Rate
Dera Ghazi Khan	Dera Ghazi Khan	40.85%
Bahawalpur	Bahawalpur	40.90%
Multan	Multan	47.45%
Sahiwal	Sahiwal	50.00%
Sargodha	Sargodha	51.17%
Faisalabad	Faisalabad	52.30%
Lahore	Lahore	52.80%
Gujranwala	Gujranwala	60.45%
Rawalpindi	Rawalpindi	64.80%

Literacy wise Punjab (Pakistan) division representation is shown below in graphical way

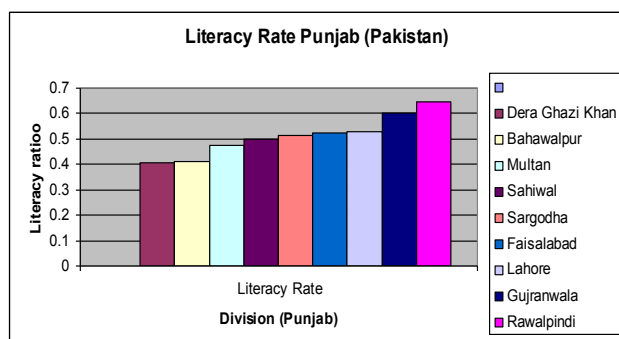


Figure 2. literacy graph Division of Punjab (Pakistan)

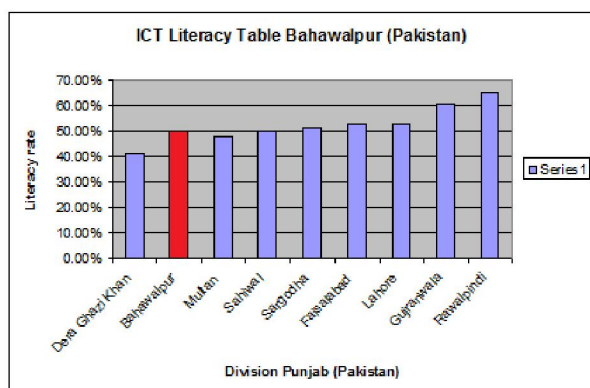


Figure 3. ICT Implemented frame work literacy graph Bahawalpur (Pakistan)

It has been observed that by implementing this ICT frame work in the entire region, the literacy rate could be increased up to a certain extent almost 50% within three to five years. This region could be developed and this research can further be enhanced all over the country and thus under developed areas come close together to the developed areas and which would not be helpful for peace harmony, development and prosperity of this region but also the entire world.

Table 3. ICT Implemented frame work literacy table Bahawalpur (Pakistan)

Division	Capital	Literacy Rate
Dera Ghazi Khan	Dera Ghazi Khan	40.85%
Bahawalpur	Bahawalpur	49.90%
Multan	Multan	47.45%
Sahiwal	Sahiwal	50.00%
Sargodha	Sargodha	51.17%
Faisalabad	Faisalabad	52.30%
Lahore	Lahore	52.80%
Gujranwala	Gujranwala	60.45%
Rawalpindi	Rawalpindi	64.80%

### 3 Conclusions and Future Work

In this research, we have highlighted a number of important issues which influence on performance of e-learning and also suggested effective and affordable solution to solve these problems. This research provides a guideline for specific performance issues based on specific IT tools and also focus on technology. This research focuses on performance based information and communication technology framework has added value only if designed it thoughtfully by using technology with highly knowledge base system.

For future work there are lot of things could be done in this field, especially for an instructor point of view, the focus of training programs is an important issue on delivering training sessions rapidly and massively which proved to be productive. The advanced methodology e.g. artificial intelligence is a highly rich area of research in e-learning. It is also a great area of research for collaboration with other disciplines especially human computer interaction, psychology and management for producing better results.

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