

Measuring the Impact of ICT and E-learning on Higher Education System With Redesigning and Adapting MOODLE System in Kurdistan Region Government, KRG-Iraq

قياس أثر تكنولوجيا المعلومات والاتصالات والتعلم الإلكتروني في نظام التعليم العالي مع إعادة تصميم وتكييف نظام MOODLE في حكومة إقليم كردستان العراق

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ABSTRACT

Today internet has been able to reach anywhere in the world. Information and communication Technology (ICT) has paved the way to change not only the way society accesses knowledge but also transform and restructure traditional models of higher education. Nowadays many universities and colleges have been focusing on e-learning environment and much less on traditional methods as a result of the newly acquired capacity students and teachers to have access anywhere and anytime to internet. ICT and e-learning help teachers and students become actively engaged together in online collaborative work to enhance traditional learning methods. In Kurdistan of Iraq, approximation of students and teachers has a continuous opportunity to enter into their universities web-portals but without having any interactions through the lack of Learning Management Systems (LMS). The main objective of this work is to measure the impacts of ICT and e-learning technologies on higher education systems in Kurdistan Region Government (KRG)-Iraq. This is based on a survey using online questionnaires involving samples of students and teachers, then re-designing and adapting an LMS MOODLE into the system. While large proportion of teachers and students have a positive view towards the use of ICT and e-learning methods, only a limited proportion use these techniques effectively. Hence the need for Kurdistan to start with distance and e-learning system is essential.

KEYWORDS

ICT, Web-based Learning, Virtual learning, Effectiveness and readiness of E-learning, Online Education, Learning Management System, Kurdistan Higher Education

I INTRODUCTION

Nowadays internet role in education sector roles an important play in particular in the side of education activities. Information and communication technology (ICT) is a force that has changed many aspects of the way we live. As institutions adopt e-learning, some important issues arise: Institutions must provide an adequate and reliable technical infrastructure to support e-learning activities. Instructors and students must possess the technical skills to use e-learning tools. Instructors must redesign their courses to incorporate e-learning effectively into their pedagogy (Paul Arabasz et al, 2003).

1.1 What is learning and e-learning?

The question "What is learning?" can be answered in many ways. As you can see when you Google you find over 80,000 hits. Some are from reliable sources like well known dictionaries and experts, other are from everyday people who are new in the field of education. According to the American Heritage dictionary (http://www.leerbeleving.nl/wbts/1/what_is_learning.html visited

learning is 1) the act, process or experience of gaining knowledge or skills 2) knowledge or skill gained through schooling or study and 3) behavioral modification especially through experience or conditioning. E-Learning is learning with the aid of ICT-technology. It can be the computer but the learning process can also be facilitated by a Smartphone, iPod, a PDA or a PSP.

1.2 History of E-Learning

In the history of e-learning, it is important to note that there is no single evolutionary tree and no single agreed definition of e-learning: since 1960s, e-learning has evolved in different ways: in business, education, training and military sectors. In school sector it refers to the use of both software-based and online learning whereas in other sectors it refers to a large number of online practices. (B.Fernandez –Manjon et al,2007)

At the end of the 90s the Learning Management System (LMS) concept was used. Some universities started to design and develop their own systems but most of the educational institutions started with systems off the market. One of the key players within the educational market was the American company Blackboard. Outside the educational world, other LMSs became popular http://www.leerbeleving.nl/wbts/1/history_of_elearning.html (visited june 2011)

1.3. E-learning Systems

E-learning systems have several names which basically mean the same: Virtual Learning Environment (VLE), Learning Management System (LMS), Course Management System (CMS), Learning Content Management System (LCMS), Managed Learning Environment (MLE), Learning Support System (LSS) and Learning Platform (LP).

In Europe the term VLE is mostly used, but in United States the term CMS is favored over others. Virtual learning environment (VLE) is computer software that enables the use of multimedia on a simple platform on the net. There are several VLEs offered to customers on the net, some of them are commercial and others open source. The most used and famous ones are Blackboard, Moodle and WebCT (Kanninen Essi,2009).

Learning management system (LMS) is a software application for the administration, documentation, tracking, and reporting of training programs, classroom and online events, e-learning programs, and training content. http://en.wikipedia.org/wiki/Learning_management_system (visited july 2011). The most common features of an LMS by categorizing them as pedagogical tools are: • Content creation • Communication • Assessment • Administration (Yefim Kats,2010).

1.4 Benefits of E-Learning

E-learning is not yet a full substitute for traditional methods of learning: they'll continue to work. We won't throw them away. The traditional learning solution that still leaps to the mind of most companies is to gather everyone in a classroom and present the material. It might be a simple presentation-style lecture class or a full-blown class with lectures, hands-on exercises, and group projects.

These traditional solutions have drawbacks:

- The time it takes to reach all (not just some) of the students who need the training
- The cost of reaching all (not just some) of the students.

1.5 Factors That Support E-Learning Organization

There are a lot of factors that support e-learning: -A CEO who does believe e-learning, corporate change initiatives, a central training organization, a supportive IT department, regulatory requirements, budget reductions, a geographically dispersed company and having a strong network (intranet) in place (Don McIntosh,2006)

II - CURRENT CASE OF ICT AND E-LEARNING IN HIGHER EDUCATION OF KRG

Empowering distance education is crucial for Iraq including Kurdistan Region after decades of traditional learning. Iraqi people need the knowledge and competence to compete in an increasingly technology-driven world economy. Iraq needs new models of education facilitated by educational technology. Some of the most promising new educational approaches are being developed through e-learning and virtual schools. This is an exciting, creative and transforming era for students, teachers, administrators, policymakers and parents. It is time for Iraqi higher education entities to keep abreast of this quite revolution. These words, presented at the Iraqi Higher Education conference in Kurdistan / Iraq, on December 2007, tries to promote the Iraqi higher education entities, via utilizing education e-learning strategy considerations (Ugur Demiray ,2010)

2.1. A Brief History of Higher Education in Kurdistan

In a new initiative, the current ministry of higher education in Kurdistan all over Iraq for the first time created ZankoLine <http://gozanko.info/>(visited may 2011) on September 2011 which is an Online Central Student Board Application System. Thousands of high school students can apply online to get their future colleges and institutes <http://www.mhe-krq.org/?q=ku/node/1111>, <http://gozanko.info/>(visited May 2011). Consequently, the total number of students at higher education institutes in Kurdistan region rose to 94,700. The percentage of female students is 48%. There is no tuition fee as education is free in Kurdistan Region. The Higher Education institutions in Kurdistan Region offer the degrees of Diploma (two years), Bachelor (four years), Master (two years) and Doctorate (Ph.D.)(three to five years) in various academic fields of science <http://www.mhe-krq.org/?q=node/105> (visited May 2011).

2.2. ICT Development in Kurdistan Region

Kurdistan is in its very preliminary stages in the field ICT development. ICT and computerized systems are not luxuries any more, but an essential tool that will enables Kurdistan society to enter the new global economy where almost everything can be done electronically. Tackling the important triangle of Legislation, Education and Technology is the most fundamental step towards creating an advanced Information Society that is capable of delivering advanced information systems to provide solid basis for carrying out and delivering e-service technology.

Current statistics show that IT is one of the world's largest industries. In 2002, worldwide IT spending reached US\$1 Trillion and the projected growth rate was about 9.4% from the period from 2001 to 2006(Farzad Sanati, Kurdistan Academy of Science (KAS)). The chart (fig 2.1) displays the total Government Budget on IT. As we can see, Kurdistan ranks last at \$2.2million; it has a total difference of \$84million from Estonia which is 13th. It is important to note that the Kurdistan region has almost no IT infrastructure and therefore needs to invest heavily in the first few years unlike more of the listed countries above.

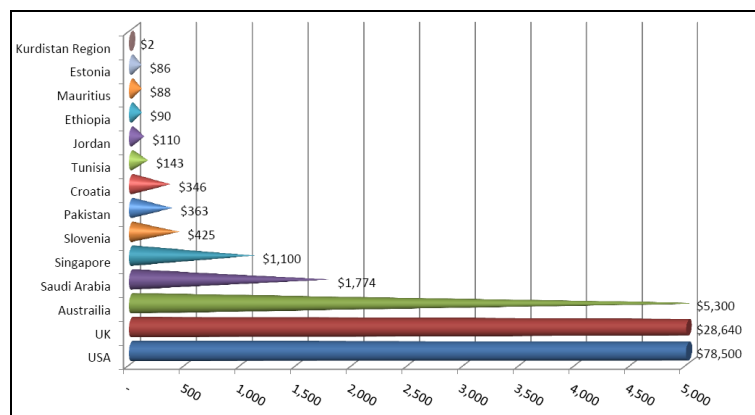


Figure 2.1 Government ICT Budget of all Countries (Millions \$)

Figure 2.2 shows Government ICT Budget as a percentage of total Government budget. Most countries whether they are developed or developing, rich or poor, small or large appear to spend between 1% to 3% of their total budget on ICT. The Kurdistan region spends 0.02% which is not a healthy situation and is not in line with global trends and best practices. At this percentage Kurdistan Region will fall behind if the budget for ICT does not reach at 1.00 % at least, At this, Kurdistan Region has to increase this percentage to target it.

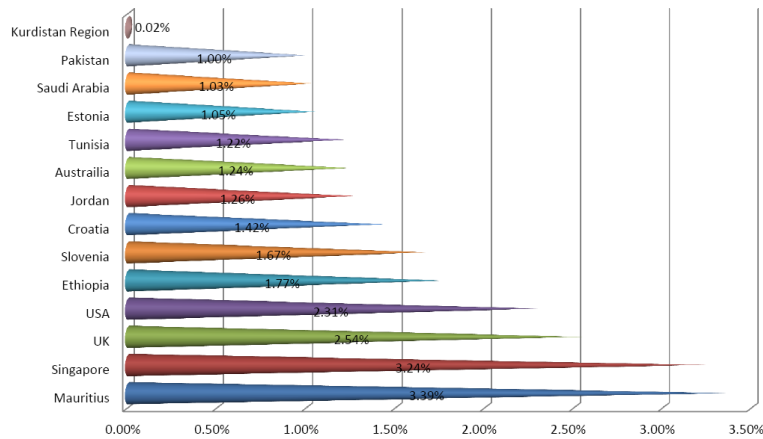


Figure 2.2 IT Spending as % of Total Government Budget

As we have seen from the analyses, investment in Information Technology is important in countries around the world. The proposed \$2.2million IT budget for the KRG appears thus relatively low and it is clear that it is necessary to increase this budget to similar levels to the other countries . This will ensure that the Kurdistan region develops its IT infrastructure, enables its government to work better and make administrative reforms and e-government a reality for its citizens. Investing the right percentage in ICT and e-Government will be an important achievement for the KRG’s ture.http://it.krg.org/documents/Global_IT_Spending_2011_Fact_English.pdf(visited August 2011).

2.4 Characteristics of the ICT Sector in the KRG

Several aspects were listed in a recent study and which we can list here:

First, the use of information technology (IT) is still extremely limited. Most applications are restricted to personal and domestic use, while there is a scarcity of advanced information systems, the use of which is rare and limited to a few banks and communications companies.

Second, Traditional methods, such as paper documentation and conventional learning, continue to prevail. There is a lack of interest in keeping abreast of progress in this sector.

Third, the IT market in the region is restricted to computers and their accessories, while there is an absence of a market for software and advanced systems.

Fourth, there is a state of chaos in marketing products and technologies in the region, as poor quality and inferior products dominate.

Fifth, there is a scarcity of regional experts in the field, as most of them are self-taught, and only a few are educated or trained abroad, and are hence capable of taking the lead in fast change and development.

Sixth, there is a lack of interest in ICT in the region’s educational curricula. Complicated and outdated curricula prevail, amid an absence of ICT education and applications across several school levels and colleges.

Seventh, there is an absence of legislative protection for patents, technology transfer contracts, and ICT use and applications.

III - MEASURING THE IMPACT OF ICT AND E-LEARNING ON HIGHER EDUCATION SYSTEM IN THE REGION

The new educational phenomenon has been discovered in many education institutions, which is enhancing learning and teaching through the use of technology. We have to find out the factors and effects of ICT and e-learning through qualitative and quantitative data that has been discovered through a list of questionnaires in both English and Kurdish language conducted online through “limeSurvey Software” among students and teachers in Kurdistan Region Universities and Institutes. Through this survey we came to analyze the collected data and some findings have been revealed as the impact of e-learning and ICT on higher education system in KRG. All the figures and tables in this section have been produced through the data we have collected.

3.1 Methodology

In this study we have chosen online questionnaire (as the data collection method. Based on the assumption that a web-based survey (online questionnaire) can effectively and efficiently reach widely distributed respondents, Questionnaire, if worded correctly, normally require less skill and sensitivity to administer than semi-structured or in-depth interview. The survey conducted online was made through designing a very user friendly interface, you can see in the link <http://elearningkurdistan.limeask.com/42222/lang-en>. As the targeted people are only Kurdish teachers and students in this phase so the questionnaire has been translated into both Kurdish and English languages so as not the participants face any misunderstanding of the questions to have a very pure and accurate information (tis is not a clear sentence, please rephrase). We have developed four-group questions:

1. The first groups of questions were intended to gather data regarding demographic characteristics of the participants such as age, gender and the role of internet in the institutions.
2. Questions about experiences with technology-enhanced learning, designed to measure how students and teachers are using of ICT.
3. Questions about the effectiveness of ICT on improving skills, designed to understand teachers believes if e-learning enhances their teaching skills and
4. Questions related to the readiness of e-learning implementations on higher educations, designed to evaluate whether the participants in the institutions are ready to adopt e-learning and they need training for e-learning before embarking on it.

Seventy nine completed questionnaires were collected in the intervention in a database while the website at <http://elearningkurdistan.limeask.com/42222/lang-en> was open from 29 Aug 2011 to 12 Sept, 2011. The data were extracted in an Excel and graph formats and analyzed it well for getting the best outcome.

3.2 Data Analysis and Results

First Group Questions (demographic characteristics of the participants)

The survey revealed that the majority of the participants are male (84.62%) and 15.38% female, The age groups of the respondents are categorized as follows: 30.77% are between 20-30 years old, 47.44% are between 30-40 years old, 17.95% are between 40-50 years old, and 3.85% are between 50-60 years old. This shows that 96 % of the participants are between 20 and 50 years old. Another criterion of the participants are their affiliations and their roles: 80.77% of the respondents are currently working in universities as teachers or M.SC or PhD students, 20.51% are working in other ministries as administrators and the others are in other places unknown. Besides, the participants are also classified according to their diplomas holders: 51.28%% are PhD or M.SC

holders , 43.59% are B.SC or B.A holders ,2.56% are high school holders, and the others are unknown which is 2.56%.

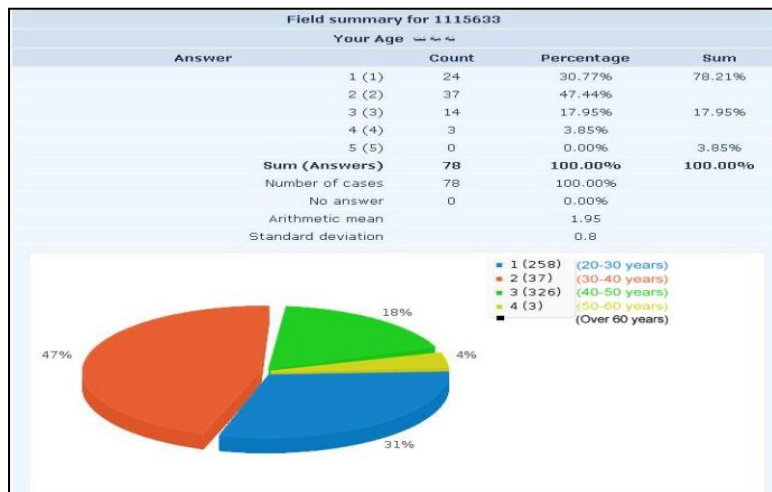


Figure 3.1 Age Group

Second Group Questions (how students and teachers use ICT)

98% of the participants have computers connected to internet at home while 93% have computers connected to internet at their work place but only 67.08% are satisfied with the speed of their internet at home or at working place as shown in the table below.

Table 3.1: Access to the Internet

Yes/No	Percentage of access to Internet at Home	Percentage of access to internet at Working Place	Percentage of having PC at Home	Percentage of having PC at Working Place
Yes	96%	92%	100%	94%
No	4%	8%	0%	6%

Among these numbers 46% of the participants are heavy users; they use internet and computer more than 20-30 hours a week, the other percentage of 49.29% use between 2-10 hours a week. The main usage purposes of computer and internet among participants are (86% for the purpose of searching and enriching my studies, 50.63% for national and international media news, 41.77% for email exchanging with my academics, 16.64% for social networks like face book, and 10.13% for e-business.

Table 3.2 the main purpose of using internet

What is your main purpose of using internet?			
Answer	Count	Percentage	
just for pleasure or entertainment	6	7.59%	
For email exchanging with my teacher or responsible	33	41.77%	
For the purpose of searching information and enriching my studies	68	86.08%	
For chatting on face book or other messenger or social networks	13	16.46%	
For national and international media news	40	50.63%	
For e-business or online business	8	10.13%	
Other	4	5.06%	

If we compare the statistics between age groups and technology users we observe that there is an influence of age on people’s opinions; we saw that the extent to which the respondents have used technological equipment in their academic and professional life is indifferent with respect to variable age.

Third Group Questions (if e-learning enhances their teaching skills)

ICT plays an important role in people’s daily life and most participants take a positive attitude on its impact. Among the occupation groups being surveyed, teachers and students use the technological equipment in their life most frequently. More than 97% of respondents agreed that their ways of working has been changed by the development of technology. As shown in table 3.3 a majority of teachers and students have rather positive or very positive attitudes towards e-learning.

Table 3.3 Attitude about Integrating ICT into Higher Education System

In general what is your attitude of integrating ICT into higher education organizations?		
Answer	Count	Percentage
Very Positive (A1)	49	62.03%
Rather Positive (A2)	21	26.58%
Neither Negative nor Positive (A3)	3	3.80%
Rather Negative (A4)	1	1.27%
Very Negative (A5)	3	3.80%
I di not know (A6)	2	2.53%
No answer	0	0.00%

In a question about the way of communication with your teacher after class between teachers and students encourage for active participation and making relations through technologies. More than 97% of the participants found that the impact of ICT on their learning is valuable and they believe that the problems of access to learning are much better using multimedia in class so, a relatively strong agreement can be found on the impression that learning is enhanced when multimedia, components integrated in the learning content. So, a majority of participants agreed that ICT was used to encourage active learning participation and develop high level thinking skills such as synthesis and problem solving.

Fourth Group Questions (the readiness of e-learning implementations)

In this group of questionnaire we mainly focused on e-learning technologies. As this type of learning is in general new for students all over the world in particular Middle East namely Kurdistan of Iraq because of the long previous continuous wars from 1980s as explained in part 3 so we started a question about participants best types of their learning styles which is by Visual as shown in table 3.4 and their best definitions for e-learning.

39% of the participants believe that e-learning is “The use of technology to enable people to learn anytime and anywhere...”this is meanwhile if we go back to part one for the definition of e-learning we see that the e-learning has many definitions. It is a kind of ambiguity for teachers and students when they hear the word of e-learning, Kurdish teachers and students could support the right common definition for e-learning as explained in that part.

Table 3.4 the best Learning Style

What is your best learning style?		
Answer	Count	Percentage
Learning by listening (Auditory)	18	22.78%
Learning by seeing (Visual)	47	59.49%
by experimenting and feeling (Kinesthetic)	44	55.70%
by testing through this link http://www.metamath.com/multiple/multiple_choice_questions.html	1	1.27%

As we aim this research also for future to implement LMS software on the universities and institutes, we faced participants with several questions which have relations to readiness of teachers

and students about implementing e-learning system on the current universities and institutes in KRG. At first as shown below, among 85 teachers and students only 31 teachers and students have knowledge about one of the types of LMS like Blackboard, Moodle, OLAT, eCollege, Sakai... and the others 54 people have no idea about LMSs.

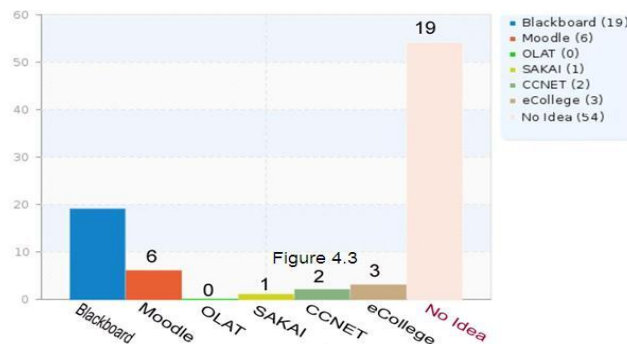


Figure 3.3 On which Learning Management Software LMS you worked before?

A number of participants 48.10% believe that within more than five years we will see the effectiveness of technology on the university courses while 29.11% they think only in five years later this change will happen and fortunately 16.46% they say that this changes do not occur in Kurdistan .

Table 3.6 how is technology most likely to affect academic course in Kurdistan Region

How is technology most likely to affect academic course in Kurdistan Region?		
Answer	Count	Percentage
Within five years (A1)	23	29.11%
Longer than 5 years (A2)	38	48.10%
Unlikely to occur (A3)	13	16.46%
I do not know (A4)	5	6.33%
Comments	11	13.92%

In relation to e-learning outcomes, 86% of participants believe that e-learning technologies improve quality of teaching methods and 87% of them need training in this new system in Kurdistan as they have little notions about it.

Table 3.7 E-learning improves quality of teaching methods

Do you think that e-learning improves quality of teaching methods?		
Answer	Count	Percentage
Yes (Y)	68	86.08%
No (N)	11	13.92%

Table 3.8 shows the need for training in e-learning implementation

If you agree teaching by using e-learning, do you need a train plan for that?		
Answer	Count	Percentage
Yes (Y)	69	87.34%
No (N)	10	12.66%

At the last question to all the participants, 38% of them are strongly agree, and 46% are agree to start implementing e-learning system at universities but only 8% are not agree but they believe that e-learning can have better outcomes than ordinary classroom instruction.

IV CONCLUSIONS, POLICY RECOMMENDATIONS AND FUTURE

To summarize, section one gave us general consideration about ICT and e-learning as tools. Section two revealed that e-learning has a fundamental impact on the structure of HE through literary review. Now a day the organizational structure of the universities has to change next years to fit new requirements of the ICT world. Central support units for ICT and e-learning at the university are a way to reach the goals. Section three showed that currently computer and internet access are approximately everywhere in the universities and institutes of Kurdistan but the system till now works traditionally. Section four gave the final results which can be summarized as follows:

- 97% of the participants to agree that multimedia environments are considered to provide a high benefit for teaching and learning.
- Most of the teachers have positive or rather positive attitude towards e-learning.
- For students, e-learning can provide a model on how to become self directed independent learners.
- Training staff is a must in e-learning implementations and techniques as 87% of participants need training in e-learning because they have little notions about it.

We found that in 2011 KRG budget for IT was so little for progressing ICT. Most countries spend at between 1-3% from their total budget on ICT but the Kurdistan region spending 0.02% which is not a healthy indicator and is not in line with global trends and best practices.

The policy implication is that KRG must do what it can to help achieve the minimum ICT requirement and only that will make it possible to master the digital leap, first it must create contexts and opportunities for information technology interaction across the various levels of administration, businesses and educational sectors as well as between the public and private sectors.

A central ICT planning authority must be created in KRG to coordinate all these efforts. This central ICT luckily came into being from last two years under the name of KRG Department of Information Technology (Farzad Sanati, 2007). The objective of KRG IT department is development of strategic objectives which articulate the outcomes of the strategy in various domains.

Future

By extension, the development of a modern economy is predicated on its ability to take part in global data exchange. This data exchange requires high-speed data access through fiber optic connections. Therefore, the most important ICT task for the Kurdistan Regional Government (KRG) is to create a robust fiber-optic communications infrastructure. To facilitate economic growth it is necessary to develop a high speed data network, initially based on wireless technologies. In the last three years, all investment in communications in the Kurdistan Region has been private and primarily focused in one area of communications infrastructure and mobile phones which is typical of most developing economies. The ease of deployment combined with a massive demand for communications has made mobile communication extremely successful and very profitable in developing economies (USAID, page 61-8).

After discussion and finding all the conclusions, there is one question: Can currently e-learning work for Kurdistan-Iraq? Can it be successful?

“If we look at the Middle East in general we see that the Arab regions have developed remarkably in the domain of distance and e-learning higher education over the past two decades.” (Ugur Demiray, volume I, 2010) but Iraq including Kurdistan has been left behind due to the known reason of always having wars in the country and the region.

Besides, yes we can say that it does work for Iraq and in particular for Kurdistan Region Government KRG entities and institutes as it is obvious that the Kurdish region is safer in terms of security since 2003's change power.

Other reasons why it is time: the Region is geographically diverse. In KRG parliament, a new department of IT since 2007 has been opened and is delivering the establishment of a state of the art

Regional IT Academy, the KRG Biometric Electronic ID Card System and the development of the KRG IT Strategy 2011-2016.” <http://it.krg.org/en/about-us/head-of-department>(visited Sept 2011). Ministry of Higher Education is developing rapidly, since the beginning of 2010 the ministry has launched HCDP grant program Human Capacity Development Program and conveying about 3000 students for getting Master and PhD degrees in the high ranked universities in US and Europe in general. Can take advantage of regional online distance learning educational programs that have been already deployed in some neighboring countries, Jordan, UAE, Lebanon, Kuwait and KSA.

REFERENCES

- [1] Almas Heshmati , “Review of the Recent Trends in Development Economics Research: With Experience from the Federal Region of Kurdistan” , University of Kurdistan Hawler, HIEPR and IZA Discussion Paper No. 3208 , page No. 41 , 2007
- [2] Donovan A. McFarlane , “ A Comparison of Organizational Structure and Pedagogical Approach: Online versus Face-to-face” , Frederick Taylor Universit, The Journal of Educators Online, Volume 8, Number 1, January 2011
- [3] B.Fernandez Manjon et al “Computers and Education-Learning from theory to practice”, Springer 2007
- [4] Don McIntosh, “E-learning and Organizational Culture” , 2006
- [5] Farzad Sanati , “E-Commerce Strategy for Southern Kurdistan Region” , Department of Education, NSW Australia ,Kurdistan Academy of Science (KAS),2007
- [6] Farzad Sanati , “Strategic road map for Digital Kurdistan” , Faculty of Information Technology, University of Technology Sydney , Broadway NSW 2007
- [7] Kanninen Essi , “Learning styles in virtual learning environments” , Tampere University Of Technology ,Master’s Degree Program in Electrical engineering, Page 25 ,January 2009
- [8] Kanninen Essi , “Learning styles in virtual learning environments” , Tampere University Of Technology Master’s Degree Program in Electrical engineering,Page 12,17,18,January 2009
- [9] Khaled Bakleh, “ Kurdistan Business Agenda” , Center for International Private Enterprises, part 14, 2006
- [10] United States Agency for International Development , “ Kurdistan Region Economic Development Assessment Final Report “ , page 61-68 ,December 2008
- [11] Paul Arabasz, IDC Judith A. Pirani, Sheep Pond Associates Dave Fawcett, IDC , “ Supporting E-Learning in Higher Education “ , EDUCAUSE Center for Applied Research, Volume 3, page 9-13,41 , 2003
- [12] Aidrina SofiadinTan ,Sri Datuk and Dr Anuwar Ali , “ Issues and Challenges in Implementing E-Learning in Malaysia “ , 2004
- [13] Ugur Demiray , “Cases On Challenges Facing E-Learning And National Development: Institutional Studies And Practices” Volume: I ,page 277 & 283 , 2010
- [14] Yefim Kats , “ Learning Management System Technologies and Software Solutions for Online Teaching: Tools and Applications” , Ellis University, USA & Rivier College, USA,2010