ICT Adoption Analysis for Innovation in Higher Education Sector

Ms. Adeela Bashir
Department of Information System
Computer Science College, King Khalid University
Abha, Saudi Arabia
abshir@kku.edu.sa

Dr. Arshi Naim
Department of Information System
Computer Science College, King Khalid University
Abha, Saudi Arabia
arshi@kku.edu.sa

Abstract— **Technology has advanced all areas in learning environment and in simple livelihood. Information and Communication Technologies (ICT) has its application in the significance development of sectors like healthcare, military, agriculture, government, etc. Education sector is a prominent field for ICT application. In Saudi Arabia, ICT is working immensely to achieve the objectives of 2030 vision, and advancement of learning and teaching processes in higher education is one of the vital facets of the vision. Many universities have adopted ICT applications in education and are improving the teaching and learning processes. In this paper, the effectiveness of ICT in higher education sector is reviewed. We have conducted a survey to find the opportunities, needs and challenges faced by the faculty in the use of ICT in teaching and learning process. Survey results have shown the adequacy of ICT for teaching and the constraints in the utilization of ICT by the university lecturers.**

Keywords—ICT; Higher Education; Vision 2030

I. INTRODUCTION

"Information and Communication Technologies," ICT refers to technologies that provide access to information through telecommunications. It is similar to Information Technology (IT), but focuses primarily on communication technologies. This includes the Internet, wireless networks, cell phones, and other communication mediums. ICT description has been applied in various environments including economic growth, teaching & learning, trade and individual usage [1].

In last decade, information and communication technologies have given people with different range of new communication potentialities.

Current information and communication technologies have created a "global village," in which people can communicate with others across the world as if they were living next door. [1] Therefore, ICT is studied in modern communication technologies to find it affects society in general and education sector specifically.

The use of Information and Communication Technologies (ICT) is becoming unavoidable in every sector these days. Enterprises, healthcare, government sector, military and education sector are affected the most. ICT has renamed the trend in changing traditional pedagogy of learning and teaching. Nowadays the role of Information and Communication Technology (ICT), especially internet in the education sector plays an important role, in the process of empowering the technology into the educational activities. Education sector can be the most effective sector to anticipate and eliminate the negative impact of ICT. Technology (internet) in another side can be the most effective way to increase student's knowledge [2].

In the current scenario, modern education is influenced with the technology and ICT is also growing in the fast pace. To balance the entire education system in higher education and reform it ICT should be implemented [2].

In [3], the analysis of different levels of proficiency showed that Finland, Norway, Belgium and Korea are most proficient in terms of ICT integration in education sector. Although some less developed EU countries like Slovakia and Poland also showed somewhat high level of ICT efficiency but a momentous growth in ICT expenditures is required in these countries. In general, the study says that most of the countries hold excessive potential for better productivity in ICT which can improve the educational sector efficacy.

The integration of ICT is altering the education design and delivery in higher education sector. The academic and socio-economic forces have motivated the higher education sector to adopt and integrate ICTs in teaching and learning which helped in providing better communication and information access, multiple modes of learning; augmented collaboration and teamwork, and cost-effectiveness. However, ICTs have not integrated to a higher degree in most developing countries e.g. Tanzania due to variety of unavoidable circumstances [4].

The goal of implementing ICT strategies in Education is to provide better future to educationists, enhance learning processes and integrating ICT into the general educational activities.

Second, the influence of ICT, especially internet (open source tool) cannot be ignored in our student's lives. So, the learning activities should be reoriented and reformulated, from the manual source centered to the open source ones. In this case the widely use of internet access has been an unavoidable policy that should be anticipated by higher educational authorities [2].

Nevertheless, ICT is widely used to discover, improve, examine and present the information in various forms, in addition to solve problems and model situations. It facilitates quick access to concepts and proficiencies from an extensive range of individuals, societies and cultures, and permits learners to collaborate and interchange information. The reason behind the integration of ICT in education is to acquaint learners with the usage of computers, and associated societal and moral concerns. ICT enables learning through several modes as ICT has presented education through simulation games; which enables active learning via all senses [5]. Use of different forms of ICT has become foreseeable for learners in each form of learning. By using modern ICTs learners can easily retrieve any required data when needed. They have access to electronic data in form of e-books, e-journals which can expand their knowledge by using a variety resources like internet, search engines, big data, Internet of Things, websites etc. [6].

II. OBJECTIVES

The followings are the aim and objectives of ICT implementation in education:

- ✓ To apply the principle of continuous learning and developing in the education.
- ✓ To enhance the variety of educational methods and tools.
- ✓ To explore the system of collecting, distributing and publishing educational information.
- ✓ To promote technology knowledge to all the people, especially for students and teachers.
- ✓ To stimulate the culture of e-learning, distant learning.
- ✓ To support academies in sharing experience and information with others.

III. VISION 2030 & ICT

The Kingdom of Saudi Arabia (KSA) is blessed with many rich assets, geographic; cultural, social, demographic and economic advantages which has enabled them to take a leading position in the world. To build the best future for the country, the vision for KSA stands on three pillars that represents unique competitive advantages. Our status will enable us to build on our leading role as the heart of Arab and Islamic worlds. At the same time, we will use our investment power to create a more diverse and sustainable economy. Finally, we will use our strategic location to build our role as an integral driver of international trade and to connect three continents Africa, Asia and Europe. The country's vision is built around three themes: a vibrant society, a thriving economy and an ambitious nation. To meet all three visions, development in education sector plays an important role with an implication of ICT [7].

Saudi Arabia is on the new line of development and ways of Educational development, Developing Philosophy, Policy, and Goals of Curricula, Means of Development, Mechanism Activation, and connecting all these means with the programs of Teacher Preparation and his professional development [8]. Concentrating on inculcating skills, personality development, improving confidence, and promoting spirit of creativeness by using ICT [8]. Developing Attractive, Preferred, and Stimulant learning environment, connecting it with supportive and integrated services systems [8]. Improving and developing the administrative environment in the Ministry and its Education Departments, approving decentralization of the administration, delegating powers to departments and institutions to serve the education system [8]. Developing rules and procedures to ensure work seriousness, and discipline in education system, promote justice, and reward excellent performance [8]. Raising the efficiency of performance, employing modern support technologies in education system. Following figures show the challenges faced by education system in Saudi Arabia and the intended objectives [8].

Fig. 1: Challenges Facing Education, Vision 2030 Saudi Arabia [3]
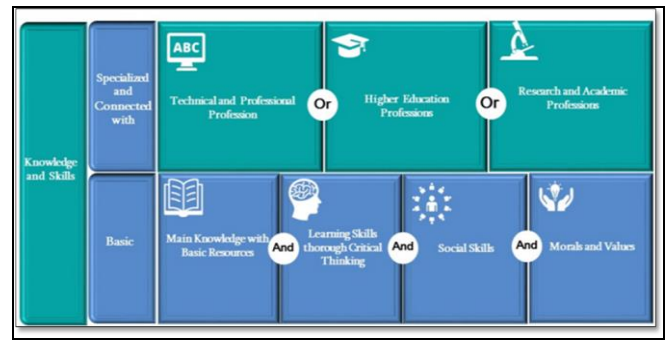

Fig. 2. Intended Objectives of Education System, Vision 2030 Saudi Arabia [3]

Moreover, Projects are initiated to enhance the quality standard in all areas of education sector like primary & secondary education, higher education, technical and vocational training. Work is going on towards the development of curricula according to international standards, rehabilitation of teachers, and enhancement of educational environment [9].

IV. NEED OF ICT INTEGRATION IN EDUCATION

There is a need to fully integrate ICT in education to overcome the crowd in learning institutes. By using ICT in education, virtual classrooms can give learners a pace of freedom to study at times of their choice, accessibility of education material at any time and location, interaction to the instructor as well as class fellows wouldn't be a problem. All these advantages are linked to the proper integration of technology in education for instance online teaching, distance learning, MOOC, blended learning etc. Teaching and learning without any integration of technology will form the traditional society and wouldn't produce smart citizens to populate smart cities all over the world. ICT integration in education is still in the development stages. In many fields of study traditional education is still needed because all learning outcomes are not met by using only ICT there. Technology practitioners think about the technology advancement first and then about its integration in education that makes it difficult to be linked to pedagogy completely.

V. RESEARCH METHODOLOGY

This research work utilized a survey research method. The mechanisms utilized for this review were organized questionnaire, individual perception and short meetings. The population for this review was the faculty members of Computer Science, King Khalid University. Nonetheless, the straightforward survey was conducted in attainment of a workable exemplary estimate. The tool was separated into two segments. Segment A looked for data relating to statistical information of the respondents while Section B contained organized inquiries coordinated to the review. Talk with sessions and individual perceptions of respondents were likewise completed. The information produced was investigated utilizing recurrence and rates.

The populations for this review were instructors in the Faculty of Computer Science. Nonetheless, the straightforward survey was conducted as a part of touching base at a workable example estimate. One hundred (100) surveys were directed yet just eighty (85) were returned, giving a reaction rate of 85%. The information produced was investigated utilizing recurrence and rates.

Questions asked from the respondents were covering many facets of the idea behind use of technology ranging from the motivation of teachers and learners for ICT adoption to the availability/unavailability of resources and the reasons behind reluctance in ICT implementation. Survey questions are:

- ✓ Whether teacher is comfortable with using/not using ICT?
- ✓ Point out the reasons behind answer to 1st question?
- ✓ Is the teacher motivated to use ICT in teaching?
- ✓ According to teacher's perception, whether ICT is integral part of teaching?
- ✓ Are teachers seeking professional development to integrate ICT in teaching?
- ✓ Questions about the teachers' and learners' usage of computer and the purpose of use.
- ✓ Resources availability like Computer, internet in labs and lecture rooms.
- ✓ Do ICT adoption seems easy to teachers?
- ✓ Are teachers aware of diverse ways to integrate ICT in teaching?

VII. RESULTS

Following are the results in form of tabular data and their correspondent graphical representations to illustrate the outcome of survey carried out for this research work.

TABLE1. ICT IS AN INTEGRAL PART OF TEACHING AND LEARNING

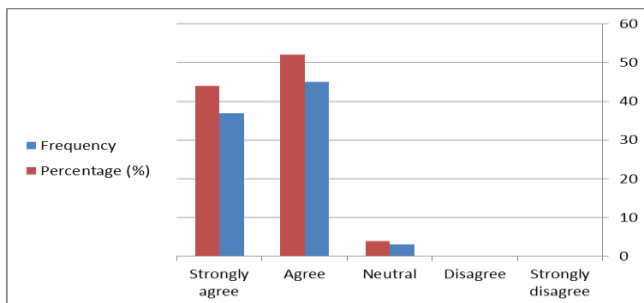| Responses	Frequency	Percentage (%)
Strongly disagree	0.00	0.00
Disagree	0.00	0.00
Neutral	03	04.00
Agree	45	52.00
Strongly agree	37	44.00
Total	85	100.00

Fig. 3. Responces for importance of ICT in education

The results show more than 90 percent of respondents agree that nowadays ICT is becoming an important aspect of high quality process of teaching and learning. Only a few respondents i.e. 4 percent were sought to be neutral but no one could negate the importance of ICT in education sector.

TABLE 2. MOTIVATION OF USING ICT IN LECTURES

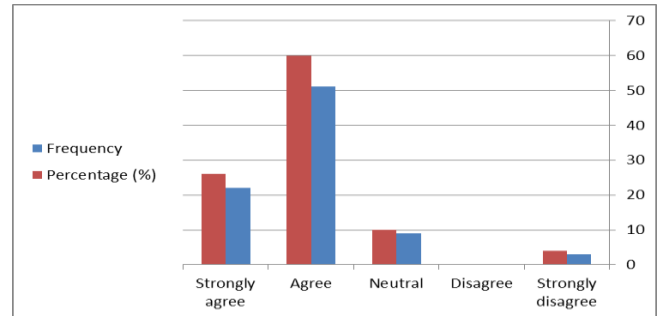| Responses	Frequency	Percentage (%)
Strongly disagree	03	04.00
Disagree	00	0.00
Neutral	09	10.00
Agree	51	60.00
Strongly agree	22	26.00
Total	85	100.00

Fig. 4. Motivation of using ICT in lectures

Result shows that majority respondents i.e. more than 80 percent are motivated to use technology while teaching in lecture rooms as well as labs and for monitoring the learners' capabilities through quality assessments but due to various reasons frequency of use is low. To find out the reasons effecting the use of ICT, questions were asked and it was noted that main reason for teachers' reluctance to ICT usage is the limited access to required resources.

TABLE 3. TEACHERS ARE COMFORTABLE WITH:

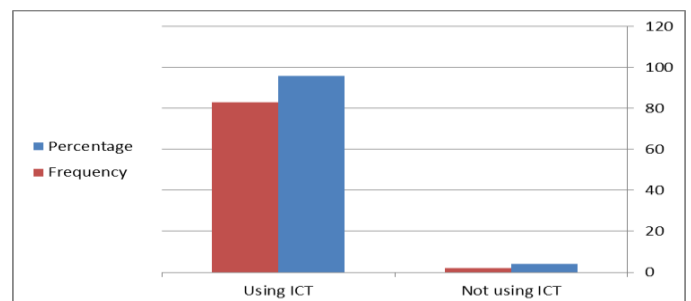| Parameters	Frequency	Percentage
Using ICT	83	96
Not using ICT	02	04
Total	85	100

Fig. 5. Teachers are comfortable with/without ICT

In continuation with the previous questions, it is observed that teachers (being the CS faculty) are comfortable with using all forms of ICT in their teaching and assessment process if they are provided with enough resources.

TABLE 4: SEEKING PROFESSIONAL DEVELOPMENT FOR USE OF ICT

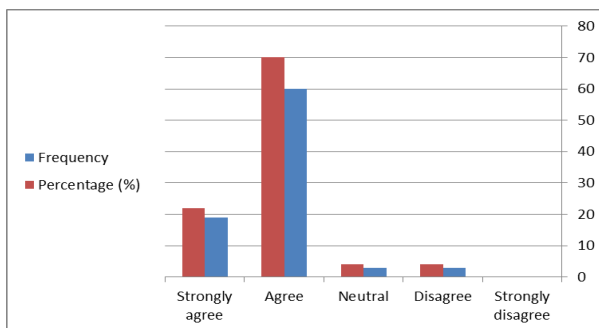| Responses	Frequency	Percentage (%)
Strongly disagree	00	0.00
Disagree	03	04.00
Neutral	03	04.00
Agree	60	70.00
Strongly agree	19	22.00
Total	85	100.00

Fig. 6. Teachers are seeking/not seeking professionl development

The question asked for the above tabular data is regarding the teachers' involvement towards the whole process of integrating ICT in teaching. Two types of teachers can be found.

- ✓ First, teachers who know every method of ICT integration all the way in their teaching and assessment.

- ✓ Second, teachers don't have enough skills but they are agreed to be trained through professional development training/workshops.

Results show a little variation in willingness to receive a professional training and actually receiving the training but most of the respondents are in favor to the ICT integration whether they are trained or need to be trained.

We can accomplish form the results that for the purpose of ICT usage in education, trainers need to be trained first. Teachers must be trained according to international standards of online teaching like in King Khalid University, for blackboard usage proper training is provided for the faculty and certificates are given to the teachers for development of online courses according to international standards of Quality Matters.

VIII. CONCLUSION

To conclude, integrating the use of technology into curriculum in a determined and meaningful way is one of the numerous issues instructors are confronting today. Results show the need of ICT incorporation in teaching and learning process. Faculty members are motivated towards using ICT in their lectures and they are aware with the needs of technology integration in the educational process. Many of them consider technology as an integral part of teaching and learning process and they are seeking professional development for use of ICT in teaching. While integration of ICT, it is the responsibility of Govt. and education institutions to provide enough physical resources like computers, internet, smart devices etc. as well as the professional development of faculty. Training should be given to faculty members on incorporation of technology in teaching. The aim is to ensure accessibility, availability and reliability of ICT facilities as every lecture room and staff offices will have access to high speed internet and have equipment appropriate for accessing a range of electronic resources.

REFERENCES

[1] Defining ICT in a boundary less world: the development of a working hierarchy, International Journal of Managing Information Technology (IJMIT) Vol.4, No.3, Aug 2012.

[2] The Roles of Information Communication Technologies in Education Review Article with Emphasis to the Computer and Internet, Ethiop. J. Educ. & Sc. Vol. 6, No 2, Jul 2011.

[3] The impact of ICT on educational performance and its efficiency in selected EU and OECD countries: a non-parametric analysis, Aleksander Aristovnik University of Ljubljana Slovenia, ICICTE Proceedings, 2012.

[4] Sife, A.S., Lwoga, E.T. and Sanga, C. (2007). New technologies for teaching and learning: Challenges for higher learning institutions in developing countries. *International Journal of Education and Development using ICT*, vol. 3, No. 2.

[5] Gateway, D.R. (n.d). Defining ICT in Education. Retrieved October 3, 2010.

[6] Khan, Shakeel Ahmad; Bhatti, Rubina; and Ahmad Khan, Aqeel, Use of ICT by Students: A Survey of Faculty of Education at IUB, Library Philosophy and Practice (e-journal), 2011.

[7] https://www.vision2030.gov.sa

[8] https://www.moe.gov.sa

[9] National report on educational development in the Kingdom of Saudi Arabia, Report submitted on 48th session education international conference, Geneva 25-28 Nov, 2008.

[10] Crafting smart cities in the gulf region: A comparison of masdar and lusail,evrentok, phd, fatemah al mohammad, ma (c), maha al merekhi, European Scientific Journal June 2014 /SPECIAL/ edition vol.2 ISSN: 1857 – 7881.

[11] Taewoo Nam and Theresa A. Pardo, Smart City as Urban Innovation: Focusing on Management, Policy, and Context, In Proceedings of the 5th International Conference on Theory and Practice of Electronic Governance, 2011.

[12] Guo J., Zheng J. (2012) Research on Application of Multimedia Teaching over Literature Classroom. In: Zhang W. (eds) Advanced Technology in Teaching. Advances in Intelligent and Soft Computing, vol 163. Springer, Berlin, Heidelberg.