

# Technology to Enhance Learning: The Jordanian Experience

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## ABSTRACT

The rapidly growth of Information and Communication Technologies (ICTs) has changed the routine life in the world. Developing nations see the economic prosperity in developed nations by development of associated information technology and development of a knowledge society. Jordan, as one of the developing countries, highly values the importance of Higher Education Institutions (HEIs) and their role in achieving an economic prosperity through the development of human resources. Unfortunately, the adoption and usage of ICT in teaching and learning process is quite low among the academic staff in the public HEIs in Jordan. The main purpose of this study is to present the differences between academic staffs' demographic characteristics and the usage of common technologies such as computers, Internet, mobile phone, and personal digital assistant (PDA) that affects their adoption and usage of ICT in the teaching and learning process. The results show there are some significant differences between demographic factors and such common technologies. Besides, the study presents the current status of ICT usage in public HEIs in Jordan among academicians.

**Keywords:** *ICT, teaching, learning, Jordan*

## I INTRODUCTION

ICT plays an important role in modern institutions by facilitating and improving teaching and learning process in the information age. Developing nations have more at stake in the diffusion of ICT in supporting higher education than do the developed nations (Beerens, 2008). Though technology patterns vary across underdeveloped nations, eventual success depends heavily on an educated workforce (Mistry, 2005). Education technology provides the manpower to achieve this high technology advantage. Teaching and learning is one of the most important fields in the aspect of human development. In striving towards a competitive institution, a university or any HEIs must enhance teaching and training process related to the advancements of ICT and the innovations of

technologies (Duggan, Hess, Morgan, Kim, and Wilson, 2001; Davis and Wong, 2007) Therefore, educational technologies must become more popular among developing nations which seek economic improvement.

## II ICT DEVELOPMENT IN HIGHER EDUCATION IN JORDAN

The Hashemite Kingdom of Jordan (HKJ) is one of the highly developed Arab countries in the Middle East. His Majesty (H.M) King Abdullah II and the government have sponsored many initiatives to encourage the diffusion of technologies in the country that does not only possessing geographical advantages, but also often seeking to develop technological workforces to increase the standard of living and economic productivity (Al-Jaghoub and Westrup, 2003). Unfortunately, the application of technologies such as Internet banking, e-government services, and the use of ICT in teaching and learning process in Jordan and the Arab countries will face many difficulties and challenges such as culture differences, tribes, language, and religion that could have impeding public' appreciation and motivation of using ICT and Internet (Khasawneh and Ibrahim, 2008).

In spite of the usage of Internet is the lowest in the Middle East compared to all other regions in the world except that in Africa (Ali, 2004), Jordan is a shining example of technology diffusion (Al-Jaghoub and Westrup, 2003). The young King, H.M. Abdullah II, has made technology diffusion in general, and the Internet specifically, articles of faith among the population and inroads are being made in adapting technology to the purposes of economic development in Jordan. The Jordanian Ministry of Higher Education and Scientific Research (MoHESR) has launched many initiatives to promote the using and adoption of ICT in the teaching and learning process among universities in the country. Jordan like any developing countries wants to transform its teaching system from the "chalk and blackboard" which is concerned on lecturing and preparing examination to a new system by using ICT and Internet (MoHESR, 2010).

### III ICT TO ENHANCE LEARNING

The diffusion of the Internet and web-based technologies provides a new trend for universities to design new teaching and learning environment. The trend of ICT such as e-learning and web learning has been around since 1998. In its early implementation, it has emerged from being a radical idea where the effectiveness of which was yet to be proven to something that is widely regarded as the mainstream. ICT has achieved strong growth in a short time and e-learning becomes a service offered by most colleges and universities and the core activity to their managerial and educational plans. Particularity, e-learning referred to delivering instructions at a distance over the Internet and mainly takes the form of online courses, where the dominant learning technology employed today is a type of system that organizes and delivers these courses.

ICT is widely deployed in the higher education institutions that changed the fundamental structure and scope of education in universities (Turan and Khasawneh, 2008). The explosive growth of ICT has made it a popular platform for providing electronic services to business and education (Chiu, Hsu, Sun, Lin, and Sun, 2005). It is widely accepted that advances in technology and new developments in educational system provides opportunities to create well-designed, student-centered, and facilitated e-learning environments (Khan, 2005). This study hopes to play a significant role in the development of the education system in general, and in higher education in particular. It guides the academic staff to accept technologies necessary for the delivery of web based technologies and eLearning processes.

### IV THEORETICAL BACKGROUND

The Review of the literatures shows there is a gap in the fields of adoption and utilization of ICT in the educational system especially in the higher education field between developed and developing countries. Filling this gap in the literature is one reason for conducting this study. This study concerns on the factors that affect on the academic staff to use ICT in their teaching and learning process by studying the differences between their demographic factors and the using of common technologies in the educational system. In spite of the wider range and rapidly growth of adoption of ICT in HEIs, many academic staffs are still resisted using new technologies in their teaching and learning process (Patnaik, 2001). According to a report issued by the United Nations Development Program (UNDP), there is a lack of ICT

utilization in HEIs in Jordan. This is due to the lack of technical infrastructure and training program (AlFarawati, 2001). In regards to Jordan, until now there is a lack of ICT usage among the universities' academic staff in Jordanian HEIs (Al-Mobaideen, 2009), in which they have lack knowledge, skills, motivations, and interests in using ICT in facilitating their works (Jawarneh, El-Hersh, and Khazaleh, 2007; Qudais, Al-Adhaileh, and Al-Omari, 2010).

Adoption of innovation may also be affected by the individuals' characteristics and the characteristics of the social system which the individual lives in (Rogers, 1995). Previously, Katz (1992) found that personality traits are affects the adoption and attitude of the technology. From social cognitive theory perspective, gender is the main factor on which human is differentiated (Bussey and Bandura, 1999), including in terms of computer and ICT adoption. In spite of, many studies found that the adoption and usage of ICT is less among women (Shashaani and Khalili, 2001), there are also studies have presented differing ideas about the role of gender in adoption and use of ICT. Besides, Luan, Aziz, Yunus, Sidek, Bakar, Meseran, and Atan (2005) found that there exists a gap between male and female academicians in using technologies in the educational system. In certain cases, the competencies of female academic staff have even surpassed those possessed by males, which is agreed by Chen and Tsai (2005) in terms of web-based learning.

On the other hand, age is also one of the most important demographic characteristics and considered a significant factor in the adoption of technologies in the universities among academic staff. Many studies found the relationship between the age of academic staff and their attitudes in using ICT in the teaching system. Lin (2002) found that the older lecturers have lower technological familiarity. As a result, the significance of the relationship between age and other factors may be somehow different; this means individuals in a certain age groups might have different factors, which significantly affect each group. For example, Morris and Venkatesh (2000) reveal that the adoption decision by younger is stronger than older.

Consequently, Rogers (1995) argues that the level of education for an individual may affects on his/her adoption of an innovation. This means that those who have the higher level of education are more familiar to use new technologies. Besides, many researchers study the relationship between lecturers' experience and the usage of ICT in their

teaching system. In accordance, Davis (1998) argues that the attitude towards ICT is different between senior lecturers that have experience in teaching and junior lecturers without experience, which summarized that there is a significant relationship between lecturer attitudes and years of teaching experience, which is supported by Haaparanta (2007), and Huang (2003). A study was therefore conducted to present the differences between academician's demographic characteristics and their usage of common technologies that affects them in adoption and using of educational technologies.

## V RESEARCH METHOD

The most suitable method for this study is the quantitative technique survey. The questionnaires were distributed to the academicians and lecturers in the Jordanian public universities. In relation to the population of the study consists of all academicians who are working in public universities and institutions in Jordan. The statistical number of this population is 5308 academic staff at the end of 2010 academic year (MoHESR, 2010). The study has selected the sample randomly, which means, every academic staff in all public universities (population) has the same chance to be selected as the sample. The researcher decides to distribute 500 questionnaires to be sure that the numbers of return and valid questionnaires cover the sample size proposed by Sekaran (2000). However, not all distributed questionnaires were returned, and some of the returned questionnaires are incompleated as explained in Table 1.

Table 1. Summary of Sample's Responses to Survey Questionnaire

Sample	Size
Initial sample size	500
Non-returned	61
Number of form received	439
Response rate	88%
Incomplete forms	24
Number of useable forms	415
Gross response rate	83%

## VI ANALYSIS AND DISCUSSION

Human differentiation in gender and age are an essential phenomenon that influences virtually every feature of their daily lives. With regards to that, Table 2 reveals that the respondents' gender was equally distributed, with male respondents' rate of 71.6%, and female respondents' rate of 28.4%. While the total population equals 5308, the rate of male from all population is 79.6% and the rate of female is 20.4% (MoHESR, 2010).

In relation to the age, the participants are grouped into four categories. Out of the total participants

from the academic staff in Jordanian universities, 38.6% are in forties, which this is the largest rate. It is followed with 30.4% of those in their thirties, and 18.6% of over 51 years old. The smallest category is under 30 years old with percentage rate 12.5%. In terms of educational level, the percentage rate of them that holding PhD degree is 57.8% and whose holding master degree is 42.2%. On the other hand, the percentage rates of participants who obtained their higher educational degree in Jordan are 38.1% while graduated from abroad is 61.9%. Lastly, among the respondents 54.2% of them specialize in scientific areas, while 45.8% specialize in humanities.

Experience of teaching is also considered as an influential factor in adoption and using ICT in teaching system. However, experience of teaching depends on the age of the academic staff in the universities. Junior academic staff may be familiar with ICT in the education system especially those who have used computers as a part of the college studies or receiving higher education degree from developed countries. On contrary, the senior academic staff may be unfamiliar with ICT in their teaching system because they do not use it in their studies. As a result, knowledge to use ICT in the education system is considered a new skill and may result in diverse attitudes towards ICT.

Table 2. Summary of Responses Depend on Demographics Factors

Variable	Value	Freq	%
Gender	Male	297	71.6
	Female	118	28.4
Age (Years)	Under 30	52	12.5
	31-40	126	30.4
	41-50	160	38.6
	Older 51	77	18.6
HE Degree	Master	175	42.2
	PhD	240	57.8
Place of the degree	In home	158	38.1
	Abroad	257	61.9
Degree Major	Scientific	225	54.2
	Humanities	190	45.8
Experience (Years)	1-5	138	33.3
	6-10	157	37.8
	11-15	93	22.4
	Over 15	27	6.5

### A. Experience with ICTs related to Demographic Factors

Eriksson, Kerem, and Nilsson (2005) point out that frequency of technology used as well as the duration of the experience with the technology has been found to capture the consumer's use of a technology. In this study, the distribution of the sample in terms of the use of four common technologies expected to be related to the

adoption of educational ICT are outlined in Table 3.

**Table 3. Summary of Using Common Technologies**

Technologies	Yes	%	No	%
Computer	389	93.7	26	6.3
Internet	371	89.4	44	10.6
Mobile Phone	415	100	00	0.0
(PDA)	15	3.6	400	96.4

The findings show that personal computers, Internet, and mobile phones received a relatively high penetration rate among the respondents. The data was analyzed using SPSS for windows version 16. One-way-between-groups ANOVA with Post-hoc comparisons, independent-samples t-test, and descriptive statistics were computed to determine the effect of demographic factors and the usage of common technologies to the using of ICT services in the educational system among the academic staff in Jordanian public universities. As shown in Table 4 Independent-samples t-test was done to determine the differences between demographic factors and the usage of common technologies.

**Table 4. T-test Comparison between Demographic Factors and ICT Usage**

ICT	Value	Mean	SD	df	Sig
<b>Computer</b>	Male\	2.79\	1.23\	413	.456
	Female	2.88	1.23		
HE Degree	Master\ PhD	2.65\	1.13\	413	.022*
		2.93	1.29		
Place of Degree	In home\	2.75\	1.20\	413	.441
	Abroad	2.85	1.25		
Major	Scientific\	2.95\	1.26\	413	.014*
	Humanities	2.65	1.18		
<b>Internet</b>	Male\	2.33\	.866\	413	.677
	Female	2.37	.884		
HE Degree	Master\ PhD	2.26\	.774\	405.941	.118
		2.40	.932		
Place of Degree	In home\	2.25\	.741\	387.800	.099
	Abroad	2.39	.938		
Major	Scientific\	2.42\	.863\	413	.048*
	Humanities	2.25	.872		
<b>Mobile</b>	Male\	3.20\	.945\	413	.175
	Female	3.34	.998		
HE Degree	Master\ PhD	3.09\	.852\	405.402	.004**
		3.35	1.02		
Place of Degree	In home\	3.18\	.971\	413	.354
	Abroad	3.28	.955		
Major	Scientific\	3.34\	.993\	410.136	.019*
	Humanities	3.12	.911		
<b>PDA</b>	Male\	1.02\	.151\	151.860	.077
	Female	1.06	.252		
HE Degree	Master\ PhD	1.02\	.167\	413	.482
		1.04	.200		
Place of Degree	In home\	1.01\	.136\	411.868	.106
	Abroad	1.04	.211		
Major	Scientific\	1.04\	.196\	413	.648
	Humanities	1.03	.175		

The findings in Table 4 show that there are significant differences in the higher educational

degree and the major of the academic staff with the use of computers and mobile phones. In the Internet using, the major of the academicians is significant. However, none of these groups show statistically significant difference in the use of PDA at  $P < 0.05$  levels. On the other hand, one-way between groups ANOVA was conducted to explore the impact of the academic staffs' age and experience with the usage of common technologies. Table 5 presents the findings that reveal there is a statistically significant difference in the computer usage with age under 30 years old and between 41 years old to 50 years old ( $P = 0.013$ ), also between 41 years old to 50 years old and 51 years old or older ( $P = 0.000$ ). While, there is no statistically significant difference in computer usage with experience groups. In terms of the Internet, the findings show that there is a statistically significant difference with age under 30 years old and between 41 years old to 50 years old ( $P = 0.012$ ), also between (51 years old or older with (30 years old and 40 years old, 41 years old and 50 years old, respectively),  $P = 0.000$  to each of them). While, there is no statistically significant difference in Internet usage with experience groups.

**Table 5. ANOVA Comparison between Selected Demographic Factors and Using of ICT Services**

Computer	Value	Mean Difference	Sig
Age	(Under 30) and (41 – 50)	-.63750	.013
	(41 – 50) and (51 or older)	-.74789	.000
<b>Internet</b>	Value	Mean Difference	Sig
	Age	(Under 30) and (41 – 50)	-.43990
	(30 – 40) and (51 or older)	.54762	.000
	(41 – 50) and (51 or older)	.73661	.000
<b>Mobile</b>	Value	Mean Difference	Sig
	Experience	(1 – 5) and (6 – 10)	-.48869
<b>PDA</b>	Value	Mean Difference	Sig
	Age	(41 – 50) and (51 or older)	.07500
Experience	(1 – 5) and (11 – 15)	-.07504	.028
	(6 – 10) and (11 – 15)	-.07767	.017

In the case of mobile phones, the findings show that there is statistically significant difference with the experience years between (1 year to 5 years and 6 years to 10 years,  $P = 0.000$ ). While, there is no statistically significant difference in the use of mobile phones with age groups. Lastly, findings show that there is statistically significant difference in the use of PDA with age group (between 41 years old and 50 years old, and 51 years old or older,  $P = 0.037$ ). Also the findings show that there is statistically significant

difference in the use of PDA with experience group between (11 years to 15 years and (1 year to 5 years  $P=0.028$ , and 6 years to 10 years  $P=0.017$  respectively)).

### B. Test the Relationship between Demographics and Intention to Use ICT

In order to facilitate the investigation on the study main objective highlighting the influence of demographic characteristics on the adoption of ICT, this study aims to look into the issue from two angles. In the first part, the study investigates the association between the demographic characteristics and the ICT adopter, while in the second part it aims to examine the contribution of demographic variables as the independent variables in the adoption of ICT. According to Coakes and Steed (2003), correlation, can be performed between dichotomous or categorical variables (Phi Coefficient), which run under crosstabs analysis. In this connection, the relationships between ICT adopters and demographic characteristics involved in the current study were subjected to a non-parametric test for which the Pearson's chi-square test was utilized. The results are displayed in Table 6.

Table 6. Pearson's Chi-square Test: ICT Adopters and Demographic Factors

Relationship	Pearson's Chi-square	Asymp.Sig (2-sided)	Result
ICT Adopter and Gender	33.396	0.042	Sig
ICT Adopter and Age	97.053	0.004	Sig
ICT Adopter and educational degree	24.392	0.279	No
ICT Adopter and place of educational degree	19.469	0.555	No
ICT Adopter and major	21.577	0.424	No
ICT Adopter and teaching experience	62.032	0.511	No

### C. Experience with ICT in the Teaching and Learning Process

Using ICT tools in the educational system in Jordanian universities could be considered in its beginning stages. Data was analyzed to provide a better understanding of the needs and preferences of the potential adopters of educational technologies. Table 7 shows that around 75.6% of the respondents are considered as adopters of the educational technologies. However, the study defines an adopter is the person who uses at least one of the technologies or services in the educational system. Consequently, the non

adopter is defined as the person who does not use any of them in the educational system.

Comparing the mean shows those services such as Computer-Based Learning (CBL) and Web-Based Learning (WebCT) are considered the top two services in the ranking as the first and second services being adopted by academic staff in HEIs. In addition, the services such as Mobile-Based Learning (MBL) and Online Assessment Tools (OAT) are at the third and fourth rank, respectively. Class Recording, Virtual Class, Authoring tools and Learning Management System (CR, VC, At, & LMS) take the last rank in the adoption of ICT services in HEIs.

Table 7. The Preferred Educational Technologies

Technologies	Yes	%	No	%
(CBL)	278	67.0	137	33.0
(WebCT)	266	64.1	149	35.9
(MBL)	186	44.8	229	55.2
(OAT)	181	43.6	234	56.4
CR, VC, At, & LMS	159	38.3	256	61.7

### D. Reason for the Non-adoption ICTs in the Educational System

Results presented in Table 8 indicate that most of the respondents agree on the reasons why they do not use technologies in the educational process. The most reason is the lack of knowledge (29.2%), followed with that they are not necessary (28%), lack of technical understanding (25.1%), unsuitability for their requirements (23.1%), and lack of resources (16.9%).

Table 8. The Reasons for Non-adoption of Educational Technologies

Reasons for non-adoption	N	%
Lack of Knowledge	121	29.2
Not Necessary	116	28.0
Lack of Technical Understanding	104	25.1
Not suit my requirements	96	23.1
Lack of resources	70	16.9
Other	0	0.0

## VII CONCLUSION

Adoption and use of ICT in the educational system has been increasing in the last few years. This study reports the findings of an empirical research on the usage of technologies by academic staff in Jordanian public universities. It gives benefits to the higher education system and the universities in Jordan to improving the teaching and learning process by utilizing ICT services in the teaching system. The study also gives the higher education leaders a full image about the current status of ICT usage in the teaching system. Besides, it pointed out that academicians in Jordanian universities like to use ICT services in the educational system more than

others in their teaching and learning process. In contrast, the findings also revealed the barriers that face the academicians to use the educational technologies. Furthermore, the study found that there is a significant relationship between academic staff's demographic characteristics and their use of common technologies that affect their intention to use ICT in the educational system.

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