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The Extent of Computer Skills Possession and Use by Jordanian School Teachers

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Abstract

The present study explored the extent of both possession and use of computer skills by Jordanian school teachers. A random sample of 74 teachers (33 males and 41 females) was selected. Data obtained were collected by a two-checklist questionnaire consisting of 52 items covering four ICT domains. Teachers' responses were entered into the SPSS program. Means and standard deviations were computed, and t-test was conducted for each of the four domains to identify any statistical differences attributed to the classification variables investigated. T-test scores for both possession and use of computer skills showed significant differences due to school stage and type of job in favor of basic school stage and working full-time teachers. Overall results revealed a high degree of consistency between the degree of possession and use of computer skills. Conclusions as well as recommendations were made for continued ICT teacher training with a focus on software design and production.

Key words: computer skills, school teachers.

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مدى امتلاك معلمي المدارس الأردنية لمهارات استخدام الحاسوب ودرجة ممارستهم لها

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الملخص

هدفت هذه الدراسة إلى الكشف عن مدى امتلاك المعلمين في المدارس الأردنية للمهارات الحاسوبية ودرجة ممارستهم لها. ولتحقيق أهداف الدراسة، طور الباحثون استبانة مؤلفة من قائمتي فحص اشتملت على (٥٢) فقرة عالجت أربعة مجالات تتعلق بتكنولوجيا المعلومات والاتصالات. تم جمع البيانات من عينة عشوائية تكونت من (٧٤) معلما ومعلمة (٣٣ ذكور، ٤١ إناث). تم استخراج المتوسطات الحسابية والانحرافات المعيارية بالإضافة الى استخدام اختبار "ت" لتحديد أية فروق دالة إحصائيا تعزى للمتغيرات التصنيفية للدراسة. أظهرت نتائج الدراسة وجود فروق ذات دلالة إحصائية عند مستوى الدلالة (α=٠,٠٥) لأثر كل من المرحلة الدراسية ونوع الدوام المدرسي على مدى امتلاك المعلمين للمهارات الحاسوبية ودرجة ممارستهم لها ولصالح معلمي المرحلة الأساسية المعينين في الخدمة الدائمة. كما أظهرت نتائج الدراسة وجود درجة عالية من الانسجام بين مدى امتلاك المعلمين للمهارات الحاسوبية ودرجة توظيفهم لها. وأوصت الدراسة إلى الاستمرار في تدريب المعلمين في مجال تكنولوجيا المعلومات والاتصالات مع التركيز على تصميم البرمجيات التعليمية وإنتاجها.

الكلمات المفتاحية: مهارات استخدام الحاسوب، معلمي المدارس.

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Introduction

The use of computers in education has expanded rapidly during the last two decades. The computer has become an integral part of the curriculum in universities, colleges and schools in many developed and developing countries (Anderson & Weert, 2002; Sharp, 2005). The introduction of computers into education is seen as a mean of developing human capital to strengthen the market sector. That is, underlying the computer and education policies is an explicit objective of meeting the demands of the changing labour market (Neo, 2005). In the developed and the developing nations alike, importance of preparing today's students to become competitive in a technology based world society is seen as an essential ingredient of their development plans. Such nations have adopted ambitious policies concerning introduction as well as utilization of computer technologies in their schooling systems (Xuereb, 2006).

The researchers assert that the computer is a very powerful tool. Its potential uses are simply enormous. The advantages of its applications are unlimited. Beside the uses of computers for the purpose of administration and decision making, agriculture, industry, commerce, health, defense, communications and transport, the effective utilization of computer technologies in the instructional process is proliferating. In a study carried out by Selinger (2001) it was argued that research about the way computer technology could support, augment and extend learning potential was abundant. The Findings of a number of studies pointed out that computer

associated technology had a significant impact on education (Scardamalia & Bereiter, 1994). These studies asserted that computers supported collaboration and communication skills between pupils enriched thinking skills. Results from other studies emphasized that computer use enhanced students' overall learning in school subjects including mathematics, science, and English (Jackiewitz, 1995; Frost, 1997). Along the same lines, Owens & Waxman (1994) concluded that CAI proved to be an effective method of instruction.

The computer revolution has greatly occupied the minds of all the parties concerned with the educational process. Educational authorities worldwide felt it would be wise to encourage the use of computers in schools so that young learners would be able to cope with the ongoing technological revolution. Governments of many developed as well as developing countries assumed that the principal source of sustainable socio-economic development would be the generation, transformation and application of information (Hawkridge et al, 1990; Simsek, 2005).

Recently, many UNESCO reports on education and schooling systems worldwide suggest that a major step toward solving problems in schools is the proper integration and effective utilization of computers in instruction (Anderson & Weert, 2002). Results of recent research carried out to investigate the effectiveness of computer utilization in education were in favour of computer-based instruction (Seabrooks et al, 2000).

Proper use of computers in schools will give students new skills necessary in the global competition for markets and jobs (Bayraktar, 2002). The rate of change in today's world is remarkable. Technological advances are permeating the fabrics of everyday life. Surely, our children will be deprived of the benefits ICT can offer being unable to deal with the march of technological progress being witnessed. As a result they will suffer a technology deficit and be doomed to a big failure as they lack knowledge and competencies necessary for the information age characterized by common ICT literacy (Sharp, 2005).

If properly used in schools, computers may lead to the improvement of students' achievement (Ghazzawi, 2002; Al-ali, 2003). Computers may provide learners with opportunities for free exploration and discovery (Kirschner & Selinger, 2003).

To reap the full benefits of ICT integration in schools, teachers at all school levels should be equipped with necessary skills and competencies required for effective ICT incorporation in school subjects. As findings of many studies pinpointed the need by today's teachers to integrate ICTs, lack of such technologies will lead to blatant failure of schooling. Surveying basic school teachers' ability to use the internet in instruction, Hernes, Hestmann and Haaland (1999) found that their overall level of competence in ICT was low. They also found that women and older teachers were less competent in ICT skills possession and use in their pedagogical practices. In their study about teacher's professional learning in an online community, Carr and Chambers (2006) concluded that teachers lacked experience in using computer-mediated communications tools in the delivery of instruction. Relatively low level of ICT skills acquisition and use among practicing teachers in Greece was identified by Minaidi and Hlapanis (2005). In their study of the factors that hinder the acquisition and use of ICT skills in schools, they found that teachers differ in their level of ICT competence according to their gender, specialty, school level and age. Along the same line, in their exploration of factors influencing the use of new media in vocational training schools in Switzerland, Totter, Stutz, and Grote (2006), pointed that many female teachers were still reluctant to use ICT in their actual pedagogical practices. Another issue related to possession and use of computer skills in educational settings is gender differences among teachers. In this regard, research findings seem to point to males having more computer competencies than females (Khine, 2001). Since the first experience of introducing computers into Jordanian schools in 1984, a technological movement has taken place across the country (Hawkridge et al, 1990). Computing has become a common term in the Arabic language vocabulary and a daily activity for a large number of people. This is an indicative of what has been called Jordanian society's movement towards a new information age. Within this framework, computers also have found their way into classrooms at all levels to the extent Jordanian citizens place computer use among the basic literacy skills.

While the growth of computer utilization in the Jordanian schools may be viewed as a proper response to the challenges of the 21st century; mainly represented by the emergence of the global economy, there is more

consideration of its actual significance in the Jordanian educational scene for a couple of reasons: First, computer is unique among educational innovations in that the driving force to computerization movement is often external to the educational authorities. Second, compared to other previous technological innovations introduced into classrooms, computers require much more teacher training to be utilized effectively. One cannot place a computer in the classroom and expect that teachers will use them with high degree of proficiency. Similar to their colleagues worldwide, Jordanian teachers need not only gain computer knowledge and skills, but more importantly how to integrate such knowledge and skills in instruction.

Problem of the Study

Teachers have been viewed as the backbone of the educational structure. However, they have been bypassed with respect to the use of computers in schools. Bypassing the role of teachers in such a process is usually based on the assumption that teachers are expected to simply integrate successfully whatever has been thrust upon them. Often times, little or no training is provided. As a result, a widespread state of confusion and resentment may exist among teachers concerning utilization of computers in the school curriculum. Hence, such a state of affairs will not be conducive to the effective use of computers in the schooling system. Therefore, the researchers in this study assert that teachers should be involved in the process and moreover, be provided enough time and proper training to absorb and process this new technology in today's schools represented by the computer associated technologies. The researchers also assert that the need to develop teachers' capabilities to effectively use computers, and the need to make rich computer environments accessible for teachers should be stressed in order to ensure successful utilization of computers in schools. Moreover, for the purpose of getting acquainted with the actual reality of computer utilization in Jordanian schools, the researchers have decided to conduct this study to pinpoint the level of teachers' competence concerning the possession of computer skills and their use in instruction.

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Aim and Questions of the Study

The present study aimed at exmining the extent Jordanian school teachers possess and use computer skills in their teaching practices. In essence, this study tried to answer the following questions:

1- To what extent do Jordanian school teachers possess and use of computer skills?

2- Are there any statistically significant differences (α= 0.05) in the extent of computer skills possession by Jordanian school teachers that can be attributed to teacher's gender, school stage, and type of job?

3- Are there any statistically significant differences (α= 0.05) in the extent of computer skills use by Jordanian school teachers that can be attributed to teacher's gender, school stage, and type of job?

Significance of the Study

Identifying the extent of teachers' ICT skills possession and use from their perspective contribute to developing a list of ICT needs by teachers to be used as a framework for building an effective in-service training program to handle their incompetence. A thorough review of the related literature revealed that teachers still do not integrate ICTs extensively in their pedagogical practices. Teachers' lack of ICT integration in instructional activities necessitates carrying out a study to identify the degree of ICT possession and use by teachers to help authorities responsible for education in Jordan cater to teachers' ICT training needs. This study; therefore, comes as a starting point in the process of effective ICT integration in the Jordanian schools.

Limitations of the Study

1- This study is limited to investigating the level of ICT skills possession and use by Jordanian school teachers.

2- The study reflects the perceptions of basic and secondary Jordanian school teachers.

3- The study was conducted in schools attached to educational directories in the northern region in Jordan.

Operational Definitions of Terms

Information and Communications Technology (ICT): It is defined as the computing and communications facilities and applications adopted in education.

Teacher's ICT competency: This refers to ICT related skills, abilities, and knowledge a teacher must have in order to effectively deliver instruction.

Teacher: The person employed by the Ministry of Education in Jordan at basic and secondary stage.

Methodology and Procedures

Population and Sample

The population of this study is all secondary and primary teachers teaching in the northern region of Jordan. A random sample of 74 teachers (33 males and 41 females) was selected.

Research Instrument

To achieve the aim of the study, the researchers developed a two-checklist questionnaire consisting of 52 items divided over four domains. These domains include: basic computer skills (14 items), designing computerized instructional lessons (14 items), computer software use (15 items), and students' assessment (9 items).

The independent variables in this study are: teacher's gender, school stage, and type of job. On the other hand, the dependent variable in this study is the responses of the participating teachers on the rating scale concerning their ICT skills possession and use.

The questionnaire used in this study was developed by the researchers based on their experience in the field of ICT. The validity of the instrument was established by a panel of experts specializing in instructional computing, educational technology, measurement and evaluation, and Arabic language. Modifications to the instrument were made with consideration given to its original intent with the guidance of the panel of experts. The study used a survey through a self–rating questionnaire containing two checklists which examine the degree of teachers' ICT skills possession and use in various teaching learning situations in educational settings. The responses were recorded using a 3-point continuous Likert rating scale with values

ranging from 1 to 3, with 1 representing "low" and 3 representing "high".

Cronbach alpha procedure was used to obtain the reliability estimate of the internal consistency of the four domains constituting the instrument.

An overall reliability alpha coefficient of 0.97 was calculated. Reliability alpha coefficients on the four domains of the questionnaire were basic computer skills, 0.91; designing computerized instructional software lessons, 0.92; computer software use, 0.96; and students' assessment, 0.94. These values of Cronbach alpha were considered enough for the purpose of this study (Cohen et al, 2000).

Data Analysis

To analyze the data gathered from teachers, the responses were first coded and then entered into SPSS. Mean scores and standard deviations were computed for responses to each item on the questionnaire. Mean scores and standard deviations were then generated for each of the four domains addressed by the instrument. In addition, a t-test was used to identify any statistically significant differences attributed to the classification variables in the study.

In accordance with the Likert scale used in the questionnaire, the teachers' ICT level was segmented into three categories: high, medium, and low. Teachers with a high degree of possession and use of computer skills were those whose rating among the items pertaining to a certain ICT related domain averaged at least 2.5. Teachers who possessed medium level of computer skills were those whose ratings among the items pertaining to a certain ICT related domain averaged from 1.5 to less than 2.5. Teachers who possessed and used computer skills to a low extent were those whose rating among the items pertaining to a certain ICT related domain averaged less than 1.5.

Tables were developed to present these results and are provided herein to allow interpretation of the data.

Results

To answer the first question of the study, to what extent do Jordanian school teachers possess and use computer skills?, means and standard deviations were computed and presented in tables 1-4.

Table 1
Means and Standard Deviations for Items in the Domain of Basic Computer Skills

N	Items	Possession			Use		
		Mean	SD	Rank	Mean	SD	Rank
10	Assisting others to use basic computer operating systems	2.04	0.77	1	1.86	0.75	3
3	Utilizing a printer	1.95	0.77	2	1.91	0.85	1
8	Operating two pieces of software simultaneously	1.89	0.82	3	1.91	0.76	1
11	Using the Internet	1.88	0.86	4	1.74	0.81	5
7	Formatting disks	1.85	0.92	15	1.77	0.87	4
1	Setting-up the computer and its peripheral devices	1.78	0.80	6	1.72	0.79	7
4	Using various operating system tools	1.77	0.71	7	1.73	0.73	6
13	Using E-mail	1.73	0.78	8	1.59	0.77	8
2	Loading various software	1.64	0.65	9	1.57	0.70	9
12	Designing a Home Page	1.64	0.69	9	1.50	0.62	10
9	Choosing computer and software suitable for students with special needs	1.49	0.69	11	1.32	0.60	12
5	Troubleshooting simple computer malfunctions	1.46	0.71	12	1.47	0.71	11
14	Using a scanner to insert pictures, graphs and drawings into instructional software	1.42	0.55	13	1.32	0.53	12
6	Using a digital camera	1.24	0.59	14	1.24	0.54	14

As shown in table 1, item 10 receives the highest mean (m= 2.04) regarding the degree of possession and a mean of (m= 1.86) regarding the degree of use. This table also shows that item 6 occupies the last rank (m= 1.24). Based upon these results, it can be inferred that there is a high degree of consistency between the degree of possession and use of computer skills by Jordanian teachers. In addition, all items in this domain scored means less than 2.5 indicating that these responses fell between low to medium range of the scale.

Table 2
Means and Standard Deviations for Items in the Domain of Designing Instructional Software Lessons

		Possession			Use		
N	Items	Mean	SD	Rank	Mean	SD	Rank
23	Designing instructional software Lessons using PowerPoint	1.59	0.76	1	1.54	0.78	1
24	Incorporating sound and animation effects into the instructional software	1.58	0.74	2	1.45	0.74	2
18	Designing instructional software appropriate to various instructional settings	1.51	0.71	3	1.41	0.68	3
15	Designing a Web Page	1.43	0.66	4	1.32	0.60	5
19	Designing and developing instructional software using programming languages	1.38	0.63	5	1.26	0.55	11
17	Designing instructional software that suits students' characteristics	1.36	0.61	6	1.28	0.56	7
25	Hyper linking PowerPoint-based instructional with Visual Basic	1.36	0.63	6	1.36	0.67	4
21	Getting students involved in designing and developing multimedia-based projects	1.35	0.61	8	1.30	0.61	6
16	Designing instructional software using a video and digital camera	1.34	0.58	9	1.24	0.54	12
26	Recording audio materials into instructional software suitable for the content	1.31	0.57	10	1.28	0.59	7
20	Designing instructional software suitable for students with special needs	1.27	0.58	11	1.27	0.56	10
27	Publishing instructional software on the Internet	1.26	0.55	12	1.23	0.54	13
28	Designing an instructional web site on the Internet	1.26	0.53	12	1.28	0.54	7
22	Designing instructional software using authoring tools	1.20	0.44	14	1.22	0.50	14

The results in table 2 indicate that item 23 ranked first both with regard to the degree of possession (m= 1.59) and the degree of use (m= 1.54), whereas item 22 ranked last both in terms of possession (m= 1.20) and use (m= 1.22). The overall results indicate that none of the items in this domain scored a mean in the high category of the scale.

Table 3
Means and Standard Deviations for Items in the Domain of Computer Software Use

		Possession			Use		
N	Items	Mean	SD	Rank	Mean	SD	Rank
37	Editing pictures (color, size and placement)	2.05	0.84	1	1.93	0.83	4
29	Using a word processor	2.03	0.84	2	2.03	0.84	2
32	Using a word processor to edit, spell-check and change the format of a document	2.03	0.86	2	2.09	0.83	1
31	Using a word processor for typing documents	1.95	0.83	4	1.96	0.83	3
35	Creating simple pictures using the paintbrush program	1.93	0.85	5	1.80	0.81	7
30	Identifying the instructional applications of a word processor	1.88	0.83	6	1.91	0.78	5
36	Creating pictures using drawing tools.	1.85	0.81	7	1.73	0.80	8
38	Incorporating drawings and clarifying pictures into the content of instructional software	1.82	0.80	8	1.81	0.82	6
43	Using Microsoft PowerPoint	1.81	0.85	9	1.72	0.82	9
40	Using formulas to carry out calculations on students grades including means, standard deviations, frequencies, Percentages	1.80	0.81	10	1.64	0.77	13
42	Creating charts	1.80	0.83	11	1.72	0.82	9
39	Using electronic tables for data entry	1.76	0.84	12	1.72	0.84	9
33	Asking students to do their assignments using a word processor	1.68	0.80	13	1.65	0.78	12
34	Using a word processor to help students improve their communication skills	1.64	0.79	14	1.64	0.79	13
41	Using various statistical packages to carry out appropriate statistical analysis	1.61	0.74	15	1.47	0.69	15

In table 3, item 37 ranked first (m= 2.05) with regard to the degree of possession, whereas it ranked fourth (m= 1.39) regarding the degree of use. Item 41 scored the lowest mean in this domain occupying the last rank in both the degree of possession (m= 1.61) and use (m= 1.47). Items

29 and 43 occupy similar ranks both in terms of the degree of possession and use. The mean scores for all items in this domain fell between low and medium category range of the scale.

Table 4
Means and Standard Deviations in the Domain of Student Assessment

		Possession			Use		
N	Items	Mean	SD	Rank	Mean	SD	Rank
44	Understanding ways of computer applications in students' assessment	1.62	0.79	1	1.54	0.73	2
45	Using the computer to follow-up students' progress	1.61	0.77	2	1.57	0.78	1
46	Identifying students' weaknesses by the computer	1.55	0.76	3	1.39	0.64	4
49	Identifying students' self - assessment instructional software	1.53	0.69	4	1.38	0.59	6
48	Evaluating small groups' performance using the computer	1.51	0.67	5	1.36	0.61	6
52	Providing drill and practice instructional software	1.51	0.69	5	1.41	0.66	3
47	Employing the computer in the delivery of various instructional strategies	1.50	0.67	7	1.39	0.62	4
51	Using the computer as a remedial tool for students' weaknesses to enhance their achievement level	1.46	0.67	8	1.38	0.61	6
50	Using instructional technology resources (instructional software) to cater for students who do not respond to traditional teaching methods	1.41	0.57	9	1.34	0.53	9

Table 4 shows that item 44 ranked first (m= 1.62) with regard to the degree of possession and the second rank (m= 1.54) with regard to the degree of use.

This table also shows that item 50 ranked last in both the degree of possession (m= 1.4) and the degree of use (m= 1.34). In general, all responses fell in the range of low to medium category of the scale.

To answer the second question of the study, "are there statistically significant differences at (α = 0.05) in the extent of computer skills possession by school teachers due to gender, school stage, type of job"?, a t-test was conducted and the results are shown in tables 5,6,7,8,9 and 10.

Table 5
T-test Results of Computer Skills Possession by Jordanian School Teachers Due to Gender

Computer skills domains	Gender	No.	Mean	SD	t	df	Sig.
Basic computer skills	Male	33	1.69	0.50	-.046	72	0.96
	Female	41	1.70	0.48			
Designing instructional software lessons	Male	33	1.40	0.44	.582	72	0.56
	Female	41	1.34	0.44			
Computer software use	Male	33	1.79	0.63	-.288	72	0.77
	Female	41	1.83	0.64			
Student assessment	Male	33	1.52	0.56	-.843	72	0.40
	Female	41	1.62	0.51			
Total	Male	33	1.62	0.48	-.230	72	0.82
	Female	41	1.64	0.46			

*significance: 0.05

As shown in table 5, t-test results reveal no statistically significant differences found due to gender in the means obtained by subjects for all four domains of the study.

Table 6
T-test Results of Computer Skills Possession by Jordanian School Teachers Due to School Stage

Computer skills domains	School stage	No.	Mean	SD	t	df	Sig.
Basic computer skills	Basic	26	1.88	0.41	2.55	72	0.01
	Secondary	48	1.59	0.49			
Designing instructional software lessons	Basic	26	1.53	0.50	2.37	72	0.02
	Secondary	48	1.29	0.38			
Computer soft-ware use	Basic	26	2.03	0.58	2.30	72	0.02
	Secondary	48	1.69	0.63			
Students' assessment	Basic	26	1.80	0.58	2.76	72	0.01
	Secondary	48	1.46	0.47			
Total	Basic	26	1.83	0.45	2.86	72	0.01
	Secondary	48	1.52	0.44			

*significance: 0.05

T-test results for possession (table 6) show statistically significant differences due to school stage in favor of basic school teachers.

Table 7
T-test Results of Computer Skills Possession by Jordanian School Teachers Due to Type of Job

Computer skills domains	Type of job	No.	Mean	SD	t	df	Sig.
Basic computer skills	Full time	42	1.76	0.51	0.39	72	0.70
	Part time	32	1.67	0.45			
Designing instructional software lessons	Full time	42	1.47	0.48	2.26	72	0.03
	Part time	32	1.24	0.35			
Computer soft-ware use	Full time	42	1.87	0.64	0.96	72	0.34
	Part time	32	1.73	0.61			
Students' assessment	Full time	42	1.63	0.58	0.95	72	0.35
	Part time	32	1.51	0.47			
Total	Full time	42	1.69	0.49	1.19	72	0.24
	Part time	32	1.56	0.43			

*significance: 0.05

In table 7, t-test results showed no statistically significant differences existing due to type of job for the first, the third and the fourth domains of the study. However, t-test results show statistically significant differences due to type of job for the second domain about designing computerized instructional software lessons in favor of working full time teachers.

To answer the third question of the study, “are there statistically significant differences at (α= 0.05) in the extent of computer skills use by Jordanian school teachers due to gender, school stage, type of job"?, a t-test was conducted and the results are shown in tables 8, 9, and 10.

Table 8
T-test Results of Computer Skills Use by Jordanian School Teachers Due to Gender

Computer skills domains	Gender	No.	Mean	SD	t	df	Sig.
Basic computer skills	Male	33	1.70	0.52	1.36	72	0.18
	Female	41	1.55	0.43	1.33	61.88	0.19
Designing instructional software lessons	Male	33	1.42	0.52	1.71	72	0.09
	Female	41	1.24	0.41	1.67	59.28	0.10
Computer skills domains	Gender	No.	Mean	SD	t	df	Sig.
Computer software use	Male	33	1.79	0.64	0.41	72	0.68
	Female	41	1.73	0.61	0.41	67.42	0.68
Students' assessment	Male	33	1.42	0.49	-0.45	72	0.65
	Female	41	1.48	0.50	-0.45	69.59	0.65
Total	Male	33	1.60	0.49	0.80	72	0.43
	Female	41	1.52	0.43	0.79	64.71	0.44

*significance: 0.05

As shown in table 8, t-test results revealed no statistically significant differences due to gender in the means obtained by subjects for the four domains of the study.

Table 9
T-test Results of Computer Skills Use by Jordanian School Teachers Due to School Stage

Computer skills domains	School stage	No.	Mean	SD	t	df	Sig.
Basic computer skills	Basic	26	1.79	0.41	2.28	72	0.03
	Secondary	48	1.53	0.49			
Designing instructional software lessons	Basic	26	1.53	0.55	3.04	72	0.00
	Secondary	48	1.20	0.38			
Computer software use	Basic	26	2.03	0.57	2.91	72	0.01
	Secondary	48	1.62	0.60			
Students' assessment	Basic	26	1.68	0.51	3.12	72	0.00
	Secondary	48	1.33	0.44			
Total	Basic	26	1.78	0.43	3.26	72	0.00
	Secondary	48	1.44	0.43			

*significance: 0.05

In table 9, t-test results showed statistically significant differences existing due to school stage for all domains of the study in favor of basic school stage. In addition, statistically significant differences existed due to school stage for the total of the study domains in favour of basic school teachers.

Table 10
T-test Results of Computer Skills Use by Jordanian School Teachers Due to Type of Job

Computer skills domains	Type of job	No.	Mean	SD	t	df	Sig.
Basic computer skills	Full time	42	1.68	0.54	1.30	72	0.20
	Part time	32	1.54	0.37			
Designing instructional soft- ware lessons	Full time	42	1.45	0.55	2.83	72	0.01
	Part time	32	1.15	0.25			
Computer software use	Full time	42	1.86	0.65	1.59	72	0.12
	Part time	32	1.63	0.56			
Students' assessment	Full time	42	1.53	0.52	1.53	72	0.13
	Part time	32	1.35	0.44			
Total	Full time	42	1.64	0.50	1.98	72	0.05
	Part time	32	1.44	0.37			

*significance: 0.05

In table 10, t-test results showed no statistically significant differences existing due to type of job for the first, the third and the fourth domains of the study. However, t-test results show statistically significant differences due to type of job for the second domain about designing computerized instructional lessons in favor of working full time teachers. In addition, statistically significant differences exist due to type of job for the total of the study domains in favor of working full time teachers.

Discussion

The results revealed that the Jordanian school teachers' ICT level fell in the low to moderate range of ability both with regard to possession and use. This result was observed on all the four domains in the study. An interesting finding was that concerned with the direct relation between the degree of ICT possession and use by the teachers. The degree of ICT use (for most of the competencies) by teachers is directly related to the degree of their possession of ICT skills. The more the teachers' mastery of computer skills, the more they tend to incorporate these skills in their teaching. In many instances, several items had similar ranks for both possession of ICT skills and their use by teachers. This conclusion indicates that teachers apply ICT skills in the cycle of teaching and learning in as much as they have been trained to do so.

Taylor (1980) envisaged three roles computers can play in education. These roles are: tool, tutor, and tutee. Relating Taylor's vision to the current status of teachers' level concerning computer skills possession and use it could be argued that the Jordanian school teachers did not get to the point where computers are used as tools effectively, not to mention using them as tutors or tutees. The low level of competence among teachers at schools appears to be a common problem worldwide despite teacher training programs. Murphy & Beggs (2003) argued that there had been a disappointingly slow uptake of computers at schools by the majority of teachers in spite of increasing ICT resources. Carr and Chambers (2006) also concluded that teachers lacked experience in computer-mediated communications tools in the delivery of instruction.

The t-test result for both possession (table 5) and use (table 8) showed no statistically significant differences attributed to the classification

variable (gender). t-test results for both possession (table 6) and use (table 9) showed statistically significant differences due to school stage in favor of basic school teachers for all domains of the study. This result can be attributed to the fact that the level of ICT skills required to implement basic stage curriculum is less in terms of complexity and sophistication than that needed by secondary stage curriculum. Moreover, this result can also be ascribed to easiness and suitability of ICT equipment to the delivery of basic school curricula. As such, the narrow use of ICT skills for the implementation of secondary stage curriculum is reflected on secondary teachers' possession as well as use of ICT skills. The results of the current study were not in line with the results obtained by Hernes et al, (1999) who reported that women and older teachers were less computer competent than male teachers, and the findings obtained by Yuen and Ma (2002) who noted that female teachers were particularly more hesitant to integrate ICT in instruction. The results revealed in the present study were consistent with the findings obtained by Minaidi and Hlapanis (2005) who found that school level had influenced teacher' ICT skills possession and use but were inconsistent with their findings regarding the impact of teachers' gender and specialty. In most studies investigating the gender differences concerning teachers' ICT skills possession and use, findings asserted that male teachers had better ICT skills than female teachers (Young, 2000; Khine, 2001; Totter et al, 2006).

In tables 7 & 10, t-test results showed no statistically significant differences due to type of job for the first, the third and the fourth domains of the study. However, t-test results show statistically significant differences due to type of job for the second domain about designing computerized instructional lessons in favor of working full time teachers. This result can be ascribed to the fact that full time teachers usually receive intensive training sessions (e.g. ICDL and Intel) regarding ICT skills and their incorporation in instruction with specific emphasis on instructional software design. Full time teachers perceive computer technology as a core constituent of today's teaching profession that leads to feelings of job security. Moreover, ICT related training sessions are essential for full time teachers' promotions to higher ranks based on the Jordanian Ministry of Education (MOE) stipulations. This requirement makes them more

devoted and committed to ICT skills possession and use in instruction. This involvement of full time teachers enlarges their horizon regarding the pivotal role computer technology plays in creating a better teaching-learning environment.

Conclusion

Despite the political rhetoric which accompanied the process of computer introduction into the Jordanian schools and the parallel process of training and educating teachers to be competent in this field, the results showed an adverse effect attributed to these processes. According to the model of innovation diffusion stages introduced by Rogers (1983), it is noted that ICT experience in Jordan is still in the incubation stage. Personal communications with teachers regarding the realities of the overall ICT contribution to the improvement of students learning do not reflect the claimed benefits.

Properly prepared and field tested instructional software programs are needed for computer based instruction. Effective computer based instruction depends upon the design of good instructional software. Appropriate uses of properly designed software by teachers definitely result in improvements in the quality of students' comprehension and in the speed with which this improved quality is achieved.

Planning for the future is more important than planning for the present. When considering the use of computers in schools and their influence on the education of our youngsters, we must look to the future, not to the present (Bork, 1985). This is important because technological advances are invading almost all walks of life. In today's "technopoly" world the rate of change is remarkable. This rapid change continuously brings with it novel ICT knowledge and competencies entailing that teachers should be kept abreast with how to benefit from technological innovations for improving the teaching-learning process.

Recommendations

Based on the results of the study, pre-service and in-service teacher education and training programs should consider issues like foreseeing what curriculum for the information age and what creative delivery

approaches to be provided for teachers.

The results of this study revealed that teachers' integration of ICT in instruction is strongly related to their level of competence in ICT. Another important factor that contributes to teachers' involvement in ICT is the ease of access to ICT related facilities at schools. Therefore, facilitating teachers' access to ICT resources is in many instances more important than just piling up ICT related equipment in schools. Decisions to incorporate computers in education should be based on pedagogical grounds rather than technological grounds per se. Practical strategies and down to earth approaches should be rallied towards building up a closer affinity and stronger association between teachers and computers.

There are no requirements for teachers prior to their entry into the teaching profession in Jordan other than having a bachelor degree. An acceptable level relative to computer skills possession and use should be stipulated by the MOE in Jordan as an essential prerequisite to practice teaching.

The current teachers' ICT level in the Jordanian schools may not be conducive to prepare our children to face the future challenges. In order to ensure that the computer in education in the Jordanian schools does not turn out to be a failure project, relentless efforts coupled with strict measures need to be taken to make the use of computers a success. The center of these efforts should focus on constant training and re-training of ever increasing numbers of teachers in the field of ICT. Higher education institutions (colleges and universities) have to modify their curricula to be in line with the recent innovations of ICT use in education. Teacher educators should role model the appropriate use of ICT in the delivery of instruction at the universities to enable prospective teachers to get to grips with ICT integration in instruction prior to the commencement of actual teaching.

We still have so much to learn about the use of computers as cognitive tools in instructional contexts. Wide use of computers without proper identification of its educational feasibility may not cure all educational anomalies. Computers' potential in education has yet to be explored. Therefore, much educational research is needed to gain a deeper insight regarding the use of computers to assist students to learn efficiently and effectively.

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