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Effective Strategies on Using ICT for Teaching and learning Undergraduate Level at Jordanian Universities

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Abstract
This study aims to investigate the use of ICT in Undergraduate levels at Jordanian Universities. Sixteen Jordanian universities (public and private) have been investigated in this matter. Qualitative method has been used to collect data; these methods include semi-structured interviews of 44 lecturers. Results of the study indicate positive attitudes and high levels of ICT use in teaching and learning. The results also revealed a medium effect of factors affect ICT use in teaching and learning. Lecturers believe that ICT use saves time and efforts and helps them gaining new knowledge and skills, while they believe that the lack of technological infrastructure, lack of support, lack of training and lack of financial resources are the most important factors that have huge impact on ICT in teaching and learning. It was concluded that it is important to overcome the negative factors by adopting clear vision about ICT integration based on the current situation and the desired one, and to adopting flexible plans that respond to social, cultural, and economic changes.
Keywords: Effective Strategies, ICT, Teaching, Learning, Higher Education

1. Introduction

The last two decades have witnessed huge developments in all life's sectors and domains. These changes were led by the introduction of information and communication technologies (ICT). The coinciding developments of computers and other supporting technology with the developments of networks led to the generation sharing of knowledge faster than ever. This created many challenges in all sectors and was also reflected in the educational sector, especially because the educational sector is responsible for preparing the new generation to face the new technological challenges. Thus, many specialized people in educational technology undertake the responsibility of searching, evaluating and developing the best practices that can be adopted in educational institutions for better integration and use of ICT in teaching and learning.

2. Problem for the study

Jordanian universities have exerted great efforts to include ICT in their educational courses. For achieving this, money was dedicated to provide the needed equipment and devices. In addition, training programs have been extendedly held to educate and train lecturers how to efficiently use modern technologies in teaching and learning. Bearing in mind that these new trends have begun recently in Jordan, and are an ongoing process, there is still a need for further insights into the state of educational setting with respect to the contribution of ICT in the educational field. These insights will give a clear picture about efforts dedicated and money spent on education computerizing related project and the general contribution of ICT in educational process in Jordanian universities. On this level, there are several claims from lecturers in Jordanian universities about their unwillingness to use educational technologies as they are a major concern for them and a threat for their careers. Many lecturers believe that educational technologies is a major threat for them and will make a key shift in the common vision of the lecturers as being the only source of knowledge, thus marginalizing their role.
As undergraduate education is a key indicator to determine the effectiveness of educational institution, the current study has attempted to investigate contribution level of ICT in undergraduate education.
The study has attempted to address the following questions:

1. How do lecturers perceive ICT use in teaching and learning?
2. What are the main obstacles hindering the use of ICT in Jordanian universities from the perspective of lecturers?
3. Are lecturers prepared to use ICT in teaching and learning? If so, why?
4. How are Jordanian universities supporting ICT use for teaching and learning?
5. How does this perception vary among faculties?

3. Research Aim

To investigate the use of ICT in Undergraduate levels at Jordanian Universities, and to explore the lecturers' attitudes.

4. Significance for the Study

The significance of the current study may be summarized in the following points:

- Assessing ICT contribution level in university educations, as this contributes in identifying the effect of ICT on learners.
- The current study may provide some visions about ICT contribution level in university education, thus, decision makers in the Ministry of Higher Education in Jordan and in Jordanian universities may benefit from the results of this study.
- The study meets current directions and trends in Jordan towards ICT.
- The current study is necessary considering the fact the lack of studies addressing the use of ICT in Jordanian universities.

5. Literature Review

Perceptions about ICTs are affected by many factors such as the users' experiences, lack of resources, lack of professional training, the faculty, gender, academic qualification, age, lack of institutional support, and lack of time. (Gay et al., 2006) and (Galanouli and McNair, 2001) and Zare-ee (2011). Furthermore, many studies indicated that positive perceptions don't mean high levels of ICT use; this is because the use of ICT is also affected by the previous factors that affect the perception in the first place. (Abu Qudais, Al-Adhaileh and Al-Omari (2010) To develop positive perceptions, suggestions were provided by educators such as increasing lecturers' motivation, because it is believed that motivation and perceptions are related to each other (McCormick, 2004). Other recommendations were provided such as supporting and resourcing educational institutions, and providing effective ICT training.

Regarding the ICT and training studies it is noticed that there is a lack of training on ICT use, which is reflected in lecturers' and students' performance, (Gulbahar and Guven, 2008; Raji and Godsy, 2010). Although the studies indicated that lecturers are willing to learn and use ICT in their teaching practices. Giavrimis, Giossi and Papastamatis (2011) and Jung (2005). Training courses may be provided but not in an effective way, which could lead to weak use of ICT in teaching alongside the lack of administrational support, which also could lead to discouraging the lecturers, thus leaving them unmotivated (Lareki, de Morentin and Amenabar, 2010). So to avoid this, motivational and effective training courses must be provided for lecturers. Those courses must be flexible, diverse and authentic.

Based on the Positive and negative factors that affect ICT use in teaching and learning, it was that factors can't be counted, because they are very interrelated and every one affects the others and the whole process. However, most of the researchers agreed that the most important factors are access to ICT infrastructure, clear plans and vision, availability of proper training and support from the top, (Alaadili, 1999). On the other hand most of the studies agreed that the main obstacles that hinder ICT are lack of time or workload, lack of training, lack of technological infrastructure, resistance to technology, (Abu Qudais, Al-Adhaileh and Al-Omari, 2010) and Spotts (1999) and Thomas (2000) and Edwina (2003). Eventually, lecturers from different studies suggested some procedures to overcome obstacles hindering ICT use in education such as providing professional training programs, reducing workload to save enough time for practicing, providing proper educational technology, and providing support and incentives, (Somekh, 1998) and Papanastasiou & Angeli (2008). Based on the previous studies, I noticed how ICT integration is an interrelated process; it requires more than technological infrastructure and willingness of lecturers and students to use ICT in teaching and learning. ICT integration needs support from all educational stakeholders, public and private sectors, and decision makers. This is because education is a shared responsibility; it is not a stand-alone sector, its success and failure is reflected on the whole society, and depends on the whole society.

6. The study population and sample

The study population consists of all lecturers in science and humanities faculties in Jordanian universities (public and private), 21016 lecturers for the academic year 2011/2012. Those universities offer undergraduate and graduate degrees in a wide range of academic areas (MOHE, 2012).

A sample "is a section or a subgroup of the population we intend to study" (Hartas, 2010, p.67). In the first phase, 55% of the 29 Jordanian universities were selected according to the geographical distribution (south, middle, and north of Jordan). This means 16 universities were selected. In the second phase, 40% of the 21016 lecturers were selected by purposive sampling to form the study sample of 44 lecturers.

7. Research methodology

A qualitative approach was chosen to assess lecturers' attitudes towards ICT use in Jordanian University.

Qualitative Methods according to Creswell and Plano Clark (2011, p.7) is used "to explore a problem, honour the voices of the participants, map the complexity of the situation, and convey multiple perspectives of participants". According to Mack et al. (2005) qualitative methods seek to explore phenomena, and use semi-structured methods such as focus groups, observation and interviews. Its data format is textual, as notes, audiotapes and videotapes.

7.1 The interviews

Interviews are defined as one of the qualitative research methods, and are popular because they are "effective in giving a human face to research problems" (Mack, 2005, p. 41).Buarki (2010) referred to qualitative interviews as semi-structured interviews that emphasize the interviewees' perspectives, which provides detailed and rich data.

Interviews include the researcher's engagement with interviewees by asking questions neutrally, listening to the interviewee's responses attentively, and posing follow-up questions. Interviews usually include one interviewer and one participant (individual interview) and it is usually direct, i.e. face to face. Interviews also can be conducted by phone. Interview data may take more than one form; they may be tape recorded, or transcripts or simply notes written by the interviewer (Mack, 2005).

Mack (2005) identified the types of data that interviews are designed to collect. Interviews are effective for learning individuals' perspectives and interpretation of the world around them. It can also provide data about individuals' experiences, feelings, opinions and beliefs.

The talk about interviews is associated with important issues such as obtaining participants' consent, which can be orally given or written. The purpose of the consent is to ensure that participants understand the aim of the interview and are aware of the risks and the benefits of participating in the interview.

The other important issue, which is related to interviews, is confidentiality, which must be respected by the interviewer. Participants must be assured that their privacy is protected and nothing of what is mentioned by them will be shared with others or used for other purposes. This kind of assurance is important for acquiring participants' trust and earning better data (Mack, 2005).

7.2 Conducting Interviews

The interviews were included 21 open ended questions about ICT use in teaching and learning, the affecting factors, the training on ICT use which they might have, the universities' supporting strategies, and students' impressions and perspectives about using ICT in teaching and learning. Forty four interviews were conducted during the month of February 2012, 33 of them were face to face and 11 were via telephone. Each interview lasted about 15 – 20 minutes. After conducting the interviews, they were transcribed, translated into English and coded to analyze them by the use of NVIVO 9.

8. Qualitative data analysis

After conducting 44 interviews, they were transcribed and then translated from Arabic to English, except ten interviews which were conducted in English. The data were imported and analysed using NVivo 9. NVivo 9 was developed by Qualitative Solutions and Research International (QSR, 2010), and enabled the use of thematic analysis. Thematic analysis according to Braun and Clarke (2006, p.77) "is used widely in qualitative analytic it offers an accessible and theoretically flexible approach to analyzing qualitative data". According to Gleeson (2003, p.1) a theme means "a cluster of linked categories conveying similar meanings". Thematic analysis involves the use of induction and deduction as "induction creates themes and deduction authenticates them". (Gleeson 2003, p.1).

Thematic analysis has many advantages; some of these advantages are flexibility which allows the use of wide range of analytic options, summarizing key features of a large amount of data, providing deep description and insights. On the other hand there are several disadvantages of the thematic analysis as the use of wide range of analytic options can be paralyzing because the researcher then cannot decide what data to focus on.

In analysing the interview data specific codes (labels) were developed and stored as "Nodes", which are containers where ideas are stored. In this study, the initial nodes were developed into themes which were categorised using NVIVO. This allowed the generation of descriptive statistics showing the frequency that the themes appeared. This allowed the identification of important themes which appeared more frequently during this process, see Figure 1 below.

Figure 1: List and frequency of nodes

administrative tasks	1	18	7/4/2012 16:28
internet	3	30	6/17/2012 12:23
lab room	1	15	7/4/2012 12:16
national context	3	20	6/23/2012 11:40
negative of ICT use	3	20	11/21/2012 11:56
online testing and computerized exams	1	15	7/4/2012 14:47
peripheral support systems	3	17	6/23/2012 11:53
positive ICT use	3	15	11/21/2012 13:23
practice	3	17	7/20/2012 13:29
beneficial or waste	2	7	6/20/2012 13:51
using ict tools	3	44	6/20/2012 13:30
different classes	3	15	6/17/2012 12:41
experience	3	17	6/20/2012 11:29
resources available	2	17	6/23/2012 11:28
selective use of ICT	3	41	6/23/2012 11:48
student centre of learning	3	18	6/23/2012 13:41
student expectation	3	5	7/20/2012 16:16
student interaction	1	13	7/6/2012 17:06
student performance	3	6	7/21/2012 12:00
students bored	2	7	6/23/2012 11:42
support	3	43	6/23/2012 11:54
synchromesh broadcast	1	1	7/4/2012 11:55
technological revolution	3	5	6/23/2012 16:22
technology acceptance	2	4	6/23/2012 16:10
traditional use	2	12	7/12/2012 11:38
trainer qualified	1	4	7/4/2012 16:28
training	3	46	6/17/2012 12:23

9. Challenges of the study

The interviews were hard to arrange meetings due to the lecturers' busy schedules. As a result, many interviews were cancelled, postponed more than once and conducted by phone. One of the challenges of the study is the subjectivity of the qualitative results; as it is formed of the answers of the respondents on the questions proposed from the interviewer, so their answers are limited to answer the study questions. In addition to this, the research reflects the situation in Jordan during the period 2012-2013, in a selection of universities, so caution must be exercised when generalizing the findings.

10. Results and Discussions

Q1. How do lecturers perceive ICT use in teaching and learning?

The results show high levels of ICT use in planning outside and inside the lecture room, administrative tasks, evaluation and in other uses such e-libraries, emails, e-groups and online chatting. This indicates positive perceptions toward ICT use in teaching and learning. These positive perceptions are developed due to the lecturers' awareness of ICT potentials in teaching and learning, such as convenience, flexibility, capacity, interactivity and speed. It was noticed from the responses on the interviews that most of the lecturers have basic ICT skills, since the areas they show in high uses of ICT, such as preparing lessons, plans and exams, data shows and OHP, preparing students' databases, analyzing students' results and exchange feedback and e-libraries, do not demand advance skills. Whereas the areas they show weak use of ICT, such as VLE, IWB and creating online exams, require them to use more developed skills.

Q2. What are the main obstacles hindering the use of ICT in Jordanian universities from the perspective of lecturers?

The answer of this question is related to the first question about perceptions toward ICT use in teaching and learning. The results showed that experience, availability of technical support and training has high effect on ICT use in teaching and learning. Regarding the medium effect, the results show that availability of ICT infrastructure and tools, internet access, quality of training and resources about how to use ICT have medium

effect on ICT use in teaching and learning. Lecturers also said that training and availability of ICT are important factors that can affect ICT positively if they are available and negatively if they are not available. On the other hand, some lecturers stated that they still feel unconfident about ICT use and face chaos and uncertainty about how to use effectively in teaching and learning. This chaos and uncertainty about ICT are caused by the lack of training or the quality of the training they received. Gulbahar and Guven (2008) found that among the challenges that teachers face regarding ICT use is the lack of training opportunities. Lack of training leads the lecturers to misuse ICTs, and in turn this misleads the students and distracts them. In other cases, some lecturers believe that the use of ICT distracted the students' attention as it uses many channels of display, which causes distraction and lack of focus on the core material. This can happen if the material is not designed properly to achieve its goals. Many studies show that the use of ICT helps students with different abilities to understand the displayed material. Distraction is a result of weak design. Lee at el. (2009) focus on the influence of individual differences on ICT choice, and two dimensions were found to control students' choice of ICT in their tasks; the first is the individual student's learning style and the other is individuals' perceptions. The results revealed that individual differences affect students' choice of ICT. This must be taken into consideration when designing instruction. In addition to that, some lecturers believe that ICT does not suit the courses they teach, such as mathematics. I believe that ICT can be used in all subjects, but I think it suits early learners more, as the use of practice and drill programs helps students to learn more effectively in an interactive way. Van and Peeraer (2000) seem to agree with my point of view as they found that the subject influences ICT integration in teaching practice; for example, teachers who teach subjects like technology and ICT, mathematics or natural sciences are more exposed to ICT uses than other teacher are. Raji and Godsy (2010) concluded that ICT can be useful for all learners, because of the available resources on the Internet, and applications which help exploring subjects and networking among learners and faculty members. Other lecturers stated that there is a lack in the universities' technological infrastructure, and if it is available it is not effective enough as it is outdated most of the time. This is related to the universities' limited financial resources, which is an important issue that lecturers pointed out, i.e. the tight budgets that limit the universities to having only the basic technology at its minimum levels and prevents them from acquiring more advanced technologies. Tinio (2003) addressed this issue and identified potential sources of money such as grants, public subsidies, private donations, fund-raising events, community support and private sector-public sector partnerships. Considering these potential sources can help universities to overcome the limited and tight budgets for acquiring more advanced and needed technologies. According to Al-Mobaideen, (2009) lack of technological infrastructure leads to poor skills and engagement of the students. It also leads to ineffective teaching and failure of instruction. Lack of incentives is an important factor that limits ICT, and lecturers need motivation and to be encouraged more to integrate ICT into instruction. Hamdi (2001) suggested that the technological model adopted by the university should take into consideration motivating faculty members who are using information technologies by incentives and promotions in order to achieve successful ICT integration. Lack of technical support is important, since ICT use is based on the use of machines which constantly need maintenance and updating. If this is not available for students and lecturers it will lead to the failure of ICT use. Insufficient technical supports and little access to internet and ICT prevent teachers from using ICT in the classroom (Chigona et al., 2010; Salehi & Salehi, 2012). Many of the lecturers pointed out that lack of time is among the factors that limits ICT. By lack of time they mean the busy work and social schedules; lecturers are busy in their instruction and evaluation at work and busy in their social engagements, so their free time is limited. Shortage of time affects their ability to develop and learn more about ICT use and discourages lecturers from integrating ICT into the curriculum (Salehi & Salehi, 2012). Some lecturers stated that ICT cannot be used for long times because it affects health; it also causes emotional isolation for its users. Zare-ee's (2011) analyses of data showed that Iranian university teachers strongly agreed with the educational benefits of ICTs in higher education, but they are concerned for the possible losses in intimate face-to-face teacher students' interactions in university settings.

Q3. Are lecturers prepared to use ICT in teaching? If so, why?

One of the major factors that affects perceptions toward ICT use in teaching is training (Gulbahar and Guven, 2008; Raji and Godsy, 2010). Presenting effective and coherent training for lecturers is important in building positive attitudes toward ICT. Sipilä (2010) described training as a way to change attitudes. On the other hand, many studies indicated that the lecturers recognized ICT's potentials but they were unable to integrate it into instructional activities. This shows the need for training and professional development programs (Chowdhury, 2009). The results of the study stated that they are confident in using ICT in teaching and learning. These uses include the use of PowerPoint, datashow, overhead projector, internet and blackboard. Confidence in use ICT is most probably gained from attending training courses in ICT use, such as ICDL, INTEL, designing and

developing educational aids, blackboard, designing and illustration, programming and IWB, or by self-learning and practising. Giavrimis, Giossi and Papastamatis (2011) found that the main reasons for teachers' participation in ICT training courses is their interest in exploiting ICT, in both their teaching and in their personal lives, as they consider lifelong education as necessary to the practice of teaching and useful in settling educational inequalities.

Q4. How are Jordanian universities supporting ICT use for teaching and learning?
The results revealed that the universities are supporting ICT use by providing basic infrastructure such as computers, datashows, basic software and e-learning centres and labs, it is important to pair in mind that the availability of infrastructure does not mean that it is used effectively in teaching and learning. Other lecturers stated that the university provide poor infrastructure and training but do not facilitate its application. The given reasons for this are the lack of financial resources and the ambiguity of the achieved results and adopted plans. The lecturers also pointed that the major consequences of the lack of support is using ICT traditionally; this means that ICT applications, if there are some, will not achieve their intended goals and could be used ineffectively. Furthermore, the limited technological infrastructure will lead the universities to accept limited numbers of students. The chaos, uncertainty in application of ICT and the ambiguity of the plans caused by the lack of support could waste money, time and effort. Lecturers and universities are aware of the benefits of ICT and also aware of the limited resources dedicated to the educational system, so decision makers should pay more attention and support ICT integration by adopting clear vision, based on the current situation and the desired situation. Plans must be flexible to suit the social, cultural, and economic changes. Adopting such flexible plans will not provide the complete solution, but by incorporating effective management and cost transparency to avoid the waste of money, time and effort. In addition to that constant evaluation and feedback about the achieved plans are necessary to capture the weaknesses, to overcome them and to reinforce the strengths. according to UNESCO (2004) James and Hopkinson (2009) and Tinio (2003) decision makers need to take in consideration the following resources, such as the partnership with other sectors and the private sector, grants, public subsidies, private donations, fund-raising events and community support to overcome the lack of funds.

Q5. How do lecturers' perceptions vary among faculties?
The results showed that there are differences among lecturers in scientific faculties and humanities faculties regarding their perception due to the faculty they teach in. Lecturers in scientific faculties use ICT more than lecturers in humanities faculties. Regarding the factors, ICT use of lecturers in scientific faculties is affected by the factors that affect lecturers in humanities faculties. Furthermore, lecturers in scientific faculties believe they are trained on ICT use more than lecturers in humanities faculties do believe. And lecturers in scientific faculties indicated that ICT use is supported in the faculties they teach in, while lecturers in humanities indicated that ICT support is limited in the faculties they teach in. Three reasons were given in the results to justify differences in perception. The first is the availability of ICT tools in scientific faculties is more than it is in the humanities faculties. The second reason is ICT tools are used more in the scientific faculties since many subjects are practical and applied, depending totally on its use, unlike the theoretical subjects in the humanities faculties. The third reason is the lecturers' and students' skills; many lecturers stated that the students' skills control their choices of teaching methods. Based on their experience they found that students in the scientific faculties are more skilled because they are more exposed to ICT than other students in humanities faculties.

11. Conclusion

The results of this study as well the other related studies proved that the use of ICT is related to many aspects. One of these aspects is the perceptions toward ICT use. The results of this study showed that most of the lecturers have positive perceptions about ICT use, as they are willing to learn and use ICTs in teaching and learning (Neno, 2003). This is because they realize its benefits when used outside the lecture room to plan the teaching more effectively, inside the lecture room to increase students' understanding by offering a variety of displaying channels that overcome individual differences, in administration to save time, effort, paper and ink and to prevent losing important documents, in evaluation to save time and effort, to enable lecturers to work effectively and accurately, and to benefit from the large storage that ICTs provide; and in chatting and e-mails to overcome the time and place boundaries, in e-groups to share, save, translate and discuss different topics and in e-libraries which make the searching process easier than using the traditional library.
On the other hand, the lecturers' perceptions are affected by many factors such as the lack of training, lack of technological infrastructure, students' weak skills and motivation (Al-Zahrani, 2005) workload, lack of support, lack of financial resources and incentives, lack of technical support, absence of strategic plan and clear vision

(Edwina, 2003; Hamdi, 2001; Thomas, 2000; Mwalongo, 2011; Gulbahar and Guven, 2008). Based on these factors, ICT use is negatively affected and the consequences of this could be chaos and uncertainty, for example, waste of time and efforts, lack of understanding and failure of effective ICT integration.

Not being prepared or not being confident about using ICT in teaching and learning is as a result of the unavailability of training and professional development programs (Chowdhury, 2009). It is obvious that training is related to perceptions; since presenting effective and coherent training for lecturers is important for building positive attitudes toward ICT use. The majority of the lecturers stated that they were trained on how to use basic computer programs (ICDL) but not the more advanced tools, such as IWB for example, because it is still not used widely in education. Other lecturers stated that they are confident in using many tools based on their own experience as they gained the knowledge by self-learning not by training provided by the universities (Giavrimis, Giossi and Papastamatis, 2011). The lecturers stated also that the most important reasons preventing them from attending training courses, if they are available, is the inefficiency; as the offered training courses don't cover what they particularly need to learn, besides giving huge amounts of material which they couldn't master in the limited period of the course. A third reason was the lack of application as a result of the lack of infrastructure and technical support during lecturing (Allision, 2000; Al-Muhaisen, 2000). Results also showed that the workload or the busy schedules of work and social obligations prevents them from attending training courses.

Regarding the universities' support of ICT, which is related to other important aspects such as the availability of infrastructure, training, funds and incentives, the results showed medium levels of ICT support (Naida, 2003; Martha & Barbara, 1998). The results showed that universities are supporting ICT use by providing basic infrastructure such as computers, datashows, basic software, and limited advanced infrastructure such as e-learning centres and advanced ICTs (Zare-ee, 2011). Regarding the training, the results showed that the universities provide training but do not facilitate its application due to the lack of financial resources and the ambiguity of the achieved results and adopted plans (Loing, 2005).

Regarding the variation in lecturers' perception between faculties, the results showed that there are differences, as the lecturers in the scientific faculties showed higher levels of perception in all items about ICT use in teaching and learning (Al Khatib, 2006). Three reasons were given to justify the high level of perception in the scientific faculties; the first is that the availability of ICT tools in the scientific faculties is higher than it is in the humanities faculties. The second reason is ICT tools are used more in the scientific faculties since many subjects are practical and applied depending totally on its use, unlike the theoretical subjects in the humanities faculties. The third reason is the lecturers' and students' skills; according to the lecturers students in scientific faculties are more skilled because they are more exposed to ICT than other students in humanities faculties, which controls lecturers' choices of the teaching methods.

It is clear that ICT use is affected by the faculty and the subject (Al-Zahrani, 2005; Van and Peeraer, 2000; Hamdi, 2003) therefore, if lecturers in scientific faculties perceive ICT more positively, they will use it more. As a result, positive perceptions lead to higher levels of ICT use (Al Khatib, 2006; Dang, 2011; Gulbahar and Guven, 2008).

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