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Improving Higher Education Quality in Jordan using Mobile Technologies

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Abstract: In This Paper, We Introduce The Outcomes Of A Project, Which Aims At Developing An Adaptive Curriculum In Engineering Education That Is Based On Digital Learning Resources For Mobile Devices. This Project Comes As A Response To The Requirements For Modernization And Accessibility Of The Jordanian Higher Education System To Improve The Integration Of Disadvantaged Learners In The Educational System. Disadvantaged Learners Include Those With Special Needs Or A Socioeconomic Status That Significantly Restrict Their Ability For Adequate Education. Those Include High School Students And Undergraduate/Graduate Students At Universities. The Study Investigated Methods For Effective And Sustainable Integration Of Mobile Technologies Into The Educational Process. Additionally, An Assessment Of The Most Suitable Digital Content And Devices To Be Used Was Conducted In Order To Develop Plans, Strategies And Programs That Combine The Appropriate Methods And Techniques Of Training, Particularly For People With Special Needs. The Study Of The Educational Needs To Implement The Newest Mobile Technologies Was Carried Out By Means Of Questionnaires And Interviews.

Keywords: E-learning, Quality of education, Mobile technology, Disadvantaged learners

Introduction

The goals of this study can be divided into specific goals and wider goals. The specific goals are:

- Analysis of student needs in different contexts and existing curriculum at several universities in Jordan. Given the objectives of the project, this study is oriented toward assessing the extent of use of mobile technologies by the specified groups of learners and opening opportunities for their inclusion in the learning process (Bekteshi, 2015).

- Design of a Mobile Digital Resources (MDR) model to support the didactic features of mobile technologies in order to adapt them to the training conditions of disadvantaged groups of people.

- Design of educational scenarios, which includes (i) Use of mobile technologies to expand training opportunities for students with special needs; and (ii) Use of mobile devices for distant training of socio-economic disabled people (Sung et al., 2016). The general objective of the scenarios is improvement of the

conditions for equal access to education and training by enhancing the motivation to participate in the educational process, by facilitating access and by additional activities with the students.

- Development and adaptation of mobile applications and digital educational resources (Hayhoe, 2015). This objective addresses the need for implementation of e-learning tools generalized across a range of disciplines in the field of engineering education and across several institutions, to meet the needs of disadvantaged group's education and training (Vate-U-Lan, 2008) (Hakkani-Tur et al., 2011).

- Strengthening the institutional capacities of the Jordanian universities through short term intensive training of academics and staff members (Lopez et al., 2015).

The study also had wider goals, which include:

- Increasing the quality of the Jordanian higher education system by promoting the adoption of the MDR model as a model for a wider reform of education in the domain of engineering education for people with special needs (Mwandosya & Montero, 2017) (Koole, 2006).

- Implementation and promotion of inclusive education practices for students with special educational needs in Jordanian universities that will lead to delivering a more equal education opportunity for all students.

National E-learning Strategy for Higher Education in Jordan

Many universities and institutions of higher education have recognized the value of the Internet in changing the way people learn. Traditional classroom courses can be augmented with interactive material on the Web, and old-fashioned distance learning courses can be transformed from correspondence courses or television lectures into e-learning environments.

However, few institutions have been able to embrace e-learning in a way that enables widespread innovative uses of learning technology throughout the institution. Instead, many rely on individual faculty or departments to make their own decisions about how to implement an e-learning environment that best suits their needs. The result is a hybrid of incompatible solutions that makes it difficult for faculty to share their work.

The lack of a centralized technical support organization can also limit the use of e-learning tools to departments that have technical expertise. E-learning can be defined as the use of information and communication technology to acquire knowledge and improve skills at times and on terms defined by each learner in an interactive and engaging environment. It can cover a spectrum of activities from supported learning, to blended learning (the combination of traditional and e-learning practices), to learning that is entirely online.

Higher education has been traditionally recognized as the base for learning, technological innovation, and knowledge creation. Empowering this base with widened and lifelong learning capabilities better promotes innovation, intellectual capital investment, social and economic development, and education empowerment. Recent advances in Information and Communication Technologies (ICT) have spurred an increasing interest in e-learning pedagogy to widen access to learning and cultivate lifelong learning among citizens through the use of ICT (National e-learning strategy for higher education, 2009).

Strengths and Weaknesses for Using Information and Communication Technologies in Jordan

Despite the fact that universities in Jordan are distinguished in the quality of teaching and research, their utilization of e-learning is still in the early stages and they may face many challenges in this regard. Jordanian universities have excelled in some areas related to information technology and have many challenges to face as well. In what follows, we will identify the strengths and weaknesses in e-learning as well as the many opportunities that will be available. The objective of our work is to utilize the universities' strengths and build on them, mitigate weaknesses, avoid threats and exploit opportunities (National e-learning strategy for higher education, 2009).

Strengths

- The vision of HM King Abdullah II that "Jordan will become an IT hub for the region" has been a rallying call to all Jordanians to pull together to realize His Majesty's vision for the future benefit of all citizens.

- In 2003, the Ministry of Education led Jordan to become the first country in the Arab world to take clear steps into applying true e-learning to all its students by deploying EduWave at the Kingdom's main Data Center and to serve over 1.2 million students in Jordan.

- Connecting Jordanians Initiative: A National Broadband Learning and Educational Network (NBN) has been launched in 2003, which resulted in approximately 5,000 km of optical fiber and several thousand IT-network devices to be installed as one of the most advanced educational networks in the world. This network linked Jordan's 3200 public schools, 10 public universities, 23 community colleges, and 75 Knowledge Stations to support the transformation of Jordan's formal and informal education system.

- The Jordan Universities Network, which connects the 10 public universities and the Schools Broadband Learning Network has been launched. It provides a 155 Mbps (STM-1) Internet link to Jordanian universities.

- Jordan is already well endowed with telecommunications infrastructure. Fixed and mobile telephone services are available almost universally in inhabited areas of the country, and penetration has reached more than 93% of households overall. In addition, the quality and reliability of the telecommunications infrastructure is above global standards.

- Mobile penetration is growing rapidly and reached 64%, mainly due to significant drops in mobile charges.

- Jordanian universities have robust, standards-based information technology network infrastructure, including hardware, software, and applications for intra-university connectivity; and global connectivity through the Internet.

- Jordanian universities are connected to a centralized integrated e-library system.

- Some Jordanian universities have invested in e-learning tools (VLE and Content Development tools).

- Technology incubators have been established to encourage innovative solution development in partnership with the private sector (such as Yarmouk University, I-park incubators, Jordan Innovation Center, Philadelphia University, JIC – University of Jordan, AlHasan Industrial zone).

Weaknesses

- E-learning experience is immature in all Jordanian universities and it is scattered among some departments/faculties without consistency.

- There is no broad awareness of e-learning beyond academic and some government circles.

- There is no common definition of e-learning as they range from using computers for learning to purely distance learning.

- There is no common understanding of the benefits of e-learning. Some see it as a lesser form of education (when compared with traditional classroom-based, teacher or professor-led instruction). Very few people see the potential it can bring to improving the quality of education, and increasing the reach and breadth of educational opportunities.

- There is no shared vision of e-learning for Jordan; some decision makers see e-learning as a luxury form of education, a replacement of faculty, a way to reduce budget deficit, etc.

- There is no holistic or coordinated/collaborative approach to e-learning that considers the cost of PCs and Internet access.

- There is no broad adoption of international web-based training development standards.

- There is a lack of skills for self-paced learning which has been addressed by the Jordan Education Initiative.
- Most of the content being developed does not leverage e-learning instructional design.
- The current e-learning efforts are largely run individually by faculty or for piloting purposes.

Analysis

The study of the educational needs in the process of implementing the newest mobile technologies was carried out by means of questionnaires and interviews. Information was gathered by means of asking respondents about the preconceptions and attitudes of both educators and learners to the used technologies and their application in the processes of teaching and learning (Riek, 2013) (Frank & Kaplia, 2014).

Two questionnaires (for educators and students) and a card with questions for the interview were developed for the study. This study aims to examine the readiness and use of mobile technologies in the higher educational institutions in Jordan. The study also seeks to assist in developing plans, strategies and programs that support education reform for people with special needs.

This study will attempt to answer the following questions: (i) What is the level of social adaptation of the students? (ii) What is the state of the learning environment; is individual approach applied for students with special needs? (iii) What type of digital content is most frequently used (types of digital resources – audio, video, images, or text)? (iv) What type of mobile devices do they (the target groups) use? (v) When do they most often use their mobile devices? and (vi) Where do they most often use their mobile devices?

Based on information collected from the questionnaires and interviews, the consequent analysis will define summarized profiles of the target groups. The basic characteristics of the target groups are studied and a pedagogical-psychological profile was prepared. This helps in building a conceptual model, corresponding to the age, abilities and specific needs of the group, for which the digital resources for learning by means of mobile devices will be developed.

We would like to define the mechanisms by which the proposed model could improve the way in which the students acquire knowledge and gain skills. For successful application of these mechanisms we have to: (i) Build a didactic model; (ii) Define the technical means to be used (smartphones, tablets, laptops) for e-learning; (iii) Create a description for the selection of multimedia resources appropriate for the target groups; and (iv) Construct an educational technology to combine the appropriate methods and techniques of training.

The target groups of this study are shown in Tables 1 and 2 below, as well as the responsible university that had conducted the interviews and collected the surveys. A sample of 239 participants, including instructors, teachers and students, were contacted and interviewed. Fifty of them were selected for one-on-one interviews.

The study population consisted of samples from three public universities, General Secondary Schools for Children with Special Needs, Gazza refugee's camp and Nazik Al Hariri welfare center for special education in Jordan. The qualitative study sample consisted of 114 teachers and 125 students with special needs.

Table 1. Jordanian universities responsible for the study target groups

Target group	Responsible university
General Secondary Schools for Children with Special Needs	The University of Jordan (UJ)
Higher Council for Affairs of persons with Disabilities	The University of Jordan (UJ)
Gazza refugees camp	Jordan University of Science and Technology (JUST)
Nazik Al Hariri welfare center for special education	Princess Sumaya University for Technology (PSUT)
Deanship of Students Affairs at each Jordanian University	UJ, PSUT, and JUST

Table 2. Number of collected samples by each university

University	Instructor's questionnaire	Student's questionnaire
UJ	35	57
JUST	29	53
PSUT	50	15
Total	114	125

This study used the following research methods, which are illustrated in Figure 1:

1. The analytical descriptive quantitative method was used in order to describe the extent of using mobile technologies in Jordanian public and private universities, and to identify the possible obstacles to this usage and the reasons behind these obstacles by conducting a comprehensive survey and well-designed questionnaire.

2. The qualitative method was used in order to investigate the views of instructors and students about the extent of using mobile technologies in higher education in Jordan, and to identify the obstacles that might face this usage. This was implemented by conducting one-on-one interviews with students and teachers.

To achieve the objectives of this study, two questionnaires were developed, one for instructors and the other one for students. Each contains three major sections: background information, general questions and specific questions. An online questionnaire was created and circulated using Google forms. Moreover, the questionnaires were translated into Arabic language by UJ team to facilitate the process of data collection and to get more accurate results.

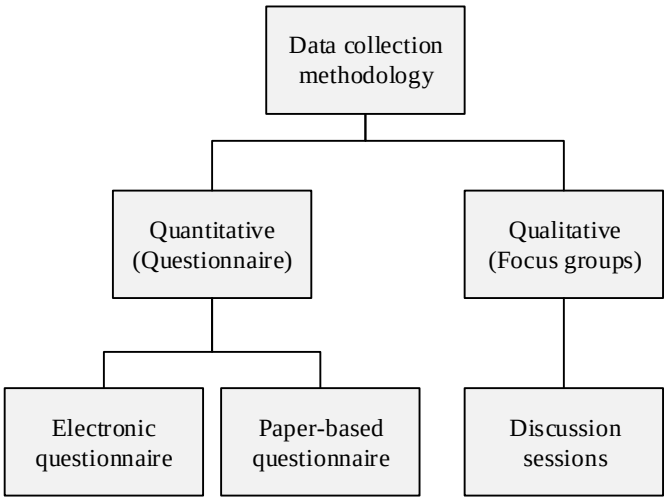

Figure 1. Data collection methodology

Results

Results of the instructors' questionnaire

The survey was done with about 80% male and 20% female. All of the instructors have a mobile device (cell phone, laptop, or tablet). Most of the instructors use mobile phones daily while a smaller percentage uses laptops and even fewer percentage uses tablets. This is shown in Figure 2.

The study shows that the majority of instructors use their mobile phones to conduct calls while they prefer to use laptops for preparing course materials or for research.

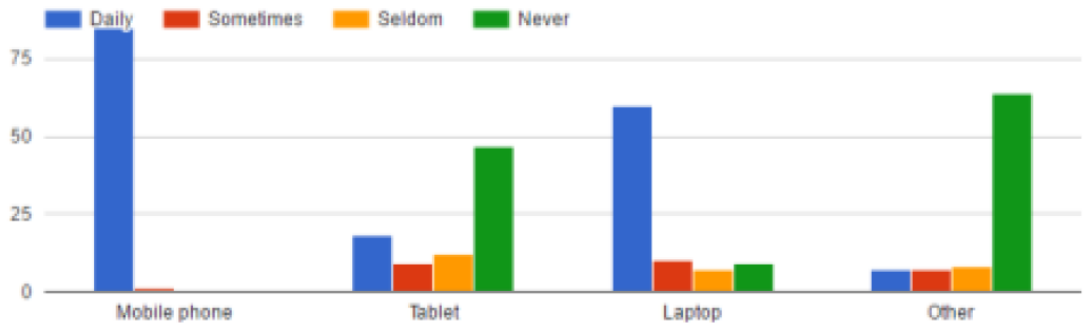

Figure 2. Usage of mobile devices

The study found that more than 96% of the instructors have Internet access at school and nearly all of them use e-mail and social networks for communication. But around two-thirds of the instructors in the sample study have no experience in teaching using mobile technologies. This is demonstrated in Figure 3. On the other hand, around 78% of them agreed that mobile learning will bring new opportunities for the learning process as demonstrated in Figure 4.

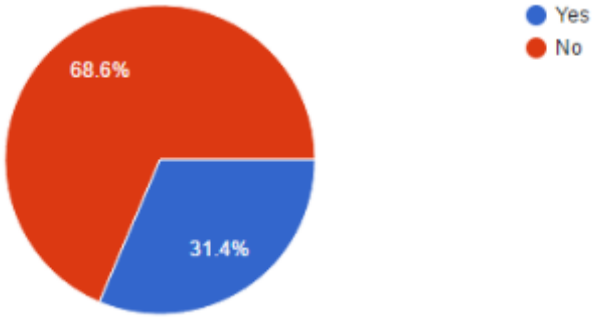

Figure 3. Instructors with experience teaching using mobile technologies

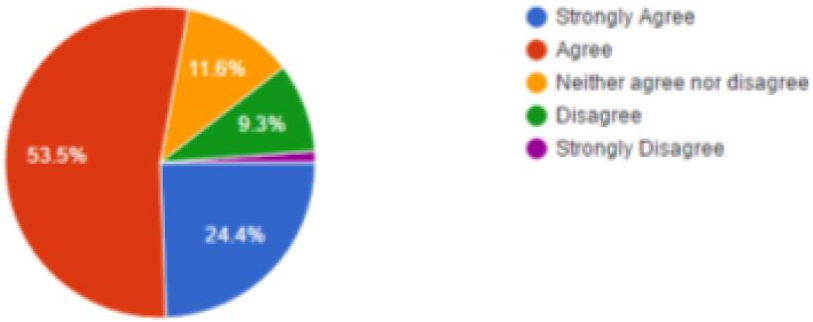

Figure 4. Instructors agreeing mobile learning brings new opportunities

It was found that two-thirds of the sample studied agreed that mobile learning will be a more flexible method of learning as it can be done anytime, anywhere. Also mobile learning will improve communication between the student and the teacher and mobile learning is a quicker method of getting feedback in learning. On the other hand, instructors found that it is difficult to control the use of mobile devices in class. This is demonstrated in Figure 5.

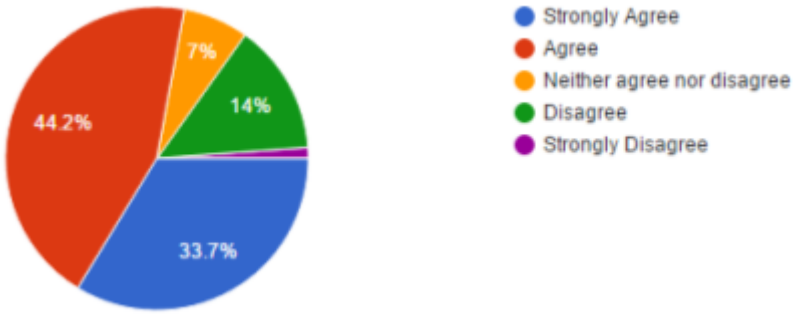

Figure 5. Difficulty to control usage of mobile devices in class

Results of the Students' Questionnaire

Percentage distribution of respondents by gender were as follows: 57.9% female and 42.1% male, while the distribution of respondent's age is shown in Figure 6.

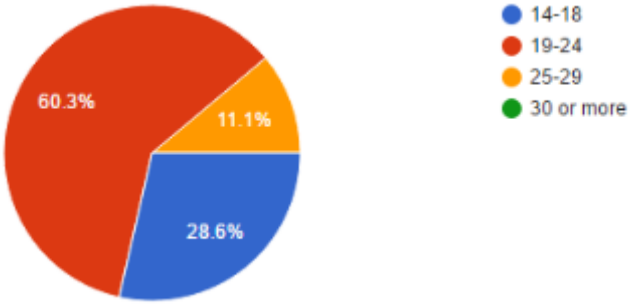

Figure 6. Age distribution of student respondents

It is found that above 90% of the respondents own at least one mobile device, while the other 10% does not have any mobile device. The majority of the respondents use mobile phones to conduct calls and communicate with each other, while they prefer to use laptops and tablets for studying and research purposes. More than two-thirds of the sample has Internet access at school and more than 90% of them use the Internet to retrieve data. The percentage of students using mobile devices in their education is shown in Figure 7.

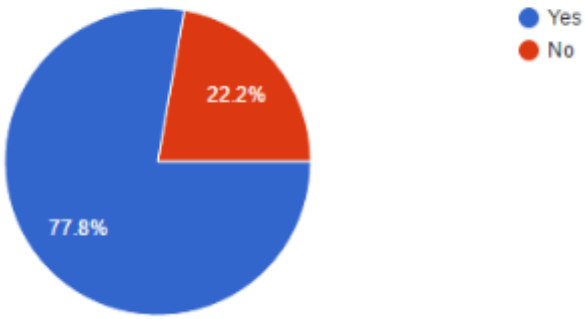

Figure 7. Percentage of students using mobile devices in education

Around two-thirds of the group mentioned that learning by using mobile devices would be easier because it allows them to study anytime, and any place (see Figure 8). Most students would like to be able to interact with teachers and classmates both inside and outside class via mobile devices. They would also like to have some lessons in which they can watch video films (Haiyan & Dongming, 2012).

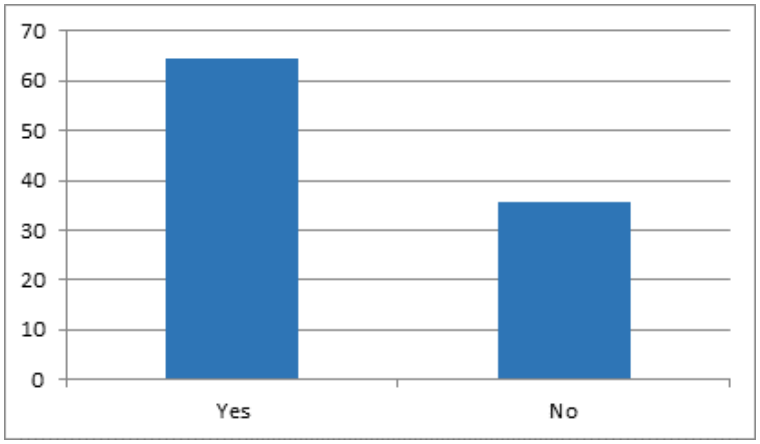

Figure 8. Easiness of learning using mobile devises

Recommendations and Conclusions

Based on our study we can deduce the following conclusions regarding the implementation of mobile devices in the learning process in Jordan, especially for disadvantaged students both in high school and at universities:

- There is a need for effective and continuous integration of mobile technologies in the educational process.
- The most suitable devices to be used are tablets or laptops while using mobile device inside classrooms might be difficult.
- Tablets or laptops should be distributed in a way that is compatible with the students' numbers and educational needs.
- Activating and promoting mobile devices in the educational process should be sustainably serviced to avoid technical problems that students might face. Furthermore, the lectures' content must be updated to meet the students' needs.
- The study recommended activating e-mail accounts and special mobile apps (e.g. WhatsApp) as a means of communication among students.
- Finding radical solutions for slow Internet connections and other disconnection inconveniences before applying the program.
- Attracting and involving all faculties in the development of the educational process.
- Changing the type of lecture's content most frequently used from hard copies (text) to digital resources: audio, video, and images.
- Most teachers (about 80%) agree that mobile learning will bring new opportunities of learning.
- Around 78% of the students used their mobiles in education. Students with special needs (deaf students) are the most.

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