Attitudes towards e-Learning and Satisfaction with Technology among Engineering Students and Instructors in Libya

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Abstract

E-learning is increasingly becoming a vital stream and modern model of education worldwide, including developing countries. While the potential benefits of e-learning for developing countries have been discussed in the literature, there is limited research on the perspectives of e-learning among users in developing countries. User perspectives, including their attitudes towards e-learning, beliefs about e-learning, as well as satisfaction with technology and past e-learning experiences are regarded as determinants of success of future e-learning initiatives. In Libya e-learning has been a major focus of e-Libya policy and it has the potential to play a vital role in re-developing Libya's higher education system and assisting students and instructors. This article presents selected descriptive findings from a case study carried out at two Libyan Universities on experiences with and perceptions of using ICTs and e-learning among engineering students and instructors. The reported findings focus on participants' attitudes towards and their satisfaction with technology. The article concludes by commenting on the prospects of e-leaning in Libya.

Keywords: e-learning, e-learning success, developing country, Libya, information and communication technology (ICT), student attitudes, student satisfaction, engineering students.

Background

The evolution of ICT in education over the past thirty years has shifted from the use of standalone data processors in computer labs, through to accessing the Web, to using complex integrated Web services for teaching and learning Gerry (2005). In this evolution, e-learning has been identified as:

> ... an ideal learning environment using modern means of information technology, through the effective integration of information technology and the curriculum to achieve, a new learning style which can fully reflect the main role of the students to thoroughly reform the traditional teaching structure and the essence of education, to train large numbers of high quality personnel (Ma, Wang & Liang, 2008, p. 54).

Although an e-learning revolution has been gaining momentum in education institutions world-wide, Libya and the Arab region are still far behind. The advancement and success of e-learning in

Libya and the surrounding region requires a positive mindset towards e-learning from policy makers, students and educators (Abouchedid & Eid, 2004).

The success of e-learning is influenced by a variety of factors including users' attitudes towards e-learning as well as their satisfaction with technology during a learning/teaching experience. Users perceive an e-learning program to be successful if they feel comfortable with the technology (McGorry, 2003; Masrom, 2007) and are provided with easy access to suitable technical infrastructure and support (Wagner, Hassanein & Head, 2008). E-learning program is perceived to be successful if it fulfils and *satisfies* the needs, meets the expectations, and addresses the concerns of its stakeholders (Clayton, Elliott, Saravani, Greene & Huntington, 2008; Elliott & Clayton, 2007; Merisotis & Phipps, 1999; Miliszewska, 2009; Wagner, Hassanein & Head, 2008). *Users* (students and instructors) will *perceive e-learning as effective if they recognize* that it would help them improve their learning and teaching effectiveness and efficiency.

Determinants and Measures of e-Learning Success

Attwell (2006) found a useful and comprehensive framework for evaluating and researching the success of e-learning projects and programs. Over several e-learning evaluation projects, the following five major clusters of variables have emerged: individual learner variables, environmental variables, technology variables, contextual variables and pedagogic variables. Selim (2007) concurred, identifying instructor characteristics, student characteristics, technology, and technical support as vital determinants of e-learning success. Spooner et al. (1999) emphasised student satisfaction, comfort, convenience, as well as perceptions of effectiveness. Attwell (2006) confirmed that many educators considered learners' satisfaction as an important factor influencing e-learning success. However, the key to a successful e-learning program is the success of the individual factors and the flexibility of the interface between them.

Phipps & Merisotis (1999) proposed three general success measures for online delivery: student attitudes towards learning through distance education (or e-learning program); student learning outcome such as scores and learning achievements; and overall student satisfaction and approval with such a program (cited in Charbonneau, 2003). Masrom (2007) focused on the individual users' acceptance investigation for e-learning in universities as an effective learning tool. He stated that: technology was perceived as useful if the user believed that using it would improve his or her work performance, while perceived ease of use referred to how effortless he or she perceived using the technology would be. Both aspects are considered distinct factors influencing the user's attitude towards using technology (Masrom, 2007).

Several empirical studies attempted to measure student learning along with student satisfaction, which is considered a suitable approach to measuring e-learning success (Song & Bosselman, 2011). Levy (2007) stated that *students' satisfaction with e-learning is a significant factor in measuring the effectiveness of e-learning* (Levy, 2007, p. 189). Learner satisfaction as a measure of e-learning effectiveness has also been a focus of many other researchers including Arbaugh (2002), and Arbaugh 2000a, 2000b, 2000c, as cited in McGorry (2003).

Attitude, Awareness, and Motivation of Libyan Users

Awareness goes along with attitude and *"positive attitude towards ICTs is widely recognized as a necessary condition for the effective implementation"* (Woodrow, 1992, cited in Sife, Lwoga, & Sanga, 2007, p. 7). Developing countries still lack sufficient awareness of ICTs and e-learning. In Libya, the level of educational technology awareness and even basic computer skills is generally low among educators in all types of higher education institutions, which leads to resistance in adopting ICT for teaching. Most students and teachers have had little, or even no, experience in using a computer; and those who are familiar with computers, generally only use them as a tool

for entertainment and communication (the Internet). Thus students tend to feel anxious and even worried when engaging with technology for learning purposes, because of their perceived a sense of incompetence (Rhema & Miliszewska, 2010). On the other hand, they find interacting with computers pleasant, helpful and easy, as they use online chat-rooms, and download music and films.

Student motivation is a factor that affects students' satisfaction and capacity: *"Highly motivated students perform well in most cases whereas non-motivated students tend to drop out"* (Andersson & Grönlund, 2009, p. 5). Personal motivation is one of the main reasons for success or failure in the integration of ICTs and adopting e-learning in teaching and learning. And conversely, ICT may have an impact on students' motivation. Many researchers indicate that ICT increases student engagement because it helps students to develop new knowledge, concepts, and skills and allow them to work at their own pace and level (Friedman & Coates, 2009; Kay, 2007). It also provides opportunities to shift from teacher-centred to student-centred learning thus creating a potentially more enjoyable learning environment for students (Neal, 2005). However, many Libyan students, particularly those with limited exposure to computers, lack sufficient appreciation for the benefits of e-learning which, in turn, affects their motivation to study with the help of ICT (Rhema & Miliszewska, 2010).

Technological Challenges in Libya

Technology is a fundamental factor in the development of e-learning, and it refers to requirements such as networks, hardware, software, computers, radio, audio cassettes, video, and Internet access. According to Khan (2003), the technological dimension of the e-learning framework examines issues of technology infrastructure in e-learning environments including infrastructure planning, hardware and software. Another factor related to technology is software and interface design. According to Khan (2003), interface design points to the overall look and feel of e-learning programs and encompasses page and site design, content design, navigation, and usability testing. Thus, educational software should be easy to use and a learning management system should support the selected learning models and pedagogies. Lastly, adequate technical support is an important part of the implementation and integration of ICT and e-learning in an education system (Sife et al., 2007).

Libya faces a number of challenges on the technological front. The country largely lacks the required technological infrastructure; however, many infrastructure projects are currently in progress. While computer laboratories are available in most Libyan higher institutions, the lack of adequate network facilities places serious restrictions on Internet access. The use of educational software within institutions is limited too, as there are very few products on the market that are available in Arabic, and the country lacks the capacity to develop its own products. Lastly, the technical support is almost unavailable in Libya, which leads to delays in installation, operation, and maintenance of equipment and software, and further discourages users (Rhema & Miliszewska, 2010).

Purpose of the Study

The descriptive findings presented in this article come from a research study investigating the e-learning experiences and perceptions of engineering students at two Libyan universities. The results described here focus on students' and instructors' satisfaction with technology, as well as their attitudes towards e-learning. The research presented in this article was guided by the following research questions: (1), What is the level of attitude towards e-learning among students and instructors?; (2), What are the levels of satisfaction with the available technologies among students and instructors?; and, (3) What is the level of interest in studying/providing e-learning courses among students/instructors?

Methodology

Survey Instrument

The scale of 'Attitude towards ICT and E-learning' was developed based on a number of studies conducted to measure faculty attitude towards ICT and e-learning (Mishra & Panda, 2007; Gasaymeh, 2009). It consisted of eight positive statements to determine participants' attitudes towards ICT and e-learning. Participants were requested to use a rating scale (from "1" 'strongly disagree' to "5" 'strongly agree') to indicate the degree to which they perceive their attitude towards ICT and e-learning in learning/teaching.

To measure participant satisfaction with technology, a published survey called Teleconference Evaluation Questionnaire (Biner, 1993; Miliszewska, 2006) was adapted and used. The survey section "Technological Characteristics and Technical Support" consisted of 9 statements. Students and instructors were asked to indicate their level of satisfaction with the provided statements. They were asked to apply a rating scale (from "1" 'very poor' to "5" 'very good') to indicate the level to which they rate their satisfaction with technology.

Study Participants

Data for the study was collected in 2011/2012 shortly after the cessation of the armed conflict in Libya through a paper-based questionnaire. The survey was administered to all engineering students in the selected programs by their instructors during lectures; surveys were also sent out to all instructors in the participating engineering departments at two participating higher education institutions. The student and instructor response rates were 45% and 36% respectively.

The two universities are the University of Tripoli in Libya's capital and a regional University of Al-Jabal Al-Gharbi. The University of Tripoli, established in 1957, is one of the oldest and largest universities in Libya. The University of Al-Jabal Al-Gharbi, established in 1985, is located almost 100km southwest of Tripoli and is one of the biggest regional universities in Libya. Both institutions are funded by the Government. Participants came from the departments of Electrical Engineering and Petroleum Engineering at each of the universities. Table 1 presents the demographic characteristics of students participating in the study.

Table 1: Demographic characteristics of participating students.

	University of Tripoli (urban)				University of Al-Jabal Al-Gharbi (regional)			
Demographic	Dept of Elec. Eng. Group A *N*=125		Dept of Petroleum Eng. Group B *N*=105		Dept of Elec. Eng. Group C *N*=45		Dept of Petroleum Eng. Group D *N*=73	
	n	%	*n*	%	*n*	%	*n*	%
Gender								
Female	77	62	49	47	21	47	56	77
Male	48	38	56	53	24	53	17	23
Age								
18 - 20	20	16	11	11	9	20	28	38
21 - 22	46	37	32	30	20	44	24	33
≥ 23	59	47	62	59	16	36	21	29

Study Year								
1	9	7	13	12	4	9	17	23
2	13	10	7	7	17	38	24	33
3	41	33	40	38	12	27	12	16
≥ 4	62	50	45	43	12	26	20	28

The proportion of participants in their first and second year of study was considerably lower in the urban university (Group A and Group B); Group C had very few first year participants. These lower rates could be attributed to lower enrolment numbers in 2011 and 2012, caused by the outbreak of the armed conflict in Libya in February 2011 and the subsequent reconstruction of the country in 2012.

Instructors from both universities also participated in the study. Table 2 presents the demographic characteristics of the participating instructors.

Table 2: Demographic characteristics of participating instructors.

	University of Tripoli (urban)		University of Al-Jabal Al-Gharbi (regional)	
Demographic	Dept of Elec. Eng. Group A *N*=24	Dept of Petroleum Eng. Group B *N*=6	Dept of Elec. Eng. Group C *N*=7	Dept of Petroleum Eng. Group D *N*=6
	n	*n*	*n*	*n*
Gender				
Female	1	2	0	2
Male	23	4	7	4
Age				
25 - 35	1	2	2	1
36 - 50	14	2	5	5
≥ 51	9	2	0	0
Education				
Master	11	5	5	6
PhD	13	1	2	0

The overall number of participating instructors was small: 30 from the urban university and only 13 from the regional one. Most of the instructors were male (88%). All instructors had at least a Master degree, and 37% of all instructors had a PhD.

Findings

Attitudes towards Technology

Students and instructors were asked to apply a rating scale (from 1 = 'strongly disagree' to 5 = 'strongly agree') to indicate their level of agreement with various attitudinal statements. The categories in the rating scales have been collapsed to facilitate statistical analysis and ease of inter-

pretation. Categories 'strongly agree' and 'agree' were merged into a single category, 'agree'. Similarly, categories 'strongly disagree' and 'disagree' were combined into a single category, 'disagree'.

The analysis revealed that students in all groups felt confident in using computers, enjoyed using computers in their studies, believed in the benefits of e-learning, and would be interested in studying courses that used e-learning, as illustrated in Table 3.

Table 3: Student perceptions of ICT and e-learning (represented as observed percentages)

			University of Tripoli (urban)		University of Al-Jabal Al-Gharbi (regional)	
			Group A *N*=125	Group B *N*=105	Group C *N*=45	Group D *N*=73
Attitudes	I feel confident in using computers	*Agree*	71	87	89	82
		Neutral	22	10	7	16
		Disagree	7	3	4	2
	I enjoy using ICT for my studies	*Agree*	63	70	73	69
		Neutral	27	21	18	19
		Disagree	10	9	9	12
Beliefs	I believe that e-learning gives me the opportunity to acquire new knowledge	*Agree*	86	93	91	88
		Neutral	10	7	5	10
		Disagree	4	0	4	2
	I believe that e-learning enhances my learning experience	*Agree*	86	93	90	89
		Neutral	12	7	9	11
		Disagree	2	0	1	0
	I believe that convenience is an important feature of e-learning	*Agree*	76	91	87	88
		Neutral	21	8	9	11
		Disagree	3	1	4	1
	E-learning increases the quality of learning because it integrates all forms of media	*Agree*	80	87	78	85
		Neutral	17	10	15	12
		Disagree	3	3	7	3
	Adopting ICT and e-learning allows for increased student satisfaction	*Agree*	79	83	84	89
		Neutral	17	14	11	11
		Disagree	4	3	5	0

Instructors also felt confident in using computers, enjoyed using ICT for teaching, and believed in the benefits of e-learning in relation to teaching. While the majority of instructors in groups A, B,

and C declared interest in providing courses that use e-learning, instructors in Group D were somewhat less keen, as illustrated in Table 4.

Table 4: Instructor perceptions of ICT and e-learning (represented as numbers)

			University of Tripoli (urban)		University of Al-Jabal Al-Gharbi (regional)	
			Group A *N*=24	Group B *N*=6	Group C *N*=7	Group D *N*=6
Attitudes	I feel confident in using computers	*Agree*	23	6	7	5
		Neutral	1	0	0	1
		Disagree	0	0	0	0
	I enjoy using ICT for my teaching	*Agree*	16	5	6	5
		Neutral	7	0	0	1
		Disagree	1	1	1	0
Beliefs	I believe that e-learning gives me the opportunity to better convey new knowledge	*Agree*	19	6	5	4
		Neutral	5	0	2	2
		Disagree	0	0	0	0
	I believe that e-learning enhances my teaching capacity	*Agree*	16	6	6	4
		Neutral	8	0	1	2
		Disagree	0	0	0	0
	I believe that convenience is an important feature of e-learning	*Agree*	17	6	3	2
		Neutral	6	0	4	3
		Disagree	1	0	0	1
	E-learning increases the quality of teaching because it integrates all forms of media	*Agree*	19	6	6	4
		Neutral	4	0	1	1
		Disagree	1	0	0	1

Satisfaction with Technology

As in the previous section, students and instructors were asked to apply a rating scale (from 1 = 'very poor' to 5 = 'very good') to indicate the level to which they rate their satisfaction with technology. The categories in the rating scales have been collapsed to facilitate statistical analysis and ease of interpretation. Categories 'very poor' and 'poor' were merged into a single category, 'poor'. Similarly, categories 'good' and 'very good' were combined into a single category, 'good'.

As shown in Table 5, student satisfaction with the available technologies was generally low among all groups of participants. Satisfaction was particularly low among students from Group D in the regional university. These students were least satisfied with the quality of the internet access (90% of students rated it 'poor'), the ICT infrastructure (84% of 'poor' responses), the quali-

ty of technology used in classes (85% of 'poor' responses), and the quality of technical support (75% of 'poor' responses).

Table 5: Student satisfaction with technology (represented as observed percentages)

		University of Tripoli (urban)		University of Al-Jabal Al-Gharbi (regional)	
		Group A *N*=125	Group B *N*=105	Group C *N*=45	Group D *N*=73
The quality of the Internet access in the institute	*Good*	16	10	7	2
	Average	16	27	26	8
	Poor	68	63	67	90
The necessary ICT infrastructure	*Good*	10	10	13	0
	Average	27	26	18	16
	Poor	63	64	69	84
The quality of the technology used in classes	*Good*	8	8	2	4
	Average	25	23	29	11
	Poor	67	69	69	85
The ease of use of technology	*Good*	20	20	13	3
	Average	37	34	40	38
	Poor	43	46	47	59
The degree of confidence you had that classes would not be interrupted or cancelled due to technical problems	*Good*	34	22	5	12
	Average	31	44	46	46
	Poor	35	34	49	42
The quality of technical support provided	*Good*	10	11	5	6
	Average	31	33	20	19
	Poor	59	56	75	75
The overall usefulness of technology used in classes	*Good*	31	31	27	21
	Average	22	31	22	23
	Poor	47	38	51	56

The participating instructors reported low levels of satisfaction with technology, as shown in Table 6. The aspects that were rated lowest include the quality of the internet access, the ICT infrastructure, the quality of technology used in classes, and the quality of technical support; instructors in Group C reported the lowest levels of satisfaction among all groups. However, the instructors were relatively satisfied with the overall usefulness of technology use in classes.

Table 6: Instructor satisfaction with technology (represented as numbers)

		University of Tripoli (urban)		University of Al-Jabal Al-Gharbi (regional)	
		Group A *N*=24	Group B *N*=6	Group C *N*=7	Group D *N*=6
The quality of the Internet access in the institute	*Good*	2	3	0	1
	Average	5	3	0	1
	Poor	17	0	7	4
The necessary ICT infrastructure	*Good*	2	0	0	1
	Average	5	4	1	1
	Poor	17	2	6	4
The quality of the technology used in classes	*Good*	1	3	0	2
	Average	5	3	1	4
	Poor	18	0	6	0
The ease of use of technology	*Good*	7	1	2	3
	Average	7	5	3	3
	Poor	9	0	2	0
The degree of confidence you had that classes would not be interrupted or cancelled due to technical problems	*Good*	6	2	1	2
	Average	10	4	3	3
	Poor	8	0	3	1
The quality of technical support provided	*Good*	1	2	0	1
	Average	5	3	3	3
	Poor	17	1	4	2
The overall usefulness of technology used in classes	*Good*	16	1	6	2
	Average	5	5	0	4
	Poor	3	0	1	0

Interest in Studying/Providing e-Learning Courses

Student interest in e-learning programs was high across all groups, as shown in Table 7.

Table 7: Student interest in e-learning (represented as observed percentages)

		University of Tripoli (urban)		University of Al-Jabal Al-Gharbi (regional)	
		Group A *N*=125	Group B *N*=105	Group C *N*=45	Group D *N*=73
I would be interested in studying courses that use e-learning	*Agree*	85	89	78	94
	Neutral	9	6	18	6
	Disagree	6	5	4	0

Figure 1 shows mean scores for student interest in studying courses that use e-learning, based on ratings where 1 = 'disagree' and 5 = 'strongly agree', and mean scores for student satisfaction where 1 = 'poor' and 5 = 'very good'. The figure illustrates that, while student satisfaction with the available technologies was generally low among all groups of participants, it did not seem to affect their interest in studying courses that use e-learning. Even Group D, whose levels of satisfaction with technology were particularly low, expressed high interest in participating in e-learning.

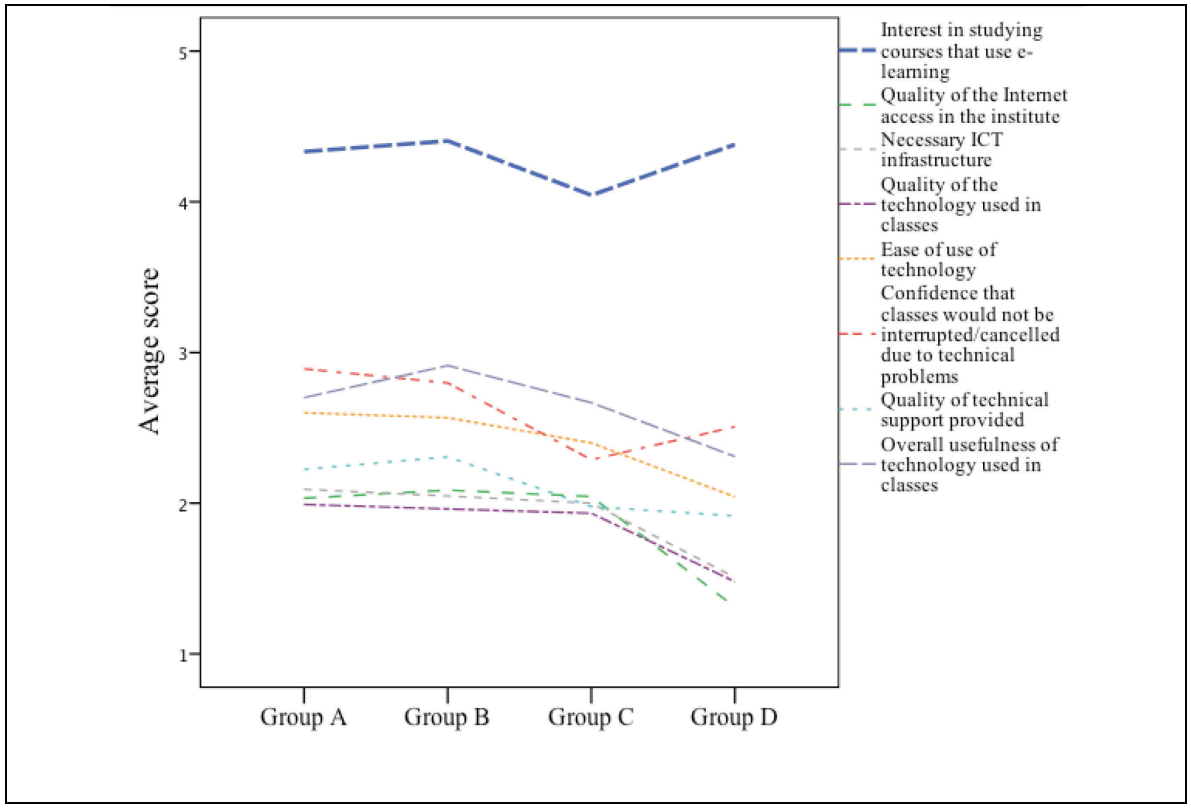

Figure 1: Student interest in studying e-learning courses and their satisfaction with available technologies

The majority of the participating instructors in groups A, B, and C expressed interest in providing courses that use e-learning, whereas instructors in Group D were somewhat less interested (Table 8).

Table 8: Instructor interest in providing e-learning (represented as numbers)

		University of Tripoli (urban)		University of Al-Jabal Al-Gharbi (regional)	
		Group A *N*=24	Group B *N*=6	Group C *N*=7	Group D *N*=6
I would be interested in providing courses that use e-learning	*Agree*	20	6	5	2
	Neutral	4	0	1	4
	Disagree	0	0	1	0

Figure 2 illustrates that, in spite of low levels of satisfaction with the available technologies among all groups of instructors, their interest in providing courses that use e-learning was relatively high with groups A and B reporting the highest levels of interest. Even Group C, whose levels of satisfaction with technology were particularly low, expressed considerable interest in providing e-learning courses.

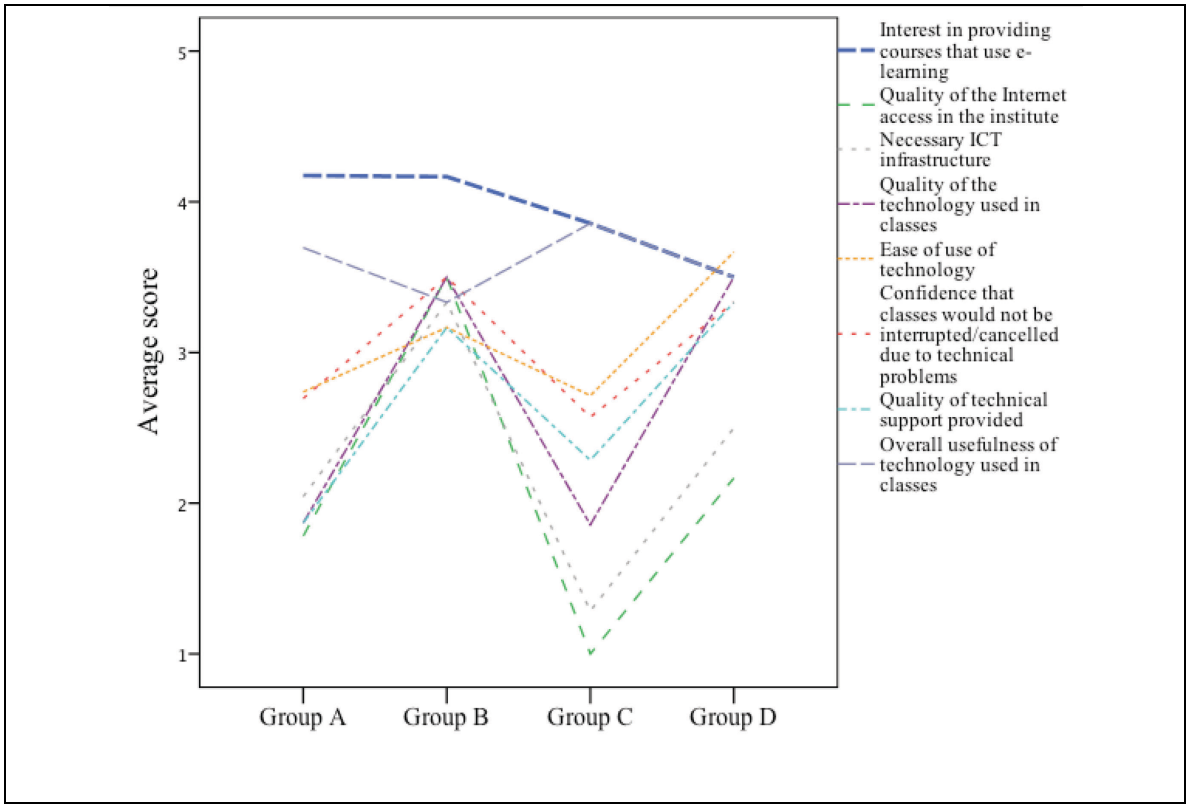

Figure 2: Instructor interest in providing e-learning courses and their satisfaction with available technologies

Conclusion

This article presented selected findings from a larger study examining Libyan engineering student and instructor experiences with, and perceptions of, technology supported learning. The article outlined the participants' attitudes towards, and beliefs about, e-leaning, in view of their experiences with e-learning, including satisfaction with technology.

A comparative analysis indicated that the participating students and instructors in the urban and regional areas were positively disposed towards e-learning and believed in its benefits, even though their satisfaction with past e-learning experiences, as related to technology, was low. The positive attitudes and the willingness of students and instructors to engage in e-learning courses suggest that future e-learning initiatives in Libya have a chance to succeed. These findings are comparable with the results of a study conducted in Pakistan virtual university by Hussain (2007), as well as with the findings of a study conducted in the Gulf region by Al-Doub, Goodwin & Al-Hunaiyyan (2011).

Satisfaction with technology was low among all participating students and instructors. The low levels of satisfaction with technology were not surprising, considering that the participants had just experienced the devastation caused by the 2011 armed conflict in Libya, which resulted in considerable damage to the educational infrastructure and serious disruptions to the provision of educational services (Rhema & Miliszewska, 2012). Although the level of satisfaction with technology was low among the majority of participants, most of them expressed interest in studying/providing courses that use e-learning.

While an under-developed infrastructure is likely to continue to be a challenge for the development of e-learning in Libya, mobile-broadband technology could offer a more accessible and affordable alternative to the Internet-based and unreliable land-line infrastructure (Rhema & Miliszewska, 2012). Mobile phones and smart-phones and related applications could be particularly useful as a platform for e-learning at a time when the necessary internet infrastructure is lacking. It has been suggested in the literature that mobile phones are likely to provide alternative means of communication in Libya where Internet infrastructure is unreliable and limited (Jones et al., 2012).

Another challenge is the availability of relevant e-content in Arabic on the Internet and mobile devices. Although e-content development in Libya, as in the rest of the Arab region, is still emerging, some countries, such as Egypt, have made considerable progress in several areas including cultural and educational content development, and e-government content. As the development of such content presents a growth opportunity, Egypt is likely to continue to generate e-content for the Egyptian market and other Arab-speaking markets, including Libya (UNCTAD, 2011).

It is important to note that while the findings presented in this article provide useful insights extend the limited body of work related to e-learning in Libya, they are based on a study of only two institutions and a limited number of participants, especially among instructors. In addition, engineering students and instructors may be more technically-minded and accepting of e-learning than members of other disciplines. It would be useful to see if the findings presented in this article could be confirmed by participants from other disciplines and other universities.

References

Abouchedid, K., & Eid, G. M. (2004). E-learning challenges in the Arab world. *Quality Assurance in Education*, *12*(1), 15-27.

Al- Doub, E., Goodwin R., & Al-Hunaiyyan, A. (2008). *Students' attitudes toward e-learning in Kuwait's higher education institutions.* Retrieved March 7, 2013 from http://www.apsce.net/icce2008/papers/ICCE2008-paper202.pdf

Andersson, A., & Grönlund, A. (2009). A conceptual framework for e-learning in developing countries: A critical review of research challenges, *The Electronic Journal on Information Systems in Developing Countries*, *38*(2), 1-16.

Arbaugh, J. B. (2000a). Virtual classroom characteristics and student satisfaction in Internet-based MBA courses. *Journal of Management Education*, *24*(1), 32–54.

Arbaugh, J. B. (2000b). Virtual classroom versus physical classroom: an exploratory comparison of class discussion patterns and student learning in an asynchronous Internet-based MBA course. *Journal of Management Education*, *24*(2), 207–227.

Arbaugh, J. B. (2000c). How classroom environment and student engagement affect learning in Internet-based MBA courses. *Business Communication Quarterly*, *63*(4), 9.

Arbaugh, J. B. (2002). Managing the on-line classroom: a study of technological and behavioral characteristics of web-based MBAcourses. *Journal of High Technology Management Research*, *13*, 203–223.

Attwell, G. (2006). Evaluating e-learning - A guide to the evaluation of e-learning. *Evaluate Europe Handbook Series Volume 2*. Retrieved October 28, 2012 from http://www.pontydysgu.org/wp-content/uploads/2007/11/eva_europe_vol2_prefinal.pdf

Charbonneau, J. (2003). *Weblectures: Enhancing the Webct experience for external students.* Department of Marketing, Massey University, New Zealand. Retrieved January 14, 2011 from http://www.col.org/pcf3/Papers/PDFs/Charbonneau_Jan.pdf

Clayton, J., Elliott, R., Saravani, S., Greene, N., & Huntington, N. (2008). *E-Learning in industry: A summary of activities.* Tertiary e-Learning Research Fund, Wellington, New Zealand.

Elliott, R., & Clayton, J. (2007). E-learning activity in New Zealand industry training organisations: Perceived benefits and barriers. *ICT: Providing choices for learners and learning, Proceedings ascilite Singapore 2007*. Retrieved January 22, 2011 from http://www.ascilite.org.au/conferences/singapore07/procs/elliott-r.pdf

Friedman, T., & Coates, H. (2009). *School connections: Using ICT to engage students in learning*. Sydney: Microsoft Corporation.

Gasaymeh, A. (2009). *A study of faculty attitudes toward internet-based distance education: A survey of two Jordanian public universities*. PhD Thesis, the College of Education, Ohio University, Ohio, USA.

Gerry, W. (2005). *Beyond the horseless carriage: Harnessing the potential of ICT in education and training*. Education.au limited. Retrieved October 30, 2009 from http://www.educationau.edu.au/jahia/webdav/site/myjahiasite/shared/papers/horseless_carriages_GW.pdf

Hussain, I. (2007). A study of student's attitude towards virtual education in Pakistan. *Turkish Journal of Distance Learning, 8*(2), 69-79. Retrieved February 26, 2013 from http://tojde.anadolu.edu.tr/tojde26/pdf/article_6.pdf

Jones, C., Kennedy, S., Kerr, S., Mitchell, J., & Safayeni, D. (2012). *Furthering democracy in Libya with information technology: Opportunities for the international donor community.* CIGI Junior Fellows Policy Brief, NO. 4. Retrieved February 26, 2013 from http://www.cigionline.org/sites/default/files/no4_0.pdf

Kay, R. (2007). A systematic evaluation of learning objects for secondary school students. *Journal of Educational Technology Systems*, *35*(4), 411-448.

Khan, B. (2003). *A framework for e-learning*. Retrieved September 5, 2009 from http://www.bookstoread.com/framework/

Levy, Y. (2003). A study of learners perceived value and satisfaction for implied effectiveness of online learning systems. *Dissertation Abstracts International, 65*(03), 1014A.

Levy, Y. (2007). Comparing dropouts and persistence in e-learning courses. *Computers & Education*, *48*(2), 185–204.

Ma, X., Wang, R., & Liang, J. (2008). The e-Learning system model based on affective computing. In *Proceedings of the Seventh International Conference on Web-based Learning.* College of Computer and Information Engineering, Tianjin Normal University, China.

Masrom, M. (2007). Technology acceptance model and E-learning. *12th International Conference on Education, Sultan Hassanal Bolkiah Institute of Education, Universiti Brunei Darussalam, 21-24 May 2007*. Retrieved January 17, 2011 from http://eprints.utm.my/5482/1/MaslinMasrom2006_Techn.pdf

McGorry, S. (2003). Measuring quality in online programs. *Internet and Higher Education*, *6*(2), 159–177.

Merisotis, J., & Phipps, R. (1999). What's the difference? *Change, 31*(3), 12-17.

Miliszewska, I. (2006). *A multidimensional model for transnational computing education programs*. Thesis. Australian Library Collections.

Miliszewska, I. (2009). *Effective transnational education programs: Concepts, dimensions, perspectives*. Saarbruecken: VDM Verlag.

Mishra, S., & Panda, S. (2007). Development and factor analysis of an instrument to measure faculty attitude towards e-learning. *Asian Journal of Distance Education*, *5*(1), 27-33.

Neal, G. (2005). Student reflections on the effectiveness of ICT as a learning resource. *Paper prepared for presentation at the AARE Annual Conference Parramatta Nov 2005*. Retrieved January 17, 2013 from http://www.aare.edu.au/05pap/nea05582.pdf

Phipps, R., & Merisotis, J. (1999). *What's the difference? A review of contemporary research on the effectiveness of distance learning in higher education.* Washington, DC: The Institute for Higher Education Policy. Retrieved December 5, 2010 from http://www.ihtp.org/Pubs/PDF/Difference.pdf

Rhema, A., & Miliszewska, I., (2010). Towards e-learning in higher education in Libya. *Issues in Informing Science and Information Technology,* 7, 423-437. Retrieved from http://iisit.org/Vol7/IISITv7p423-437Rhema735.pdf

Rhema, A., & Miliszewska, I. (2012). The potential of e-learning in assisting post-crisis countries in rebuilding their higher education systems: The case of Libya. *Issues in Informing Science and Information Technology,* 9, 149-160. Retrieved from http://iisit.org/Vol9/IISITv9p149-160Rhema033.pdf

Selim, H. M. (2007). Critical success factors for e-learning acceptance: confirmatory factor models. *Computer and Education*, *49*(2), 396-413.

Sife, A, S., Lwoga, E, T., & Sanga, C. (2007). New technologies for teaching and learning: Challenges for higher learning institutions in developing countries. *International Journal of Education and Development Using ICT*, *3*(2), 57-67.

Song, S, M., & Bosselman, R. (2011). *Contextual factors that influence learning effectiveness: Hospitality students' perspectives.* ScholarWorks@Umass Amherst. Retrieved November 18, 2012 from http://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1327&context=gradconf_hospitality

Spooner, F., Jordan, L., Algozzine, B., & Spooner, M. (1999). Student ratings of instruction in distance learning and on-campus classes. *The Journal of Educational Research, 92*(3), 132-140.

United Nations Conference on Trade and Development, UNCTAD (2011). *ICT Policy Review: Egypt.* United Nations Publication (UNCTAD/DTL/STICT/2011/6), Switzerland. Retrieved January 13, 2013 from http://unctad.org/en/Docs/dtlstict2011d6_en.pdf

Wagner, N., Hassanein, K., & Head, M. (2008). Who is responsible for E-Learning Success in Higher Education? A Stakeholders' Analysis. *Educational Technology & Society*, *11*(3), 26-36.

Woodrow, J. E. (1992). Locus of control and student teacher computer attitudes. *Computers in Education, 14*(5), 421-432.

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