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OpenCourseWare: Impact and Usage of Faculty in the Developing Countries of the Middle East

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Abstract

Global learning spaces and information societies that are open to all are creating a paradigm shift in the world of education. One of the most rapidly growing projects promoting collaboration in the higher education sector and helping faculty teaching in universities in the developing world that tackle issues of sustainable human development is the OpenCourseWare (OCW) project. Currently there is a gap in the literature on the usage and impact of OCW in the developing world. The purpose of this study was to examine the extent to which science, mathematics, technology and engineering faculty in universities in developing countries of the Middle East access and use OCW, and to determine the satisfaction with and perceived impact of OCW on their professional practice.

This study found that OCW has made a positive impact on the professional practice of faculty teaching in developing countries of the Middle East. The participants were satisfied with quality of OCW materials and used them in way variety of ways in the classroom. According to this study, OCW is projected to continue helping science, mathematics, technology and engineering faculty in these countries to be more productive and effective at work, update their knowledge in their field of study, and improve the quality of their teaching.
Keywords: Higher Education, Developing World, Open Courseware, eLearning, Middle East, Teaching

Introduction

The concepts of global learning spaces and information societies that are open to all are revolutionizing the world of education. One of the most rapidly growing projects, promoting collaboration in the higher education sector with a promise to help faculty teaching in the developing world, tackle issues related to sustainable human development and that is the OpenCourseWare (OCW) project. Modeled on the open source software movement, the OCW project was an experiment in sharing the knowledge of a leading technology institute for free on the Internet. The Massachusetts Institute of Technology (MIT) was the first institutions to initiate OCW in 2004. Many institutions of higher education around the world followed the footsteps of MIT and became a part of the OCW, also known as the Open Educational Resource movement (Matkin, 2005).

Currently more than 110 universities have joined the OCW Consortium (OCW Consortium, 2012). The OCW Consortium (2012), a worldwide community of higher education institutions

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and associated organizations committed to advancing OpenCourseWare and its impact on global education, notes the following definition for OCW on its website:

> An OpenCourseWare (OCW) is a free and open digital publication of high quality college and university-level educational materials. These materials are organized as courses, and often include course planning materials and evaluation tools as well as thematic content. OpenCourseWare are free and openly licensed, accessible to anyone, anytime via the internet.

The mission of participating members of the OCW Consortium is to serve both the individuals who use OCW and the institutions that make OCW possible. The ultimate goal of OCW is to create an open source of knowledge that raises the quality of learning and ultimately the quality of life around the planet. OCW is a process intended to make the undergraduate and graduate course materials of the participant universities available online to any user in the world without any costs. The coherent interface which includes sophisticated search algorithms to explore additional concepts, pedagogies, and related attributes across the site as well as within courses is a key characteristic of OCW (Long, 2006). "OpenCourseWare combines two things: traditional openness and outreach, and the democratizing influence of American education, with the ability of the Web to make vast amounts of information instantly available", stated MIT President Charles Vest (Margulies, 2003).

OCW was not the only program in higher education aimed to support the development of a scholarship of teaching and learning. Many other programs were initiated but later on changed focus or ceased offering free services to members. One major project in higher education, the Carnegie Academy for the Scholarship of Teaching and Learning (CASTL) adopted the characteristics of OCW (Long, 2006). According to the CASTL website, the goal of the program was to foster long-lasting learning, enhance the practice and profession of teaching and bring faculty members together (Carnegie, 2012). The program involved responsible stewardship by constantly sharing and examining the quality of faculty work and subjecting that work to the critical examination of others in the professional community (Long, 2006). One of the objectives of this program, as well as the OCW movement, was to create a community of practice. Communities of practice are defined as groups of people informally bound together by shared expertise and passion for a joint enterprise (Wegner, 2000). Examples of communities of practice had been previously observed in conjunction with online learning (e.g., Palloff & Pratt 1999; Russell & Ginsburg 1999).

One of the regions in the developing world that is tackling serious issues related to sustainable human development is the Middle East. Numerous factors such as centuries of wars for control of resources, religious conflicts in the region, poverty and socio-economic issues, and scarcity of natural resources such as water has created serious human development issues (Gleick, 1994). Institutions of higher education in the developing countries in the Middle East face numerous educational, political and technological challenges in regards to sustainability of professional development and faculty training. One of these challenges deals with lack of infrastructure, filtering and accessibility of Internet in such countries (Deibert, Palfrey, Rohozinski and Zittrain,

2008). Generally poor infrastructures, high cost of the Internet, slow speed of the Internet, and low access to computers have been the main technology challenges in the developing world (Gorji, 2004). Computer illiteracy of faculty in many developing countries is another major challenge in universities in the developing world. A survey conducted in the Middle East indicated that 38% of the faculty members were having difficulties with basic computer functions or Internet browsing. Most universities did not make efficient use of computers for teaching purposes. In such universities, computer labs are mainly used by students for chatting or browsing not related to academics (Hasan, 2003).

There is an evident gap in the literature on how the OCW is being accessed and used by educators around the world, specifically in the Middle East. The important question of how OCW is impacting the professional practice of educators in developing regions needs to be explored. Such information is not currently available due to the contemporary nature of OCW and low number of studies that have focused on this issue. In addition, many educators are critical of the real impact OCW is making on enhancing teaching and learning in the information society through independent life-long learning. Therefore, this study is aimed to provide greater understanding of the OCW usage profiles of faculty teaching in universities in developing nations of the Middle East and the impact OCW is making on their professional practice.

Methods

The purpose of this study was to examine the extent to which faculty in universities in developing countries of the Middle East access and use OCW and to determine the satisfaction with and perceived impact of OCW on their professional practice. This study focused on the developing countries of the Middle East region as a whole and did not attempt to compare individual countries in this region. The study was guided by the following questions**:**

1. What is the frequency of access to OCW by science, mathematics, technology and engineering faculty in universities in developing countries of the Middle East?
2. How is OCW material being used for teaching purposes by science, mathematics, technology and engineering faculty in universities in developing countries of the Middle East?
3. How satisfied are science, mathematics, technology and engineering faculty in universities in developing countries of the Middle East with the OCW material?
4. What is the perceived degree of impact of OCW on the professional practice of science, mathematics, technology and engineering faculty in universities in developing countries of the Middle East?
5. What is the perceived expected future impact of OCW on higher education teaching in science, mathematics, technology and engineering in universities in developing countries of the Middle East?
6. What is the likelihood of science, mathematics, technology and engineering faculty in universities in developing countries of the Middle East that have never used OCW accessing these sites if they were informed about the OCW project??

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This study utilized a survey design. There is not currently an entity or process in place to accurately measure the frequency, usage and impact of OCW on faculty. Therefore, in order to answer the research questions, the researcher surveyed the faculty teaching in universities in the Middle East. The survey methodology is appropriate when participant's attitudes, opinions, and perceptions are asked (Wiersma & Jurs, 2008).

Due to the scarcity of research on OCW, there was no widely accepted instrument that could be considered as valid for this study. Therefore, the researcher developed an instrument which included 14 questions to answer the research questions. The researcher followed a three-step process to ensure validity and reliability of the instrument. Internal consistency of the research instrument was based on the average correlation of items within the survey. Cronbach's Alpha was employed to yield a reliable coefficient. This analysis resulted in a reliable coefficient of 0.78.

The survey instrument was hosted online by "Hosted Survey", one of the premier web-based survey hosts chosen by researchers and educators (Hosted Survey, 2012). The statistical package SPSS was utilized to analyze the data. Descriptive and inferential statistical analyses were employed to analyze the responses to the study's questionnaire. Approval of the Institutional Review Board (IRB) was granted for this study to ensure the Protection of Human Subject. This protocol received the exempt status since it involved no deception, vulnerable populations, sensitive information, unethical treatment of subjects, or disclosure of personally identifiable information.

Participants of the Study

According to the World Bank (2012), a developing country has a relatively low standard of living, an undeveloped industrial base, and a moderate to low Human Development Index score. There were seven developing countries in the Middle East at the time of this study: Iran, Iraq, Lebanon, Syria, Pakistan, Turkey, and Yemen. The total number of faculty members in these countries was an unknown variable. Therefore, for the purposes of this study, the population consisted of all faculty members teaching in four-year universities in developing countries of the Middle East that met all the following conditions:

- The university had a published English website listed on the Catalogue of World Universities produced by the Cybermetrics Lab, a unit of the Consejo Superior De Investigaciones Científicas (CSIC), the main public research body in Spain (CSIC, 2012),
- The university offered a Bachelor's degree in either science, mathematics, technology or engineering,
- And the university had listed the emails of its faculty members online.

Since most OCW sites offered courses mainly in the fields of science, math, technology and engineering, the study was limited only to faculty members in these fields of study. According

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to the CSIC directory, there were 72 universities in developing countries in the Middle East that met all of these conditions. There were a total of 5114 faculty members in these universities. This number was used as the population size for this study. For the purposes of this study, the entire population was surveyed.

Two sets of invitation emails were sent to the population of the study since the first round of invitations did not yield a satisfactory return rate. Seven hundred and five faculty members from the population responded to the online survey, thus yielding a 11.8% (605/5114 = .118) overall return rate for the instrument. This return rate was lower than initially estimated. The first question on the survey asked the participants if they had ever accessed OCW websites. As illustrated in Table 1, 57.5% of participants had never accessed OCW sites.

Table 1.
Have you ever accessed OCW sites?

Answer	Frequency	Percentage
No	348	57.5%
Yes	257	42.5%
Total	605	100%

Table 2 illustrates the demographic profile of the participants based on area of study.

Table 2.

Demographic profile based on area of study

Area of Study	Frequency	Percentage
Engineering	284	46.9%
Mathematics	36	6.0%
Sciences	261	43.1%
Technology	24	4.0%
Total	605	100%

Results and Discussion

To answer research questions one to five, only the 257 respondents that answered yes to the filter question were used. To answer research question six, only the 348 participants that answered no to the filter question were used. Note that, there were missing values in most questions on the survey.

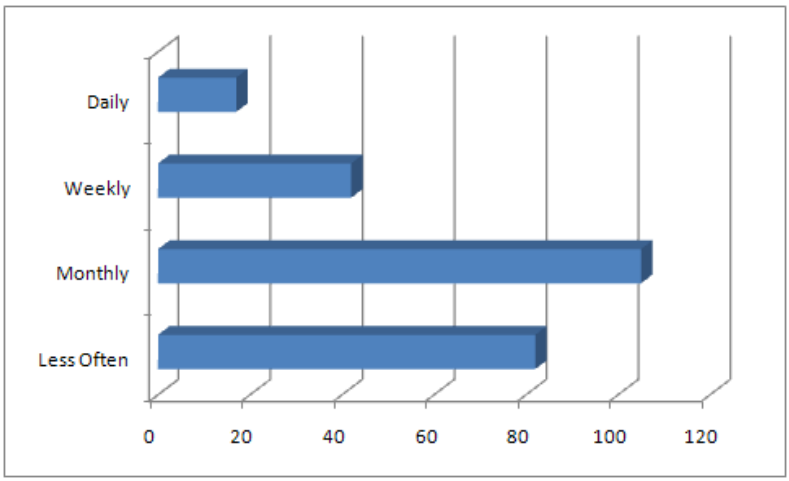
Research Question One

What is the frequency of access to OCW by science, mathematics, technology and engineering faculty in universities in developing countries of the Middle East?

The majority of faculty members in universities in the developing countries of the Middle East accessed OCW sites on a monthly basis. Only 6.9% of the participants access OCW sites on daily basis. Figure 1 illustrates the frequency of access of participants.

Figure 1.

Frequency of access



The results of the Kruskal-Wallis test indicated statistical significance differences between the areas of study ($p<.05$). Fifteen percent of faculty members in mathematics accessed OCW sites on daily basis. Faculty from mathematics showed the highest frequency of access to OCW sites. Faculty members in sciences had a lower frequency of access than others. Table 3 illustrates the frequency of access of the participants based on the area of study.

Table 3.

Frequency of access based on area of study

	Engineering	Science	Mathematics	Technology	Total
Daily	9	5	2	0	16
Weekly	23	10	4	5	42
Monthly	65	30	3	7	105
Less Often	42	32	4	4	82
Total	139	77	13	16	245

Research Question Two

How is OCW material being used for teaching purposes by science, mathematics, technology and engineering faculty in universities in developing countries of the Middle East?

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The majority of faculty members in universities in developing countries of the Middle East recommended OCW sites to their students in their classes. As illustrated in Table 4, OCW was also highly used for modifying existing courses and course development. The lowest method of usage of OCW materials was giving the materials as handouts to students.

Table 4.

Usage of OCW

Usage	Frequency	Percentage
Recommending to Students	81	33.6%
Handouts to Students	5	2.1%
Emailed Materials to Students	12	5.0%
Course Development	60	24.9%
Modify Existing Course	70	29.0%
Assessment	13	5.4%
Total	241	100%

The results of the Kruskal-Wallis test indicated statistical significance differences between the areas of study ($p<.05$). Faculty members in sciences used OCW materials for assessment purposes more than other participants. None of the participants from mathematics or technology used OCW materials for assessment purposes. Faculty members in mathematics used OCW materials for course development purposes more than the other participants. Faculty members in engineering used OCW materials for modifying courses more than the other participants. Faculty members in mathematics used OCW materials to give handouts or email them to students more than the other participants. Faculty members in engineering recommended OCW sites to students more than the other participants. Additionally, engineering faculty used OCW sites by recommending them to their students more than the other methods of usage. Table 5 illustrates usage based on area of study.

Table 5.
Usage based on area of study

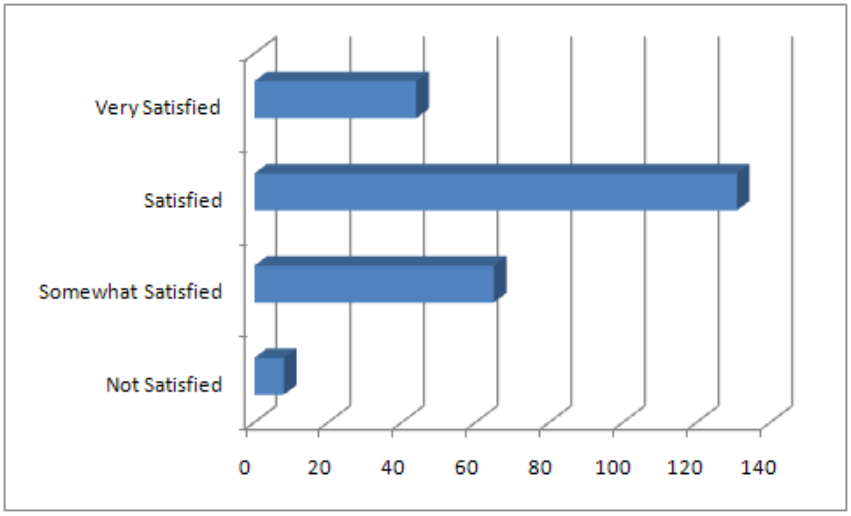
	Engineering	Science	Mathematics	Technology	Total
Assessment	7	6	0	0	13
Course Development	31	18	5	6	60
Modifying Course	43	19	3	4	69
Emailed Materials	6	4	1	1	12
Handouts	1	2	1	1	5
Recommending	50	25	2	4	81
Total	138	74	12	16	240

Research Question Three

How satisfied are science, mathematics, technology and engineering faculty in universities in developing countries of the Middle East with the OCW material?

The majority of the faculty members were satisfied with the quality of OCW materials available on the sites. Only three percent of the participants indicated that they were not satisfied with the quality of the OCW materials. Figure 2 illustrates the satisfaction level of the participants with the quality of the OCW materials.

Figure 2.
Satisfaction with the quality of OCW materials



The results of the Kruskal-Wallis test indicated statistical significance differences between the areas of study ($p<.05$). Engineering faculty members had the highest rate of satisfaction with the quality of OCW materials. Faculty members from sciences had the lowest rate of satisfaction with the quality of OCW materials. Technology faculty members were more satisfied than the mathematics faculty with the quality of OCW materials. Table 6 illustrates the satisfaction level of the participants with the quality of the OCW materials based on the area of the study.

Table 6.
Satisfaction with the quality based on the area of study

	Engineering	Science	Mathematics	Technology	Total
Very Satisfied	29	7	3	5	44
Satisfied	75	36	8	11	130
Somewhat Satisfied	37	26	2	0	65

Not Satisfied	4	4	0	0	8
Total	145	73	13	16	247

Research Question Four

What is the perceived degree of impact of OCW on the professional practice of science, mathematics, technology and engineering faculty in universities in developing countries of the Middle East?

The majority of participants indicated that OCW has made a positive impact on their professional practice. Nineteen percent of faculty members believed OCW has had little or no impact on their professional practice. Figure 3 illustrates the impact of OCW on the professional practice of participants.

Figure 3.

Impact of OCW

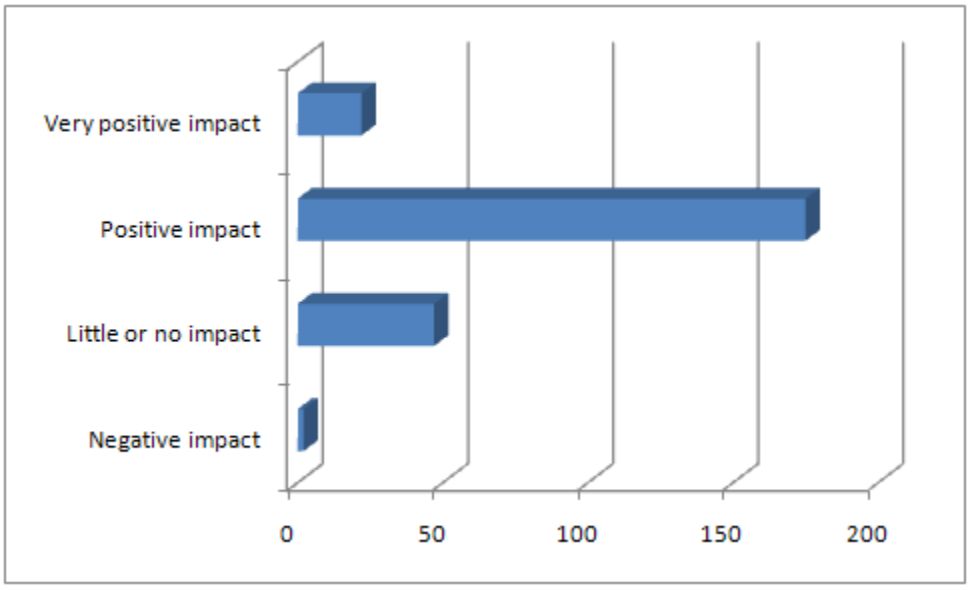


Table 7 illustrates the impact of OCW on the productivity of the faculty members. The majority of the participants indicated that OCW has helped them to become more productive. However, ten percent of the participants disagreed with this statement.

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Table 7.

OCW and productivity

Level of Agreement	Frequency	Percentage
Strongly Agree	23	9.3%
Agree	123	49.4%
Somewhat Agree	77	30.9%
Disagree	26	10.4%
Total	249	100%

Table 8 illustrates the impact of OCW on updating the academic knowledge. The majority of participants indicated that OCW has helped them to update their knowledge in their areas of study. However, ten percent of the participants disagreed with this statement.

Table 8.

OCW and updating knowledge

Level of Agreement	Frequency	Percentage
Strongly Agree	23	9.2%
Agree	130	52.2%
Somewhat Agree	70	28.2%
Disagree	26	10.4%
Total	249	100%

Table 9 illustrates the impact of OCW on the improvement of teaching of the faculty members. The majority of participants indicated that OCW has helped them to improve their teaching. However, ten percent of the participants disagreed with this statement.

Table 9.
OCW and improving teaching

Level of Agreement	Frequency	Percentage
Strongly Agree	27	10.9%

Agree	126	51.1%
Somewhat Agree	69	27.9%
Disagree	25	10.1%
Total	247	100%

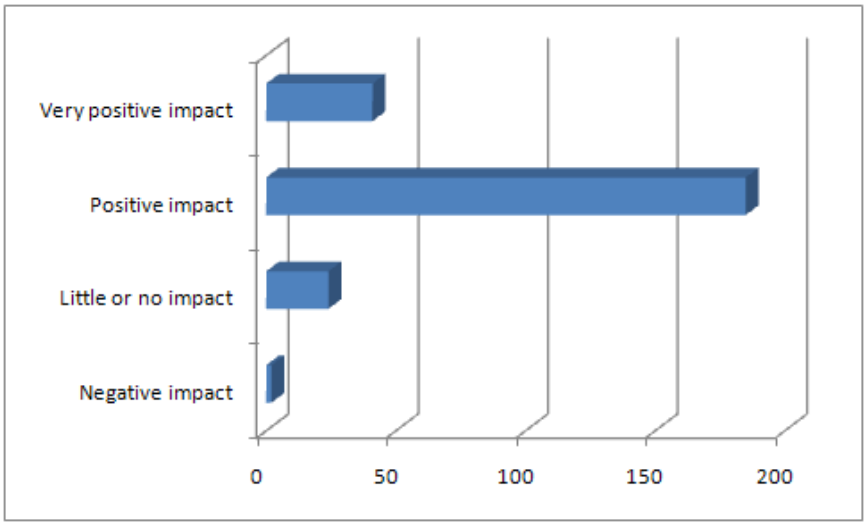
Research Question Five

What is the perceived expected future impact of OCW on higher education teaching in science, mathematics, technology and engineering in universities in developing countries of the Middle East?

Most faculty members indicated that OCW will have a positive impact on higher education teaching in universities in the developing countries of the Middle East. Figure 4 illustrates the future impact of OCW on higher education teaching in the developing countries of the Middle East.

Figure 4.

Future impact of OCW



The results of the Kruskal-Wallis test indicated that there are no statistical significance differences between the areas of study ($p<.05$).

Research Question Six

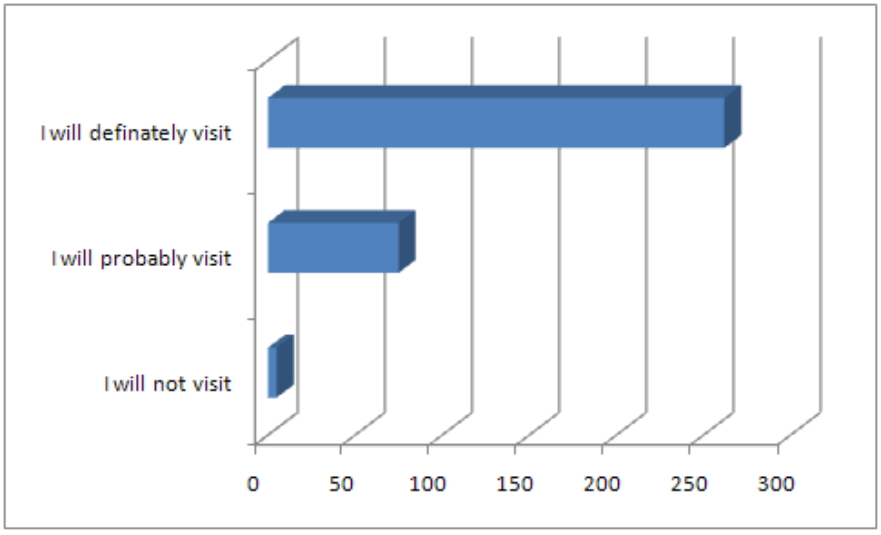
What is the likelihood of science, mathematics, technology and engineering faculty in universities in developing countries of the Middle East that have never used OCW sites in accessing these sites if they were informed about the OCW project?

Most faculty members that had not used OCW sites indicated that they will definitely visit OCW sites if they were informed about the OCW project. Figure 5 illustrates the likelihood of faculty

members in universities in developing countries of the Middle East using OCW sites if they were informed about this project utilizing a bar graph.

Figure 5.

Likelihood of visit if informed about the OCW project



The results of the Kruskal-Wallis test indicated statistical significance differences between the areas of study ($p<.05$). More than 87% of the faculty members in technology fields indicated that they will definitely visit OCW sites. This number reflected the highest number among all areas of study. Faculty members in mathematics showed the lowest likelihood of visiting OCW sites. Table 10 illustrates the likelihood of participants in using OCW sites if they were informed about this project based on the area of study.

Table 10.

OCW and likelihood of visit based on area of study

	Engineering	Science	Mathematics	Technology	Total
I will definitely visit	99	142	14	7	262

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I will probably visit	32	36	6	1	75
I will not visit	1	2	2	0	5
Total	132	180	22	8	342

Conclusions and Recommendations

Based on the findings of this study, the following conclusions are made:

1. Science, mathematics, technology and engineering faculty members in universities in the developing countries of the Middle East are satisfied with the quality of OCW material.
2. Science, mathematics, technology and engineering faculty members in universities in the developing countries of the Middle East are using OCW materials in a variety of ways such as recommending them to students and using them in course development and course modification.
3. OCW has made a positive impact on the professional practice of science, mathematics, technology and engineering faculty in this developing region of the world.
4. OCW is projected to continue helping science, mathematics, technology and engineering faculty to be more productive and effective at work, updating their knowledge in their field of study, improving the quality of their teaching, and increasing their motivation and interest in teaching.
5. OCW is being accessed and used by engineering and science faculty more than the others.
6. Faculty members that had a relatively low frequency of access such as, sciences had the lowest satisfaction rate with the OCW materials. On the other hand, faculty members that had a high frequency of access such as engineering faculty had the highest level of satisfaction. This suggests that the more frequently the faculty members access OCW sites, the more satisfied they will be.

This descriptive study concerning access, usage, and perceived impact of OCW on higher education teaching in developing countries of the Middle East has improved the knowledge base of the effects of global learning spaces to raise the quality of learning and ultimately the quality of life in this region of the developing world. Currently, there is a gap in the literature on this topic. It is highly recommended to replicate this study to gain more understanding of the frequency of access, usage and perceived impact of OCW on faculty members in other developing regions of the world. Further studies need to explore and seek in-depth understanding of the impact the global learning projects opportunities such as OCW is having on higher education in the disadvantaged regions of the world. A few examples for further research are listed below:

1. This study may be replicated in other developing regions of the world to gain better understanding of the impact of the OCW in the developing world.

2. Qualitative studies may be conducted to gain in-depth information about access, usage, and impact of the OCW in the developing countries of the Middle East. It is recommended to study why the faculty members in sciences have the lowest rate of satisfaction with OCW materials.
3. This study did not review and examine the perceived impact OCW is having on higher education teaching from the students' and administrators' points of view. Quantitative studies can be conducted to find the impact of OCW on the quality of instruction in developing countries of the Middle East and other parts of the world.

This research showed that the OCW project is in the right path to achieve its goal of creating a World Wide Web of knowledge that raises the quality of learning and ultimately the quality of life around the planet. OCW has yet to reach its full potential. This is simply the beginning; the beginning of "an information society open to all" that helps sharing the knowledge desperately needed to solve the world's pressing problems.

> …We have a lot of work ahead of us and it is my hope that many more people around the world will rally around the notion of "An Information Society Open to All." Perhaps the first step is to open our minds a little (UNU, 2012).

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