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Use of Open Educational Resources: How, Why and Why Not?

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Open Educational Resources (OER) and OpenCourseWare (OCW) target barriers of education and learning by sharing knowledge for free to benefit self-learners, educators, and students. This study aims to investigate the use of OER both as a supplementary resource for a traditional course and as a resource for self-learners. First, the attitudes and perceptions of undergraduate students toward using a General Physics Laboratory OER and about how those resources contributed to the outcomes of the course were determined. Second, public usage of resources was assessed by analyzing OER access statistics. Resources were designed to encourage students to review experiments before laboratory sessions. Results indicated that students who used the OER experienced benefits to their learning processes. In line with their aim, the resources facilitated preparedness for the course. More than half of the respondents deemed supplementary resources unnecessary. On the other hand, self-motivated learners found, reviewed, and benefited from the resources.

Rapid developments in technology and its influences on society have brought both opportunities and challenges to education. Educational institutions are continuously seeking more effective ways to share knowledge online with students, educators, and graduates (Johnstone & Poulin, 2002). Nevertheless, most of these resources are not easily accessible or available for public use (OECD, 2007). In response, Open Educational Resources (OER) or OpenCourseWare (OCW) has emerged as a movement that aims to eliminate the barriers to sharing knowledge for free and making it reachable for everyone (Caswell, Henson, Jensen & Wiley, 2008; Duval & Wiley, 2010; OECD, 2007). Despite a small difference between OCW and OER, the terms are mostly used interchangeably. Both OCW and OER offer free educational materials to all learners, but while OCW is a collection of materials organized as courses, OER can consist of any size and type of materials. In other words, each OCW is an OER, but not every OER is an OCW (Terrell & Caudill, 2011).

OER targets the free availability to everyone of the entire sum of human knowledge in any place at any time (Matkin, 2005). OCW promotes life-long learning by sharing educational resources online for self-learners. It improves quality of education by guiding teachers as well as providing complementary resources for students and is defined as a digital collection of educational materials designed as a course (OCW Consortium, 2013a). Creating and sharing free and accessible knowledge is not only important for educational institutions, but also supports global goals that extend beyond schools. High quality education seems to be key for maintaining peace, establishing sustainable social and economic developments, and encouraging intercultural dialogue, all spheres where OER is believed to have strategic influence (UNESCO, 2013). In 2002, UNESCO organized the First Global OER Forum to investigate the possibility of universal access to high quality education (UNESCO, 2013) and the impact of OCW on higher education in developing countries (Johnstone, 2005). The Massachusetts Institute of Technology (MIT) OCW project and similar projects of other US universities were presented and discussed throughout the forum, and the premise of OER was one of many outcomes (Johnstone, 2005). As a result of the exponential growth of free and accessible information, the OER movement is becoming more common around the world (Rhoads, Berdan, & Toven-Lindsey, 2013). OER materials are regularly published with an open, Creative Commons license, which allows users to duplicate, edit, and reuse materials in alignment with defined educational purposes. Another distinctive feature of these materials is educational intent, even though they might have not been published with that aim originally (White & Manton, 2011).

The Organization for Economic Co-operation and Development (OECD), foreseeing OER as a major educational tool, listed reasons for sharing knowledge for free from the perspectives of stakeholders. Institutions are prone to information sharing, as it is in line with academic tradition, leads to tax leverage, may result in quality improvement, and elevates public relations. Moreover, faculty and researchers are eager to share since it complies with academic values and may increase publicity and reputation (OECD, 2007). Despite the digital divide in terms of technology and Internet availability, the OCW movement has still managed to succeed in helping faculty members to enhance teaching environments (Kasraie, 2012). Smith and colleagues reported barriers for adoption of OCW as economic issues at the institutional level, intellectual property rights problems, faculty members' attitudes towards sharing, and adequate technological reach (Smith & Casserly, 2006). Later, copyright issues emerged as the greatest concern of OER, along with

sustainability (Hylen, Van Damme, Mulder, & D'Antoni, 2012). Incentives of OER have been listed as increased institutional branding, student appreciation, and faculty motivation (Smith & Casserly, 2006). Respondents of a survey at the Delft University of Technology (TUD) pointed out that they accessed OCW to gather information about studying at TUD, second only to increasing their expertise (Dopper, 2011). The OCW Consortium Europe surveyed higher education institutions to identify best practices for implementing OER/OCW and identified the factors facilitating initiatives as faculty members' positive attitudes and institutional factors such as encouragement, policy-making, resources, and incentives. Lack of support, negative attitudes of faculty, intellectual property challenges, and difficulty accessing high quality open resources for reuse have also been listed as barriers (Tovar & Zamora, 2012).

In a study conducted in order to identify reasons that contribute to or prevent the use of OCW by the public, researchers found that their population sample reported incentives such as self-directed learning, convenience, and quality, while disincentives were lack of support, certification, content, and resources (Arendth & Shelton, 2009). Additional potential benefits of open resources include usage as supplementary materials to enable or improve understanding (Smith & Casserly, 2006). MIT students' main motivations for using OCW were to preview a course before enrollment, to supplement on-campus courses, and to review past courses (Matkin, 2005). Similarly, users of the Tufts University OCW visited the site for personal learning, supporting an in-class course, making enrollment decisions, and keeping knowledge up-to-date (Tufts University, 2011). Parallel to that, researchers have concluded that open resources are also being used to support traditional teaching (Tovar & Zamora, 2012). For the 28 countries that responded to the 2011 OECD questionnaire, the most relevant advantages for using OER were listed as the opportunity for open and flexible learning environments and increased quality and efficiency of learning materials (Hylen et al., 2012). A user feedback report was recently released that noted the following ways of using OCW: to help studying for a course, to supplement teaching materials, to benefit specific projects, to update skills or knowledge, and to fulfill personal interests (OCW Consortium, 2013b).

METU OpenCourseWare

After an Internet connection was established in Turkey in 1993, many faculty members started to share course materials on personal web sites (Wolcott & Cagiltay, 2000). However, these were only individual attempts. There was no nationwide OCW initiative in Turkey until 2007, when the Turkish Academy of Sciences (TUBA) organized the kick-off for a nation-wide OCW project with delegates from 24 universities and research institutes. After the meeting, TUBA initiated a national OCW consortium (TUBA, 2013). Even though 61 universities endorsed the project, only eight completed institutional OCW sites. Among these universities, Middle East Technical University (METU) has sustained the largest system. The METU OCW project officially started on April 16, 2008 (Kursun, Cagiltay & Can, 2014). Since then, the Instructional Technology Support Office (ITS), one of the administrative units of METU, has provided assistance to academic staff publishing courses as OCW. Instructors who are willing to share their course materials contact ITS, and resources are prepared. The scope of course contents depends on the instructor's enthusiasm for sharing and diverges from the syllabus and weekly schedule to include enriched educational materials such as lecture videos or notes, assignments, and other resources. Instructors provide notes and assignments, while lectures are recorded by ITS. After the approval of the instructor, courses are brought into public use. All educational resources presented are licensed with the Creative Commons Attribution-Non Commercial-ShareAlike License. As of December 2014, METU OCW had 107 courses from 31 departments and 5 faculties. The METU OCW has been visited by 289,876 individual visitors, accessing 395,415 pages since launch. According to a Google Analytics report, 17,711 visits were made between March 1 and March 31, 2014, by 13,959 individual users accessing 80,422 pages. Although some materials are in Turkish, most are in English, the official instructional language of METU. Therefore, the METU OCW is usable not only by students in Turkey, but also from other countries. An analysis of viewers showed that almost half of the visitors accessed the site from outside of Turkey. During the same period in March 2014, the METU OCW had 1,207 visitors from the USA, 894 from India, 429 from the Philippines, 373 from Indonesia, 257 from the UK, 248 from Pakistan, 157 from Malaysia, 134 from Germany, and 123 from Egypt.

General Physics Laboratory Experiments as OER

General Physics Laboratory is a part of the General Physics courses at METU, which are two-semester courses and mandatory for the majority of undergraduate students. In addition, two courses are offered for specific departments with appropriate coverage changes. Each semester, students attend laboratory sessions and conduct five experiments. The different courses also have five experiments, and there are two introductory experiments for each course.

For maximum effectiveness of laboratory intervention, student preparedness is a key factor. To encourage students to review experiments before laboratory sessions, the Department of Physics and ITS collaborated to design and develop video recordings of all 12 experiments. Teaching assistants conducted each experiment in front of the camera, voiceover was recorded, and recordings were edited. Registered students of General Physics courses were informed about the video experiments by their teaching assistants and flyers distributed in the laboratories. Usage was not a requirement of the course but suggested as a voluntary supplement. In 2014, 62,000 activities of guest users were logged for those resources.

Research on OER and OCW has focused on the benefits and challenges of using the resources as well as preparing them. However, the perspective of end-users has received little attention. Moreover, when it has been considered, those studies have focused on the overall effects of OCW rather than the actual effects of a specific course. This study aims to determine the attitudes of undergraduate students toward using a General Physics Laboratory OER and how those students perceive the contribution of the resources on the outcomes of the course. Suggestions from students for improvement are also introduced. Although the General Physics Laboratory resources were designed as supplementary materials, they are also open to self-learners. Therefore, a second aim of this study is to assess public usage of these resources.

Methods

This two-stage study was designed to observe local and global usage of a General Physics Laboratory OER hosted by METU OCW. For the local usage and effect of the resources, a survey was administered to METU students; YouTube statistics were analyzed for global usage.

Survey Participants

This study was conducted in the spring semester of the 2012–2013 academic year. A total of 710 (296 female and 411 male) undergraduate students enrolled in a General Physics course replied to a paper-based survey. Nearly all (97.7%) of the participants were freshmen, since General Physics is required in the first-year curriculum (see Table 1). The majority (74.5%) of the participants were from the School of Engineering (Table 2).

Data Collection and Analysis

Data for local usage analysis were collected at the end of the semester via a printed survey developed by the researchers. The survey consisted of 18 questions: 8 to obtain descriptive information about students and 10 to understand how students used the system and its benefits. Fifteen questions were multiple choice and analyzed by SPSS software; three were open-ended and qualitative data analysis was applied to create themes.

To observe the global usage of OER, statistics were collected by the researchers from YouTube, the platform hosting the experiment videos. Lifetime statistics began January 25, 2013 (the day of creation). Video performance as well as audience engagement, geographic locations, discovery methods, traffic sources, devices, and retention data were analyzed.

Table 1
Class Distribution of Participants

Year	Frequency	Percent	Cumulative Percent
1st	694	97.7	97.7
2nd	9	1.3	99.0
3rd	5	0.7	99.7
4th	2	0.3	100.0
Total	710	100.0	

Table 2
Distribution of Participants

School	Frequency	Percent	Cumulative Percent
Education	68	9.6	9.6
Engineering	529	74.5	84.1
Art and Science	113	15.9	100.0
Total	710	100.0	

Table 3
Participant Responses to Sources of Information About OCW

Source of Information	Frequency	Percent
Teaching Assistants	263	37.0
Flyers	165	23.2
Peers	141	19.9
Instructor	49	6.9
Other	28	3.9
Media	9	1.3

Table 4
Reasons for OER Use

Reasons of Usage	Frequency	Percent	Valid Percent
Readiness for experiments	244	34.4	90.4
Both readiness and review	14	2.0	5.2
Review of experiments	9	1.3	3.3
Other	3	0.4	1.1
Total	270	38.0	100.0

Table 5
Distribution of Contribution of OER Responses

Contribution of OER	Frequency	Percent
Assisted with effective experiments	155	21.8
Enabled comprehension	151	21.3
Reduced the time required	117	16.5
Reduced number of questions	75	10.6
Improved grade	41	5.8
Other	3	0.4

Results

Results of the study are presented in two parts: survey results and usage statistics.

Survey Results

OCW awareness and source of awareness. Participants were asked whether they were aware of the General Physics Laboratory OER videos published on the METU OCW portal. From a list including flyers, peers, teaching assistants, instructors, media, and other, participants were asked to select sources of information about OER; multiple selections were allowed (see Table 3).

Over 76% of participants were aware of the OCW, listing teaching assistants, flyers, and peers as their most frequent sources of information. Instructor was one of the least frequent sources. Moreover, 23 participants noted other sources of information, reporting that they discovered the resources by themselves via online search, on social network sites, or while surfing the OCW portal.

Frequency and purpose of OER usage. Students were asked about their usage of the General Physics Laboratory OER. Students who affirmed using the resources were asked about their frequency and purpose of usage. The frequency question also indicated when students preferred to access the OER. Among 706 (99.4%) participants, 287 (40.4%) stated that they had used the OER, while 419 (59.0%) had not. Out of that group, 110 (41%) used the OER for each laboratory session, 134 (50%) used the resources for some sessions, and 24 (9%) used the resources a few times. The majority of participants (82.1%) preferred using the resources before laboratory sessions, while 7.1% used them both before and after, and 1.8% used resources

only after sessions. Parallel to these findings, among 270 participants who responded to the question, the dominant reason for use (90.4%) was to be prepared for experiments (see Table 4).

Contribution of OER. The perception of participants about the contribution of the OER to their learning processes was also examined. They were asked to specify its contribution by selecting from a list of benefits: assisted in conducting effective experiments, reduced the time required to conduct experiments, enabled comprehension of experiments, reduced number of questions for teaching assistant, and improved grade. Multiple selections were allowed. Out of 272 respondents, nearly every participant (91.9%) affirmed the positive contribution of the OER. The most frequently selected contributions were on conducting experiments effectively (21.8%) and easing comprehension (21.3%). Reducing experiment length was mentioned by 16.5% of responders, and relatively smaller groups, 10.6% and 5.8%, respectively, believed that the OER reduced questions asked of teaching assistants or improved grades (see Table 5).

Advantages of OER. In response to an open-ended question, 109 participants provided advantages of OER. The most common theme mentioned was preparedness for experiments (see Table 6). The second most underlined advantage was the facilitative effect of OER on comprehension. Moreover, resources were observed to reduce the time required to complete laboratory activities and increase the effectiveness of those activities. A few students also mentioned increased ability to memorize information and improved grades.

Reasons for OER not being effective. One open-ended question investigated why students thought that the OER was not effective, and only 16 participants responded. The most common topic, mentioned by six participants, was about the content of the video materials. Those students thought that the materials were superficial, focusing on how to conduct the experiments without addressing the aim or providing enough information. Furthermore, the narration of the experiments was described as fast, fuzzy, ineffective, and insignificant. Other students mentioned that since the experiments were conducted in the laboratory and the teaching assistants reviewed the experiments beforehand, resources such as reports and quizzes were unnecessary. Three students explained that since the experiments were not complex, they did not need supplementary materials.

Table 6
Frequency of Mentioned Advantages of OER

Advantage of OER	Frequency
Enabled preparedness for experiments	64
Enabled comprehension	39
Reduced the time required	21
Increased effectiveness	17
Enabled safer experiments	3
Improved grade	2
Increased ability to remember	1

Table 7
Distribution of Reasons Not to Use the OER

Reasons for Disuse	Frequency	Percent
Lack of need	103	14.5
Not being informed	88	12.4
Shortness of time	45	6.3
Satisfactory resources	19	2.7
Indifference to course	13	1.8
Unattractiveness	13	1.8
Other	4	0.6
Use of other resources	2	0.3
Did not come to mind	1	0.1

Table 8
Video Duration of Experiments

ID	Name of the experiment	Duration (min)
I1	Measuring Instruments	03:03
I2	Measurements, Errors, and Graphs	02:03
1	Uniform Motion with Constant Velocity	02:22
2	Linear Motion with Constant Acceleration and Motion in a Plane	02:06
3	Atwood's Machine	01:38
4	Collisions and Conservation of Linear Momentum	05:09
5	Rotational Motion	02:31
6	Ohm's Law, Series and Parallel Combination of Resistors	06:53
7	Equipotential and Electric Field Lines	02:51
8	Constructing an Ammeter and a Voltmeter	06:08
9	Charging and Discharging a Capacitor	02:49
10	Force on a Current Carrying Conductor	05:52

Table 9
Video Performance Statistics

ID	Number of views	Estimated minutes watched	Number of subscribers
I1	755	991	0
I2	2,779	1,938	11
1	1,587	1,807	3
2	1,589	1,656	7
3	821	890	1
4	2,010	4,210	2
5	668	897	2
6	5,005	8,493	11
7	1,968	3,145	5
8	1,332	1,882	2
9	3,485	4,458	6
10	458	1,125	0

Table 10
Average View Durations of OER Videos

ID	Average view duration (min)
I1	01:18
I2	00:41
1	01:08
2	01:02
3	01:04
4	02:05
5	01:20
6	01:41
7	01:35
8	01:24
9	01:16
10	02:27

Table 11
Economic Development Distribution of Top 10 Countries According to Average View Duration

Economic development level	Number of countries
Least developed	4
Developing	50
In transition	7
Developed	15
Not known	1

Note. Palestine was not included in the country classifications

Reasons not to use the OER. The participants who reported not using the resources were asked to note why, and 288 of 419 participants responded to the open-ended question. The most common response was mentioned by 103 participants: lack of need for the resources. Supporting that response, satisfactory course resources such as books, laboratory manuals, and teaching staff, as well as the use of other resources, were also mentioned. Other reasons included not being informed, shortness of time, and unattractiveness of the OER (see Table 7).

Improvement suggestions. Suggestions from students for improvement to the OER were investigated by an open-ended question, and 43 participants responded. The main theme was content. Participants stated that content needed to include more details such as the goals and results of experiments, more resources to explain laboratory reports and calculations, and more examples of quizzes. In addition, interactive resources for tasks such as report preparation could be helpful. Furthermore, enhancement of audio and visual quality were suggested. Finally, participants noted that the order of the experiments in the OER portal should be rearranged in parallel to the laboratory curriculum and the resources should be kept up-to-date.

YouTube Statistics Results

The 12 experiment videos were published on YouTube for public use both as a playlist and as independent videos. They ranged in duration from 01:38 to 06:53 (see Table 8).

Video performance. The total number of views, estimated minutes watched[1], and number of subscribers earned after watching each video defined its performance. Experiment 6 was the most popular experiment, and Experiment 10 was the least popular (see Table 9). Given the small numbers of subscribers (1,867 at the point of data collection), audiences preferred individual visits, but Experiments I2 and 6 had the highest influence on subscriptions.

Audience retention. This section reveals average total view duration and viewer geographic locations. Audience retention is reported as "an overall measure of your video's ability to retain its audience.[2]" According to average view durations, more than half of only four videos were viewed. Viewers of Experiment 1 watched 82% of the video on average, or 1:08. Viewers watched more than half of Experiments 3, 5, and 7 on average, though less than a quarter of Experiments 6 and 8—the longest videos at over six minutes. Data about viewer geographic location was used to determine the economic development, income, and region of the audience. For analysis, countries were sorted by average percentage viewed, and after compiling the top 10 countries for each experiment, a list of 79 countries was generated. The average percentage viewed was highest from developing countries compared to other development levels[3] (see Table 11) and primarily from upper-middle and high income countries[4] (see Table 12). Interestingly, Experiment 8 attracted more low and lower-middle income countries (7 out of 10) than other videos. In contrast, all countries analyzed for Experiment 2 were of upper-middle or high income.

Audience engagement. An audience may present feelings about a video by clicking thumbs up or thumbs down buttons, leaving comments, or adding it to a list of favorites. For the OER videos, audience engagement was low but positive (see Table 13). Only Experiment 9 received dislikes, while Experiment 6 received the highest number of likes and the only share. Experiments 4, 7, and 8 were each added to favorites once.

[1] "This shows the estimated amount of time that a viewer has watched a video. This way you have a better sense of what content viewers actually watch, over those that they click on and then abandon." https://support.google.com/youtube/answer/1714329

[2] https://support.google.com/youtube/answer/1715160

[3] World Economic Situation and Prospects 2014, UN, http://www.un.org/en/development/desa/policy/wesp/wesp_current/2014wesp_country_classification.pdf

[4] Country and Lending Groups, World Bank, http://data.worldbank.org/about/country-and-lending-groups#IDA

Table 12
Income Distribution of Top 10 Countries According to Average View Duration

Income	Number of countries
Low	10
Lower-middle	14
Upper-middle	29
High	25
Not known[5]	1

Table 13
Audience Engagement Statistics

ID	Likes	Dislikes	Comments	Shares	Favorites added	Favorites removed
I1	4	0	0	0	0	0
I2	5	0	0	0	0	0
1	1	0	0	0	1	1
2	1	0	0	0	0	0
3	1	0	0	0	0	0
4	4	0	0	0	1	0
5	2	0	0	0	0	0
6	10	0	1[5]	1	0	0
7	4	0	0	0	1	0
8	1	0	0	0	1	0
9	4	4	0	0	0	0
10	2	0	0	0	0	0

Table 14
Average View Duration Statistic by Device

ID	Computer	Mobile Phone	Tablet
I1	1:18	1:05	1:33
I2	0:40	0:48	0:54
1	1:06	1:16	1:28
2	1:00	1:22	1:07
3	1:04	1:02	1:23
4	2:01	2:31	2:15
5	1:18	1:37	1:33
6	1:41	1:37	1:41
7	1:35	1:49	1:29
8	1:24	1:24	1:30
9	1:16	1:21	1:14
10	2:25	2:48	2:26

[5] Comment was spam and removed by the administrator.

Audience geographies. The geographic locations of the audience were sorted according to total views, and the top five countries were analyzed. Turkey, India, and the United States were among the top locations for all videos. The other countries, in descending order of appearances in the top five, were Canada, the Philippines, the United Kingdom, Malaysia, Egypt, Nepal, South Africa, Indonesia, and Saudi Arabia. Although the top five countries varied according to number of views, when average view durations were compared, nine of the videos were watched longest in Turkey. Experiments 2 and 3 were watched longer in India, whereas Experiment I2 was watched longest in the Philippines and Egypt. Moreover, Canada tied with Turkey in average view duration for Experiment 8.

Sources of discovery. The top two traffic sources for the audience were YouTube searches and external links such as Google, Yahoo, or Facebook. In addition, YouTube playlists, direct connections,[6] and embedded players appeared in the top three sources of discovery. Although direct connection was not the most common source of discovery, those who used that source watched videos longer.

Audience devices. The three most common devices used by the audience were analyzed: computers, mobile phones, and tablets. Computers had the highest share for all videos with over 75% of views. However, audiences who used mobile devices tended to watch videos longer than computer users (see Table 14). Only Experiment 6 was viewed equally long on computers as on mobile devices.

Discussion and Conclusion

OpenCourseWare (OCW) and Open Educational Resources (OER) have emerged to address life-long learning by sharing knowledge for free and by making educational materials more accessible. OCW/OER targets public use as well as educators and students. This study aimed to clarify the viewpoint of students on the educational contributions of OCW/OER.

In order to provide educational materials to help students prepare for sessions, General Physics Laboratory experiments were recorded and published online. Students who attended sessions were administered a printed questionnaire to capture how materials were used, their benefits, and suggestions for improvement. With the help of teaching assistants, flyers, and peers, the majority of the students heard about the OCW; however, more than half of the students did not use the resources. Likewise, students of FGV Online, a Brazilian school, reported peers as a source of information, accompanied by online search (OCW Consortium, 2013b), implying that a larger proportion of Brazilian students found resources by searching compared to METU students.

The primary reason for not using the resources was lack of need. Students believed that available course materials and the guidance of teaching assistants were satisfactory for expected success. It could be said that need is crucial for the use of OER. If learners need resources, they search for and find them. In addition, some students mentioned that they were not informed about the OCW, ran short on time, or found the resources unattractive. Awareness of OCW has been highlighted by the OCW Consortium as a reason for not using materials as well (OCW Consortium, 2013b). Similarly, lack of time has also been mentioned in the literature (Hylen, n.d.).

An overwhelming majority of students who adopted the OCW used the resources before sessions either for each experiment or for some of them. Parallel to both the scheduling of use and purpose of the materials, students mentioned that they used the OCW to be ready for experiments. This usage trend is similar to the findings of FGV Online, in which students benefited from OCW for quick review of subjects (OCW Consortium, 2013b). Moreover, participants believed that the OCW had a positive effect on their learning processes. The main contributions and advantages included increasing the effectiveness of experiments, facilitating comprehension, and reducing time required to conduct experiments. A few students mentioned improvements in grades.

The primary criticism of the OCW was the content. Students expected detailed and comprehensive content, including information on reporting, examples of quizzes, and interactive materials. However, the content of the video materials was framed by the coordinators of the General Physics Laboratory, and expected observations and laboratory reports were deliberately omitted in order to prevent replication of results without experimentation or careful observation. Enhancing the materials in terms of audio and video quality was among the top suggestions provided by the students. These findings correspond to the findings of the OCW Consortium, which has highlighted the need for various types of materials (OCW Consortium, 2013b).

According to YouTube statistics, the duration of a video should be less than five minutes, after which average view duration drops drastically. However, depending on content matter, videos may need to be longer. Capturing attention with fun facts or interaction

[6] Views from unknown referrers on mobile apps and direct traffic on the YouTube video and channel pages. Possible origins of direct traffic include email and instant messaging clients or pasting an URL into a browser.

around each second minute would be a useful tactic. Furthermore, as mobile devices are being used by more learners to reach resources, platforms should be adaptive and feature low quality or standard definition options for devices with limited data packages. YouTube statistics also show that the curriculum of a country can affect audience geographies. The most watched video was on Ohm's Law, a common topic for almost all countries. Moreover, low income or less developed counties did not benefit from the OER as much as other countries, possibly due to lack of hardware and Internet connections.

To summarize, students who used the OER as complementary material to a traditional course observed the benefits and contributions to their learning processes. In the light of student responses, one can conclude that OER facilitates preparedness for a course. The materials in question aim to help students review experiments before sessions, and they are prone to accomplishing their goal. However, to increase the benefits of OER, providing only video recordings seems insufficient; other course materials should also be presented. That expectation is well suited for OCW, which involves the organization of high quality educational materials into courses. Therefore, it is important to enrich available educational materials with high quality media. As technology advances, the expectations of users escalate. Providing high quality audio and visual representations may also impress those students who mention unattractiveness as a reason for not using an OER. In the case of those students who did not use the OER, the main problem was the belief that the materials were not needed. Such beliefs result in disregarding materials, and not being motivated is a valid concern that needs to be defeated, not only for open educational environments, but for any learning environment. Especially for supplementary materials, learners should either feel the need or be obliged to access them. To persuade students to use and increase the adoption of OCW/OER, benefits could be made more observable, as suggested by Rogers (1995).

Limitations and Future Study

For future research, this study could be replicated after the implementation of participant suggestions in order to examine potential changes in the attitudes of students. Moreover, observations provided by educators would be valuable, and instructors' and teaching assistants' comments about the effects of using OER on students' performance could be obtained. Since the OER in question was developed to complement a course, participants of this study were students enrolled in that course. Though reaching the target population would be troublesome, to understand the full contributions of OER, self-learners and other students who utilize materials for educational purposes could be considered as potential participants. Their evaluations may reveal other aspects that need to be improved.

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