

Evaluating MOOCs According to Instructional Design Principles

Ayşe Bağrıaçık Yılmaz
Gazi University, Turkey
aysebagriacik@gazi.edu.tr

Mertcan Ünal
Gazi University, Turkey
mertcanunal@gazi.edu.tr

Hasan Çakır
Gazi University, Turkey
hcakir@gazi.edu.tr

ABSTRACT

The aim of this study was to evaluate the massive open online courses that gains popularity day by day in terms of the properties which learning environments should have. For this purpose, six courses, which were selected from a MOOCs platform called Udemy, were evaluated. The evaluation was carried out according to the online learning environment evaluation form, developed by the researchers. The evaluation form was created by reviewing the literature and taking expert opinions. The results of the study showed that all investigated courses met the overall criteria and paid courses had no advantage over free courses. In addition to many advantages of the courses, there were some limitations as inability to provide feedback on a regular basis by the instructor to students, to be accessible for physically disadvantaged persons, to provide opportunities for resource sharing among students, automatically provide personalized learning options to users and to provide the contact information of other students.

Keywords: MOOCs, instructional design, seven principles, online learning, evaluation

INTRODUCTION

Rapidly and constantly changing social structure, leads to the formation of individuals who have different expectations from the educational institutions. To reach the information at any place and any time is also one of those expectations (Ally, 2008). Online education has been recognized as an effective flexible learning approach that meets the educational requirements of individuals. Both educational institutions and the faculty in these institutions benefit from the opportunities of online learning to deliver the courses to a wider audience. As demand for online education increases, educational institutions and students began to questioning the quality of instruction (Koh & Lim 2012; Yerby & Floyd, 2013). In this case, it also attracted the attention of researchers and has led to the increase of studies in online learning (Zimmerman, 2012).

There is no limitation of time and place, and the notion of distance is not important for learners in

online learning. Through online learning, students have the opportunity to access materials on the subject to date and to communicate with subject area experts. In online learning, students can complete the course even at the workplace and they can apply their knowledge and skills. Educators can support students at any place and time. Online materials can be continually updated and students can be informed immediately about this update. As students reach the learning materials via the Internet, it is easier for faculty to respond to the needs of the students (Ally, 2008).

Online learning offers students a wide range of courses than the traditional school has to offer. Disadvantageous people for example dropped out their education with any reason or home bound due to illness, pregnant etc. can continue their education beyond the classroom. Online education allows students to continue their education who are in constant motion, such as immigrants too. In addition, by offering flexible options, reduces

Correspondence to: Ayşe Bağrıaçık Yılmaz, Department of Computer and Instructional Technologies, Faculty of Education, Gazi University, Ankara, Turkey, E-mail: aysebagriacik@gazi.edu.tr

clutter of curriculum (Bailey, Schneider, & Vander Ark, 2013).

MOOCs (Massive Open Online Courses) are one of the emerging concepts of online learning at last few years (Liyanagunawardena, Adams, & Williams, 2013). The world-famous university lecturers offer their lessons to the entire world's access using a variety of tools, such as written material, videocast, podcast etc. In some MOOCs platforms anyone can be a lecturer who considers himself/herself competent to teach what he/she know and wants to share it with others. Some websites can be given as example to these platforms such as Coursera, Udacity, Khan Academy, Edx, and Udemy. The popularity of these platforms can be understood from the number of students they have. For example, the number of students in Coursera in January 2016 was around 16 million while it reached 22 million in January 2017 (Coursera, 2016; Coursera, 2017).

As previously mentioned, the increase in demand for these platforms requires questioning the quality of the education. However, there are no enough studies questioning the qualities of the MOOCs, which are gaining popularity day by day. Margaryan, Bianco and Littlejohn (2015) in this regard performed one of the rare efforts. The researchers examined 76 MOOCs course according to ten principles. Those principles were consisted of the Merrill's First Principles of Instruction (2002) and the additional five principles which were created by the researchers. At the end of the study, they found that the courses are insufficient in terms of instructional design principles.

There are many instructional design models, frameworks and principles to provide effective and efficient learnings. As Margaryan et al. (2015) stated the principles of Merrill (2002) focus on activities and centralize problem solving. One of the basic structures accepted by researchers belongs to Chickering and Gamson (1987). This structure has seven principles. A good practice (1) Encourages contacts between students and faculty, (2) Develops reciprocity and cooperation among students, (3) Uses active learning techniques, (4) Gives prompt feedback, (5) Emphasizes time on task, (6) Communicates high expectations, (7) Respects diverse talents and ways of learning. These principles are based on a fifty-year-old

experience and provide guidelines for students, faculty, and managers to improve learning and teaching. Teachers have tested these principles and the results of the research supported these principles (Chickering & Gamson, 1987).

The seven basic principles of Chickering and Gamson (1987) are generally used to evaluate traditional, face-to-face education, but are also has begun to be used in the evaluation of online courses over time. For example, Graham, Cagiltay, Lim, Craner, and Duffy (2001) assessed four online courses at Indiana University based on these principles, and stated that this experience provided them important information about the design of online courses. Bangert (2004) developed a 35-item questionnaire based on Chickering and Gamson's principles. The questionnaire was used to determine the perceptions of graduate students about the effectiveness of the internet based course distributed through WebCT. Ritter and Lemke (2000) conducted a similar study by collecting data from 236 students who received internet-based training. In this study, the researchers asked the students several questions for each principle and they evaluated their lessons by adding their own comments to the student comments.

Zhang and Walls (2006) conducted another study using Seven Principles in the self-evaluation of online teaching lecturers. Data were collected from the instructors by a 35-item questionnaire based on seven principles. Tirrell and Quick used the same questionnaire (2012) to determine whether the use of these principles by faculty members had an effect on dropouts. As a result of the research, it was determined that the teaching staff applied these principles and there was a relationship between encourage active learning principle and student drop outs. Hathaway (2013) has also conducted a study on the applicability of the seven principles to online learning. At the end of this literature review, which assessed each principle in terms of online education, it is stated that the Seven Principles structure can be used to build online learning environments in accordance with constructivist principles, and there are many tools to support these principles in online learning environments.

As it is seen, there were several studies on the use of the Seven Principles structure of Chickering and Gamson (1987) in online or technology-supported

learning environments. Although MOOCs platforms have a very flexible structure, they need to have particular qualities. It is noteworthy that the number of studies questioning the existence of these qualities is insufficient. For this reason, the aim of this study is to evaluate the massive open online courses based on the Seven Principles structure. It is thought that this study will provide guidance and information to both researchers and practitioners by setting out the advantages and disadvantages of MOOCs platforms in terms of conformity with constructive principles.

METHOD

This section provides information about the research model, selected courses, data collection tool and analysis of data.

Research Method

This study was conducted based on case study pattern. This pattern is intended to investigate one or more situations in depth. Studies based on case study method try to reveal the existing case as it is. There is no effort to influence or change the status in anyway (Karasar, 2012). Based on guidelines of this model the features of six courses, which were selected from MOOCs named Udemy, were evaluated according to Online Learning Environment Evaluation Form.

Selected Courses

In this study, only one of the MOOCs platforms was evaluated because evaluating all MOOCs platforms will be costly in terms of time and resources. In addition to English courses, serving Turkish courses were taken as criterion while determining the learning environment (Udemy). The reason of setting these criteria was the thought that it might be more appropriate for the current cultural context to evaluate a system which can be easily understood by Turkish students. Udemy is an organization based in the United States and has an office in Turkey. Thus, although the system is not completely supporting in Turkish, it has many Turkish courses.

After the selection of the Udemy platform, it has been decided which courses will be examined. A total of 6 courses were examined in the study.

When selecting courses, it was considered that four of the courses appeals everyone and the other two appeals to special interests. The reason for this is that MOOCs are platforms that can be used for both personal development and professional development. First Impression, Confidence, Storytelling and Time Management courses are the courses that everyone can benefit from. However, Java and Android are courses that appeal to those interested in these fields professionally. The theme of the first impression course is which ways must be followed to make a positive impact on the first-time individuals. Confidence course aims to increase the confidence of the individuals in their personal and professional life. The Storytelling course contains tips on how to make a good storytelling. Time management course provides information on how to provide time management to people. Another characteristic of this course is that it is paid. Researchers have deliberately included a paid course in order to compare the paid and free courses. Java and Android courses are about software development and offer learning opportunity to those who want to improve themselves professionally.

Data Collection Tool

The Online Learning Environment Evaluation Form created by researchers composed of 32 items was used to collect data. Items in draft form were created by making the necessary literature review and taking expert opinions. While the literature was being reviewed, it was determined that the Seven Principles structure belonging to Chickering and Gamson (1987) was frequently used in the measurement tools which were used to evaluate online learning environments. However, these measurement tools were either used by teachers to evaluate their own teaching or by students to evaluate the courses. The aim of this research is to evaluate the MOOCs courses according to certain criteria. For this reason, a new measurement tool based on the structure of Chickering and Gamson was developed in this study. The items of the Quality Online Course Initiative Rubric (ION, 2016) which was developed by the University of Illinois, were also utilized when the items of the measurement tool were created. Two experts who are experts in the field of measurement and evaluation consulted the 38-item item pool. In the direction of the feedbacks from the experts, the

item pool was revised so evaluation form consisting of 32 items was created. Distributions of the items in categories are located under the relevant headings in the findings section.

The items of the evaluation form are collected in eight categories namely, “communicate high expectations”, “ease of use”, “emphasizing time on task”, “encourage active learning”, “feedback”, “respect diverse talents and ways of learning”, “student-student interaction” and “student-faculty interaction”. The Communicate high expectations category is based on the phrase "Expect more and you will get more" (Chickering and Gamson, 1987). The items in this category are concerned with expressing what is expected from students and taking responsibility for their own learning. The Ease of use category was inspired mostly by the ION Rubric. This category concerns students' ability to use the MOOCs platform in a technical way. For a good learning, the students need to manage their time well. Thus, it would be appropriate to integrate the learning tools into the learning platform for students to follow developments about education process. The emphasizing time on task category questions the MOOCs platform in terms of meeting this requirement. The encourage active learning category contains items that control whether the courses and assessment are ordinary, conventional, routine or variable, with different methods and sequences. Being aware of what she/he knows or doesn't know contributes to learner's performance. For this reason, appropriate feedback should be given to the students (Chickering and Gamson, 1987). The feedback category questions whether the student has received appropriate feedback about himself / herself and whether the teachers have received appropriate feedback about the students. In the category of respect diverse talents and ways of learning, there are items to determine how much the system responds to students with different backgrounds and different characteristics.

Data Collection and Analysis Process

Data were obtained from the evaluation of the selected six courses according to Online Learning Environment Evaluation Form. In order to ensure consistency between researchers, firstly two courses were selected and the researchers evaluated the same courses and compared the evaluations.

Four courses were evaluated after clarifying the conflicting points and finally the data analysis process has started. In data analysis process, only descriptive statistics has been used.

FINDINGS

Six courses offered as massive online courses in Udemy were evaluated. Descriptive statistics of the courses discussed in this study are shown in Table 1.

Table 1. Descriptive Statistics of Courses and Total Evaluation

Course	Status	Number of Students	Evaluation (%)
First Impression	Free	3907	78.125
Confidence	Free	3325	75.000
Storytelling	Free	2793	81.250
Time Management	Paid	9792	75.000
Java	Free	4344	75.000
Android	Free	4703	81.250

When Table 1 is examined, it is seen that 5 of the courses are free and one of them is paid. The number of students enrolled in the courses ranges from 2793 to 9792 and Time Management course which is a paid course has the highest number of students. When these courses are evaluated according to online learning environment evaluating criteria it was seen that the Storytelling and Android courses (%= 81.250) got the highest score and Confidence, Time Management and Java courses followed them with % 75 success. One of the comments may be conclude from the table is that paid courses have an advantage compared to those free courses.

When Table 2 is examined, it is seen that 6 courses meet the evaluation criteria as 66.67% in total. The weakest dimension of the MOOCs platform is respect diverse talents and ways of learning. Based on the data, it can be said that the courses should also be developed in the context of encourage active learning and student-student interaction.

Table 2. Overall Evaluation on Dimensions

Dimension	Number of Items	Yes	No	%
Communicate high expectations	5	6	0	100
Ease of use	7	5.14	0.14	87.71
Emphasizing time on task	2	6	0	100
Encourage active learning	3	3.67	2.33	61.11
Feedback	4	4.5	1.5	75
Respect diverse talents and ways of learning	5	1.4	3.4	43.33
Student-Faculty interaction	2	5.5	0.5	91.66
Student-Student Interaction	6	4	2	66.67
Total	33	4.52	1.48	66.67

Findings about Feedback Dimension

When the learning environment was examined, it was seen that regular feedback was not being provided by the instructor (Table 3). Students pursue their courses at their own pace and receive feedbacks only from the system (not instructor) as “You have completed 25% of the course”. Besides, based on the fact that the website gives feedback to the students about their own progress, researchers think that system provides instructors feedback regarding students’ progress too. Actually, when we think that there are thousands of students in a course, this situation of feedback process is not surprising. In addition, when looking at the feedback dimension it is seen that the rate of providing the criteria is at good level (75%). In a study conducted by Tirrell and Quick (2012) the instructors teaching online assessed themselves according to Chickering and Gamson's principles and as a result of the study it was seen that one of the categories in which teachers gave themselves the highest scores was feedback. In Ritter and Lemke's (2000) study, it was also determined that the students found the teachers satisfactory in this respect.

Table 3. Criteria and Statistics about Feedback Dimension

Items	Yes	No	%
Does it have a rewarding and evaluation system?	6	0	100
Do the students receive feedback about their own progress?	6	0	100
Do the instructors provide feedback to students regularly?	0	6	0
Do the instructors receive statistical feedback on the students’ progress?	6	0	100
Mean	4.5	1.5	75

Findings about Communicate High Expectations Dimension

The Communicate high expectations category is one of two categories that provides all the criteria (100%) (Table 4). According to Chickering and Gamson (1987) if you “expect more and you will get more.” Graham et al. (2001) stated that giving challenging tasks to students is one of the ways of expecting more. Of course, challenge level in learning situations also needs to be well adjusted. Challenge level perceived by students should be neither too low nor too high (Fleming, 1993). In Udemy each course curriculum, objectives and prerequisites were shared with all students whether or not registered. This will allow students to adjust themselves to a certain level of challenge. Students who register for courses in Udemy stay alone with the responsibility of their own learning, and this is another challenge for them.

Table 4. Criteria and Statistics about Dimension of Communicate High Expectations

Items	Yes	No	%
Are the students offered the opportunity to manage their own learning?	6	0	100
Does it provide information to students about the learning objectives?	6	0	100
Do the students take responsibility for their own learning?	6	0	100
Are the prerequisites of the course clearly stated?	6	0	100
Mean	6	0	100

Findings about the Ease of Use Dimension

Ease of use is a dimension created mostly benefiting from QOCI Rubric (ION, 2016). This rubric contains a section where online courses were evaluated for their usefulness. Chang and Tung (2008) found that perceived usefulness and ease of use affected students' behavioral intentions toward using online courses. Likewise, Liu, Chen, Sun, Wible and Kuo (2010) found that perceived usefulness directly influences students' intention to participate in the online learning community. The perceived usefulness and ease of use also affect the satisfaction of students in e-learning environments (Sun, Tsai, Finger, Chen, and Yeh, 2008). In this study, it was determined that Udeemy platform has a good level of ease of use (87.71%). However, the learning environment is not accessible for the physically-challenged students (e.g. visually and hearing impaired), and when it is considered that distance education is essential for the disadvantaged people this is a very important issue that Udeemy should consider (Table 5).

Table 5. Criteria and Statistics about Ease of Use Dimension

	Items	Yes	No	%
Ease of use	Does the learning environment contain help and support pages?	6	0	100
	Does it have sitemap?	6	0	100
	Does it give the students information on how to use the system?	6	0	100
	Does the learning environment include a learning management system?	6	0	100
	Are the students able to download course materials easily?	6	0	100
	Are the students able to download course materials asynchronously?	6	0	100
	Is it also accessible for the physically challenged people?	0	6	0
	Mean	5.14	0.14	87.71

Findings about Emphasizing Time on Task Dimension

It is important for an educational institution to indicate time management expectations from students in terms of higher learning performance. At the same time, it is important for students to have time management skills in terms of having higher learning performance (Rovai, and Downey, 2010). Having time management skills is one of the intrinsic factors that affect the integrity of students, their attendance or drop out intentions (Street, 2010). Time management is an important component in both online and blended learning environments (Barnard, Lan, To, Paton, and Lai, 2009). In this study, it was determined that the Udeemy platform has the components to support the time management skills (100%) of the students (Table 6). For example, giving a course schedule to students before the course starts helps them to adjust their time by previewing the process. In addition, a news forum where homework, exams and similar announcements are posted can also help students.

Table 6. Criteria and Statistics about Emphasizing Time on Task Dimension

	Items	Yes	No	%
Emphasizing time on task	Does it share syllabus with students?	6	0	100
	Does the course have a bulletin board about the ongoing course?	6	0	100
	Mean	6	0	100

Findings about Respect Diverse Talents and Ways of Learning

Learning environments may have students with different characteristics in terms of skills, aptitude, information processing and application of information to new situations. These differences influence students' ability to achieve different learning outcomes. (Johnson, and Aragon, 2003). Therefore, online learning environments should have features such as suggesting students the topics convenient to their characteristics, giving them detailed information when needed, and presenting related topics to the students (Somyürek, 2009). In this study, it was determined that Udeemy's weakest point (43.33%) was to provide learning to different

students and different learning styles (Table 7). Only one of the courses examined emphasized the students' prior knowledge. Also, the system is not suitable for the use of students with physical disabilities.

Table 7. Criteria and Statistics about Respect Diverse Talents and Ways of Learning

	Items	Yes	No	%
Respect diverse talents and ways of learning	Is it also accessible for the physically-challenged people?	0	6	0
	Does the instructor take students' interests into account?	6	0	100
	Does the system take the students' prior knowledge into account?	1	5	16.67
	Does it provide an opportunity for students to progress at their own pace?	6	0	100
	Is it providing automatically personalized learning options to students?	0	6	0
	Mean	1.4	3.4	43.33

Findings about Student-Student Interaction

Student-student interaction is a very important component in both face-to-face training and distance education. (Anderson, 2003). This type of interaction can occur without presence of an instructor. (Chou, 2003; Lawson ve Comber, 2010). According to Chou (2003) an educational website should have the features of sending/receiving e-mails, discussion boards and chatrooms in order to maintain communication. With such technologies, communication and interaction between students can be supported. In MOOCs environments where thousands of students enrolled, student-student interaction can be utilized to decrease the workload of the instructor. The MOOCs platform Udemy, which is the focus of this study, is at a level that can be considered good in this regard (66.67%) (Table 8). However, there are also points that need to be improved. For example, there might be profile pages on the platform where students can see each other's information (Country, job, education, etc.) or a resource pool can be created where students can share resources with each other.

Table 8. Criteria and Statistics about Student-Student Interaction

	Items	Yes	No	%
Student-Student Interaction	Are the students able to share opinions between each other?	6	0	100
	Does it allow the students to construct their knowledge together with other students?	6	0	100
	Does it contain discussion boards or chatrooms, which enable students to communicate with the instructors and the other students?	6	0	100
	Are the students able to reach each other's contact information through the system?	0	6	0
	Does it allow the students to express themselves socially?	6	0	100
	Does it allow sharing resources among students?	0	6	0
	Mean	4	2	66.67

Findings about Student-Faculty Interaction

Getting personal support from faculty and staff, social and informal interaction with faculty and other students is important for both online and face-to-face students (Chen, Lambert, and Gudry, 2010). The student-instructor interaction has many benefits, such as facilitating learning, motivational and emotional support for students, cognitive guidance and providing feedback (Moore, 1993). The student-instructor interaction is a predictor of student satisfaction and learning motivation in online learning (Ahn, 2012; Cheng, 2013). Bangert (2008) identified student-faculty interaction as one of the dimensions that students developed to assess the effectiveness of online learning. Zhang and Walls (2006) examined how much the online instruction responded to the primitives set by Chickering and Gamson (1987). They found that "encouraging cooperation among students and encouraging student-faculty contact dimensions" were the least practiced dimensions. In this study, the MOOCs platform was found to be sufficient in this respect (91.66%) (Table 9). At this point, it should be stated that there is no definite information about how much feedback the lecturer gives to the students, however it is a system in

which the students can send messages to the lecturer when they wish.

Table 9. Criteria and Statistics about Student-Faculty Interaction

Items		Yes	No	%
Student-Faculty interaction	Are the students able to contact the instructors whenever they want?	6	0	100
	Are the students able to feel the presence of the instructor during the course?	5	1	83.33
	Mean	5.5	0.5	91.66

Findings about Encourage Active Learning

Students do not learn well by listening to their teacher, memorizing or giving answers in certain patterns. Students learn better by talking about things they learn, discussing, and applying what they learn in their daily lives. (Chickering and Gamson, 1987). Prince (2004), in his study about the benefits of active learning techniques such as cooperative, collaborative learning and problem based learning, has found that active learning was not the solution to all problems, but the literature generally supports these methods. In a study conducted by Tsai and Chiang (2013), it was determined that the studies about problem-based learning in e-learning and online learning environments have increased since 2008, especially the experimental studies have increased significantly.

In this study, it was found that the MOOCs platform needs to develop itself in terms of active learning (61.11%) (Table 10). Only one of the courses titled “storytelling” use different methods to evaluate learning performance. Only "Building Confidence" and "Time Management" courses provide tasks that enable students to apply what they learn but there is no monitoring system for whether students are doing these assignments.

Table 10. Criteria and Statistics about Encourage Active Learning

Items		Yes	No	%
Encourage active learning	Does system contain different evaluation methods?	1	5	16.67
	Can the students find the opportunity to apply what they have learned?	4	2	66.67
	Does the topics follow a logical order on the courses?	6	0	100
	Mean	3.67	2.33	61.11

CONCLUSION AND RECOMMENDATIONS

The purpose of this study was to examine the increasingly popular MOOCs platforms in terms of instructional design principles. The results of the study showed that the selected massive open online courses met the online learning environment design criteria by 66.67%. It was determined that both paid and free courses have many of the features of online learning environments. However, there are some limitations of these learning environments. The learning environment has got a very low score, especially in terms of responding to different learners and learning styles. Encouraging active learning and student-student interaction are dimensions that need to be improved. There is a system where students always have access to the instructor; but the effectiveness of this system needs to be questioned. It has been determined that the platform is sufficient in terms of high expectations, ease of use, emphasizing time on task and feedback dimensions. However, it should also be pointed out that there is no structure that instructors can give feedback to the students on a regular basis.

This research has only examined six massive open online courses provided by Udemy. Therefore, all determined positive and negative aspects is valid only for Udemy and is not generalizable. It is recommended to perform similar studies on different platforms such as Coursera, Udacity and Khan Academy. The online learning environment evaluation criteria used in this study can be expanded by other researchers and used again on the same or similar platforms. More research can be done by interviewing teachers and students involved in these platforms on MOOCs.

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