"How Satisfied Are You With Your MOOC?"—A Research Study About Interaction in Huge Online Courses[*]

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This research work investigates the importance and satisfaction on the level of interaction in MOOCs (Massive Open Online Courses) as perceived by learners and instructors. The study is based on data from online students and instructors of MOOCs. Two web-based surveys were used to collect data. The theoretical bases of the two surveys is the five-step model for interactivity developed by Salmon (2001). Salmon's model proposed effective e-moderating in five discrete steps (Access and Motivation, Online Socialization, Information Exchange, Knowledge Construction and Development). Findings of the survey revealed that students rated the importance of interactions in MOOCs as highly important. However, they reported negatively the availability of many criteria suggested by Salmon. On the other hand, Instructors rated nearly half of Salmon criteria as less important, and consequently did not offer them in their MOOCs. In addition, the study revealed that students and instructors rated a high level of satisfaction in MOOCs. In contrast, some students expressed their less satisfaction of interaction in MOOCs. They revealed their dissatisfaction to that lack of instructor interaction. Instructors suggested that it is impossible for instructor to interact with this huge number of students in MOOCs. As a result, some strategies were suggested to enhance instructor interaction with students of MOOCs

Keywords: MOOC, interaction, Salmon interactivity model

Introduction

With the potential to redefine education, a product of the Internet evolution, MOOCS are "Massive Open Online Courses" designed to reach as many students, formal and informal, as possible. MOOC is a new concept, where learners study alone, outside a traditional university and helping each other. They assemble by affinity or language communities to exchange, share and solve all theirdifficulties they encounter in their learning (Epelboin, 2013). The *New York Times* and other periodicals have proclaimed that 2012 was the "Year of the MOOC" (Pappano, 2012). MOOCs are a relatively recent online learning phenomenon, having developed from the first early examples five years ago. They are now generating considerable media attention and significant interest from Higher Education institutions and venture Capitalists that see a business opportunity to be exploited (Yuan & Steven, 2013).

The term MOOC was first coined by Dave Cormier, Manager of Web Communication and Innovations, at

the University of Prince Edward Island in 2008 for a large online class taught by George Siemens and Stephen Downes (Mcauley, Stewart, Siemens, & Cormier, 2010). Siemens and Downes envisioned "MOOCS as an environment for enacting connectivist pedagogy, an approach to teaching focused on building networks between participants, based on, but moving rapidly beyond, a foundation of shared content" (Mahraj, 2012, p. 360), and making use of social networking tools (Mak, Williams, & Mackness, 2010) for further student interaction and collaboration. The promise of MOOCs is that they will provide free access, cutting edge courses that could drive down the cost of university-level education and potentially disrupt the existing models of Higher Education (Future learn, 2013). In contrast to traditional university online courses, MOOCs have two key features (Wikipedia, 2012):

(1) Open access—anyone can participate in an online course for free.

(2) Scalability—courses are designed to support an indefinite number of participants.

MOOCs offer students the chance to take courses from celebrated specialist experts, without any required course prerequisites. They are presented over a set length of time, just as regular classes are, and follow a set syllabus (Dikeogu & Clark, 2013). Butler (2012) pointed out that these massive courses cover not only a very broad range of technical subjects such as math, statistics, computer science, natural sciences, and engineering, but, increasingly, also courses in social sciences and humanities (Becker & Posner, 2012). MOOCs provide an online version of complete courses, with video instruction, online quizzes, forums to encourage student participation, but without having much direct interaction with the instructor (Khalil & Ebner, 2013), except in a pre-recorded sense (Walker, 2013). MOOCs generally serve a huge number of students. For example several early MOOCs done by Stanford University served over 100,000 students (Koller, 2012). This form of massive education is interesting to the world, because it can serve those who would have otherwise no other access to Higher Education. Because of this massive number of learners, several platforms have been launched to make teaching, learning resources and courses in various subjects and levels, available online (Carson & Schmidt, 2012). The most important platforms are Udacity, Coursera, edx, udemy, and the Khan Academy. They all have one thing in common provide opportunities for anyone to learn with experts, peers andothers outside traditional universities (Daniel, 2012).

Theoretical Background

As a result, it is assumed that within few years, many MOOCs will find a possibility for offering credits. Walker (2013) pointed out that a problem could come in from the type of interactivity found in MOOCs. Most MOOCs are highly interactive, with students interacting with each other, and interacting with the content. On the other side the interactivity is lacking with the instructor (Khalil & Ebner, 2013). In fact creating interactivity in MOOCs by creating a learning community is essential to the learning and success of the students. Therefore, many educators pointed out the importance of interactivity for high quality MOOCs (Mcauley et al., 2010; Waard, 2011; Levy & Schrire, 2012; Fisher, 2012). They suggested that interaction and communication in MOOCs will help students to construct their own knowledge and develop their personal learning network from the nodes and connections in the digital environment. Mak, Williams, and Mackness (2010) indicated that interaction in MOOCs assits students to develop their own ideas, express themselves, establish a presence, and make thoughtful long-term relationships.

Moore (1989), in his seminal piece, defined three categories of interaction evident for Online Learning: learner-instructor, learner-learner, and learner-content. According to Moore (1989) "student to student"

interaction refers to the exchange of information and ideas amongst students with or without the real-time presence of an instructor. "Student to instructor" interactions refer to the interaction between student and expert which establish an environment that encourages students to understand the content better. "Student to content" interaction is "a defining characteristic of education" and "without it there cannot be education" (Moore, 1989, p.1). Khalil and Ebner (2013) pointed out that these types of interaction happen in many different forms in current MOOCs. "Student to student" interaction includes using social networks (like Facebook, Twitter, blogs, YouTube, or Google+) as well as discussion forums. "Student to instructor" interaction includes using quizzes, assignments, activities, and group projects. Whereas, little "student to instructor" interaction happens in MOOCs through announcements, guides, asking and answering questions, or participating in discussion. They carried out that "student to student" interaction is the most type of interaction that is used in MOOCs. Whereas, little interactions in MOOCs are happening between students and instructor. Therefore, the goal of the present research work is to investigate the causes of limited interaction between students and their instructors through understanding of the students' and instructors' perception and satisfaction of interactivity in their MOOCs. As such, this study asks the following questions:

(1) How do students and instructors perceive interaction in their MOOCs?

(2) How satisfied are students and instructors with the interaction in their MOOCs?

Research Methodology

In this section descriptions for the instruments, the participants of the study, and data collection and analysis is provided

Instruments

Two online questionnaires are designed to evaluate students' and instructors' perception and satisfaction of interaction in MOOCs. The questionnaires are implemented by a learning management system at Graz University of Technology. The theoretical bases of the two questionnaires is the five-step model for interactivity developed by Salmon (2001). In this model, Salmon offers several key observations regarding interactivity in online courses. Both questionnaires consist of two sections, the first section of the questionnaires related to the importance of interaction in MOOCs. It consists of 35 items for students questionnaire and 19 items for the instructors' questionnaire. The second section of the questionnaires had items about satisfaction with general interactivity in MOOCs. At the end of the questionnaires, one question about any comments of interaction in MOOCs is included.

Participants

The online questionnaires were sent be e-mail to a sample of students and instructors of MOOCs with a consent form seeking their permission for participation in this study and assuring them of the confidentiality of their responses. The e-mail included information about the purpose of study as well as the URL to the survey site. 250 students who received the e-mail request, 48 completed the survey (19%) and 40 MOOCs instructors who received the e-mail request, 11 completed the survey (28%).

Data Collection and Analysis

The data were stored automatically in the hosted online survey service into two separate databases (students and instructors responses) after submission of the responses. Descriptive data analyses (such as average) were conducted using the data analysis tool provided.

Results and Findings of the Survey

Research question 1: How do students and instructors perceive interaction in their MOOCs?

a. Students' Perception of Online Interaction

Thirty-five questions in the students' questionnaire asked to measure the importance of interaction in MOOCs. As mentioned before Salmon's model suggests many criteria as effective e-moderating techniques within her five-step model of interactivity. The scales of one to four represented one as "Very Important" and four as "Not Important". Table 1 presented the results of importance scale of the five step model.

Table 1

Students' Perception of Interaction in MOOCs.

Steps of interaction	Average of importance
Access and motivation	1.96
Online socialization	1.8
Information exchange	2.56
Knowledge construction	2.72
Development	1.92
Overall interaction	2.20

Access and motivation. Students rated the importance this criteria as important (average = 1.96). They pointed out the importance of easily starting the course and feeling "welcomed" and received proper guidance and clear information about the purpose of the MOOC. However, many students who pointed out the importance of this criteria, commented negatively to the availability of many items in their MOOCs. Some of them reported the lack of guidance and clear information provided by their MOOC instructor. One wrote "*One week the instructor is telling us we don't need to do math to do science and then the next week the one quiz is ALL math. Not very clear*". Other students commented negatively to the usability of their MOOCs, one of them reported "*It is crucial to find two things quickly: (1) Course Content; (2) Students with similar problems/questions/courses*". Another one wrote "*This is important, but not followed through on as I have questions on how to submit some of my material*". In addition, one of the students responded negatively to the availability of welcoming new participants by the instructors, he wrote "*Dude, It is important, but the people that joined late didn't even get welcomed by the staff members, they got welcomed by us other students and there questions got answered by us*". Another student suffered about lack of technical help, he reported "*Very important but not supplied*".

Online socialization. Salmon (2001) suggested that online socialization and the creation of interactivity are vital to the success of online courses. The course design should empower online students to interact formally and informally and allow them to discuss course content in a comfortable environment. Students rated the importance of this criteria as important (average = 1.8). They pointed out the importance of communication and socialization in MOOCs. They reported that social interaction in MOOCs enhance their own knowledge and increase their personal learning network. Nevertheless, some items in this criteria were scaled as less important. For instance, students rated the item "*MOOC environment provided me with a sense of confidence in discussing unfamiliar topics*" as less important. One of students who rated this item as less important wrote "*Don't really think the environment has much to do with it, more a matter of personality*". In the same way, other students rated the importance of the item "*Students' introduction of themselves was helpful in interaction*

during the MOOC" as rather bad. One of them reported "*This is not important to me. I notice the people that I want to know what they are doing and can easily send them private message if I want to know their background, etc.*", another student who perceive this item as less important wrote "*Not important, there are too many people*".

Information exchange. Salmon (2001) suggested that a well-designed online course should begin with information focusing on the course objectives. This stage serves as an orientation to the course. Students learns where to find or get to access information relevant to the course. Also, the instructor can provide frequently asked questions to ease some of the unnecessary communication students rated the importance of this criteria as less important (average = 2.56). One of them wrote "*This wasn't necessary for the instructor to give any instructions*".

Knowledge construction. Salmon (2001) suggested that students should get assistance for online discussion (e.g., how to use the most relevant content material). Also, she suggested that creating relevant exercises could promote critical thinking for students in online discussion. Students rated the importance of criteria in this step as less important (average = 2.72). One of the students who rated this item as less important commented "*It is not important, I did not join a group*". In the same way, some students rated the item of providing the instructor incentive to put the necessary time and effort into online discussionas less important. One of them reported "*The necessary time varies massively among different students. The best thing is to neither encourage nor discourage the students to spend time with online discussions*". Another student wrote "*This is a personal thing, there is no incentive they can provide*". Also, students rated the regularly monitoring of the discussion by the instructor as not important: "*Students have to monitor their discussions. The only intervention should come when they exchange solutions or the vast majority of them has technical problems*" and "*Not important, the teachers aid was monitoring the groups*". Finally, the importance of posting discussion topics by the instructor on a regular bases (i.e., weekly) to encourage communication is rated as less importance. One student commented "*Again not important. If there are worthy discussion topics then they are a natural side effect of doing the course. The instructors do not need to facilitate this*".

Development. Students rated the importance of this criteria as important (average = 1.92). They pointed out the importance of using the information provided to construct their own meaning based on their interpretation, past experiences and knowledge. However, some students negatively responded to the availability of some items. For example, they reported the lack of giving students the opportunity to lead the online discussions. One of them wrote "*it is important, but it is not given*".

Overall, students perceived interaction in general as important. They rated the importance of five-step model of interactivity in MOOCs as important (average = 2.20).

b. Instructors' Perception of Online Interaction

Instructors were asked to respond to 28 items in the questionnaire to measure the importance of interaction in MOOCs. Criteria designed based on Salmon's interactivity model. The scales of one to four in "Importance" section represented one as "Very Important" and four as "Not Important". Table 2 presented the results of these items from the most important to the lest important.

Nearly half of the criteria that were suggested by Salmon's interactivity model were rated by instructors as less important for MOOCs. The first 15 items on Salmon interactivity model received very important or important. But, instructors perceive the overall interaction in MOOCs as important (average = 2.18). One of

instructors who rated interaction in MOOCs as important commented "*The emphases on two-way communications I think are the most important things. When students get involved in discussing with each other, talking and arguing and that's where the learning is*". Another instructor reported "*the best instructors are those that enjoy intense interaction with their students*".

Table 2

Instructors' Perception of Interaction in MOOCs

Items of interactivity	Average of importance
Offering a user-friendly MOOC site.	1
Creating a sense of community in the MOOC	1.3
Providing opportunity to students to interact by email, social networks, or online discussion	1.35
Providing a sense of community through online discussion.	1.35
Offering structured exercises and activities	1.6
Providing frequently asked questions or other information to ease unnecessary communication.	1.65
Providing an environment with a sense of confidence to encourage students in discussing unfamiliar topics	1.65
Encouraging interaction through online discussion.	1.6
Giving students the opportunity to lead the online discussions.	1.7
Describing clearly the MOOC objectives and the requirements during the first session.	1.8
Providing links to suitable sites to stimulate online discussions.	1.8
Greeting students before the first Lecture	1.85
Contributions to the online discussion by majority of the students.	1.85
Providing guidance to the students and explains necessary steps to succeed in MOOC.	2.2
Providing opportunities for students to participate in a group class project.	2.46
Providing a sense of community through online group project(s).	2.55
Monitoring the discussion regularly.	2.64
Assigning assignments/activities to help the online discussion.	2.72
Posting regularly (i.e., weekly) discussion topics to encourage communication.	2.72
Ensuring students can send and receive online messages as soon as they are online.	2.82
Providing practical ways of sharing information online.	2.82
Providing direction for online discussion.	2..82
Providing incentive (i.e., points) to the students to put the necessary time and effort into online discussions.	3.26
Preventing the domination of a few students in the online discussions.	3.4
Offering advice and 'tips' for developing online skills.	3.4
Offering access to the permanent records of discussion to students.	3.62
Providing technical help in a variety of formats (online, phone, etc.).	3.82
Summarizing online discussions at the conclusion of each discussion.	3.82
Over all interaction	2.18

Research Question 2: How satisfied are students and instructors with the interaction in MOOCs?

a. Students Satisfaction of Interaction in MOOCS

Students were asked to respond to "How satisfied are you with the level of interaction in MOOCs?". Sixty-five percent of them reported that they either very satisfied (21%) or satisfied (44%) with the level of interaction in their MOOCs. Figure 1 presented the results of Students' Satisfaction with the Level of Interaction in MOOCs.
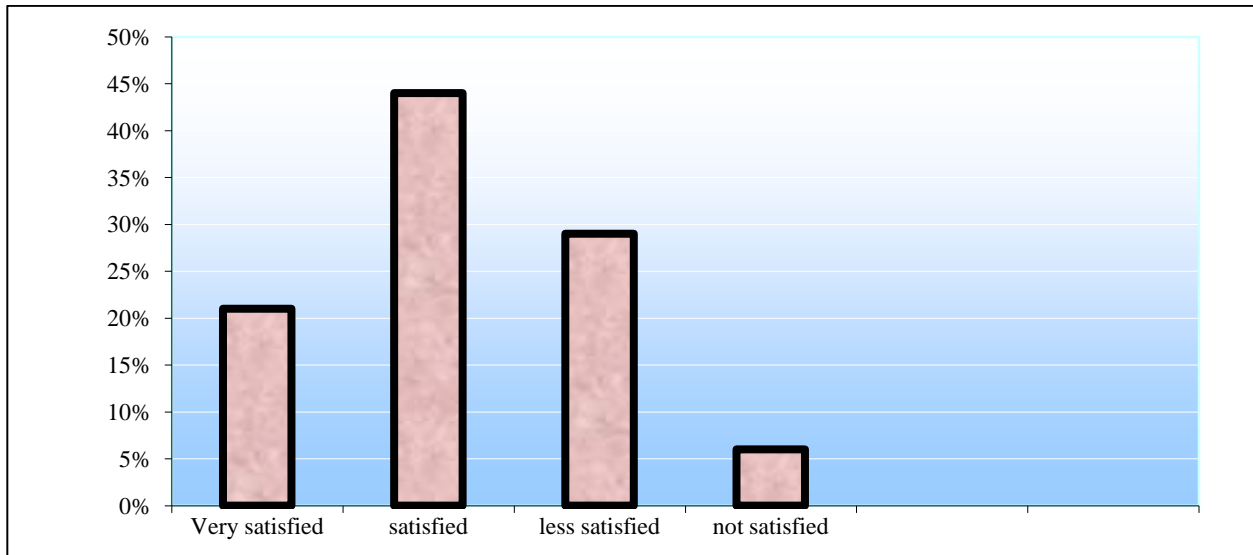
Figure 1. Students' satisfaction with the Level of Interaction in MOOCs.

Many of the comments that students provided about Interaction in MOOCs were about their satisfaction with the MOOC they participated. One of the students wrote "*The MOOC I had was a great class, it was manageable, and I would definitely take another MOOC*". Another satisfied student reported that "*I was completely satisfied with that—I enjoy working with my course mates*".

Nevertheless, 29% of the students expressed their less satisfaction of interaction in MOOCs, one of less satisfied students indicated the need to structure discussion forums. He suggested: "*The discussion forums should be more structured. I know its difficult with so many students, especially when nobody is paying attention to the instructions. But there must be a way to do this. The forums are mostly being used to express the views and its so chaotic with everyone trying to explain there point of view, as if everyone has gone mad (imagine thousands of people talking in a hall). I am not against that, everybody has a right to express but there should be allocated place to address questions directly related to the lectures*".

In addition, 6% reported that they were not satisfied with the level of interaction in MOOCs. Many of the dissatisfied students pointed to lack of instructor interaction as measure of dissatisfaction and even suggested that "*The teacher that taught the course had absolutely no interaction with students, no reply to posts, or e-mails. I didn't get anything from announcements until the 2nd or 3rd week of class. It's my believe that the teacher must have some interaction with the class. I think that MOOC interaction needs drastic reorganizing to be made effective*". In the same way, another student confirmed his dissatisfaction due to the lack of instructors' interaction. He said "*This was my first one and I found it a great way to learn. I have signed up for two more MOOCs. One thing about this course, there were no instructor interaction*". Another dissatisfied student pointed out that his dissatisfaction of interaction in MOOCs based on the problem that he doesn't know how to use interaction tools. He commented "*I have no idea about using social network like face book, twitter that makes me unable to submit some activities and assignments. For instance, the instructors asked to use some social networks to complete assignment It's very frustrating as I couldn't do my home work. As far as my professors know, I am not doing my homework! One of the professors commented that some of my fellow-students are 'native' to the age of this technology while older students [including myself] are 'immigrants'. Perhaps so, but immigrants build great nations once they are up and running*".

b. Instructor Satisfaction With Online Interaction

Instructors were asked to respond that they were "Very Satisfied", "Satisfied", "Less Satisfied", or "Not Satisfied" when asked "How satisfied are you with the level of interaction in your MOOC?". Eighty-two percent of them reported that they either very satisfied (55%) or satisfied (27%) with the level of interactivity in their MOOCs. Figure 2 presented the results of Instructors' satisfaction with the level of Interaction in MOOCs.
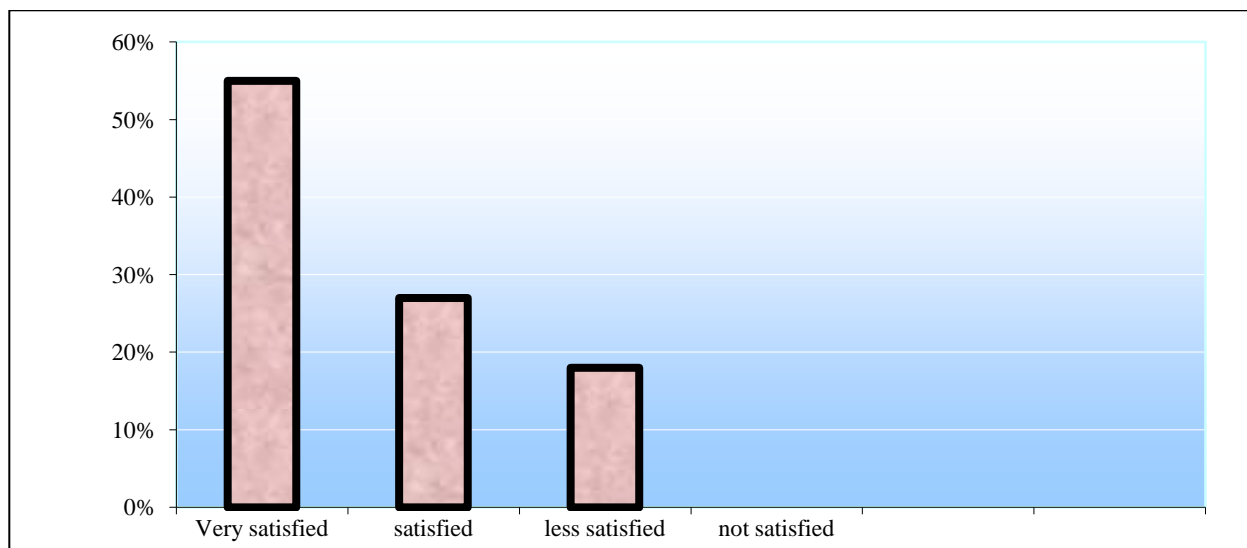

Figure 2. Instructors' satisfaction with the level of Interaction in MOOCs.

Most of the comments that instructors provided about interaction in MOOCs reported their satisfaction with the interaction of MOOC they have given. One of the instructors expressed his satisfaction with the level of interactivity in MOOCs: "*What I try to do every day is to respond students' discussions and I find those usually work pretty well*". Another satisfied instructor pointed out that "*I find I am very 'close' to my on-line students through weekly discussion posts and shared lectures (everyone has access and can comment, etc.)*".

Only 18% reported that they were less satisfied with interaction in MOOCs. One of the dissatisfied instructors reported that a lack of time, prevented him from achieving a high level of interactivity in his MOOC with that big number of students. He suggested: "*Although interaction is one of leading factors in a successful online learning, it is impossible to have 'substantive' interaction in MOOCs with that massive number of students. For example, in the case of a MOOC with 50,000 students, if each student only received 1 minute of an instructor's time, and the instructor taught for 8 hours per day, it would take 104 days to interact with every student*". Finally it is remarkable that there is no dissatisfied instructors concerning interaction in MOOCs.

Discussions

Firstly, students *and instructors perception of interaction in MOOCs:* Salmon's interactivity model was used as a bases for creating interactivity criteria for online courses. Salmon's model proposed effective e-moderating in five discrete steps (Access and Motivation, Online Socialization, Information Exchange, Knowledge Construction, and Development). Students were asked to respond to 35 items of interactivity designed based on Salmon's interactivity model. Students rated the importance of interaction in MOOCs as important. However, they reported negatively to the availability for various interactivity items suggested by Salmon. It can be reasoned that instructors were not familiar with these moderating techniques and

consequently did not employ them in their MOOCs. On the other hand, Instructors also were asked to respond to 28 items based on Salmon's interactivity model to measure the importance from their perspective. The result of instructors' survey revealed that they perceived nearly half of these items as less important for student. Consequently these items were unavailable in their MOOCs.

Secondly, students *and instructors satisfaction of interaction in MOOCs:* Students rated their level of satisfaction in MOOCs as satisfied. Some of them commented that they would very likely to enroll to other MOOCs. Nevertheless, 35% of students stated their level of satisfaction in MOOCs as less satisfied or not satisfied. Most of them reported their dissatisfaction due to the lack of instructor interaction. On the other hand, instructors rated a high level of satisfaction of interaction in their MOOCs. However, they reported that there is alack of interaction between students and instructors. They revealed this lack of interaction to the huge number of students, the thing that makes it is impossible for instructor to interact with this huge number of students.

As discussed above, there is a gab between students' perception and instructors perception of interaction in MOOCs, Students perceived many criteria of interactivity as important, but they reported negatively to the availability of these criteria. On the other hand, instructors perceived nearly half of the interactivity criteria as less important. So, they didn't offer these criteria in their MOOCs. In addition, there is another gab between students' satisfaction and instructors satisfaction of interaction in MOOCs. Instructors were very satisfied although, they reported that there is alack of instructor to student interaction. They suggested that it is impossible for MOOCs instructors to interact with the big number ofstudents in MOOCs. While, 35% of students are not satisfied because of lack of instructor interaction, and they ask for more instructor interaction. Consequently, some techniques and strategies should be taken by instructors to enhance their interaction with students and make MOOCs students more satisfied.

Conclusion

Because online students and instructors have the most immediate experience with interaction in MOOCs, it is important to assess their perceptions of this method of teaching and learning. The current study was designed to assess the perceptions and satisfaction of online students and instructors about the importance of interaction in their MOOCs. Two web-based surveys were used to collect data. The surveys revealed that there is a gab between students perception and satisfaction of interaction in MOOCs on one hand and instructors perception and satisfaction on the other hand. Students perceived interaction in MOOCs as important, how ever they reported negatively to the availability of many criteria of interaction. Whereas, Instructors perceived nearly half of interactivity criteria as less important. Consequently, many of interactivity criteria weren't available in MOOCs. In the same way, students rated their satisfaction of interaction as satisfied. How ever 35% of them were not satisfied of interaction in MOOCs. They reported their dissatisfaction to the lack of instructor interaction. On the other hand, instructors rated their satisfaction of interaction in MOOCs as very satisfied. They believed they are working well, although they reported that there is alack of "instructor to student" interaction. They suggested that this lack of interaction due to the big number of students and it is impossible for MOOCs instructors to interact with ten thousands of students in MOOCs.

Consequently, Some techniques should be used to enhance "student to instructor" interaction and make students more satisfied. For example, Instructors can offer trained teaching assistants (TAs) in their MOOCs. As long as, it is impossible for instructors to interact with this huge number of students, TAs can assist the instructor to interact with students. TAs help students who can't complete tasks, they can answer students

questions, provide their advices if students have technical problems, post some discussion topics, monitor the discussion forum on a regular basis, and they can filter out questions that need an instructor response. In addition, Instructors can use also peer-based rather than computer-based assessment to make MOOCs more interactive, it has been shown that students are willing to step in and help others Peer assessment is a key challenge in the delivery of MOOCs. Coursera also acknowledges that "In many courses, the most meaningful assignments do not lend themselves easily to automated grading by a computer". Peer assessments in Coursera leverage a "grading rubric" to help students to assess others reliably and provide useful feedback. Cronenweth (2012) pointed out that peer assessment process is a useful form of learning for students. In addition, Wong (2013) stated that peer assessment process does a good job of exposing students to someone else's work. "That is where the learning is at". Using the previous techniques will enhance interaction and make students more satisfied of interaction in MOOCs.

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