From the field

Toward a Quality Model for UNED MOOCs

Authors

Timothy Read
tread@lsi.uned.es

Covadonga Rodrigo
covadonga@lsi.uned.es

Department of Computer Languages & Systems
School of Computer Science, UNED, Madrid, Spain

This article discusses a prototype quality model developed for courses in the first edition of the UNED MOOC initiative (where over 170,000 students undertook 20 MOOCs between October 2012 and May 2013). It is argued that since it is not easy to differentiate between a MOOC and other types of online courses, it is therefore difficult to specify a quality model for the former. At the time of starting this project there were no other quality models that could be applied directly. Hence, a practical two-part solution was assumed. Firstly, it considers the overall structure and function of each course in terms of a variable set of characteristics that can be used to evaluate the initial design of the course. Secondly, it uses a flexible student certification model, argued to demonstrate that a course has achieved its objectives given the results intended by the teaching team.

Tags

qualtiy framework, quality assurance, MOOC quality, UNED

1. Introduction

Vince Cerf, one of the inventors of the TCP/IP protocol, often referred to as one of the fathers of Internet, stated that certain things get invented when it actually becomes possible to do so, referring to the need for related technology, infrastructure and context to be ready for such developments to become feasible (Cerf, 2012). The first massive open online course (henceforth, MOOC) was run in 2008 (Downes, 2012; Daniel, 2012; Watters, 2012), when arguably the technological, pedagogical and sociological conditions were right for such a course to appear. MOOCs were subsequently hailed as an "educational phenomena" in 2012 (Pappano, 2012), and in June of that year, Spain's national distance-education university, UNED, took the strategic decision to start its Open UNED Web portal (as a way to bring together work on Open Educational Resources and Practices undertaken in different parts of the university), and as part of this project, it was decided to include a MOOC initiative. In order to prepare courses for this initiative it was necessary to define a quality model that could be used to ensure that all courses that were developed would give the students the "course experience" associated with the UNED brand, which in turn, required an understanding of what a MOOC actually is and how it differs from other online courses.

It was Dave Cormier who coined the term MOOC, for this type of online course, in 2008 (Downes, 2012). It has been argued by Downes (2013a) that MOOCs combine the advantages of open content and open learning in a way that is compatible with large-scale participation thanks to the connectivist pedagogic philosophy, where knowledge is developed and distributed across a network. As well as the possibilities for learning and personal development that MOOCs offer, there are also pragmatic reasons for their wide-scale adoption by educational establishments around the globe. Higher education is competitive, not just for the students who finish their studies with a new qualification, when they try

to find a job, but also for the institutions themselves as they try to attract new students. Even though hosting MOOCs, which are essentially free to their students (if no paid certification is required), has associated costs for the institution, it is popular with the universities since these courses offer a way to provide potential students with "a taste of what is come", if they enroll on related formal educational programmes at the institution.

However, while offering MOOCs has advantages for the institutions they must also do so with care since any course or educational initiative started by them must reflect the same quality control present in their standard formal educational programmes. Any other alternative would be counter productive and lead to a loss of potential students. When UNED started its MOOC initiative in 2012 there was a strong commitment to quality in the sense of both how a given course would be structured and run together with the control of the certification process of students that have actually finished a course. Specifically, an internal policy was developed in December 2012 to assign ECTS credits to MOOCs, along with other course-specific accreditation, in order to facilitate their integration into the regular academic course programme. In this article, the question of what quality actually means for a MOOC is considered together with the practical implications of how the quality of these courses undertaken at UNED has been achieved.

When is an online course a MOOC?

UNED has over forty years of experience in distance education, and since 2000, has been using an eLearning platform as the main teaching vehicle for its online courses; the majority of which can be defined as using a blended learning methodology (combining online e-Learning with face-to-face sessions in regional study centres). Since then, the university has invested considerable effort in developing quality control mechanisms for its online courses with a special milestone in 2007, when the Spanish Ministry of Education gave instructions that all universities must have systems of internal quality assurance. UNED rapidly completed the design of its internal system of quality assurance as part of the ANECA's (Spain's National Agency for Quality Assessment and Accreditation) AUDIT Programme for all the university's degree programmes. This was verified by the ANECA, with very positive feedback, in 2009 in the First Round of the AUDIT program. Based on this quality system, an a priori control of how courses are actually conceived, structured and what resources are included together with the previsions

for supporting students and their difficulties is undertaken by the university's institute for distance education (Instituto Universitario de Educación a Distancia, IUED) Secondly, post-course questionnaires are used so that the students can give feedback on their experience of a given course. Hence, at the end of each edition of a course, the feedback from the student questionnaires is sent to the teaching teams and they are given the opportunity of answering any criticisms received and addressing any weaknesses identified.

When the university took the decision to start the MOOC initiative it was evident that there were a number of courses that could be prepared and started in the first edition. The objective was to have 20 MOOCs developed and running by January 2013. Given the heterogeneous nature of the subjects being covered in the courses and the way in which each teaching team wanted to undertake a course, it was evident that any kind of systematic quality control was going to be difficult to undertake, based upon previous experience. In order to develop a suitable quality model it was necessary to understand what actually constitutes a MOOC. As has been noted in the literature (Hill, 2012), the vary nature of MOOCs, their structure and associated pedagogy differ so much that it is even questionable referring to them by the same term. Downes (2013b)(see also Morrison, 2013a) differentiates between two types of MOOC: connectivist MOOC (or cMOOC, based upon principles of learning communities with active users contributing content and constructing knowledge) and extended MOOC (xMOOC, similar to standard online courses but with larger student numbers). Siemans (2012) notes that the former emphasizes creativity, autonomy and social networked learning whereas the latter focuses on knowledge creation and generation.

Other authors have gone further to highlight different aspects of courses that enable them to be called MOOCs, and even specify what type they are. An example is the taxonomy of 8 types of MOOC developed by Clark (2013): TransferMOOCs represent a copy of an existing eLearning course onto a MOOC platform, where the pedagogic framework follows the standard process of teachers transferring knowledge to students. An example would be the courses offered by Coursera. MadeMOOCs make a more innovative use of video where materials are carefully crafted and assignments pose more difficulty for the students. An example would be the courses offered by Udacity. SynchMOOCs are MOOCs that follow fixed calendars for start, end, assessments, etc. This has been argued to help students plan their time and undertake the course more effectively. Both Coursera and

Udacity offer these courses. AsynchMOOCs are asynchronous MOOCs that are the opposite of synchMOOCs in that they have no or frequent start dates, together with flexible deadlines for assignments and assessments. AdaptiveMOOCs try to present personalised learning experiences to the students by adapting the content they see to their progress in the course. The Gates Foundation has highlighted this approach as key for future online courses. Group MOOCs actually restrict student numbers to ensure effective collaborative groups of students. This is argued to improve student retention. As a course progresses, sometimes the groups will be dissolved and reformed again. ConnectivistMOOCS or cMOOCs, are as defined above. MiniMOOCSs are shorter MOOCs that focus on content and skills that can be learned in a small timescale. They are argued to be more suitable for specific tasks with clear objectives.

Conole (2013), instead of actually trying to fit the MOOCs into specific locations within a taxonomy, classified them in terms of a set of dimensions that can be used to define them:

> "the degree of openness, the scale of participation (massive), the amount of use of multimedia, the amount of communication, the extent to which collaboration is included, the type of learner pathway (from learner centred to teacher-centred and highly structured), the level of quality assurance, the extent to which reflection is encouraged, the level of assessment, how informal or formal it is, autonomy, and diversity".

Morrison (2013b) prefers a simplified classification, which focuses upon the nature of the instructional methods used, the depth and breadth of the course materials, the degree of interaction possible, the activities and assessments provided, and the interface of the course site. What is evident is that there are difficulties in specifying what a MOOC actually is and defining when an online course actually can be called a MOOC. Even a fairly clear indication of this type of course, namely the large number of participants, is hard to actually specify. What does massive really mean? The authors of this article have online courses on the Computer Science degree programme at UNED with over 3,500 students that are not defined by the university as being MOOCs. Hence, trying to apply the same criteria used for specifying standard online degree courses to the development of MOOCs at UNED would have been difficult to undertake given the wide range of possible courses being developed and the way in which each teaching team wanted to run them (e.g., more or less content, activities, interaction).

Even though the strategic decision was taken early on to follow a standard approach to structuring the UNED MOOCs, using design templates to give each course a similar look and feel, differences between the courses would have made it impossible to just apply simple criteria for them all, as if each course were one specific type of MOOC as indicated by Clark (2013) above.

A hybrid approach to MOOC quality at UNED

While research on the issue of MOOC quality is appearing in the literature, as can be seen, there is not currently a consensus on how quality assessment of these courses should be undertaken (Haggard, 2013, p.6) if indeed it makes any sense to try to measure it (Weller, 2013).

The MOOC Quality Project (Ehlers, et al., 2013), undertaken by the European Foundation for Quality, has involved many well-known researchers, to treat different aspects of the question of what quality actually means when MOOCs are concerned. The result of which, including the generation of blog entries and networked discussion, read and contributed to by more than 12,000 people, is that it is very difficult to define what quality means for these courses since their very nature is constantly changing, with new types and variants of courses appearing all the time. They highlight some factors that are related to the perception of MOOC quality: the notion of choice, what pre-course information is provided, the pedagogical approaches supported in a course, the level of student commitment required, is a course scheduled or not, technical requirements, the role of the teaching team, availability and level of interaction, whether certification is availability. A key issue is whether a course actually lives up to its promise.

Downes (2013c), as part of his contribution to The MOOC Quality Project, differentiates between the quality of a MOOC in terms of its platform and related tools (functionality, stability, etc.) and whether the outcome of a given instance of a MOOC is successful or not, in a given context with a given student body. He goes on to note that "measuring drop-out rates, counting test scores, and adding up student satisfaction scores will not tell us whether a MOOC was successful, only whether this particular application of this particular MOOC was successful in this particular instance".

Another quality initiative that appeared in 2013 is that of the OpenupEd label (Roswell 2012; Roswell 2013), which is based around the E-xcellence approach of using benchmarks for quality

assessment (Ubachs et al., 2007; Williams et al., 2012), but here it is applied to MOOCs. The idea is that a MOOC that has been evaluated using benchmarks can put the label on the course Web. The 32 benchmarks represent a good first step toward MOOC quality control but will inevitably need to be refined as more experience of applying them has been obtained.

Even though, as noted previously, a lot of the literature that has appeared on MOOC quality was not available in June 2012 when UNED started its MOOC program, some decisions had to be taken at the time, about how the courses would have their quality controlled, thereby protecting the university's brand, and ensuring that the first edition of these courses was successful. The initial quality model was based upon the one used for the online degree programmes, which had been developed and refined for more than 15 years. It should be noted that, in principle, preparing a MOOC represents much less of a problem for distance university lecturing staff than for their face-to-face equivalents, since typically the former have been using e-Learning platforms for several years already as part of their daily activities and are very familiar with using the tools available therein. In the case of UNED, the first platform was strategically introduced for a large part of the official courses in 2000 (although many courses had been run "unofficially" previously). Initially a part of the lecturing staff, not familiar with such platforms, had to be taught how to use the platform and its tools, but over the years its use of subsequent platforms has become second nature.

Hence, producing MOOC content and activities, which being somewhat different from those found in other standard university online courses, does not require the development of a new skill set, as might be the case in other areas. Several specific guidelines were established to guide course creators, such as:

- The division of the course syllabus into n modules (with an overall student workload of 1-2 ECTS).

- The inclusion of a short introductory video in each module.

- The use of a self –paced methodology.

- The establishment of interactive user forums to help the students, professors, and teaching assistants develop a community.

- The application of peer-review and group collaboration.

- The presence of automated feedback through objectives and online assessments, e.g. quizzes and exams.

Obviously, the videos used would be shorter than regular video tutorials used in other courses in the e-Learning platform. Instructions for the teaching assistants needed to be prepared, but this activity wasn't completely unfamiliar to the course authors. It's worth noting that in UNED MOOCs, the teaching roles were restricted to course facilitators and content curators. The latter acted as "critical knowledge brokers" to maintain the relevance of the information that flows freely between the students in the forums.

Hence, based upon the quality process used in UNED for the blended learning and e-Learning courses, a model was defined in terms of two types of control: firstly, the structural and functional coherence of a given course, based upon the objectives defined by the teaching team which would be matched to a set of characteristics that could be used to evaluate the initial design of the course, similar to those highlighted by Conole (2013), Ehlers, et al. (2013) and Morrison (2013). Secondly, the establishment of a flexible certification model (a freemium model), that would enable the students who had undertaken the course to demonstrate, in a standard test-like evaluation, that the course had achieved its objectives and that they had achieved the results intended by the teaching team.

Regarding the former, the establishment of a variable metric for each MOOC made it possible to control how each course was structured, what kind of resources were included and how activities, interaction and assessment was included. Specifically, the metric contemplated five aspects:

1. Topic: Each course should be as specific as possible, such that there could be an agglomeration of courses into a larger "knowledge puzzle" subsequently. Proposals for MOOCs that tried to cover too wide an area were reviewed and simplified, and where necessary, were split into proposals for more than one course.

2. Contents: In many cases materials previously prepared by the course author(s) could be reused, although they may have had to be adapted to the MOOC format (i.e., videos with an approximate duration of 5 minutes, guidelines that would be understandable without the support of teaching staff, activities that either finished with self-evaluation or involved some kind of forum-based collaboration

or interaction, etc.). However, in some cases certain recordings had to be re-scripted and recorded again; it was not possible to take a twenty minute recording and split it into four five- minute ones, due to the logical flow of the recording.

3. Duration: Due to the wide variety of MOOCs considered, it was necessary to accept course durations of between 25 and 125 hours. The majority of courses were nearer the former than the latter, although some were longer if they dealt with experimental simulations, remote laboratory control or the coordination of students undertaking real-world practical activities.

4. Structure: Courses were typically divided into 4 to 8 modules, depending upon duration and objectives. Each module would typically have between 4 to 8 videos with associated activities and evaluations. The latter were used to consolidate acquired knowledge and foster interaction between the students. When the structure of a given course was being reviewed in terms of its overall quality, given the differences in objectives and philosophy, more of a qualitative assessment was made than a quantitative one. A consideration was made of how the combination of videos and other materials facilitated the learning proposed by the course team in the objectives established for the course.

5. Specific instructional design guidelines: courses were designed to challenge the students who took part, and not as a series of lectures to be "passively consumed". The data generated in the assessments could be evaluated 'massively' using automated systems. Also, self-assessment methodology was applied, which requires students to reflect upon their own work and judge how well they performed.

6. Social channels: Forums were the main interaction tool provided, although other associated Web 2.0 tools could also be included if the teaching team so desired. The forum tool present in the OpenMOOC platform enabled members to vote on any post. Posts with more votes appeared higher up in the relevant thread in the forum, so were encountered earlier when searches were made. The methodological approach used for UNED MOOCs, similar to most of these courses, didn't take into account the participation of the course designers in the forums (although quite often they did, in fact, take part). Hence, the forum, and its ordered

message system, provided valuable feedback to students undertaking the courses, not only on specific course-related content but also on general platform-related and MOOC-associated topics.

Student dropout has been identified as a key problem for MOOCs (e.g., Gee, 2012; Yang et al., 2013). This is too big and complicated a problem to solve with one simple measure. One online survey ["MOOC Interrupted: Top 10 Reasons Our Readers Didn't Finish a Massive Open Online Course". Open Culture] published a "top ten" list of reasons for drop out. The reasons included: the course required too much time, or was too difficult or too basic, the course design included "lecture fatigue" (due to too many lecture videos), a lack of a proper introduction to course technology and format, clunky technology and trolling on discussion boards. Furthermore, hidden costs were cited, including the need to complement course content with expensive textbooks written by the instructor. Other non-completers were identified as "just shopping around" when they registered, or as participating only for knowledge rather than because they wanted to obtain some form of credential. However, what has been noted in UNED MOOCs is that the mutual support possible thanks to the forum tool, together with the participation of the facilitator and curator there, have helped students keep in the courses and stay focussed on the tasks relevant to learning.

This was useful both for controlling the development process and also deciding when a course was finished and ready to be put into production. Regarding the latter, the freemium certification model used for this purpose had three types of awards. Firstly, badges that were gained automatically as the course progresses, for having achieved specific results, such as finishing an activity in a course, participating a certain number of times in the community, etc. Secondly, a type of certificate, defined by UNED as a Credential, that is awarded as a result of a student having finished the majority (80% or more) of a given course and subsequently taking an online test. Thirdly and finally are full certificates, which require a student to undertake a test similar to the online one but on a computer in one of UNED's regional study centres, where proof of identity is required and the test is taken in authentic exam conditions. The third type of certification process was established to counter one of the criticisms of MOOCs and the assessments used therein, namely plagiarism and cheating (Oliver, 2012; McEachern, 2013).

Conclusions

The first edition of the UNED MOOC initiative finished in May 2013 with over 170,000 registered users and more than 2800 paid certificates being awarded. Of the 20 courses started, the most popular ones were those on second language learning, as can be seen in Table 1. It was evident when this initiative was started that some control was needed to ensure that the courses developed would be both sufficiently flexible in nature to meet the teaching team's conception of what they wanted in their MOOC, and at the same time, guarantee that the user experience would meet what was expected from a UNED course.

Course	Enrolment
Starting with English: learn the first thousand words	45,102
Professional English	33,588
German for Spanish speakers	22,438
Practical course on e-Commerce	12,763
Accountancy: the language of business	9,799
ICTs for teaching and learning	7,448

Table 1. Top six MOOC enrolment figures at UNED

However, as has been argued in this article, it is not easy to specify what exactly defines a MOOC and differentiates it from other types of online courses. Even basic characteristics of a MOOC, such as the number of students, or the degree of involvement of the teaching team once a course has started, can blur between courses, some of which are called MOOC and some are not. Hence, it is difficult to specify a quality model, given the wide range of parameters for different online courses, which may or may not be conceived as being MOOC. Since a practical solution to the question of course quality was needed for the UNED MOOC initiative, a quality model was used that considered the overall structure and function of each course in terms of a variable set of characteristics that could be used to evaluate the initial design of the course, and the use of a flexible student certification model, to demonstrate, as far as is possible, that a course had achieved its objectives and had achieved the results intended by the teaching team.

The results of the first edition of these courses were very positive because as well as the quantitative data on participation, course completion, etc., the qualitative feedback from the students in the respective forums reflected their overall level of satisfaction both with the courses and the UNED MOOC

platform. The two part quality model had served its purpose and in general the courses were well received and undertaken with few problems. One area for improvement that will be addressed in future editions of these courses was the differing expectations of students starting the MOOCs based upon their previous experience of other UNED courses. Some students who are also undertaking other studies at the university (like degree programs) are used to how these courses work and had some difficulties initially with the MOOCs because the course dynamics were different.

In terms of recommendations for course quality that could be made for other institutions wanting to start a MOOC program, leaving aside the technological decisions about which platform to use (if an in house solution is desired) or MOOC hosting (if an external service is preferred), a lot of what has been learned here can be applied. Firstly, if the institution does not have a track record of putting together e-Learning courses, then the teaching staff will initially need to learn how to use the tools required for/in such courses. Secondly, regardless of whether the first point is true, then some experience of how MOOC content and activities differ from other low student-number online courses should be obtained before starting to develop courses. There should also be some control of course structure and educational coherence so that students undertaking different courses at the institution will have a familiar experience in the different courses. Thirdly, an important factor of the dynamics of MOOC that has to be anticipated and dealt with is that of the large scale interaction that occurs in the social media, typically the forums, given that the academic(s) who has(ve) developed the course typically won't participate. Facilitators and curators have had a key role in many different areas in UNED MOOC, ranging from maintaining course engagement through to steering students toward solutions to their problems. Fourthly and finally, if quality is understood, at least in part, as the overall satisfaction of the students who have undertaken the MOOC, then it is important that analytical mechanisms for learning analytics are present and combined with questionnaires. Experience shows that there is a far wider range of expectations present in potential MOOC students then in other e-Learning courses run on degree or masters programmes. Regardless of how well a given course has been prepared there are inevitably problems that arise as the students undertake it. Given the controls presented here a lot can be done to resolve them as the course progresses or for future editions of the course.

Given the wide range of educational scenarios and experiences that are included under the MOOC umbrella it may prove difficult to arrive at a clearly definable definition of what constitutes quality here. However, as the nature of such courses becomes more clearly identified, together with what "works and doesn't work" for each type, then it will become easier to establish course structure, content and interactional dynamics a priori, thereby making the task of quality assessment easier to undertake.

References

Cerf, V. (2012). Personal communication.

Clark, D. (2013). Taxonomy of 8 types of MOOC. http://ticeduforum.akendewa.net/actualites/donald-clark-taxonomy-of-8-types-of-mooc

Conole (2013). A new classification for MOOCs. http://mooc.efquel.org/a-new-classification-for-moocs-grainne-conole

Downes, S. (2013a). Connectivism and Connective Knowledge. Essays on meaning and learning networks. http://www.downes.ca/files/books/Connective_Knowledge-19May2012.pdf

Downes, S. (2013b). What the 'x' in 'xMOOC' stands for? https://plus.google.com/109526159908242471749/posts/LEwaKxL2MaM

Downes, S. (2013c). The Quality of Massive Open Online Courses. http://mooc.efquel.org/week-2-the-quality-of-massive-open-online-courses-by-stephen-downes

Ehlers, U.D., Ossiannilsson, E. & Creelman, A. (2013). The MOOC Quality Project. http://mooc.efquel.org/the-mooc-quality-project

Haggard, S. (2013). Massive open online courses and online distance learning: review. GOV.UK Research and analysis. https://www.gov.uk/government/publications/massive-open-online-courses-and-online-distance-learning-review

Hill, P. (2012). Four Barriers That MOOCs Must Overcome to Build a Sustainable Model. http://mfeldstein.com/four-barriers-that-moocs-must-overcome-to-become-sustainable-model

McEachern, R. (2013). Why Cheat? Plagiarism in MOOCs. http://moocnewsandreviews.com/why-cheat-plagiarism-in-moocs

Morrison, D. (2013a). The Ultimate Student Guide to xMOOCs and cMOOCs. http://moocnewsandreviews.com/ultimate-guide-to-xmoocs-and-cmoocso

Morrison, D. (2013b). A MOOC Quality Scorecard applied to Coursera Course. http://onlinelearninginsights.wordpress.com/2013/06/15/a-mooc-quality-scorecard-applied-to-coursera-course

Oliver, B. (2012). Credentials in the cloud: How will open online courses deal with plagiarism? http://leadingcompany. smartcompany.com.au/big-ideas/credentials-in-the-cloud-how-will-open-online-courses-deal-with-plagiarism/201209102397

Pappano, L. (2012). The Year of the MOOC. The New York Times. http://www.nytimes.com/2012/11/04/education/edlife/massive-open-online-courses-are-multiplying-at-a-rapid-pace.html?pagewanted=all&_r=0

Rosewell, J. (2012). How to benchmark quality in MOOCs – the OpenupEd label. Presentation given at EADTU Masterclass. http://www.slideshare.net/J.P.Rosewell/how-to-benchmark-quality-in-moocs-the-openuped-label

Rosewell, J. (2013). E-xcellence / OpenupEd Quality benchmarks for MOOCs ('under review'). http://www.openuped.eu/images/docs/e-xcellence-MOOC-benchmarks-v09.pdf

Siemens, G. (2012). MOOCs are really a platform. http://www.elearnspace.org/blog/2012/07/25/moocs-are-really-a-platform

Ubachs, G., Brown, T., Williams, K., Kess, P., Belt, P., Hezewijk, R., Boon, J., Wagemans, L., Rodrigo, C., Girona, C., Sola, S., Cabrera, C., Décherat, J.L., Marini, D.,Mulder, F.,Lõssenko, J., Läheb, R., Döri, T.,Arnhold, N., Riegler, K. (2007). Quality Assessment for E-learning a Benchmarking Approach (first edition). Heerlen: EADTU.

Weller, M. (2013). MOOCs & Quality. MOOC Quality Project, week 7. http://mooc.efquel.org/week-7-moocs-quality-by-martin-weller

Williams, K., Kear, K., Rosewell, J. (2012). Quality Assessment for E-learning a Benchmarking Approach (second edition). Heerlen, The Netherlands: European Association of Distance Teaching Universities (EADTU). http://e-xcellencelabel.eadtu.eu/tools/manual

Yang, D., Sinha, T., Adamson, D., & Rose, C. P. 2013. "Turn on, Tune in, Drop out": Anticipating student dropouts in Massive Open Online Courses. Standford research paper. http://lytics.stanford.edu/datadriveneducation/papers/yangetal.pdf