

MOOC Quality Evaluation System: Tomsk State University Experience

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Abstract. E-learning development comes with an increased attention to its quality that is managed via the control over not only the learners' knowledge but over the learning process, its organization and applied tools. This paper covers Tomsk State University experience in MOOC quality evaluation, in particular popular science MOOCs and specialized ones. The quality evaluation system implies the evaluation of the MOOC materials, the learning process and the results.

Keywords: Massive open online courses, MOOCs, MOOC quality evaluation, popular science MOOC, specialized MOOC

1 Introduction

A rapid e-learning development goes along with an increased attention to its quality. The quality management is based on the control over the knowledge that learners acquire, the learning process, its organization and applied means. The quality of education should meet the unified requirements regardless its forms and technologies. Quality management in education attracts great attention in the research projects devoted to the methodological issues of quality management [1, 2] as well as to the challenges on different levels of education in various contexts including e-learning management [3] and managing the quality of massive open online courses (hereafter MOOCs) [4]. In the e-learning quality management system there are some important quality indicators: of educational content (of the course materials), of learning technologies, of the learning process organization and the quality of the learning outcomes. The choice of the certain quality indicators and their groups depends on the extent to which they influence the quality of the e-learning process and could be quickly estimated for practical usage in the quality management system.

This paper is devoted to the MOOC quality management system elaborated at Tomsk State University (hereafter TSU) that combines expert and learner evaluation, platform analytics, ways of managing the e-learning quality indicators, modification of the MOOC materials during the learning process and after it basing on the analysis

of the learning outcomes. The study includes the empirical experience description, survey data processing, comparative analysis.

2 MOOC quality evaluation system

In the previous studies we have analyzed and described the tools and mechanisms for the e-learning quality management at a university [5], and the e-learning organizational model based on MOOCs in a classical university and their integration into the system of lifelong education [6].

Starting from 2014 TSU has been working on the project producing MOOCs that are available on Russian and international e-learning platforms [7]. Nowadays there are more than 30 courses produced by 45 authors and the project team.

Performing the project we came to the point that quantitative indicators are not as important as the qualitative ones. Researchers from the Caledonian Academy and Glasgow Caledonian University found out that the quality evaluation of online courses in majority of cases is based on the learners' opinion while they can hardly be seen as experts in quality of education [4]. We involve diverse stakeholders to evaluating MOOCs at TSU such as university authorities, managers of e-learning platforms, experts in the subject field, the project team, and the course learners. Margaryan and her colleagues have analyzed the quality of 76 MOOCs and revealed that they are of high organizational quality but their instructional quality is estimated at the level of 39% at best [4]. We pay special attention to teaching our faculty instructional design and MOOC management. For that purpose we regularly hold educational events, including annual Siberian MOOC Schools. This format implies lectures, workshops, training exercises, discussions and consultations on MOOC production, promotion and application. The School participants' final project is instructional design of their own future MOOC. When the School participants work on their final paper, we highlight that there are two major types of MOOCs, they are popular science and specialized. Depending on these types there are several parameters influencing course instructional design (see Table 1).

Table 1. Differences between popular science and specialized MOOCs.

Parameter	Popular science course	Specialized course
university objectives	university brand and promotion of the scientific school; enlightenment	monetization; integration into the basic educational programs
author's objectives	building a new worldview that is aimed at reflecting on the learner's place and role in the world	materials are aimed at learners who acquire professional knowledge and skills
support of the learning process	learning community is characterized with a higher level of independence from the instructor	instructor's participation as an expert in the field is crucial, in some cases mentors are required
required learning outcomes	reflecting on the knowledge acquired; acquiring cognitive skills	significant improvement of a learner in his/her professional position; relevance to the state standards (for the promotion or a credit shift)

These characteristics that differ one type of a MOOC from another, to our mind, impact the quality requirements to their materials, learning process and outcomes.

Quality evaluation system for online courses that is used at TSU includes the same criteria as in the wide spread systems such as the Quality Matters [8] and the EC-BCheck [9]. We will consider these criteria below in more details.

Quality of MOOC learning materials.

One of the effective ways of the learning materials quality evaluation is an expert evaluation provided by different specialists – both in the subject and in e-learning. MOOC expertise at our university includes two stages – when course is applied for production and when all the course materials are ready.

Step 1. Contest of applications for MOOC production

All MOOCs produced at TSU have been winners of a special contest. Table 2 shows who evaluates potential courses and according to which criteria.

Table 2. Evaluation of MOOC applications.

Materials in the application	Expert	Evaluation criteria
the course instructional design including the course type, objectives and outcomes, target audience, curriculum, and promo video script; ideas on the MOOC integration into educational programs; information about chargeable services based on the MOOC; trial video lecture; open application presentation (oral report, answering the questions asked by the contest committee)	university authority	university branding potential; possible recover value (by means of services built on this MOOC); potential to make the course in two languages
	education program supervisor	recruitment potential; potential for blended learning (it can be included into the educational program, the credit shift is possible, etc.); the MOOC is based on the results of the research performed at TSU; the author's qualification in the subject and in e-learning
	manager of the e-learning platform where courses are going to be launched	novelty; meeting the needs of the platform target audience; potential income from the chargeable services based on the course; focus on practical activities
	TSU project team	author's experience in taking MOOCs; well-written description of the course; particular goals and measurable learning outcomes; seeing one's target audience; diversified presentation of the learning material; diverse assignments; author's interest in one's subject, charisma in front of the camera and a pleasant narrative style

The contest winners get a grant for MOOC production. Our experience of four contests since 2014 proves that this selection system allows to significantly save costs in course production. The contest helps defining the authors who would develop campus

e-learning, as far as those candidates who don't win the contest are suggested to make a SPOC first. If the SPOC is popular among learners it can be launched on a platform as a MOOC.

Step 2. Expertise of the MOOC materials.

After the contest the author and the project team starts working on the full pack of the MOOC materials (the course home page, video scripts, assignments, list of resources, additional materials and so on). We invite specialists in the subject field to evaluate the course materials. If the course receives a negative feedback, it comes back to the author for the improvement. If the author disagrees with the expert conclusion or the experts fail to reach consensus about the course we call for an additional expert evaluation to make a final decision.

If the course gets a positive feedback we continue our work with it and start recording and assembling the video lectures. Before launching the course we send 2-3 lectures and all of the course materials to the e-learning platform specialists to get their quality evaluation.

On uploading the MOOC material onto the platform, the course is subjected to the beta-testers evaluation who are students of the correspondent specialty at our university or volunteers.

Quality of the learning process.

The quality indicators measuring the learning process and relevant pedagogical communications are the most difficult ones.

The analysis of MOOC quality during the process is aimed at defining weak course elements and correcting them before the course is over, so that the learning process goes on without interruption. The following data sources are used for such an analysis: a) statistics retrieved from the course admin board, b) feedback from the MOOC learners (messages to the course administrators, forum posts, course rating with a comment, learner success stories), c) feedback from the MOOC authors who decide on the effectiveness of the course elements, methods, etc. This information helps us improving the quality of the MOOC only if the course author and the university MOOC team are highly professional. The main requirement at this stage is that the changes should not deprive the learners of the progress they have already achieved.

The most effective and frequently used course changes are: correcting tasks with a high percentage of learners' mistakes, uploading additional materials aimed to set lack of learners' knowledge off, posting new discussion forums to clarify troublesome issues of the material, updating the course information on the course home page.

We have several examples of changing the course during the learning process and improving it for the learners enrolled though they were not expected as the course target group. "Amazing World of Geography" has been made for schoolchildren but have attracted a lot of teachers. These learners have been invited for a new chargeable continuing teaching education program at the end of which they were awarded with a formal TSU certificate. 100 teachers out of 5241 learners have completed this program in two years. Another MOOC "Probability Theory – Science of Chance" showed that the assignments were not challenging for the learners. The reason for that has been found in the opening survey results – the background of learners was much higher than it was expected. The authors had to design new more difficult assignments for the course and upload it into the course immediately.

Quality of the learning outcomes.

The third step in MOOC quality analysis takes place after the course is over and the results of learning process are available. For this purpose, we use statistical data collected from the platform and the results of the final survey.

Answering the survey is not a must. There are only 1499 replies out of 3238 of those who completed our courses as we write. But this data sample is representative enough, the confidence interval is 99,7%. This survey results are the following: 88,5% considers video lectures as the most useful MOOC elements, 75% rates tasks, tests and additional materials as helpful elements, 80% is satisfied with the depth of course content, 87% considers a high level of instructors' expertise, 83% plans to use the MOOC materials in one's professional activity, and 94% will recommend the MOOC to the friends.

The final survey also includes question about learners' recommendations on the MOOC quality. The learners' insights are discussed with the author and the project team, and it may be taken into account during the next changing session.

According to the survey results the following changes can be made: 1) the course description (e.g. target audience, required background, estimated engagement time), 2) tasks or the threshold, 3) promotion tools if it is found that the course is interesting and highly effective for a certain group of learners who haven't been taken into account earlier, 4) the course assistance regime.

Having analyzed the learners' replies for the final survey, we came to the conclusion that the average quality evaluation of popular science and specialized MOOCs are different. Lectures in popular science MOOCs are appreciated for easy language and artful videos, lectures in specialized MOOCs are evaluated for the instructor's expert opinion. Assignments for the first type of learners are optional activity, it is a quiz checking the basic concepts in the lecture, while learners of the second type consider them as a tool for checking professional knowledge and skills. The requirements to the instructor's level of competence and the depth of the material dramatically differ and influence the marks that those learners give to the course in the final survey. That is why the criteria for quality evaluation of MOOCs should not be unified. There should be at least two sets of criteria – for a popular science and a specialized MOOC.

3 Conclusion

Today MOOC evaluation systems are freely accessible in the web. The MOOC evaluation system used at TSU has been developed at the dawn of MOOCs in Russia on the basis of the system for assessing e-learning. The requirements to MOOC materials hardly differ from those for any electronic course. What is special about MOOCs is their "massive" characteristic. The data derived from the surveys completed by learners and data analytics provided by an e-learning platform can hardly be overestimated. The data sample is huge and difficult to analyze but it is representative enough to provide a foundation for data-driven decisions aimed at improving the quality of MOOCs. This sample data analysis performed by TSU revealed a significant difference between the quality evaluation of different MOOCs – popular science

and specialized courses. This led us to the conclusion that the quality criteria for courses of diverse types should be different.

Acknowledgments. The project “Development of educational online projects at TSU” is being supported by the Ministry of Education and Science of the Russian Federation in the framework of Competitiveness Improvement Programme of the leading Russian universities (5-100 Programme).

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