Collaborative Calibrated Peer Assessment in Massive Open Online Courses

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ABSTRACT

The free nature and open access courses in the Massive Open Online Courses (MOOC) allow the facilities of disseminating information for a large number of participants. However, the “massive” propriety can generate many pedagogical problems, such as the assessment of learners, which is considered as the major difficulty facing in the MOOC. In fact, the immense number of learners who exceeded in some MOOC the hundreds of thousands make the instructors’ evaluation of students’ production quite impossible. In this work, the authors present a new approach for assessing the learners’ production in MOOC. This approach combines the peer assessment with the collaborative learning and the calibrated method. It aims at increasing the degree of trust in peer-assessment. For evaluating the proposed approach, the authors implemented a MOOC dedicated for learning algorithms. In addition, an experiment was conducted during two months for knowing the effects of the proposed approach. The obtained results are presented in this paper. They are judged as very interesting and encouraging.

KEYWORDS
Calibrated Peer Review, Collaborative Assessment, Learner’s Model, Learners Grouping, Learning, Massive Open Online Courses, MOOC, Peer Assessment, Peer Grading

1. INTRODUCTION AND MOTIVATION

Over the past recent years, MOOCs (Massive Open Online Courses) have become the modern trend of e-learning. They have become important tools to support the learning of several thousands of learners or apprentices simultaneously and have opened several new areas of research. According to Siemens (2013), MOOCs are a continuation of innovation made in using technology for supporting distance and online learning to provide many learning opportunities for a large number of learners.

The MOOCs are usually limited in time, organized online (the entire course can be taken online: courses, activities, home works, exams, etc.) and open to a large public regardless of origin, level of education or other criteria, specified on a precise theme which can accommodate thousands or tens of thousands of participants (Cisel & Bruillard, 2013). They include a comprehensive set of educational resources with pedagogical objectives, interactions modalities, exercises and exams possibly leading to certification. Furthermore, they involve a teaching staff responsible for learners’ supervision and smooth running of the course (Cisel & Bruillard, 2013).

The free nature and open access courses allow the ease of disseminating information for the massive number of participants over the world. Anyone with an Internet connection can watch videos of a course. Furthermore, he can download the study materials and benefit from the high-quality education of prestigious universities worldwide such as Harvard, MIT and Stanford. However, the
massive number of learners who exceeded in some MOOCs several thousands of learners generates many pedagogical problems such as the limited interaction with the teachers, the increase of the abundant rate and the difficulty of assessing learners’ productions (Hone & El Said, 2016).

The assessment of learners is one of the major difficulties encountered in MOOCs (Bachelet & Cisel, 2013). This difficulty is due mainly to the massive number of participants. In this situation, the instructors and the administrative staff become unable to assess all learners’ productions (Sandeen, 2013). The type of questions asked is another difficulty encountered in the MOOCs. In fact, there are some examples of exercises like open-ended ones or essays where the automatic assessment is impossible because these questions require a human reflection to understand the solutions (Sandeen, 2013). So, who can evaluate the works of thousands of learners in MOOCs?

Recently, assessing learners in the MOOCs increases the interest of many researchers (Admiraal et al., 2015; Balfour, 2013; Staubitz et al., 2016; Ren et al., 2016). They propose that it is better to delegate the assessment task to learners. In other words, learners can evaluate the productions of their peers (peer-assessment) (Luaces, 2015). The peer assessment represents an important solution to this new form of learning because it is the only situation where the number of correctors may be equal to the number of candidates.

Bachelet and Cisel (2013) argue that “…peer assessment is one of the major challenges of MOOCs because it is the main mechanism for assessing participants’ production as a scale of MOOCs when the automatic evaluation is not applied…” For Miao and Koper (2007), the peer assessment is “a special form of collaborative learning in which peer learners learn through assessing others’ work”. Several studies showed that peer assessment can also have benefits related to the quality of learning. According to Mirielli (2007), “…it is a powerful method for leveraging the learning processes in a variety of settings…” However, the peer assessment is often seen as not relevant. On one side, the participant does not have the required competencies to assess the works of his peers. On the other side, learners do not believe on their peers. So, an important question arises: how can we improve peer assessment in MOOCs?

To answer this question, we suggest to provide the learners with a set of tools and techniques to carry out the best assessment task. Thus, we propose to create for each learner an evaluator profile that represents his capacity to do the assessment task. Besides, learners can collaborate when assessing other learners’ productions. Many researchers considered the collaboration as a pedagogical activity that can ameliorate the learner’s level and degree of mastering a knowledge also known as cognitive profile. So, two main questions arise: (1) Does the cognitive profile of participants influence their evaluator profiles? (2) Does the collaborative calibrated method improve both the learner’s cognitive profile and the learner’s evaluator skills?

To answer these research questions, we propose a new approach for peer assessment of learners in the MOOCs that combines the peer assessment with both collaborative learning and calibrated method. In other words, our approach aims to benefit from the advantages of the peer assessment and those of the collaboration among learners in order to ensure the best form of assessment.

The rest of this paper is organized as follows. In section 2, we present the related works about the assessment in the MOOCs. The description of the proposed approach and the implemented MOOC are given in the section 3. In Section 4, we display the results and the analysis of an experiment, which was conducted in a higher-education institution. Finally, we present a conclusion and the future work.

2. ASSESSMENT IN MASSIVE OPEN ONLINE COURSES

Assessment is an important activity for evaluating the knowledge degree of a learner in any e-learning system (Ghatasteh, 2015). Several researchers focused on this main activity and how to do it (Butcher et al., 1995). Some researchers have used automatic assessment to evaluate their learners (Beg, 2014; Jordan, 2013; Stödberg, 2012). Other ones have used the peer assessment that was carried out by
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