CoFeeMOOC: Designing Contingent Feedback for Massive Open Online Courses

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Abstract. This workshop serves as an opportunity of reflection on the recurrent problems appearing in the design and the enactment of MOOCs in terms of providing feedback. Likewise, through this workshop hypothetical situations where learners have needed help will be presented and participants will be asked to reflect on how to cope with these situations. Moreover, this hands-on approach will lead us to deal around the different strategies that could be used to provide feedback, support, analysing their advantages and disadvantages.

Keywords: moocs · feedback · scaffolding · personalization

1 Introduction

Feedback as a means for scaffolding is a key aspect of learning and fundamental to socio-constructivist approaches for promoting a deep level of understanding (Sawyer, 2005). However, scaffolding and feedback alone are not enough for learning to take place. Vygotsky [13] made this explicit in connection to the Zone of Proximal Development (ZPD) that is the area in which a student can carry out a learning task if given appropriate scaffolding. Wood et. al. [15] introduced "contingent tutoring" in the context of scaffolding in human-to-human tutoring. They proposed that, in order for scaffolding to be effective, tutoring should maintain instructional, domain and temporal contingency. In other words, it should follow up with respect to the instructional strategy in place, it should provide help with respect to the learning goals and it should be provided in a timely manner [14]. Similarly, Koedinger, and Aleven [7] explored scaffolding (using the term "Assistance Dilemma") in the context of providing automated hints and feedback to students who practice their skills using Intelligent Tutoring Systems (ITSs).

1.1 Relevance for TEL

Teachers dynamically adapt the level of feedback in order to meet students' needs [16]. To achieve that, teachers monitor and assess students' knowledge and cognitive state using verbal (students' questions and responses) and non-verbal cues (facial expressions or gestures) [10]. However, in online learning environments,

such as Massive Open Online Courses (MOOCs), this direct interaction may be hard to monitor or altogether absent. Also, the use of technology introduces additional factors - such as technology failures, need for structured communication and coordination between teachers, learners and peers - that can affect the way we provide feedback. In this workshop, we will focus on the design of contingent feedback for MOOCs. MOOC participants often tackle problems that, if unsolved, can lead to course disengagement and dropout [1,11,12]. Usually students report problems in the course's discussion forums, but they do not get the attention they require due to (among others) MOOC-specific aspects, such as:

- High instruction-learners ratio: The massive nature of MOOCs makes unmanageable (a) the manual answering to learners' posts in discussion forums [11] and (b) the learners' tracking regarding their course involvement, progress and difficulties [2];
- Population´s diversity: The heterogeneity regarding learners' knowledge, background and culture constraints the provision of generic support without meeting the individual needs of participants [5,9];
- Instructors' high workload: Assisting learners is one of the instructors' tasks during course run-time, along with a) the implementation of the course components, b) the course supervision overcoming technical or other unexpected issues, c) the promotion of the participants communication [17].

On one hand, designing feedback for MOOCs cannot be addressed as in human-to-human tutoring due to the above-mentioned aspects. On the other hand, designing scaffolding following ITSs approaches is not appropriate since human factors (such as the role of the teacher and the peers) are important aspects of MOOCs. So far, research focuses on Learning Analytics to identify the students who may need scaffolding and to assess what kind of feedback is appropriate for their needs. However, empirical research suggests that the Learning Analytics methods used to provide feedback are not based on established pedagogical strategies for instruction [6] and it may inhibit learning instead of enabling it [3]. In order to move forward towards providing appropriate feedback in MOOCs, we identify three critical points:

1. To pinpoint the context-specific aspects that come into play regarding scaffolding in MOOCs and to investigate their impact on designing feedback;
2. To explore the role of learning analytics in delivering feedback. For example, how can we employ learning analytics to identify struggling learners in need of scaffolding or to design personalized feedback;
3. To develop guidelines for designing scaffolding and delivering contextualized feedback in MOOCs.

During the workshop, we will address these points using real-life scenarios and we will demonstrate how to provide personalized interventions designed for MOOCs. In particular, we will apply various computational algorithms and visualizations on existing data and attempt to interpret findings based on established educational theories. This workshop hopes to contribute to bridging the gap between pedagogical theory and practice when it comes to scaffolding in MOOCs.

2 Motivation for research

Covid-19 pandemic outbreak has posed radical challenges in worldwide education shifting learning from the traditional in-person teaching to online settings. Under such circumstances, MOOCs have gained a lot of attention not only as a lifelong learning opportunity for individuals[3], but also as a solution for remote learning addressing K12 and university sectors[4]. MOOCs are conceived as a form of democratizing education by providing global learning opportunities without geographical and cost restrictions. Nevertheless, since their existence, MOOCs are criticized for their pedagogical constraints affecting courses' quality [8]. The lack of timely and effective feedback due to the large number of participants is one of them. Feedback is considered an aspect with high impact in the learning process shaping considerably the learners-to-tutor and learners-to-learners interaction [4]. The high interest in MOOCs and their current adoption from primary to tertiary levels, require a careful design and application on the provision of appropriate feedback practices. This workshop serves as an opportunity of reflection on the recurrent problems appearing in the design and the enactment of MOOCs in terms of providing feedback. Likewise, through this workshop hypothetical situations where learners have needed help will be presented and participants will be asked to reflect on how to cope with these situations. Moreover, this hands-on approach will lead us to deal around the different strategies that could be used to provide feedback, support, analysing their advantages and disadvantages.

3 Previous related events

We have carried out two previous editions of this workshop series, as following:

- Nordic Learning Analytics Summer Institute (LASI Nordic) 2019, Workshop Title: "Using Learning Analytics to Design Appropriate, Student-Centered Feedback [5]
- Eapril 2019, Workshop Title: "Using Learning Analytics to Design Personalized and Adaptive Feedback for Higher Education"[6]

Furthermore, the proposed workshop builds on prior work presented in the ECTEL 2019 poster session regarding the identification of parameters that could facilitate the detection of struggling learners during the course run-time. The study received the Best Poster Award of the conference[7].

[3] https://www.classcentral.com/report/mooc-providers-response-to-the-pandemic/
[4] https://www.classcentral.com/report/china-moocs-coronavirus/
[5] http://colaps-project.info/?page_id=130
[6] https://colaps-project.info/?page_id=131
[7] http://ectel2019.httc.de/index.php?id=918

4 About the CoFeeMOOC Workshop

4.1 Workshop goals

This workshop aims to:

1. familiarize participants with the current identification of learners facing difficulties, feedback and support techniques regularly applied in MOOC contexts;
2. highlight the importance of addressing potential student problems together with the learning design of the course, and;
3. reflect on specific feedback strategies based on learners' behaviour evidences.

4.2 Expected participants

We expect approximately 10-20 participants with a research background in learning analytics, online learning, MOOCs, and MOOC practitioners .

4.3 Expected outcomes

Including both concrete outputs from the workshops, as well as plans for publication of proceedings or extended versions and special issues This workshop will help participants to:

- acquire practical understanding of the overarching challenges that learners face through the MOOC experience by taking/teaching a course respectively,
- reflect on how to support learners who face problems during the course runtime and,
- to collect a set of support practices (per presented scenario) in MOOC contexts The produced materials and knowledge as well as the work process will be documented and distributed in the form of a report. This workshop will help the researchers to gain insights with respect to instructors' use of data or log file indicators for the identification of struggling students and instructors' decision-making strategies for providing appropriate feedback

4.4 Workshop format

For this workshop, we will invite participants to submit their contributions (papers, short papers) on the topics (designing feedback as a means for scaffolding in online learning contexts, with an emphasis on MOOCs). The workshop will be divided into the following stages. Figure 1 depicts the workshop´s timeline.

1. First, we will introduce the topic and the participants will present an overview of their contributions in the form of a 1-minute-madness. Estimated duration: 60 minutes;

2. Then, we will follow up with a hands-on activity. During this activity, participants will be split into groups (3 to 5 participants per group). Each group will be presented a different scenario. For example, *scenario example*. For these scenarios, we will ask the groups to work together in order to design appropriate scaffolding interventions in the form of feedback. Estimated duration: 30 minutes;
3. Next, each group will present their interventions and rationale to the rest of the participants. We will carry out a focus group discussion to elaborate on the pros and cons of each intervention and its applicability in situ. Interventions will be refined and finalized with the contribution of the participants. Estimated duration: 30 minutes.

The final interventions and the design process will be documented and after the end of the workshop we will openly distribute them in the form of "lessons learnt".

The proposed workshop will run as an online event. We will use an online conference system (to be decided after discussion with the conference organizers and the workshops chairs) to facilitate the workshop - including additional video recordings for the participants' talks. We explore the possibility of using virtual breakout rooms for enabling the group discussions and the assignment of facilitators for each breakout room to orchestrate the activities. Additionally, we will use online tools, such as shared workspaces for the collaborative creation of concept maps and argument diagrams and online polls, to document participants' opinions, in order to support groups' activity.

5 Discussion

5.1 Workshop Follow-up

The Workshop on Designing Contingent Feedback for Massive Open Online Courses (CoFeeMOOC 2020[8]) was held during the 15th European Conference on Technology Enhanced Learning (EC-TEL 2020). The workshop's objective was to explore the design of contingent feedback for personalized scaffolding in MOOCs.

MOOC participants often tackle problems that, if unsolved, can lead to course disengagement and dropout. Usually, students report problems in the course's discussion forums, but they do not get the attention they require due to - among others - MOOC-specific aspects, such as a) the high instruction-learners ratio, b) the population´s diversity, and c) the instructors' high workload.

The high interest in MOOCs and their current adoption from primary to tertiary levels due to the Covid-19 pandemic outbreak require careful design and application on the provision of appropriate feedback practices. This workshop aimed to:

[8] `https://sites.google.com/view/cofeemooc2020/`

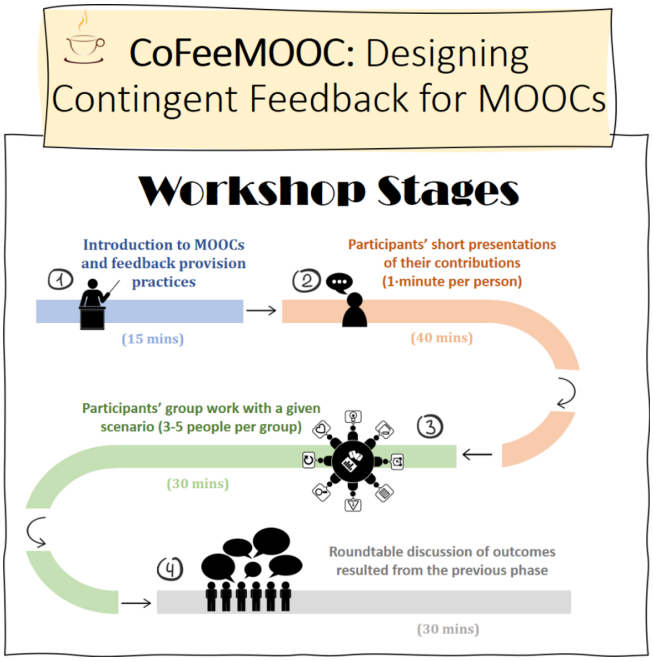

Fig. 1. Workshop´s timeline representation.

- familiarize participants with the current identification of learners facing difficulties, feedback and support techniques regularly applied in MOOC contexts;
- highlight the importance of addressing potential student problems together with the learning design of the course, and;
- reflect on specific feedback strategies based on learners' behavior evidence.

5.2 Summary of the Event

During the workshop, participants were introduced to a set of 4 commonly-reported problems that learners face in MOOC settings. Namely, we focused on the following:

1. misconceptions of the presented course concepts;
2. lack of coordination in group activities;
3. difficulties in understanding due to lower participants' background knowledge;
4. self-regulation/ time-planning issues.

Afterward, workshop participants were asked to discuss and propose appropriate support for each problem, acting as MOOC instructors. To demonstrate each problem, we developed four scenarios in which learners communicated their

problems in various ways, such as discussion forums or emails. Contextual and data analytics information was given to provide information about the problem to workshop participants. At the end of each scenario, we followed up with a set of 5 to 6 questions aiming to explore the role of contextual analytics and to gather participants' input regarding personalized support in situ.

5.3 Aftermath

Participants' previous experience regarding the enrollment and provision of online courses and MOOCs, allowed the exchange of interesting ideas and thoughts. In 3 out of 4 scenarios, the provision of learners' data analytics seemed critical to provide insight regarding the problem and to decide for an appropriate feedback strategy. Participants' proposals regarding feedback aimed at:

- The provision of support on different levels;
- The creation of critical points for the instructor;
- The consideration of learning design when delivering feedback.

More specifically, participants proposed the provision of different levels of support (ranging from generic to personalized one) according to learners' prior practice and background knowledge. Participants pointed out that the configuration of critical-checkpoints during the design phase in the different course modules can be a rich source of information for the instructors regarding learners' overall progress without the need to individually check multiple learning indicators during course run-time. Except for the data analytics, a reflection on the course learning design (i.e., the connection of each module with the next one, or the course videos with the assignments) was considered an important factor that should be taken into account. In the case of big audiences, participants proposed the creation of policies during the design phase of the course with pre-established feedback options for the learners. Finally, alternative strategies of feedback regarded the preparation of additional activities for learners targeting their learning background and the application of various learning paths for learners with different goals and needs. Overall, the workshop gave us the opportunity of fruitful discussion on the topic of feedback in MOOCs and set the perspectives for future research work. We would like to thank all the participants who joined, the ECTEL Workshop Chairs and the ECTEL and DELFI Organizers for making this possible.

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