Is Small Group Collaboration Beneficial in Large Scale Online Courses? An Investigation of Factors Influencing Satisfaction and Performance in GroupMOOCs

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Abstract: The paper analyzes students' experience within a large scale e-learning course in a higher education setting. During the course students worked on successive assignments individually or in groups of three students in an alternating fashion. Captured data include students' platform behavior (login, resource accesses, e.g., literature access, video access, active days, completed quizzes, resource coverage), students' final course grade as well as learning preferences, intrinsic motivation and satisfaction assessed via questionnaire. Results reveal that of those variables the satisfaction with the collaborative tasks is merely related to students' overall course evaluation.

Keywords: MOOC, e-learning, collaboration

Introduction

Massive open online courses (MOOCs) support a "large-scale interactive participation" (Conole, 2013, p. 6) and have received more and more attention from the academic community (Khalil & Ebner, 2014). These online courses attempt to create interactivity between the participants by means of offering discussion forums (Conole, 2013) and increasingly also by incorporating collaborative tasks which are seen as an opportunity for participants to engage with the course and the learning material. Further, it was demonstrated that interactivity, (e.g., discussion forums) is related to higher academic performance (Anderson, Huttenlocher, Kleinberg, & Lescovec, 2014). In MOOCs collaboration between students typically takes place in a plenary discussion forum. Though these discussion forums allow interaction, only a small proportion of students take advantage of it (Kizilcec, Schneider, Cohen, & McFarland, 2014). A subcategory of MOOCs that makes particular use of this aspect is groupMOOCs "where the focus is on collaboration in small groups" (Conole, 2013, p. 9). Small-group learning tasks can be beneficial as they can support task processing and problem solving (Ku, Tseng, & Akarasriworn, 2013). Additionally, it has been shown in several studies that collaborative tasks give rise to higher levels of satisfaction of students' learning process (Bolinger, 2004), and that students are more satisfied with their online course if they perceived higher levels of collaborative learning (So & Brush, 2008). This can be seen as especially important because satisfaction increases students' motivation to participate (Bolinger, 2004). However, there are certainly also problems with regard to group work. Roberts and McInnerney (2007) summarized the seven most common problems and highlighted students' general antipathy towards group work. Well-known phenomena in group work include problems like social loafing and free-riding (e.g., Piezon & Donaldson, 2005).

The goal of the study was to determine the possible influence of group tasks and individual task-related satisfaction on overall course evaluation and performance. In order to understand which aspects are related to students' general satisfaction with the course as well as to their general performance in the course we first conducted an explorative analysis. The goal was to analyze how students' learning preferences (cooperative, individualistic, competitive), prior intrinsic motivation, as well as specific behavior during the course (literature access, active days, video access, completed quizzes and resource coverage) were related to individually perceived satisfaction and overall performance as assessed via the final course grade.

On the basis of these prior considerations, we formulated the following research questions:

RQ1: Are intrinsic motivation, learning preferences and behavior on the online platform (literature access, active days, video access, completed quizzes and resource coverage) related to course satisfaction?

RQ2: Are intrinsic motivation, learning preferences and behavior on the online platform related to the final course grade?

In accordance with the assumption that a beneficial perception of collaboration and satisfaction with the course are correlated positively we derived the following hypothesis:

H1: The satisfaction with a collaborative task is positively related to students' overall course satisfaction.

As stated by Anderson and colleges (2014) interactivity (e.g., discussion forums) is related to higher academic performance and collaboration can foster academic engagement (Wentzel & Watkins, 2002). Therefore, we hypothesized that:

H2: The satisfaction with a collaborative task is related to students' final course grade.

Additionally, we strived to understand whether the learning preferences with regard to collaboration affect the satisfaction with the collaborative task as well as moderate the relation of satisfaction with the group task and overall course evaluation:

H3: Learning preference for collaborative learning is positively related to the satisfaction with the collaborative task.

H4: The individual learning preference for collaborative learning moderates the relation of satisfaction with the group task and overall course evaluation.

Methods

This study was conducted during an online seminar at the University of Duisburg-Essen and Ruhr-University Bochum over a period of one semester. Students of different study programs (and faculties) participated in this course. We chose Moodle as our platform, which is commonly used by universities and designed to support teaching as well as learning. This platform delivers a large number of learner-centric tools and collaborative learning environments. Furthermore, to facilitate typical MOOC features, our Moodle platform was customized by adaptation and configuration of a collection of existing tools for individual and collaborative learning.

Before participation in the course students were asked to provide informed consent to the usage of their behavioral data logged by the platform for research purposes (157 or 90.2% students agreed). The students' log files contained timestamped information about the login, resource accesses, e.g., literature access, video access, completed quizzes, and participation in questionnaires. The recorded actions of each type were counted for each week of the course. Further measures i.e., active days and resource coverage (subset of course material that a student has actually used) in the corresponding week were calculated. Based on the personal platform ID of every single student, it was possible to assign log files to surveys thereby providing the opportunity to analyze relations between self-reported data and process measures.

In a time period from week 6 to 10 students completed two collaborative and two individual tasks. In both tasks students should submit a text regarding a case scenario that was based on a weekly topic regarding computer-mediated communication (e.g., social interdependence theory). In the collaborative task students had to discuss theoretical aspects, their ideas, and their final submission in a forum with 2-3 fellow students whereas students of the individual task had no opportunity to discuss their ideas. Subjective satisfaction with the type of the task was surveyed, however, only data from two weeks (9 and 10) could be used due to a database error.

Students participated in several online questionnaires. Students were asked about the completed task and whether they preferred to complete the task collaboratively or individually. The questionnaire consisted of 12 ad-hoc items on a 7-point Likert scale (ranging from 1 = strongly disagree to 7 = strongly agree). With an exploratory factor analysis using Horn procedure (Fabrigar, Wegener, MacCallum, & Strahan, 1999) two factors were determined. Factor 1 consisted of 9 items indicating *liking group work* (e.g., "I liked to work on this task with others") with an internal consistency of .93 (Cronbach's α). Factor 2 consisted of 3 items indicating *exhaustion* (e.g., "Working with others was exhausting"; Cronbach's α = .74).

We assessed intrinsic motivation of the students at the beginning of the course using 5 items from the academic self-regulation questionnaire (SRQ-A) by Müller, Hanfstingl, and Andreitz (2007) ranging from 1 = strongly disagree to 5 = strongly agree (e.g., "I am learning in this online lecture because I find it fun"; Cronbach's α = .88).

Further, we employed Johnson and Norem-Hebeisen's (1979) measure of cooperative (7 items, e.g., "I like to help other students learn"; Cronbach's α = .86), competitive (8 items, e.g., "I like to do better work than