

published as: Thomas Staubitz, Hanadi Traifeh, Christoph Meinel: Team Based Assignments in MOOCs – User Feedback, In Proceedings of Fifth Annual IEEE Conference on Learning with MOOCs (LWMOOCs2018), 26-28 September, 2018, Madrid, Spain

# Team-Based Assignments in MOOCs – User Feedback

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**Abstract**—With the increasing use of graded team-based assignments on our MOOC platforms—openHPI, openSAP, and mooc.house—we see the need to consult the opinion of our course participants about their perception of these tasks and the sufficiency of the platform support. Since we introduced the feature in May 2016, seven courses that included team-based assignments have been conducted on our platforms. In four of these courses, we have conducted qualitative and quantitative surveys among the participants. The paper at hand presents and discusses the results of these surveys.

**Keywords**—Teamwork, MOOC, Peer Assessment, Team Formation, Collaborative Work, Teamwork

## I. INTRODUCTION

All of our platforms—openHPI<sup>1</sup>, openSAP<sup>2</sup>, openWHO<sup>3</sup>, and mooc.house<sup>4</sup>—are powered by the same MOOC management system (MMS), which we are developing since 2013. The platforms differ in the background of the institution providing the courses. The courses on openHPI are offered by the Hasso Plattner Institute and have an academic background, openSAP is run by SAP<sup>5</sup>, a global enterprise; and mooc.house is our white label solution for those that do not want to run a platform of their own.

In 2016, we introduced a new feature to our platform that allows the participants to work on graded, project-based assignments in teams. The feature basically consists of three components:

1. A tool to match the participants in teams according to a set of configurable criteria. We call this tool “*The TeamBuilder*”, a standalone tool attached to our platforms via the learning tools interoperability (LTI)<sup>6</sup> interface.
2. A toolbox to enable the so-formed teams to communicate and collaborate. This toolbox is an integral feature of our MMS. We call it “*The Collab Space*”. Basically, it is a set of tools under a joint user interface. *Google Hangouts*<sup>7</sup> enable synchronous video chats, *Etherpad*<sup>8</sup> allows the participants to collaboratively work on texts. A private discussion forum enables the participants to communicate asynchronously. Furthermore, *the Collab Space* offers a community management tool and some basic filesharing options.
3. A tool that allows to peer-grade the handed-in team-based assignments. The peer assessment feature is an

integral part of our platform since early 2015. It has been expanded to support team-based tasks in 2016.

See [1] for more detailed information about the complete toolset, including the *Teambuilder*, the *Collab Spaces*, and the *(Team) Peer Assessment*.

So far, we employed graded team-based assignments in seven courses. In four of these courses we have conducted surveys among the users who participated in the team task. Additionally, we have conducted detailed 1-hour interviews with 14 participants of one of the courses and are preparing a new round of interviews with participants of the most recent course. The paper at hand examines the results of the surveys and provides a peek preview to the interviews where appropriate. An in-depth evaluation of the interviews, however, is beyond the scope of this paper and will be published separately.

## Research Questions:

1. Do the users prefer to select their team partners themselves or would they rather like their teams to be built by the instructors. Kizilcec calls these approaches *laissez-faire* and *interventionist* [2].
2. Are the communication and collaboration tools provided by the *Collab Spaces* sufficient to solve the tasks? What other tools are the participants using? Do we need to integrate further collaboration tools or communication channels?
3. We evaluate the participants’ opinion on mentor-support for the teams. According to Vygotsky [3], guidance by mentors leads to faster and better learning results, but will the learners appreciate the effort, maybe even be willing to pay for such a service?

## II. COURSE SETTINGS AND ASSIGNMENTS

We evaluate the surveys that we have conducted among the users of four courses that featured team peer assessments on three instances of our platform. The course *Enabling Entrepreneurs to Shape a Better World (sbw1)* offered by openSAP and the Global Entrepreneurship Summer School<sup>9</sup> was running in May 2016 on the openSAP platform. The courses *Objektorientierte Programmierung in Java (javaEinstieg2017)*<sup>10</sup> and the follow-up workshop *Einführung in eine Java-Programmierungsumgebung (javawork2017)*<sup>11</sup> were offered on the openHPI platform in the spring of 2017, and

<sup>1</sup> <https://open.hpi.de>

<sup>2</sup> <https://open.sap.com>

<sup>3</sup> <https://openwho.org>

<sup>4</sup> <https://mooc.house>

<sup>5</sup> <https://www.sap.com/index.html>

<sup>6</sup> <http://www.imsglobal.org/activity/learning-tools-interoperability>

<sup>7</sup> <https://hangouts.google.com/>

<sup>8</sup> <http://etherpad.org/>

<sup>9</sup> <https://globalsummerschool.org/>

<sup>10</sup> Object Oriented Programming in Java

<sup>11</sup> Introduction to an Integrated Development Environment

*Intrapreneurship(bizmooc2018)* offered by the BizMOOC project<sup>12</sup> was running in spring 2018 on the mooc.house platform. In this section we will briefly introduce the courses, the target groups, the tasks to be solved, and the team matching criteria. All of the team-based tasks have been graded by means of (team) peer assessment (see [1] for a detailed description of the mechanism).

#### A. *sbwl*

The course was offered in English and targeted “people from all disciplines with an interest in entrepreneurship.” 10,124 learners were enrolled, 5,088 of them were active participants in the course<sup>13</sup>. 967 records have been issued, resulting in a completion rate of 19%. About 84% of the participants<sup>14</sup> had a professional background, 55% of those were in leadership positions. 3% were academic researchers or teachers, most of them also in senior positions. 13% were students. 68% had more than 5 years of professional experience. The participants had to choose from the topics: Migration in Mexico, in China, or in Europe. The selected topic and the participant’s time-zone have been the matching criteria for the teams. Their task was to develop an idea for a social innovation. The deliverable was a pdf document containing a pitch for the innovation including a business model. The teams started to work on the task early in the course and had to submit several mentor-reviewed milestones before handing in their final version for peer assessment. The team task was offered as an optional Special Track. 253 (5%) of the course participants registered for the Special Track, 240 of them have been admitted. The results of this course’s quantitative and qualitative surveys inspired the further research that was conducted for the paper at hand.

#### B. *javaEinstieg2017*

The course was offered in German language and targeted programming novices and experienced programmers with a non-object-oriented background. 70%<sup>15</sup> of the participants had a professional background, 30% of those were in a leadership position, another 30% were technicians. 46% had more than ten years of professional experience, another 22% more than 5 years. The team-based assignment started towards the end of the course. It was optional and provided only a few bonus points. The task was to model a small Java application in an UML-like<sup>16</sup> structure, including a glossary of the most important terms used in the application. The matching criterion was the time that the participants had committed for the assignment. 9,242 users enrolled, 6,610 of them were active participants in the course. 2,124 participants (32%) completed the course with a certificate. 1,515 (23%) participants registered for the team task.

#### C. *javawork2017*

This course extended the course *javaEinstieg2017* with a two-week workshop to apply the previously learned competences in a programming project. The participants had the option to work on the project individually or in a team of two. Contrary to the other examined courses, they had to choose their own team partners. We considered this to be appropriate as the main target group of this course were the successful participants of *javaEinstieg2017*, which was

running about two weeks earlier. We encouraged the participants to work with their teammates from the previous course, friends, or family. Alternatively they had the option to work on the task alone. The project was mandatory and provided 100% of the available course score. A bonus multiple choice quiz was provided to make up for missing points. 4,112 learners were enrolled, 1,481 of them participated. 194 certificates were issued (completion rate 13%.) 188 out of 463 participants (40%), who started to work on the assignment alone submitted a solution. 34 of 40 (85%) of those who worked in a team submitted a solution.

#### D. *bizmooc2018*

The course was offered in English and targeted a business audience: higher and middle management and technicians. It featured a fast-track with a duration of 4-weeks that additionally to the videos, contained many interactive and communicative elements. For the full-track, the participants additionally had to complete a team-based assignment and received a different certificate. 2,792 learners were enrolled, 1,897 active participants. 381 certificates were issued (completion rate: 20%.) 156 participants (8%) registered for the full track with the team task. This course contained a very detailed pre-course survey about the participants’ background and motivation. 60% of the participants had a professional background, another 20% were students. Friedl, Staubitz, and Jansen [4] provide an in-depth analysis of this data. The task to be solved by the participants was to pitch an intrapreneurship business idea within a fictitious company. The participants were allowed to hand in either a video or a slide deck.

### III. SURVEY EVALUATION

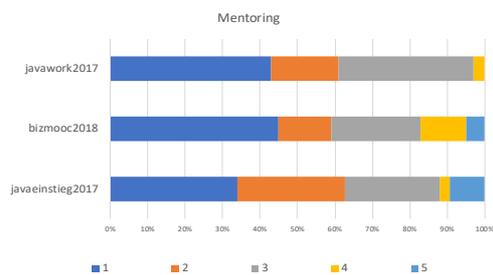


Fig. 2. Post-teamwork surveys *javaEinstieg2017* (n=340), *bizmooc2018* (n=42), *javawork2017* (n=23) Which statement describes best your opinion on mentoring for the team tasks: (1)-We did not need a mentor. We got along very well. (2)-Teamwork did not happen. A mentor wouldn’t have helped. (3)-A pro-bono mentor (e.g. a participant of a previous course) would have been helpful. (4)-A professional mentor would have been helpful. I would be willing to pay for such a service. (5)-No answer.

find teammates on your own (laissez-faire)?

In 2016, *sbwl* was the first course on our platforms featuring a team-based assignment. A survey was conducted to determine if the learners liked to work in teams and their opinion about the learning outcomes. Staubitz and Meinel have already discussed some of the results in [1]. Overall, the participants have been satisfied with the team assignment. The majority considered the task relevant, manageable, and

<sup>12</sup> <http://bizmooc.eu>

<sup>13</sup> We generally calculate with enrollments and show-rates at course middle as only participants that have enrolled up to that point have a realistic chance to finish the course with a certificate. In earlier papers we sometimes have used the enrollment numbers at the end of the course. Active participants have at least visited one of the course’s learning items.

<sup>14</sup> This information is available for 30% of the enrolled participants.

<sup>15</sup> This information is available for 27% of the enrolled participants.

<sup>16</sup> Unified Modeling Language.

suitable for virtual teamwork and enjoyed working in a team. The survey also contained a “What did you like, what should be changed” section providing some more qualitative feedback. On the positive side, the participants mainly mentioned that they liked to work in international teams with people from different educational and cultural backgrounds. Other positive statements mentioned the possibility to work on a relevant task in a team:

*It was an amazing way to practice the material and gain a lot of insights about myself and the challenges on the way*

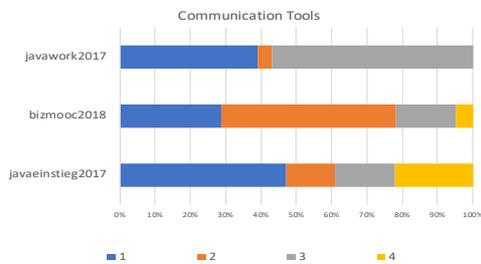


Fig. 4. Post-teamwork surveys *javaeinstieg2017* (n=340), *bizmooc2018* (n=42), *javawork2017* (n=23) Have the provided communication tools (Teamforum, Hangouts, TogetherJS, Chat in the Etherpad) been sufficient to solve the task? (1)-We only used the communication channels in the Collab Spaces. This worked well for us. (2)-We only used the communication channels in the Collab Spaces. They were in no way sufficient. (3)-In addition to the tools in the Collab Spaces, we used other communication channels. (4)-No answer.

*to become an entrepreneur.*

The survey also revealed, however, that the mentoring-related questions received less positive feedback. Two regularly mentioned issues that were requested to be changed were more time to solve the tasks and the relation to the mentors.

*Mentors should have good role to play. Initially we have great problem with mentor.*

*Also, I thing Mentors should be choosen carefully.*<sup>17</sup>

Another issue that has been mentioned quite regularly, was tensions and frustrations resulting from different time commitments of the team members and drop-outs in the teams. We have addressed the first issue by adding the time commitment as a matching criterion to the *TeamBuilder*. In [5] we have discussed our approach to predict the drop-outs among teamwork applicants based on the results of their previous quizzes and assignments.

For the paper at hand we conducted further surveys in the *java\*2017* and the *bizmooc2018* courses, to obtain more insights about the participants’ view on the teambuilding process, mentoring, and the tools provided in the *Collab Spaces*. In *javaeinstieg2017* and *bizmooc2018* we provided an almost identical post-teamwork survey that only addressed those users who participated in the team-task. In *javawork2018* we added a few team-related questions to the regular end-of-course survey. In *javaeinstieg2017*, 340 users (22% of the team task participants) submitted the survey. In *javawork2017*, 224 users submitted the survey, 23 of them were team-task participants (58% of all team-task

participants). In *bizmooc2018*, 42 users (26% of the team-task participants) submitted the survey.

### A. Teambuilding Process

In *bizmooc2018*, 158 participants submitted a pre-teamwork survey that asked for the participants’ comfort and experience with teamwork in general. When asked about their expectations towards their teammates, 40% stated that “an equal contribution of time and effort” was the most important criterion for them. Another 20% asked for a high level of commitment. 13% had “respect for their time” on the top of their list, 17% a “safe environment to communicate ideas.” Only 8% asked for “having fun with their teammates”. These results further support our decision to include the participants’ time commitment in the list of matching criteria.

In the post-teamwork surveys in *javaeinstieg2017* and *bizmooc2018*, the participants were asked if they prefer to be teamed or prefer to select their team members on their own. In both courses the vast majority supports our interventionist approach (Fig. 1). The slightly larger amount of *laissez-faire* supporters in *bizmooc2018* can easily be explained by the fact that there was a relatively large group of students from the same university, who had to submit the assignment as a part of their grade for an offline course and would have preferred to team up with others who were under the same pressure. In *javawork2017* we used the *laissez-faire* approach and therefore asked who would have rather worked in a team than alone if we had used an interventionist approach. 17% of the participants supported that<sup>18</sup>.

### B. Mentoring

In all three courses about 60% of the participants stated that they do not need a mentor as they either got along well or as teamwork did not happen anyway. About a third of the participants would appreciate pro-bono mentors from previous courses (Fig. 2). This number seems to be increasing with the level of difficulty of the task to be solved and the importance of the points to be gained in the team assignment for the overall course result. This statement is based on the results in the course *javawork2017*, but it is not very reliable. We have also asked the participants if they would be willing

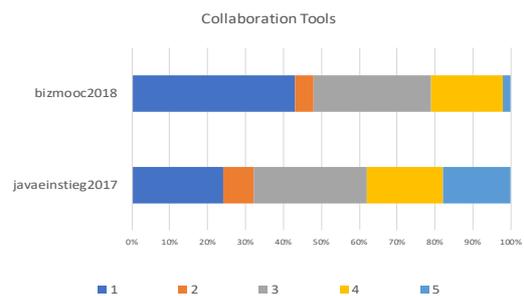


Fig. 3. Post-teamwork surveys *javaeinstieg2017* (n=340), *bizmooc2018* (n=42) Have the provided collaboration tools (Etherpad, Tele-Board) been sufficient to solve the task? (1)-We only used the tools in the Collab Spaces. This worked well for us. (2)-We only used the tools in the Collab Spaces. They were in no way sufficient. (3)-In addition to the tools in the Collab Spaces, we used tools of other providers or worked offline. (4)-We did not use the tools in the Collab Spaces and worked with other tools or offline. (5)-No answer.

<sup>17</sup> Spelling mistakes of the original answers have not been corrected

<sup>18</sup> As those who answered “No” to the question have not worked in teams but on their own, we are safe to assume that they rather meant that they prefer to work alone than that they prefer the *laissez-faire* approach.

to serve as pro-bono mentors. 63 participants in *javaEinstieg2017*, 11 in *javawork2017* and 10 in *bizmooc2018* expressed their willingness to do so. On the other hand, only few participants would be willing to pay for a professional team mentor. In *bizmooc2018*, we conducted an experiment providing different teams with different levels of mentoring. In short<sup>19</sup>, it confirmed the majority's opinion that mentoring doesn't make much of a difference for these short assignments. Either the teams got along well, without a mentor, or they didn't do anything and also ignored the mentors' efforts to activate them.

### C. Collab Space Toolset

Finally, we wanted to learn how the communication and collaboration tools in the *Collab Spaces* have been used and if we need to include further tools. Fig. 3 and 4 show the results in the two, respectively three<sup>20</sup> post-teamwork surveys. Next to figuring out if the tool support of the platform is sufficient, we wanted to know if the participants can manage to find more suitable tools on their own if necessary. 5-15% of the participants did not manage to use additional collaboration tools even if they felt that the provided tools are not sufficient to solve the task. The most asked for tool in *javaEinstieg2017* was an online UML diagram tool. As we do not have the intention to include such specialized tools in the toolset, we will provide recommendations for such tools in the next iteration of the course. Other tools that were missed are more sophisticated word processors, as the Etherpad's possibilities to format text have been perceived to be too limited even for producing a simple glossary. The *Collab Spaces* offer a discussion forum for asynchronous communication, Google Hangouts for video chats, a chat tool within the Etherpad, and previous to *bizmooc2018*: TogetherJS<sup>21</sup>. Particularly the participants in *bizmooc2018*, seemed to have problems finding appropriate alternatives when they disliked the tools we have provided. Additional communication channels that were used by the participants are *Skype*<sup>22</sup> and *WhatsApp*<sup>23</sup>, and in the *java\*2017* courses also *Discord*<sup>24</sup> and *Teamspeak*<sup>25</sup>. The most requested additional communication channel was a regular text chat with a proper notification function. Common issues with Google Hangouts were 1. participants do not have a Google account or perceive Google as evil. 2. participants expect to meet others by just starting the hangout and do not realize that they have to schedule a meeting first. 3. participants perceive a video chat as too intrusive towards their privacy.

## IV. CONCLUSION

Our goal for the paper at hand, was to answer the following questions to help us improve the team-based assignments on our platforms. *Do the participants prefer a laissez-faire approach in team building rather than the interventionist approach that we have decided for?* We can clearly state that they do not. In all surveys the interventionist approach was by far preferred. Furthermore, time commitment is considered to be an important matching criterion. *Would the participants appreciate to be supported in the teamwork by mentors?* At least for the short assignments that we use in the courses on openHPI we can negate that. For longer assignments as the one in *sbwl* it can be an option, but already has led to some

friction, thus it needs to be planned very carefully. Volunteers to mentor teams in future course iterations would be available, but then the next question is how can the quality of the mentoring be assured. Paid mentoring options do not have a business case. *Are the communication and collaboration tools that we provide in our Collab Spaces sufficient? Which additional tools are requested?* In general, a text chat has often been requested and we will include such a feature in the near future. Also a text editing option that is closer to a word processor than the provided Etherpad was requested. We are currently evaluating the options. Finally, specialized tasks require specialized tools. E.g. a UML-diagram editor would be appreciated. However, our resources are limited and the *Collab Spaces* are used for many different types of tasks, so for now the solution for this will be to provide a list of third party tools that offer these special functionalities.

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<sup>19</sup> A complete analysis of this experiment is beyond the scope of this paper.

<sup>20</sup> We have not included the question on the collaboration tools in *javawork2017*, as relevant tools for this task have not been available in the *Collab Spaces*.

<sup>21</sup> <https://togetherjs.com> – we have removed TogetherJS previous to the BizMOOC course as many participants in the previous interviews had reported problems with the tool. We also had rearranged the *Collab Spaces'*

navigation menu. From the interviews and the qualitative answers to the survey, we are rather positive, however, that these changes had nothing to do with the participants' problems to find appropriate third-party tools.

<sup>22</sup> <https://www.skype.com/en/>

<sup>23</sup> <https://www.whatsapp.com/>

<sup>24</sup> <https://discordapp.com/>

<sup>25</sup> <https://www.teamspeak.de/>