

SUPPORTING SOCIAL INTERACTION AND COLLABORATION ON AN XMOOC PLATFORM

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Abstract

Particularly in the context of education and e-learning, the topics social interaction and collaboration have been a little strained during the recent decades. Particularly, stakeholders¹ with an educational background often criticize that xMOOCs follow an approach that is too close to traditional frontal instruction; that they lack sophisticated options for user interaction.

The team that is developing and running the openHPI (x)MOOC platform, in general, approves these statements. To improve this situation, a major research effort has been started to explore the different aspects of social interaction amongst course participants. The range of the examined options includes importing existing friend connections from social networks such as Facebook or Google+, adding social network features within the openHPI platform, but also collaboration features such as learning groups and group exercises.

The paper at hand focuses on the evaluation of a survey that has been conducted amongst the users of the openHPI platform.

Keywords: MOOC, Social Interaction, Collaboration, Social Learning

1 INTRODUCTION

openHPI is Germany's largest MOOC platform with a specialization in ICT engineering. Run by the Hasso Plattner Institute (HPI) in Potsdam, it has offered nine courses on various ICT topics since September 2012—hosting between 5,000 and 17,000 enrolled users per course.

Typical openHPI courses follow a classical xMOOC schema of a six-week course with several ungraded self-tests and one graded homework per week. The courses are concluded with a final exam, which also is graded. For each of these graded assignments, the participants can achieve a certain amount of points. To be eligible for a graded certificate, a participant has to achieve at least 50% of the overall maximum course score. [1]

During the year 2013 the openHPI platform has been completely remodeled. Whereas, until March 2014 an existing monolithic Learning Management System (LMS) served as the foundation of the platform, now openHPI is based on a micro-service architecture that has been built completely from scratch.

From now on in this paper, the pre-March-2014 version will be referred to as v1, while the post-March-2014 version will be referred to as v2.

This circumstance is relevant as v2 put the team in a position where it had the chance to enhance the—amongst others—social interaction and collaboration features of the platform, not completely unthinkable in v1, but way more costly.

In this context the following questions have been of special interest:

- How do the learners actually prefer to learn—on their own or in groups?

¹ Stakeholders in the wider context of e-learning, not restricted to MOOCs in general or even openHPI.

- How active are openHPI's users on existing social networks, would they be interested in an integration of their data—e.g. friend relationships—from these sources?
- How connected are openHPI's learners already—do they know other participants in real life or through other virtual channels?
- To which extent has v1's main channel of social user interaction—the forum—been employed by the users?
- Which social interaction features, if any, do the users really miss?

Furthermore, we investigated if users would appreciate a system of alumni-mentors, and even more important: to which extent would they be willing to spent time in order to serve as mentors themselves in future iterations of the courses. Particularly, in the context of learning groups, a great potential concerning the scalability of individual assistance is anticipated in providing such a system.

The survey contained both quantitative and qualitative questions; the paper at hand explores both types in detail. Section 4 will deal with the existing social connectivity of openHPI users, particularly, if they are attending the courses on their own or with friends. Section 5 deals with the users expectations in terms of collaboration or group work possibilities. Section 6 deals with the willingness of users that have successfully passed a course to volunteer as mentors, e.g. for learning groups in future iterations of such courses. Finally, section 7 deals with concrete expectations or wishes that have been uttered by openHPI's users regarding the implementation of technical support for social interaction on the platform. It will also give an overview on which features have been implemented yet or will be released in the near future.

2 BRINGING THE 'C' TO THE 'X'

cMOOCs and xMOOCs, except for the name, have very few in common. cMOOCs, generally, follow a distributed approach—put in simple words: knowledge is out there, learning is connecting the nodes, adding a few bits here and there. Connecting the nodes—learning—is a collaborative, active process; conducted by a network consisting of all stakeholders, teaching team and students. The border between teachers and students is, if existent at all, at least fuzzy. xMOOCs, generally, follow a centralistic approach. Content is created, with the special purpose to be used in a certain MOOC. Here and there existing bits and pieces are added. The roles of teachers, teaching assistants and students are clearly defined. The students are in a comparatively passive role with only few calls to action, mostly to solve quizzes or to work on practical assignments.

There is no doubt that an active learning process is preferable to a passive learning process in terms of long term learning effects. The question remains, however, how much 'C' are openHPI's users willing to bear. To which amount are they willing to get active, to collaborate, to network? Or do they rather prefer to consume the courses as a sort of private edutainment. If yes: how can they be motivated to switch over to the 'C' side, at least a little, step by step.

3 SOCIO-DEMOGRAPHIC EVALUATION OF THE SURVEY

To demonstrate that the participants of the survey constitute a valid representation of the openHPI user base, a comparison of both groups' socio-demographic data is provided here.

All the following percentages refer to a total size of 774 survey participants and 49458 registered users on openHPI² respectively.

Table 1 shows the distribution in terms of gender, the percentages are very similar; the majority in both contexts is male.

Table 1: Gender distribution of survey participants vs. registered openHPI users

Gender	Survey	openHPI
Female	14.86%	14.26%

² As of March 2014

Male	63.57%	69.66%
NA	21.58%	16.07%

Table 2 shows the distribution in terms of location, which is also very similar in both contexts. The location of the registered openHPI users has been tracked automatically using a user-tracking tool (Piwik³) during a time range that approximately matches the active time range of the survey (Jan. – March 2014).

Table 2: Geographic distribution of survey participants vs. registered openHPI users.

Origin	Survey	openHPI
Europe	67.18%	65.30%
United States/Canada	4.65%	12.60%
Latin America	2.20%	2.60%
Asia	5.43%	12.10%
Africa	0.39%	4.30%
Australia/NZ/Pacific Islands	0.78%	2.70%
NA	19.38%	-

Finally, table 3 shows the distribution in terms of age. The group of 40 – 70 year olds is slightly overrepresented, which might be an explanation why the demand for the inclusion of social media features was rather low (see also Section 7.)

Table 3: Age distribution of survey participants vs. registered openHPI users

Age-group	Survey	openHPI
Younger than 20 years	1.81%	1.82%
20-29 years	14.86%	26.81%
30-39 years	18.73%	31.35%
40-49 years	23.77%	18.98%
50-59 years	14.60%	9.45%
60-69 years	5.56%	2.85%
Older than 70 years	0.90%	1.13%
NA	19.77%	7.58%

4 SOCIAL CONNECTIVITY OF MOOC PARTICIPANTS

This section deals with the already existing social connectivity of the participants of openHPI's courses. Do they attend courses on their own or together with friends or colleagues? How are they already connected to these people? Is there a need to connect via the platform? These questions were not only of interest in the context of the paper at hand, but also in the context of our plans to gamify the platform (see [2]).

³ <http://piwik.org/>

While more than half of the survey participants (53.49%) stated that they had no previous social contact to other course participants, more than a third (32.95%) of the survey participants reported that they have taken the courses together with one or more friends or colleagues or that they are aware of the fact that friends or colleagues participated in the same courses. The missing 13.57% did not answer the question. Out of those participants that took courses together with friends, 38% are already connected on Facebook, Google+ or similar platforms. Half of the participants in total (50,90%) stated that they use Facebook, Google+ or similar platforms. We also asked the users if they would appreciate more social features on our platform, e.g. the possibility to discuss the courses with their friends within the platform. Unsurprisingly—considering the answers to the previous question—about a third of the survey participants (30.49%) would like to make use of such a feature. Almost the same percentage (30.36%) stated that they are not interested at all. The high amount of participants that did not answer the question (39.15%) might be an indicator that more information on this topic is required. At the time of the survey in openHPI v1, three communication channels with fellow participants were available. The most important one was the forum. A very public channel that not necessarily is well suited for all kinds of questions. Sometimes it might be easier to ask certain things in a smaller group, preferably consisting of people that you already know. openHPI v1 also offered the possibility to create learning groups, but this feature was not very prominent and has not been used very much—e.g. in the course “Web Technologies” in 2013, only about 300 out of a total of 7,350 course participants joined one of the twelve learning groups. Learning groups offered the possibility to create a wiki and start discussions in a more private environment. Within the few existing groups, neither of these features has been frequently used. At least some of the groups in the above-mentioned course do not feature any content, except for a couple of members and an initial announcement. Section 7 will give more detailed insights on features of the new platform that are planned for the near future or already have been implemented, which target to improve that situation.

5 COLLABORATION VS. INDEPENDENT LEARNING

The benefits of collaborative learning cannot be stressed enough. Students do not have to despair in front of assumedly too complicated tasks. Often, all they need is just a tiny amount of individual extra explanation that can easily be provided by other group members to grasp the core of the problem and find a way to solve it. This requires other group members to explain certain aspects to their peers, which in turn improves their learning outcome, as learning by teaching is one of the most efficient ways of learning. The natural way to learn is the social process of developing a shared understanding. [3] Basically, this definition of learning, in its essence, can be traced back to Socrates, Plato and the likes, and their way of learning and teaching through a dialogic process.

On the other hand, even in offline scenarios, group learning also has its drawbacks. The group building process (forming, storming,... see [4]) requires time, sometimes the “chemistry” between group members just does not work, scheduling the collaboration requires extra effort, to mention just a few. In online scenarios, these factors have an even higher impact. A course duration of six weeks might just be too short to establish a performing group, building groups with team members that do not know each other upfront might lead to tensions, scheduling collaboration is even more complicated as course participants live in different time zones, need technical assistance to meet due to different locations, or have tight schedules due to their main occupation, family, etc. Synchronous collaboration will, therefore, be very difficult in most cases, even if the participants live in the same time zone.

To enable successful collaborative learning online, the communication channels are key. In order to strengthen the sense of community students have to be able to switch back and forth between task-specific and non-task specific conversation. Non-task specific communication strengthens the communication channels between the participants [3] and, therefore, cannot merely be seen as noise that needs to be filtered out, as Brinton et al. do in [5].

Strengthening the communication channel, according to Shannon’s communication theory improves the amount of data that can be transported over this channel without being negatively influenced by distortion. [15] It should not be expected, however, that providing the technological means for communication and collaboration is sufficient. Social interaction cannot be taken for granted. [6] To deal with the psychological and educational aspects of collaborative learning is beyond the scope of this paper, however.

To get a better understanding for the needs of openHPI’s users we asked them about their opinion. The majority (63%) of the survey participants actually prefer learning individually. A similar percentage (62%) has negative or neutral feelings against learning in groups (see Table 4 for details). On the

other hand more than 70% of the survey participants would enjoy explaining topics of which they have a good understanding to their fellow students, and nearly, as much would see strong benefits in getting complicated topics personally explained by their peers.

Nevertheless, there are topics that have an intrinsic requirement for group work. It is assumed that in such courses, due to the nature of their topic, a similar survey would result in a higher acceptance rate. openSAP's⁴ Design Thinking pilot, which has been employed to beta-test some experimental features of openHPI v2, is an example for such a course.

Table 4: Which of the following statements suits you best?

	yes, totally	rather yes	neutral	rather no	not at all	NA
I like learning in groups	7.36%	16.80%	29.20%	26.61%	6.59%	13.43%
I prefer to learn individually	19.12%	44.57%	15.12%	7.49%	0.65%	13.05%
If I have a good understanding of a subject, I enjoy explaining it to others	33.07%	37.47%	12.79%	3.75%	0.00%	12.92%
I benefit from someone who explains a complicated matter to me personally	26.10%	39.53%	16.02%	4.91%	0.39%	13.05%

The correlation between a preference for collaborative learning and the existence of friends in a course, as shown in Fig. 1, indicate that a technology to connect to other course participants or to find existing friends from other social networks in a course (as suggested in section 7.3) might help to raise the acceptance level for collaborative learning.

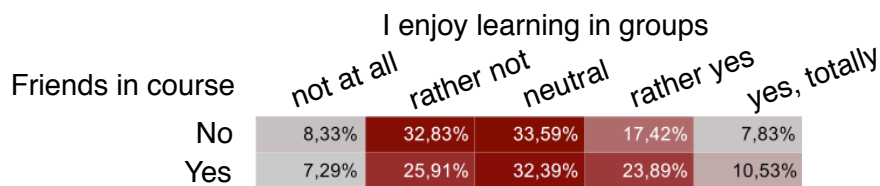


Fig. 1: Correlation between a preference for collaborative learning and friends in a course

The correlation between age and the acceptance of collaborative learning, as shown in Fig. 2, indicates that younger participants have an overall more positive attitude towards this concept. The reasons for this might be that collaboration has played a bigger part in their previous education, or simply that they have more time, as they have less liabilities in terms of work and family.

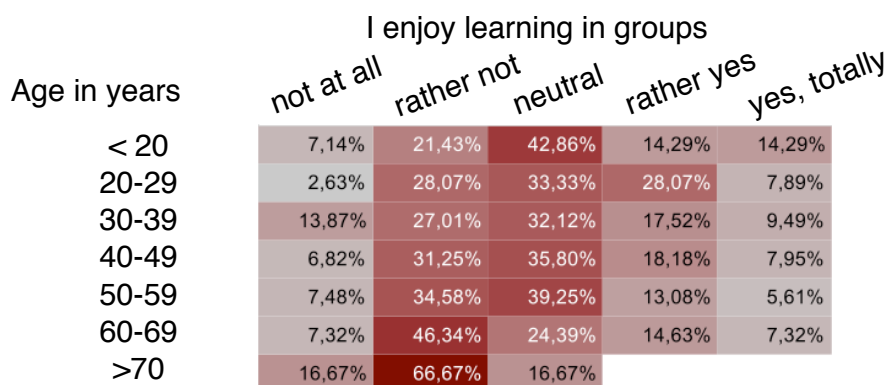


Fig. 2: Correlation between a preference for collaborative learning and age

⁴ openSAP is a sister platform of openHPI and developed by the same team.

6 MENTORING

Providing the learning groups with mentors could be one of the measures to strengthen the usage and acceptance of this feature. Mentors are students of a previous course iteration, guiding the new user generation on their path through the current iteration of the course. The mentoring model is based on Vygotsky's theory of the "zone of proximal development" or ZPD. According to Vygotsky's theory children can achieve much more when they have some sort of guidance and / or are collaborating with peers than they would be able to achieve on their own [10, p.85f]. We follow the Neo-Piagetian argumentation that very similar learning principles apply for adults as for children. [11] Vygotsky's theory has been applied e.g. by Sugata Mitra for his SOLE or "Granny cloud" project. Retired teachers in England, via Skype, act as mentors in so called SOLEs, specially designed booths, which enable up to 4 children to sit in front of one computer and work collaboratively on given tasks. [12]

Augmenting the teaching teams with mentors, recruited from former course participants, will highly increase the scalability of tasks that require a certain amount of human interaction and therefore are often omitted in the context of MOOCs. The interesting question here was if the users would be willing to volunteer as mentors and how much time per week—over the term of the course—would they be willing to sacrifice for this task? The results were quite astonishing; almost half (44.45%) of the survey participants would be willing to spend one hour or more per week to mentoring future generations of course participants, more than 20% would even be willing to spend 2 hours or more.

Fig. 3 and 4 show the correlations between the willingness to mentor and the usage of social platforms, respectively the acceptance of learning in groups. Drawing hard conclusions that users of social platforms are more willing to mentor is a little dangerous, as both outcomes might have the same reason, e.g. the the amount of spare time that these people have at their hands, but at least it can be taken as an encouragement to tackle the tasks of enabling mentoring, group work, group learning, and social connections as a group of interrelated subtasks.

		Willing to mentor	
		not at all	more than 1h
Uses social platform	Yes	33,23%	66,77%
	No	50,42%	49,58%

Fig. 3: Correlation between usage of social platforms and willingness to mentor

		I enjoy learning in groups				
		not at all	rather not	neutral	rather yes	yes, totally
Willing to mentor	more than 1h	38,10%	44,59%	64,88%	70,87%	77,27%
	not at all	61,90%	55,41%	35,12%	29,13%	22,73%

Fig. 4: Correlation between acceptance of group learning and willingness to mentor

A concrete implementation of the mentoring concept has still to be implemented. First steps have been taken towards a finer grained role and rights model, which is one of the basic requirements for this.

7 EXPECTATIONS TOWARDS THE NEW PLATFORM

One of the survey's questions asked the participants explicitly about their personal opinion to more social features on the openHPI platform, respectively what kind of features they would appreciate. 180 out of the total of the participants answered this free text question. About half (51.1%) of these responded that they are not interested in social features at all. Another 17.2% stated that in their opinion the forum is more than sufficient and more social features are not of interest for them. Another 6.11% stated basically the same but came up with ideas to improve the existing forum. Yet another 4.4% stated that they have no use for social features as they communicate offline or through other channels with their friends. In total almost 80% of the survey participants are reluctant against additional social features. This strengthens the argument, which has been discussed in section 5 yet,

that providing the technical means for communication is a necessary basis, but far from being sufficient. Currently, only courses that actively make use of these components will benefit from them. Subjects that intrinsically require collaboration are more likely to have a user basis that is willing to collaborate. Enabling social connections for their own sake, very likely is bound to fail, as the users currently are not interested in, or aware of the benefits. But to quote Henry Ford⁵: *“If I had asked my customers what they wanted, they’d have said a faster horse.”* We, therefore, did not just stop here and say: ok, if they don’t want we’ll do something else, but instead tried to explore ways how to overcome the users’ reluctance to social interaction. The details are beyond the scope of this paper and will be discussed separately in future.

7.1 Pin Board / Forum

Almost a third (27,52%) of the survey participants, claim to have used the forum actively. This may not seem to be an impressive number as the other two thirds (57,75%) claim to have not. Active usage of the forum, however, as important as it is of course, is not the only relevant usage of the forum. Passively seeking information by reading discussions of other participants obsoletes many of the questions that users might want to ask; not often enough as many duplicates show. As mentioned in the previous section, next to the group that was not interested in social interaction at all, the next largest group was formed by those users that at least considered the forum to be a relevant and sufficient means of interaction. A third of the participants (34,50%) even stated to have developed a special interest in certain posts. This confirmed former requests, which we received through forums in previous courses and the helpdesk, to add the possibility of bookmarking forum posts. Improving the forum, therefore, was a central task in our efforts to provide enhanced possibilities of social interaction. The main difference to the forum in v1 is the distinction between questions and discussions. Table 5 will highlight the differences and commonalities. Improvements in v2, compared to the forum in v1, are marked in bold.

Table 5: Which of the following statements suits you best?

	Questions	Discussions
Can be answered	x	
Can be commented	x	x
Can be voted for	x	x
Can be bookmarked	x	x
Answers can be voted for	x	
Answers can be marked as correct	x	
Answers can be commented	x	

Currently, we cannot yet make very sophisticated statements on how the users accepted these improvements. We, currently, only know that the overall forum activity on the recent iteration of this course on v2 (0.058 posts per user) was more or less the same than in a previous iteration of this course on v1 (0.059 posts per user). Fig.5 shows the correlation between active forum usage and age. As mentioned in section 3, this could indicate that the results of the survey are minimally distorted by the fact that the age group of the 40-70 year olds is a bit overrepresented in the survey as compared to the openHPI user base.

⁵ This quote is most commonly credited to Henry Ford, according to quoteinvestigator.com, however, there are other possible origins (<http://quoteinvestigator.com/2011/07/28/ford-faster-horse/>)

		Age in years						
Active forum usage		< 20	20-29	30-39	40-49	50-59	60-69	>70
Yes		69,23%	72,57%	70,50%	69,54%	61,11%	59,46%	60,00%
No		30,77%	27,43%	29,50%	30,46%	38,89%	40,54%	40,00%

Fig. 5: Correlation of active forum usage and age

7.2 Learning Groups

Only 4.4% of the survey participants requested a learning group feature. A few reasons for this small number—besides the straight forward: “The users are simply not interested”—might be the lack of knowledge about the possibility of such a feature, the lack of knowledge about the benefits of such a feature, the lack of real use cases for such a feature in the current and recent courses, and unsatisfying experiences with the learning groups that have been available in v1.

This low acceptance rate should not be used as an excuse to keep the status quo, but rather as a challenge to increase the acceptance of such a feature, both technically and in embedding it more explicitly as an integral part of the courses. Not only the users need to be made more aware of this feature, but also the teaching teams.

As mentioned in section 5 we have tested some experimental features to support group work in a semi-public course with about 300 participants on the topic of Design Thinking. Collaboration and group work are an important issue here, inherent in the topic:

“There are several main factors that are crucial in the development process of Design Thinking. One is definitely the role of teamwork and the impact it has for the outcome of the process.” [13]

Amongst participants of courses in such a context a more positive user attitude towards group work can be expected.

For successful group work a strong information channel is key. We, therefore, strengthened the learning groups that had existed in v1 yet and added a few key communication features.

- Group internal discussions, that feature had been available on the old platform yet, but benefits from the general improvements of the discussion feature as described in the previous section.
- Integration of the Tele-Board⁶ (see also [7].)
- Google Hangouts
- Group wikis
- Interface to publish selected content course wide.

A learning group is not necessarily identical with explicit teamwork tasks. Basically, it is an attempt to provide a more private subspace within the total of the MOOC with the intention to create more familiarity amongst the users. One of the meta-goals here is to increase the completion rate of the courses by dragging along users that otherwise would be at risk to drop out. In this wider context, various arrangements will be taken on openHPI v2, including gamification (see [2]), early detection of drop out indicators, and increasing the quality of registrations vs. the quantity of registrations by enabling “lazy registration”—the option that users can peek into courses without registering (see also [14].)

One aspect of our approach to get more ‘C’ to the ‘X’ is to enable strengthened connections between the users and thus fostering an environment where collaboration becomes more accepted. As Stephen Downes proposed, these connections should not result in closed groups but in open networks.

⁶ <https://tele-board.de>

“[...] the often unnoticed assumptions that inform our understanding of groups, inform our sometimes slavish devotion to groups, and shows how these contrast with my own understanding of how interaction ought to occur, in networks. It's not just a web theory (though it is that), it is a theory about life and society in general.” [9]

Open networks however don't grow by themselves. A way to go might be a network of groups. Similar to the construct of the internet as a network of networks, we hope that by creating small groups of trust—learning groups—and providing the possibility to open up these groups, enabling the groups to share content with other groups in a way that they define, in combination with the possibility to create contacts to other users, separate from the connections within the groups, such a “net of nets” will evolve over time. This might take more than one course, as six weeks are a very short time frame for such a process, but as many of openHPI's users are enrolled in more than one course this assumption is at least not completely unrealistic. Fig. 6 depicts the main aspects of such a network of groups.

- The private workspaces with the possibility to publish a well defined subset to the rest of the course.
- The possibility of personal social connections, besides the group membership.

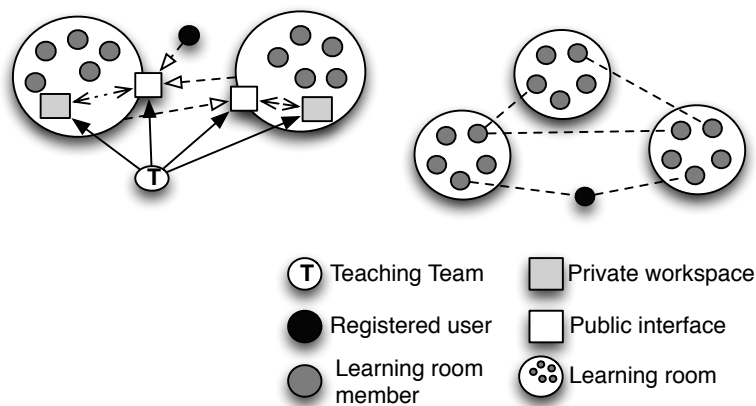


Fig. 6: Network of learning groups with private workspaces and public interfaces.

7.3 Integration of Social Platforms

According to the user survey, the integration of existing social platforms such as Google+ or Facebook and the likes is not of interest for the survey participants. Very few participants (2.77%) would appreciate the possibility to export or link the records of achievement or certificates that they have earned to their existing accounts on professional social platforms such as LinkedIn or Xing. As mentioned in the introduction, we credit this at least partially to the circumstance the age group of 40 – 70 year olds was slightly overrepresented in the survey. This amplifies the fact that, contradictory to the assumption that our main target group are students, which we had before we started with the platform, the majority of our actual users are professionals with 5 or more years work experience.

We decided to put effort in the integration of these social platforms anyhow for a couple of reasons:

1. For certain aspects of our research on gamification features we need a social graph, which can easily be obtained by enabling the import of existing connections on other platforms. This is beyond the scope of this paper and will be documented separately in future.
2. Providing simple login options via existing accounts on other platforms, such as Facebook or Google+ is a common pattern nowadays. It also provides us with the technology that we need anyhow for a closer integration with other products of our partners' portfolios.
3. In combination with other measurements it might be helpful to make our platform more attractive for a younger audience.
4. According to Stephen Downes “semantic content is more searchable if social network metadata is merged with semantic web metadata.” [8] Following this argument we propose that learning analytics also will benefit from being enriched with social metadata

8 CONCLUSION AND FUTURE WORK

In the context of the openHPI MOOC platform a good deal of the user group are professionals at an advanced stage in life, having a steady job, a family, etc. This often results in a limited amount of resources, such as time, motivation, and energy that is left by the end of the day. The application of modern educational paradigms as e.g. connectivism, in general, puts the learner in a more active role. Active learner roles, however, require more of those resources than the rather passive learner role of a classical xMOOC participant. As our survey showed many users of the openHPI platform are quite content with this passive role and rather reluctant to play a more active part. One exception of this pattern is the good feedback that we received on the willingness to take the part of a mentor in future course iterations.

The necessity for social interaction and collaboration features is also depending on the course content. It probably would not hurt to have such features in the context of a classical IT course, where the main goal is the transfer of information, but such a course—as has been shown on openHPI several times by now—also works quite well without these features. E.g. a Design Thinking course, in contrary, or a course on Agile software development, with an inherent need for collaboration, cannot work without such features.

The survey also shows that providing the technological means is by far not sufficient, creating trust amongst the users is very important. Creating awareness for the benefits of social interactivity is required. The paper at hand focused on introducing the planned and some already implemented new social and collaborative features on the openHPI MOOC platform. We are right at the beginning of bringing more 'C' to the 'X', a process that will take a lot more time and effort, both in its technical implementation as in popularizing the efforts with openHPI's user base.

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