openHPI - a Case-Study on the Emergence of two Learning Communities

Franka Grünewald, Elnaz Mazandarani, Christoph Meinel, Ralf Teusner, Michael Totschnig, Christian Willems
Hasso Plattner Institute, University of Potsdam
Potsdam, Germany
{franka.gruenewald, elnaz.mazandarani, meinel, ralf.teusner, michael.totschnig, christian.willems}@hpi.uni-potsdam.de

***Abstract*—Recently a new format of online education has emerged that combines video lectures, interactive quizzes and social learning into an event that aspires to attract a massive number of participants. This format, referred to as Massive Open Online Course (MOOC), has garnered considerable public attention, and has been invested with great hopes (and fears) of transforming higher education by opening up the walls of closed institutions to a world-wide audience. In this paper, we present two MOOCs that were hosted at the same platform, and have implemented the same learning design. Due to their difference in language, topic domain and difficulty, the communities that they brought into existence were very different. We start by describing the MOOC format in more detail, and the distinguishing features of openHPI. We then discuss the literature on communities of practice and cultures of participation. After some statistical data about the first openHPI course, we present our qualitative observations about both courses, and conclude by giving an outlook on an ongoing comparative analysis of the two courses.**

Keywords—MOOC; online course; learner community; community of practice; culture of participation

I. INTRODUCTION: PRESENTATION OF MOOC AND OPENHPI

The origin of the "Massive open online course" concept today is commonly ascribed to a course experiment led in 2008 by Canadian educational researchers, George Siemens and Stephen Downes, and the discussion it generated about the pedagogical theory of connectivism that conceives learning as the creative and social process of connecting nodes of knowledge [1]. MOOCs in this sense are meant to be open with respect to the role of the learner in defining his own learning path and his engagement in a learning community. Starting from 2011, a new concept of MOOC emerged from open online courses at Stanford University, which like a traditional university lecture offers a well defined body of knowledge, but draws on three types of resources for the dissemination of this knowledge to a massive audience: (1) video lectures, mostly segmented into small pieces, and presented in an engaging and entertaining manner; (2) interactive quizzes that allow immediate exercise of the learning content; and (3) communication tools efficiently managed by the learning community, that allow to highlight, discuss and solve relevant questions.

openHPI[1] is a platform for MOOCs of the second type, hosted at the Hasso-Plattner-Institute (HPI) in Potsdam, Germany. openHPI is partly based on the tele-TASK[2] platform and content archive. Tele-TASK is a research and development project conducted at HPI since 2004, which has brought into existence an advanced lecture recording system [2], and an online portal for the distribution of lecture videos. While the tele-TASK portal has been augmented with sophisticated semantic web search capabilities [3] and social web functionalities [4], it mainly stayed focused on delivering lecture content to HPI's students allowing them to replay or to replace the class lecture – even though the content is publicly available to all other students and life-long learners. In the advent of the MOOC format, we see the opportunity to deliver the vast amount of learning content gathered during the last years to new audiences.

openHPI's first two courses have targeted two very distinct audiences: While the first course, "In-Memory Data Management", was offered in English and dealt with an advanced topic in database technology, the second course, "Internetworking mit TCP/IP" was targeting a German-speaking non-specialist audience and offered an introduction to networking technology.

Both courses have met with substantial interest from the respective target audience: 13,126 learners registered for the "In-memory" course, from which 4,068 actively participated and 2,137 received the graded certificate of successful completion. The "Internetworking" course had 9,891 registered learners, with 2,726 active participants, and 1,635 successful completions with graded certificate.

In this case study, we report on our analysis of usage patterns of these two learner communities. Both courses were hosted at the same technical platform; both followed the same educational scenario: The subject domain was split up into six weekly units. For each week, video lectures, reading materials, and quizzes were produced and presented in a learning sequence. Discussion forums were set up for each week, and actively moderated by the teaching team. Learning progress was assessed through self-tests that could be taken an indefinite number of times, and homework, where points were granted

[1] accessible at https://openhpi.de/
[2] accessible at http://www.tele-task.de/

and collected for the final score, required for obtaining the certificate.

In this paper, we present a preliminary analysis of the learning communities that emerged in these two courses and draw conclusions based on research on cultures of participation in online learning. The second course ended only a few hours before Christmas Eve 2012, and will be analyzed intensively in January 2013, based on results of a still open survey distributed to all course participants.

II. Theoretical Background: Connectivism, Communities of Practice, and Culture of Participation

In nowadays world the disadvantages of traditional learning cultures could partly be overcome with advancements of technology. Those disadvantages include the separation of teachers and students, the dependency of the students on the teachers' methods as well as on synchronous learning and on fixed curricula. The new learning culture is constructive, self-organized, and in fluid networks [5]. E-Learning-based flexible learning scenarios enable this new culture. The old learning theories, behaviourism, cognitivism and constructivism, do not consider the technology-supported side of learning [6] and therefore do not apply to the new learning culture. The recent learning theory connectivism [6], is adapted to the digital age. It describes learning as the creation of connections between information. Web 2.0 functionalities, like forums, support this creation of connections as well as the knowledge exchange in groups. Furthermore the connectivist theory includes the insight of the "cycle of knowledge development". It means that individuals provide knowledge to the community and may also gain knowledge from the community. This collaborative knowledge creation is the core of the Web 2.0 philosophy. Providing knowledge to the community and gaining knowledge may also mean that new knowledge is generated from this sharing. One term for this happening is intelligence of the crowd.

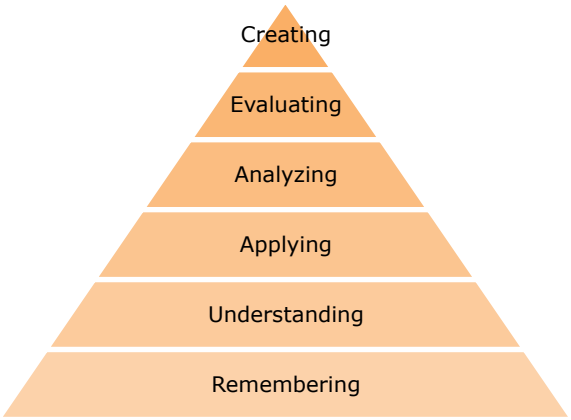

Fig. 1. Revisited Bloom's Taxonomy, according to [7]

This new concept of knowledge creation while learning has even found its way into a new version of Bloom's taxonomy of learning, suggested by [7]. In the revised version, illustrated in Fig. 1, "Creating" has been positioned at the top layer, whereas the corresponding level of synthesis had been positioned at the second level below evaluation in the original taxonomy. The positioning of the creation of knowledge on the top of the taxonomy already shows its importance. It is also an indicator that we as facilitators for online learning should be willing to invest time and effort in enabling learners to reach that layer.

Now that the learning theory was described, we will have a deeper look at the concept of community in the context of learning. One perspective is offered by the theory that has evolved around the concept of "community of practice". It considers the whole life of a person and not only one specific learning setting as crucial for the learning process. Jean Lave developed the original concept. She stated that the community of practice research lies within the intersection of people, technology and learning. Furthermore she explicates that learning is situated in social practice [8]. Her main focus was on apprenticeships as form of learning, though. Etienne Wenger further developed the main idea. He defines communities of practice in the following way:

> *"Communities of practice are groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis."[9]*

Wenger calls a community a community of practice, when three main characteristics merge together. Namely those are a shared domain of interest, a community with joint actions and a community with practitioners, as illustrated in Fig. 2 below.

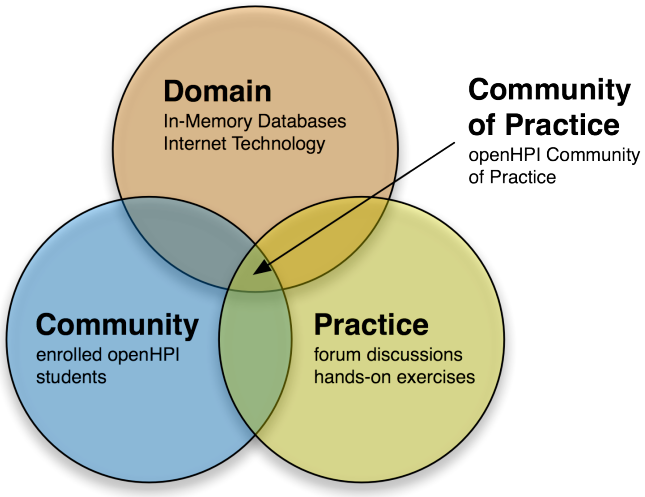

Fig. 2. Community of Practice at the intersection of domain, practice and community.

Looking at our own community within the openHPI courses, those three main characteristics can be specified for this use case. The domain can be adequately described as the topic of each course, in memory databases for the first and Internet technologies for the second one. The community itself consists of openHPI students that are enrolled for the specific course. The practice is more difficult to define, since we are dealing with learning rather theoretical concepts. Practicing those happened on the one hand through self-tests and on the other hand through the homework and final exam. While the individual learner executed these practices, the reflection about

this practice took place intensively in the forum discussions. This part of the community of practice was even more strongly emphasized in the second course by taking two major steps. First, group functionality was introduced, allowing every learner to open up one group and inviting other learners to join in. Within the group, separated forums and wikis could be used. A second step is the introduction of hands-on exercises. Those were additional exercises, where extra points could be collected. They included tasks like using Wireshark[3] to find out about certain details of the protocol usage within one's own computer. The hands-on tasks were introduced by a tutor video (or screencast) and heavily questioned and discussed in the forums.

When talking about users practicing within a community, the issue of participation will arise. Even though it might be a learning environment provider's wish and goal that a lot of users get actively engaged, only reality can show if the ideal will come true. But, as always there are success factors for active engagement. Those were researched and summed up under the headline "culture of participation" from 2007 on.

In 2008, [10] could support the finding that group learning comforts the individual eagerness and motivation to engage. A strong correlation between user satisfaction and the feeling of social presence could be found as well. However, a linkage between learning outcomes and the feeling of social presence could not be proven. The authors of [11] showed in 2007 that opportunities for self-presentation trigger the willingness of individuals to participate in group activities. They also found out that group-awareness tools could serve as medium for self-presentation.

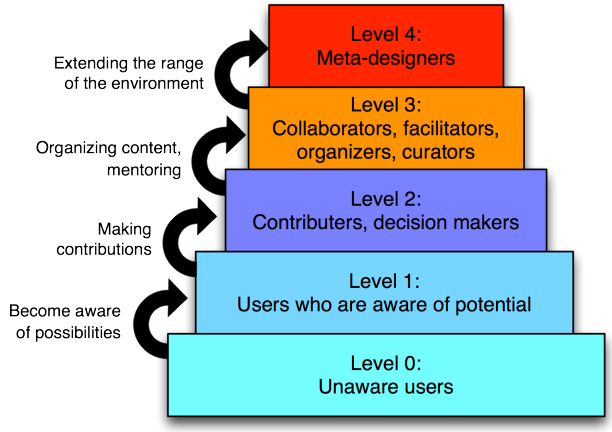

Fig. 3. Ecologies of participation according to [12].

Gerhard Fischer concretized the term "culture of participation" in 2011. Fischer suggested design guidelines for socio-technical systems, which aim at stimulating participation. His research revealed that intrinsic motivation is the basis for students. Therefore he suggests three major components. First, the infrastructure should enable collaborative design. Second, problem solving within a group of students collaborating should be enabled. In order to cater each student's individual needs, Fischer suggests dividing users into diverse degrees of engagement that he calls levels of participation (see Fig. 3). Level 0 incorporates users, that only consume the content without noticing that there is more out there and that they could actively engage in content creation. The next level sums up users that know that they might have an impact on other learners by actively participating within the group, but they are not in fact using their knowledge. Level 2 describes all users that are contributing to the creation of new content or knowledge. The following level up combines users that help mentoring other learners and in fact start organizing content themselves. By that they help facilitating learning not only for themselves, but also for others. Last, level 4, characterizes users who support the original organizers of the platform to extend the scope and possibilities of the limited technological frame. They might introduce new features or utilize third-party tools to be able to use functionalities they think are necessary for the desired goal. Fischer only briefly discusses learning as one field of application for his framework, though [12].

The motivation techniques are further researched in the work of Dick and Zietz. They extend Fischer's framework. According to their findings, awareness is the key to more contribution and action within the system without actually trying to make the users more active [13].

Since the design guidelines of Fischer in combination with the publications of Dick and Zietz form a very definitive instruction for a successful participative community, we started incorporating those elements into the openHPI platform. The following table gives an overview as to how far we have gotten so far in the implementation of the design guidelines.

TABLE I. DESIGN GUIDELINES FOR PARTICIPATIVE COMMUNITIES AS APPLIED TO OPENHPI

Design Guideline	Realization in openHPI
Support different levels of engagement (see Fig. 3 for a detailed description)	Level 0: watching lecture videos only, level 1: reading the forum, level 2: posting answers in the forum, level 3: creating own forum threads or user groups, level 4: is not planned to be implemented for security and manageability reasons.
Support human-problem interaction	Human-problem interaction is provided to openHPI learners through self-tests and homework assignments. In the second course, hands-on exercises were introduced and allowed much deeper practical involvement.
Underdesign for emergent behaviour	Negotiation and discussion opportunities exist via the public forums, the group forums and are also possible in other channels besides the openHPI platform.
Reward and recognize contributions, group-awareness	Until now it is only possible, to click a single users' profile and see how much he posted in the forums. It is not possible to compare users. Reward is given for the best users in the course.
Feeling that behavior is being judged	Since the awareness is only implemented in a rudimental manner, the judgment can only take place on a personal level within the forums.
Co-evolution of artefacts and the community	We are planning to assess if and how people contacted and coordinated outside of the openHPI platform. So no statements can be given on the issue of co-evolution yet.

[3] Wireshark is a well-known tool for the inspection of network traffic – a so-called *network sniffer* – that is used for network administration and diagnosis as well as for eavesdropping, see http://www.wireshark.org/

Now that we clarified the different terminology and how we think openHPI is involved with the different theories, the next section will deal with statistical data on the first openHPI course.

III. Presentation of Statistical Data

In the following, we describe some statistical characteristics of the participants of the "In-Memory" course. 4,068 users have either participated in the discussions or taken at least one of the homework assignments or the exam. We present three statistical evaluations of course participation. First, we show how participation in the forum translates to results in the final score. Second, we present details on how participation in the course varies across the six-week duration. Third, we compare socio-demographic characteristics of successful course participants with less performing learners and those who dropped out from the class.

A. Forum participation translated to course scores

In Table II, participants are grouped with respect to their activity level in the course forums, and the average score was calculated for each group[4]. Clearly active participation is correlated with better overall results.

TABLE II. Activity Levels Compared to Course Scores

User categories based on number of contributions to course forum	Number of users per category	Mean homework score percentage
10-29 postings	18	86.44%
5-9 postings	78	76.50%
2-4 postings	207	68.00%
1 posting	345	58.44%
0 postings	3208	47.63%

Fig. 4 presents the same data as scatter plot diagram. Interestingly, participants that have not participated in the forums at all can be found throughout the whole spectrum of scores, whereas learners that posted once or twice are concentrated on both ends of the spectrum.

We suppose that those with low scores can be described as learners, who tentatively lurked into the class and used the forum to discuss some initial problems, which eventually made them drop out of the class. Those with high scores represent motivated, but modestly engaged learners, which saw no need to actively take part in the forum, but contributed on one or two occasions when they shared some information requested by fellow learners.

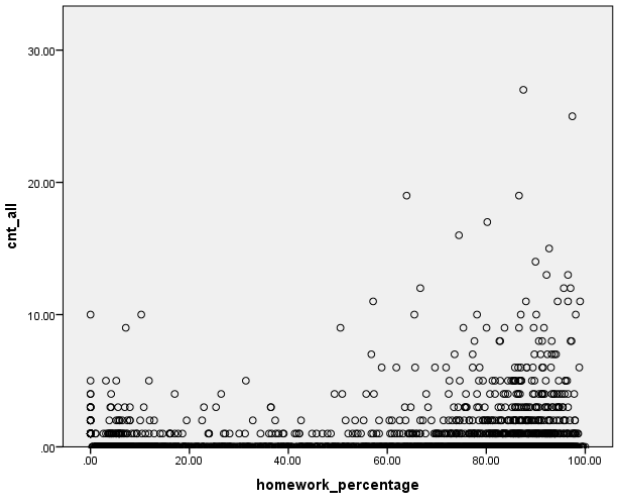

Fig. 4. Total course scores (homework_percentage) mapped to number of contributions to course forum (cnt_all)

B. Patterns of participation to homework and final exam

In the following we describe, how user participation varied across the six course weeks. Fig. 5 shows the user participation across the six weeks of the "In-Memory" course.

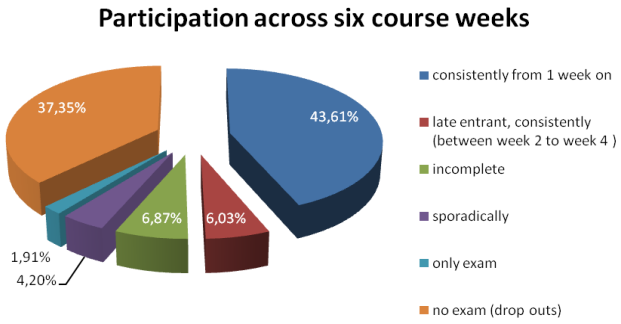

Fig. 5. User participation across the six course weeks

The two biggest chunks represent the two user groups, which are highly opposed. The first group includes 43.61% of all users and stands for those who participated in the complete course and did not miss any homework or the exam. The second biggest chunk consists of 37.35% of all active users and depicts drop-out attendants, by which we mean users who have not finished the course, i.e., who did not pass the final exam. Looking at the user participation before drop out in Fig. 6, it is clear that also very active users, who completed almost all homework, are included in this definition. 14% of all users did not attend the final exam but completed more than 50% of all homework. In contrast to the other 86% of all drop-outs, we can say that these 14% attendees were interested in learning the content of the course, but did not have any motivation to pass the exam in order to receive a certification.

[4] A single learner whose participation level fell into its own category (67 posts) was deliberately excluded from these statistics.

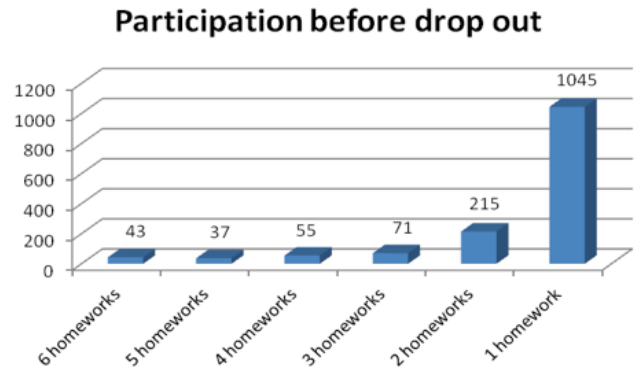

Fig. 6. User participation before dropout

C. *Sociographic description of course participants*

The typical participant of the "In-Memory Data Management" course is male, around 30 years old, has a bachelor or master degree, and has an advanced or expert background in information technology with more than 5 years of professional life. One participant out of 2 has a management or leading position. In the following figure, we illustrate how the declared level of IT knowledge is related to successful course completion. As could be expected from participants with higher levels of knowledge, a larger percentage also earned the certificate: 19,02% (out of 3,339 users) for experts, 16,17% (out of 5,511) for those who declared themselves advanced. Interestingly, the course, which explicitly targeted an advanced audience, was also successfully concluded by learners that declared to have no IT background at all (5,21% out of 288), or beginner status (10,43% out of 2,253).

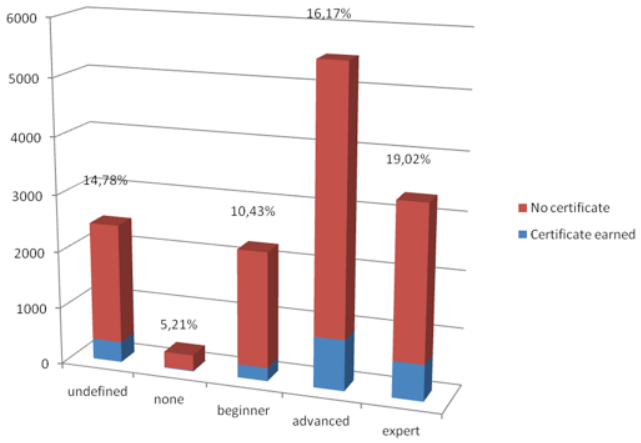

Fig. 7. Success rates dependent on IT background knowledge

IV. Qualitative Analysis of Two Learner Communities

In the following, we try to characterize different groups of course participants at openHPI based on the observations of the teaching teams. We match those groups with the levels of participation introduced in section II. Additionally, we summarize insights that came up with the teaching experience and draw conclusions that are applicable to future course design.

A. *In-Memory Data Management*

In the "In-Memory Data Management" course, all community activities were focused at the official forum. While individual requests concerning technical difficulties where handled via email, we purposely did not take part in other channels like twitter, additional blogs or groups in social networks. Our main goal in mind with that behavior, keeping the community together, was achieved that way. We occasionally looked at the other "unofficial" channels and noticed that they remained quiet after the initial effort for creating that channel. The creators also stayed in our forum. While possibly having disclaimed an opportunity to attract additional participants to the course, we are confident that the prevention of a fragmentation of the community was the better choice.

The official forum was subdivided into a general section for all questions and additional sections based on the weekly course structure. Technical issues were mainly posted in the general section. An additional section for these would have been helpful to separate them from questions regarding the content. This issue however seemed not to concern the participants too much and was solved during the first 2 weeks of the course by the introduction of tags for threads. The course atmosphere was friendly professional, which means that grammar and wording was chosen with thought like in business communication. However, participants addressed each other by first names in most cases, as it is usual in technical communities[5].

In a retrospective assessment of the communication behavior of the students, five different groups of participants could be distinguished. These general "archetypes" became apparent to the entire teaching team and were helpful in supporting the community. The five groups, that can be correlated to the five levels of engagement described in section II, are:

1. The *inactive* group (equates to level 0): Participants who do not visit the forum at all can be regarded as belonging to this group.
2. The *passive* group (correlates to level 1 and 2, mainly to level 1): Participants who exclusively consume information from the forum form this group. While they may post in the "Introduce yourselves" thread or reply to technical issues with "me too!", they do not take part in content centered discussions.
3. The *reacting* group (correlates to level 2): If questions are posted, members of this group add further aspects to them, or propose possible parts of an answer. Normally they are not confident enough to post complete answers with the intention of "finalizing" the discussion.
4. The *acting* group (correlates to level 3): Participants of that group are the main driver for discussions.

[5] The course content dealt with generic technical concepts and was not dependent on a product or company. But since it had been publicized in the intranet of the multinational software corporation SAP, a significant share of the participants was constituted by SAP employees and consultants.

Questions that arose from the course materials or were inspired by contradicting experiences the participants made, are posted by them. This group leads the content discussions forward and opens up new perceptions on the presented content.

5. The *supervising/supporting* group (correlates to level 3, some aspects of level 4): Members in this group can't be sharply separated from the *acting* group. They pose and answer questions, but have an additional overview over almost all discussions and the course progress. They interlink similar questions and summarize gained insights.

We can't say much about the inactive and passive group, despite that they make up the greatest fraction of all participants. Given that, they are of great importance and can be directly reached over the official channels (course material and announcements), but do not return any feedback. To cope with that, the contributing groups 3-5 should be perceived as an indicator. If participants, who invest their spare time to actively support your project, become unsatisfied, it is likely that the silent groups have already resigned. Luckily we have no further evidence for this assumption. Several face-to-face conversations with members of the *inactive* group however justified the opposite assumption: changes to course timings and assignment conditions that received positive feedback in the community, were also perceived well from these *inactive* members.

The following additional insights can be drawn from our experience:

- Questions that are not too specific and could be answered by fellow students should be left un-answered by the teaching team for at least one day, so that the community has a chance to react and grow together in the desired way. Even though it might be tempting to quickly answer a question when the exact answer is obvious, it is important to restrict a typical producer–consumer setting, that is already existent in principle, caused by the "teacher-student" relationship.
- Questions, which are too specific, complicated or simply not answered in a reasonable timeframe (in our course we agreed on 3-5 days), should be answered by the teaching team to prevent dissatisfaction. From the effort-benefit ratio perspective, it is of utmost importance to keep actively contributing participants satisfied, because as described, they act as an indicator and even take over certain community tasks, therefore relieving the teaching team.
- Do not tolerate any dismissive behavior or bad manners. We suggest dealing with such occurrences fast, friendly but determined. In our case, the aggressors simply left that particular discussion and we did not have to take further sanctions. However, if the problem could not be solved that easily, we assume that the possible exclusion from the forum or the complete course including the certification should be taken into consideration.

For the next iteration of the course and for the further development of the learning platform, we have planned the following changes:

- Through the introduction of the role "teaching *assistant",* community members of the *supervising-supporting* group will be granted group moderation features. This would make clear their status on the third or fourth level of engagement and would also create the group-awareness referred to by [11]. To further increase the motivation, we propose to grant additional individual certificates to these highly involved participants.
- Introduction of a "approve" feature for teaching assistants, so that community created answers can be marked as valid, without having to add an additional response just saying "everything mentioned is correct". This would stress the fact that it is the community that is responsible for part of the knowledge construction in the course.
- Feedback, which we acquired through an additional feedback form hosted by a third party, should be gathered from within the platform. It showed that via the feedback form we reached many members of the *inactive* and *passive* groups. On the downside, it is not possible to correlate the gained information with other course statistics like the level of completion / perception of the material or their overall performance. Having integrated feedback forms will allow for more precise results and further investigations (e.g. did participants who were affected from technical issues in the first week achieve worse results than a control group in the following weeks?). For the second openHPI course "Internetworking", again an external survey platform was used, because of the lack of adequate native tools in the learning platform, but this time participants received a token for accessing the survey, that allows to relate their feedback to information gathered inside the platform.

B. Internetworking

The general setup for the learning community described for the "In-Memory Database Management" course above also applies for our second course on "Internetworking". The main platform for community interaction was the discussion board of openHPI. Unlike in the first course, the teaching team tried to channel the support for technical issues into the helpdesk – a widget on the platform website connected with the issue tracker OTRS – and keep technical discussions out of the forum and personal email conversations.

With this, only a small fraction of the over 3000 discussion postings in about 675 different threads deals with technical issues – which does not mean that all other postings are directly related to the actual course content. Despite the lower number of participant in the second course, the community produced a significantly higher amount of discussion postings (about 100% more postings in about 20% more threads). We suspect the main reasons for the higher level of participation in the second course to be found in the shared mother tongue of

nearly all participants, and the closer spatial distribution of participants (mainly Germany). A reliable explanation for this remarkably different outcome is yet to determine by a deeper quantitative analysis of the "Internetworking" course and a user study based on a survey currently conducted among the participants.

Concerning the "archetypes" of students identified during the debriefing of the first openHPI course, we can confirm this taxonomy when observing the community of the second course. However, we can introduce some refinement and subtypes: In addition to the learner groups *active* and *supporting/supervising,* we can observe an archetype that can be labeled as *domain expert.* These users show up very active just in specific weeks, where their topic of expertise is the current course topic. During this period of time, the *domain expert* acts as a reliable source of information, gives high quality answers to questions from the community before the teaching team could react, and points out possible mistakes in the teaching material (including errata). Before the specific period in time, the *domain expert* was not visible as very active community member, and would also focus her contributions on the domain of expertise when the course topic has changed with the start of the following course week.

A variant of the *acting* group described above might be called the *contributing* group. Although openHPI does not (yet) come with tools for crowd sourcing or give any rewards for crowd contributions, we were able to observe the behavior of actively contributing in many situations. Most common was the provision of very detailed solutions to homework on private websites, where the sample solution of the teaching team was not detailed enough for all learners.

Other remarkable examples for community contributions beyond discussion postings cover the implementation and distribution of tools for the solution of exercises with algorithmic or mathematical nature. For example: in a tutorial video about an assignment on the calculation of the transmission time for an amount of data in a packet- switching network with network technology of different bandwidth, we encouraged the students to repeat the sample calculation with different numbers and different transmission paths. Users came up with excel sheets that allowed the validation of such self-chosen calculation examples. In some cases, the contributors just left a link for download in the forum, in other cases participants left their private email addresses and offered distribution of the tool by mail.

A third notable contribution from this group of users is the generation and allocation of audio files. Some users asked the teaching team for audio-only files with the spoken words from the lecture videos – since they wanted to use their way home from work in the car to have a first peek on the course material before they took their session with the actual videos and self-tests at home. While we answered that we would discuss if we would provide such podcasts, a user just extracted the audio stream from our videos, converted them to MP3 audio and provided download links in the forum. We later decided to add the audio-files to the course material on our own and asked the contributing user, if we could link his material on the official pages.

This behavior of the *contributing* group actually goes somewhat beyond level 4 of the grades of participation described in Fig. 3, since the collaborators introduce new forms of learning content into the platform (tools, podcasts) and widen the usage of the discussion forum by linking to dedicated sources in the Internet.

Another interesting observation in the "Internetworking" course was a tiny leap in the direction of meta-design – level 4 of Fischer's framework. During the second week of our course, we silently introduced *discussion triggers,* discussion threads where the community should discuss issues strongly related to the current week's topic but not covered. An example trigger from week 2 – where one of the main topics were local networks and LAN technology – was a thread on switches, hubs and repeaters. The teaching team triggered a number of questions in that forum thread, waited for the community to answer and highlighted good answers or clarified misunderstandings – just like in a classroom discussion.

From week 4 on, we could observe discussion triggers that were *not* initiated by the teaching team, but by students from the *active* group (respectively by *domain experts).* These triggers were usually very specific assignments, i.e. a posting in week 4 with a *traceroute*[6] output and an assignment question concerning the behavior of certain intermediate nodes on that route. The teaching team considered question design and pedagogical effect of this assignment (and others) as very good and will reuse the input in a next iteration of the course. Again, users expanded the intended use of the limited collaboration tools to bring own content of an unexpected form to the learning platform.

As a general observation concerning the introduced "archetypes", we have seen that users might switch between different types – like the domain expert does this switch between the *passive/reacting* group and the *acting/supporting* one. We could also commonly notice students that we would classify as *passive/reacting* contribute in a manner that the supporting user would do, i.e. providing links to discussion threads where a duplicate question already has been answered.

What we also detected as a difference to the first course was a relatively high number of *off-topic discussions* in two different variants. In one of these variants, students that were actually *passive* or *reacting* users came up with questions to the community that were only somewhat related with the actual topic but more with a personal issue, i.e. when the current weekly topic was the *Design Principle of IPv6,* the question arose if specific home router devices were capable of IPv6, in how far investments for small companies would be necessary with the transition to IPv6, and so on. The community always reacted very flexible on such questions and usually led these discussion threads to a satisfying answer.

The second variant of *off-topic discussions* usually was on the course design, the platform itself or future course offerings. In these discussions, we could observe a significant number of usually *passive* users becoming *reacting.*

[6] *traceroute* is a computer network diagnostic tool for displaying the route (path) and measuring transit delays of packets to a specified host across an IP (Internet Protocol) network.

A last observation from the "Internetworking" course is about the community behavior. Since the teaching team was not able to track the discussion forum 24/7 and in particular did not work on weekends, we actually feared the hiving-off of discussion threads or even the occurrence of so-called "shitstorms"[7]. In practice, we never faced a situation that could have developed in such a direction since the community has turned out to be very self-regulative. There were several critical posts (concerning the course concept, the platform or specific statements in the course material) – but in nearly all cases users from the community had already reacted and screened the teaching team from the offence. In some (very rare) situations, we even had to slow down or admonish our "protectors" to remember the netiquette.

V. Conclusion and Outlook

Through this description of the two first massive open online courses on openHPI, we can clearly state that this new format of online learning has the potential of allowing the emergence of new types of learning communities, that realize the Web 2.0 promise of the social prosumer, who actively and collectively engages with learning content and contributes to its enrichment and refinement. A still ongoing survey of the participants of the "Internetworking" course will allow us to refine this statement, and particularly provide further insight into the following questions that we were only able to glance at in this paper:

- Is active participation in the social dimension of a course directly related to satisfaction with the learning experience, and successful completion of the course? We have shown that statistically, active course participants achieve higher scores, but we plan to further assess how members of the different groups of users identified so far, evaluate their course experience.
- Is the distribution of control between the technical platform, teaching team and the learner community perceived as a motivating or inhibiting factor? We have shown that users very creatively bypass the limits of the platform by linking to their own content and tools from the course forum, and we want to investigate how this willingness to become a meta-designer according to Fischer's classification can be more systematically exploited in the design or under-design of the learning platform.
- Do the social links created in the context of the course persist outside this context? The openHPI platform provides the feature of learning groups where users manage shared wikis and forums. While this feature was only modestly used – partly due to the fact that out of security concerns, these tools had only stripped down functionality – , users could also contact each other privately through a messaging tool, and provide links to their profiles at social networks. We are investigating how these links can be taken profit of for fueling the culture of participation in future openHPI courses.
- To what extent do the different affordances of the learning materials (video, text, interactive) contribute to the learning progress and learner satisfaction? The survey will allow us to track in detail the role of the different types of learning content in participants' learning practices.
- To what extent do learners try to establish themselves with distinctive roles in the community? We have described how in both courses, an active group of users has emerged, and taken over considerable responsibility for the social quality of the learning context. Currently, openHPI does not allow honoring these contributions through explicit distinctions awarded to users, as it has become common practice in social question and answer platforms like the Stack Exchange network[8]. Through the survey, we try to establish the usefulness of similar "gamification" features in a social learning platform.
- What are distinctive characteristics of a learning community concentrated in one linguistic region, compared to an international one, where English is the common language? We have mentioned our assumption that the common linguistic and geographic reference might be a factor stimulating a culture of participation, because learners are more at ease expressing themselves in their mother tongue, and because the shared time zone also allows common temporal patterns of participation. The English speaking audience of the "In-memory" course might be compared to the communities established by Coursera, Udacity and edX, where learners compete and cooperate on a global field. To our knowledge, the "Internetworking" course is the first truly massive – with active participants in the thousands – open online course offered in German, and the analysis of the survey data will validate or invalidate our assumption that a localized MOOC format while not "bringing education to worldwide masses" (as the ambition of some platforms has been described in the media) has the potential of constituting a unique context for communities of engaged learners.

References

[1] A. McAuley, B. Stewart, G. Siemens and D. Cormier. The MOOC Model for digital practice, http://www.elearnspace.org/Articles/MOOC_Final.pdf, 2100, accessed 30.12.2012.

[2] V. Schillings and C. Meinel: tele-TASK – Teleteaching Anywhere Solution Kit. Proceedings of ACM SIGUCCS, Providence, USA, 2002.

[3] H. Sack, B. Baumann, A. Groß, C. Meinel. Linking tele-TASK video portal to the Semantic Web. Ch. Erfurth, G. Eichler, V. Schau (Eds.): Proc. of 9 th International Conference on Innovative Internet Community Systems (I2CS09), June 15-17, 2009, Jena, Germany, Lecture Notes in Informatics, LNI vol. P-148, Gesellschaft für Informatik, Bonn, 2009, pp. 205-216.

[7] The term "shitstorm" has become very popular in the German speaking world since 2010 and describes a chorus of outrage on the Internet, especially by posting and writing in social media.

[8] see http://stackexchange.com/ or http://stackoverflow.com

[4] F. Gruenewald, M. Siebert, and C. Meinel. Leveraging Social Web Functionalities in Tele-Teaching Platforms. International Journal for Digital Society, 2(3), 2011.

[5] D. Kirchhöfer, "Lernkultur Kompetenzentwicklung - Begriffliche Grundlagen", http://www.abwf.de/main/publik/content/main/publik/handreichungen/begriffliche_grundlagen.pdf, 2004, accessed 19.12.2012.

[6] G. Siemens, "Connectivism: A Learning Theory for the Digital Age". International, Journal of Instructional Technology & Distance Learning, vol. 2, no. 1, 2005.

[7] L. W. Anderson, D. R. Krathwohl, and B. S. Bloom, "A taxonomy for learning, teaching, and assessing: a revision of Bloom's taxonomy of educational objectives", Longman, 2001.

[8] J. Lave, "Situating learning in communities of practice.", Perspectives on socially shared cognition 2, 1991, pp. 63-82.

[9] E. Wenger, R. McDermott, & W.M. Snyder, "Cultivating Communities of Practice", Boston: Harvard Business School Press, 2003.

[10] C. Hostetter and M. Bush. "Student perceptions of collaborative learning, social presence and satisfaction in a blended learning environment: Relationships and critical factors". Computers & Education, vol. 51, no. 1, 2008.

[11] J. Kimmerle and U. Cress. "Group awareness and self-presentation in computer- supported information exchange". International Journal of Computer-Supported Collaborative Learning, vol. 3, no. 1, Oct. 2007, pp. 85-97.

[12] G. Fischer. "Understanding, Fostering, and Supporting Cultures of Participation". interactions, vol. 80, no. 3, 2011, pp. 42-53.

[13] H. Dick and J. Zietz. "Cultures of Participation als eine Persuasive Technologie". i-com, vol. 2, 2011, pp. 9–15.