Took a MOOC. Got a Certificate. What now?

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***Abstract*—This Research to Practice Full Paper presents the results of a survey among the participants of our MOOC platform about the benefits of what they have learned in our courses and the benefits of the certificates that they have earned for their daily life. We often hear about the high dropout rates in Massive Open Online Courses (MOOCs). On the other hand, there is a lot of movement towards micro-credentials, online master's degrees based on MOOCs, and formal MOOC degrees. However, what is the classic MOOC clientele actually doing with their certificates? What are the reasons why successful MOOC learners put a lot of time and effort in exams and exercises? Do employers accept these certificates in application portfolios? Do they allow their employees to participate in a MOOC during their working hours? Do they pay for the certificates? Are there any differences concerning gender because women are still in the minority in science, technology, engineering and mathematics (STEM) and their career paths often hit a plateau? These questions have been on our mind since we started offering courses on our MOOC platform in 2012. We have had anecdotal evidence, for example, that a participant was helped to get a new job with a certificate from one of our courses—yet this is ultimately just hearsay. Therefore, to find out what is really going on we conducted a survey among the 187,000 registered users of our platform.**

Keywords— MOOC; Certificates; Micro-credentials; Gender, Survey, STEM

I. INTRODUCTION

Even though a lot of interest has been generated lately in formal MOOC degrees, the question remains as to what MOOC participants are actually doing with their certificates. Are they looking for a new job? Do the certificates help them to improve their career? Are the courses helping them to do their current job better? Are there any differences with regard to gender? Do employers accept Massive Open Online Courses (MOOCs) as an additional qualification? We conducted a survey among the 187,000 registered users of our platform. Since 2012, we have issued more than 38,390 Confirmations of Participations in 66 courses, 31,626 Records of Achievement in 65 courses, and 308 Qualified Certificates in 12 courses for more than 23,000 users. We have received about 1,400 responses; about 70 percent of the participants, who provided a response, have earned at least one certificate on our platform. In fact, on openHPI more than three-quarters of those learners received more than one certificate. The survey participants therefore represent about 4.4 percent of the users who have earned one or more certificates. We consider this a sufficient number to provide a meaningful data set for our purposes. The comparably small number of participants who earned a certificate, should not mislead the reader to come to the conclusion that the others all have "failed". Many are just not interested in a certificate and just pick the content they're interested in. Currently, a separate study is conducted by some of the authors' colleagues with the intent to make this "silent majority" more tangible.

In 2012, we started delivering MOOCs to a wide audience. We were the first MOOC platform in Germany, probably the first in Europe. So far, we have offered about 70 MOOCs on our platform openHPI [1], including course iterations. The majority of our courses cover IT and innovation topics, from software engineering and Design Thinking [2] to entrepreneurship and IT law. On our platform we offer three different course formats: full-fledged courses with a duration of six weeks, hands-on courses with a duration of four weeks, and workshops with a duration of two weeks. All courses on our platform are offered free of charge. The participants of an active course can receive a course with either a "Confirmation of Participation", a "Record of Achievement", or a "Qualified Certificate" for their course performance (see Fig. 1). Learners can reach a Confirmation of Participation by visiting at least 50 percent of the course material. They are eligible for a Record of Achievement and a Qualified Certificate if they have earned more than 50 percent of the available points in the weekly assignments and the final exam. In addition to the Confirmation of Participation, the Record of Achievement contains credits earned, course performance (if you are among the top five, top ten or top 20 percent of participants), and an anti-counterfeit link and QR code. To receive a Qualified Certificate the ordinary enrolled "participant agrees to be proctored via webcam during the graded exercises and exams. With the help of this online proctoring technology, we determine that the registered user is taking the assignments and the final exam in person" [3]. A Qualified Certificate contains the participant's photo (see Fig. 1) and additional pages with a detailed course description and curriculum. Confirmations of Participation and Records of Achievement are offered free of charge. A small fee of 60 Euros is charged for a Qualified Certificate, to cover our costs [3].

The learning material in most courses on our platforms is delivered week by week. This helps us to synchronize the learners and facilitates more structured communication during the runtime of a course. While some learners have felt that the weekly deadlines could be challenging at times, they agree that it helps them to keep on track. The deadlines impel participants to continue learning even if it costs them some effort to find the

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Fig. 1. Various openHPI certificates

time to do so. Additionally, the week by week course schedule allows participants to spend a sufficient amount of thought on a course and to fully soak up the learning material[1]. Furthermore, the weekly structure helps us to guide the participants through the material and keep the discussions in the forum focused on the week's topics.

II. Research Questions and Hypotheses

First, we attempt to figure out the reasons why participants invest a lot of time and effort in MOOC exercises and exams. In line with the increasing demand on lifelong learning, we assume that most learners take part in MOOCs to improve their career opportunities. In the context of the current trend to micro credentials and formalization as well as the increasing relevance of recognition of MOOCs, we focus on the purposes for which MOOC certificates are actually used. Even if this trend implicates that most participants use their course assessments to take the next step on their career path, our impression is that this is not yet the main need of our learners. Furthermore, we shed light on Qualified Certificates as the most trustworthy certificate we offer. We expect that those learners who book the Qualified Certificate try particularly hard to receive a considerable result and earn credit points for their studies. Finally, we add our learners' perceived perspective of their employers toward MOOCs. We presume that employers keep MOOCs under review and take a look at MOOC certificates even if they prefer a traditional formal qualification of their employees.

III. Related Work

"Technological change demands stronger and more continuous connections between education and employment […] by bringing down the costs and providing the skills that employers were desperate for" [4]. According to Calogne and Shah, flexible and collaborative MOOCs "have a positive impact on […] skills development" [5]. McLoughlin adds that MOOCs "gave thousands of participants the possibility to have greater ownership and control over their learning experiences" [6] and Jordan points out that "many people would benefit from taking a course even if they did not reach the end" [7]. Nevertheless, the amount of participants who have earned a certificate is often below ten percent, especially in MOOCs that relied on peer grading [7] as more effort is required from participants.

According to Albert the following factors contribute fundamentally to the success of MOOCs [8]:

- adding value to the expertise and intelligence of the participants, e.g. in regard to the social construction of knowledge in discussion forums,
- relevance to the audience, e.g. readily applicable content to situations faced by the learners, such as Successful Remote Teamwork [9],
- bringing credibility, e.g. via faculty,
- short, to the point information to respect learners' time, e.g. videos of ten minutes maximum,
- weekly reminders,
- keeping participants on target, e.g. via individually defined learning objectives,
- continuous insights into the individual learning progress, e.g. via learners' dashboards, and
- issuing education certificates.

Calogne and Shah emphasize that a cooperation "between MOOC platforms and companies provides employers with the ability to engage and propose varied and cost-effective (cost of travel and lost productivity) staff development opportunities to their […] employees at scale" [5]. In this context, Krauss notices that "microcredentials and digital badges, are on the rise […] to reach short-term goals, such as becoming qualified for a particular job or closing a skills gap" [10]. Reich and Ruipérez-Valiente summarize that MOOC providers are particularly engaged "in fields with well-established return on investment, such as data science, computer programming, business, and related fields" [11]. In addition to this, Radford, Conningham, and Horn determine that employers and employees especially demand leadership and management courses to fulfil the job requirements, advance careers, and improve the skillset during tenure [12].

However, according to Hui, online degrees are "still at the 'early adopter' stage. The efficacy of your nanodegree will depend on: […] Whether the company's HR has any guidelines for how to evaluate online degrees. […] Who else is applying to the position. If others have a formal/traditional degree, you

[1] Interestingly, the majority of our learners follow this structure even when participating in self-paced courses. Whereas another group of about 20 percent pick and choose the modules they are currently interested in or take more time to complete the course, depending on the difficulty.

might be at a disadvantage“ [13]. The reasons for that are not related to credibility issues of alternative digital credentials (ADC) [14], such as MOOC certificates and open badges. To a greater degree, from “an employer’s perspective, interpreting MOOCs on a CV is complicated further if the recruiter is not familiar with this form of education” [15]. In a 2017 study by the global leading higher education company QS, “recruiters were asked whether they were familiar with MOOCs and of the 4,654 employers who responded, 71% said that they were not” [16], especially in Western Europe. “Although the traditional degree certificate is still the more valued credential among employers in general, employers in today’s job market are looking for technically skilled, job-ready candidates which a traditional degree doesn’t always guarantee. Being able to show physical evidence of your abilities is becoming increasingly important in recruitment, and MOOCs can play a key role in this with many MOOC programs culminating in a practical capstone project, giving employers a clear picture of a candidate’s abilities“ [15]. According to McIntyre, a MOOC certificate “demonstrates in itself motivation, perseverance, dedication and entrepreneurship – traits that all employers will be looking for in a candidate” [15]. MoocLab, a Forum and Community for Consumers and Providers of Online Learning meet to share, debate and learn [17], already offer “a verified academic record of all your completed MOOCs” [18], because few “employers will want to […] check if each of your certificates is genuine” [18]. Furthermore, there is a lot of movement towards online master’s degrees based on MOOCs [19, 20].

To the best of the authors’ knowledge, besides these research fields with an IT focus, empirical social research based on user and subpopulation data, e.g. in regard to target groups, usage patterns and effects of digital learning seem to be limited to date. We try to address this gap with the research paper at hand by analyzing newly collected survey data from an interdisciplinary perspective of information technology and sociology.

IV. Method: Data Collection and Analysis

Our data set is based on a survey we conducted from the beginning of December 2018 to the end of January 2019 among the registered users of our platforms (mostly openHPI, openSAP [21], mooc.house [22], and OpenWHO). 767 survey participants collected certificates on openHPI, 250 collected certificates on openSAP, 153 collected certificates on mooc.house, and 11 collected certificates on OpenWHO. Those different course platforms are heterogeneous in their course topics, e.g. the medical-focused OpenWHO vs. the engineering-centered openHPI. Nevertheless, because of the small numbers of survey participants from OpenWHO learners and our research interest in the usage of certificates altogether we do not focus on those differences in the paper at hand.

The questionnaire was designed following a team-based approach [23]. It contains Likert-style questions and free form answers to get valuable additional information in detail. Based on our research interests we operationalized our key variables and formulated the survey questions following validated questions from social sciences whenever possible. We conducted a pre-test of our questionnaire within our partner organizations.

Since 2012, we have issued 38,390 Confirmations of Participations, 31,626 Records of Achievement and 308 Qualified Certificates–in total by more than 23,000 users. We have received about 1,400 responses; about 70 percent of the participants who provided a response, have earned at least one certificate on our platform. In fact, on openHPI more than three-quarters of those learners received more than one certificate. The survey participants therefore represent about 4.4 percent of the users who have earned one or more certificates. We consider this a sufficient number to provide a meaningful data set for our purposes.

Three-quarter of our sample is male. Nearly 90 percent of men and even the majority of women live in Europe (see Fig. 1). The majority is between 30 and 59 years old. Compared to all users on openHPI, our sample is largely unbiased as more than 80 percent of our learners are male. Although, they come from more than 180 countries worldwide, the vast majority come from Europe, or more specifically from Germany (see Fig. 2). “MOOC participation has been concentrated almost entirely in the world’s most affluent countries” [11]. For the majority of our courses, we know that our “classic” clientele are learners in their thirties to fifties, on average, they are about 40 years old, have a bachelor or master’s degree, and have been working in their job for at least five years [24]. Based on the survey data, we conducted descriptive and inferential statistics such as frequency analysis, contingency tables and unpaired t tests to describe the charecteristics of the large amount of raw data in a graphic way and to better understand as well as interpret the predictions concerning the research questions mentioned above. In addition, we reviewed the small amount of open-ended responses to the survey and chose essential explanatory or additional insights for presentation.

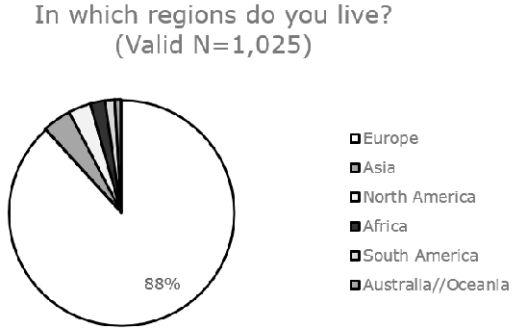

Fig. 2 Survey participants' regions of origin, own calculation

The Qualified Certificate was introduced in the course "Wie funktioniert das Internet?" (Internetworking2016) in 2016. Since then we have offered the Qualified Certificate in the courses "Linked Data Engineering" (Semanticweb2016), "Web-Technologien" (Webtech2017), "Mainframes" (Mainframes2017), "In-Memory Data Management" (Imdb2017), "Big Data Analytics" (Bigdata2017), "Internet Security for Beginners" (Intsec2018), "Information Service Engineering" (Semanticweb2018), and "Mainframe–Crucial Role in Modern Enterprise Computing" (Mainframes2018), which featured a total of about 53,000 participants. Up to now, the first paid feature of this additional certificate with machine-proctored exams, a detailed course description and content listing as well as a recommendation for two ECTS points has been booked about 440 times. With the participants who booked the proctoring option in the first three of the examined courses, we used identical questionnaires to examine how the Qualified Certificate has been accepted in its first years. Besides addressing the question of why participants booked this option and spent money on it, the survey focused on user experience.

V. Results

The following results provide insights into learners' motivation to take a MOOC and their reaction to the certificate as the outcome.

1) Reasons why MOOC learners put a lot of time and effort in exams and exercises

An "increasing desire to learn skills that can immediately be applied in the workplace, has incited […] [lifelong learners] to explore MOOCs' potential to provide an alternative or a complement to their" [5] degrees. In line with "a quick and cost-effective 'learn-certify-deploy' pattern" [5], most of our learners can apply (at least some of the) knowledge and competences that they have acquired in our courses in their daily life. Figure 3 shows that MOOCs help most participants to better understand complex topics in the news or to get another view of these themes. When asked about their favorite course on openHPI, respondents mentioned trendily topics such as "Blockchain: Hype or Innovation?" most frequently. Even though, a common survey participant answer was: "Some of the courses are a little too high skilled to understand for me. I participate to get a glance into the future". Nevertheless, on

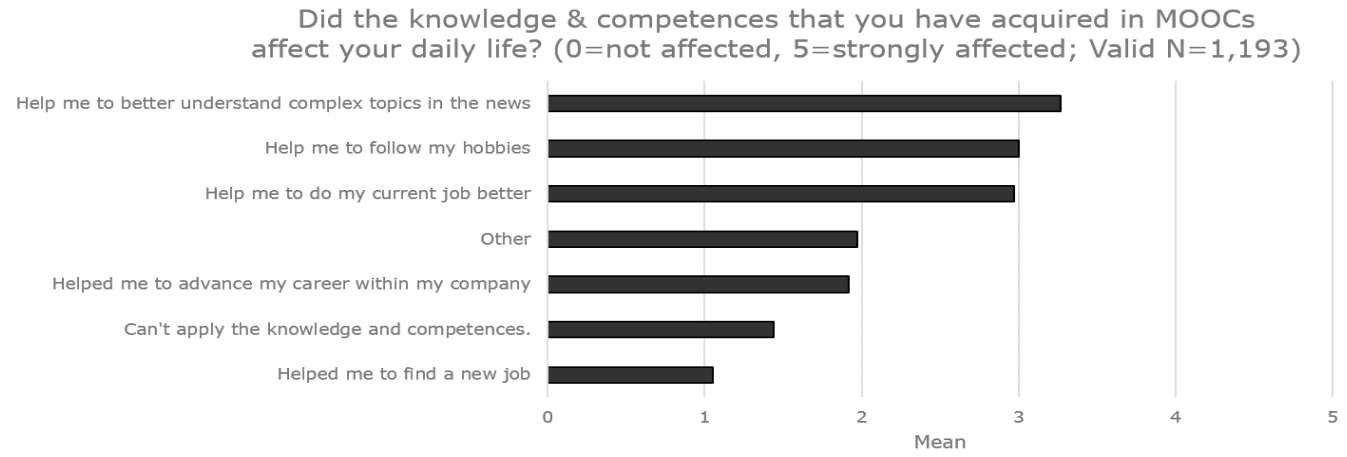

Fig. 3 MOOCs' impact on learners' daily life, own calculation

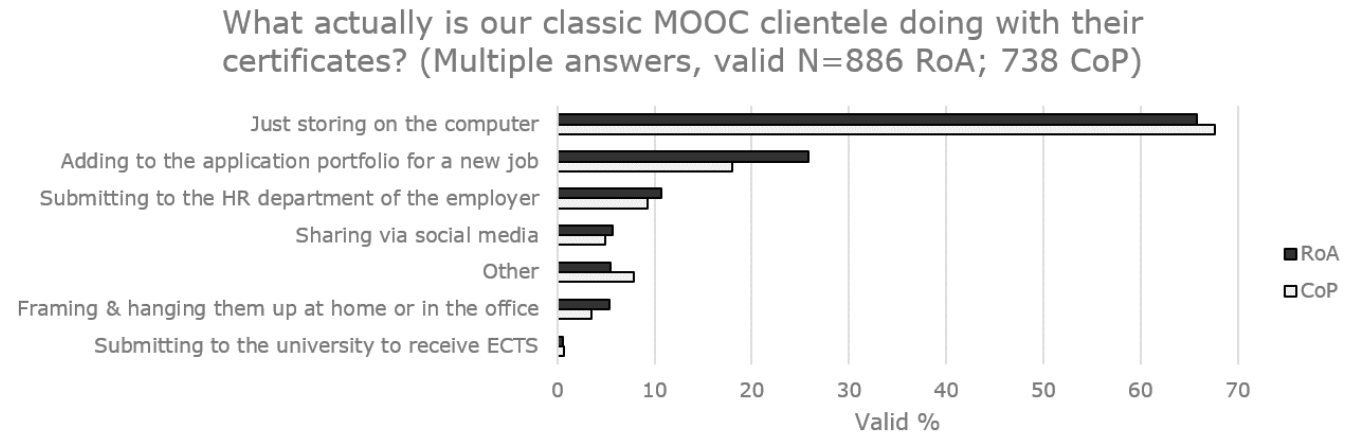

Fig. 4 Usage of MOOC certificates, own calculation (Records of Achievement, RoA and Confirmations of Participations, CoP).

the average, our survey participants agree overall with the statements that our courses help them to do their current job better or "The knowledge and competences that I have acquired in your courses help me to follow my hobbies". Our first assumption, that the participants are taking the courses to improve their careers, so far, has proven to be wrong. In respect to gender, there is a small, but still significant correlation at the significance level of at least α=0.05 (Cramérs'V and contingency coefficient from 0.1 to 0.3*). The knowledge and skills that male participants have acquired in our courses help them to do their job better, to advance their career, and to follow their hobbies more extensively than female participants (mean of men=3.1 versus women=2.4). The reason for these differences may correspond with the traditionally more technically-oriented hobbies of men, their predominance in science, technology, engineering and mathematics (STEM) and their long-established straight-line career paths. In comparison, women tend a little bit more to express the statement "I can't apply the knowledge and competences that I have acquired in your courses in my daily life" than men, but this is not significant. Concerning our first research question, we can conclude that the main reason why participants invest a lot of time and effort in MOOC exercises and exams is out of personal interest.

2) Usage of MOOC certificates by our classic clientele

The motivation of our survey participants to receive a certificate can be classified into three categories: immediate application, e.g. in the current job, for a new job or social media activities, predominantly forward-looking motives and intrinsic reasons (multiple answers allowed). Altogether, passing a course does not seem to be as relevant as a certificate in the same topic. A significant number of the participants commented that they were still uncertain about making use of the certificate at all. Nevertheless, two thirds of our survey participants want some evidence for successfully taking the course in case it will become relevant in terms of career, i.e. for a future job application. Therefore, so far, they only stored them on their computer and so far have not employed them for any other purposes (see Fig. 4). This applies to an even larger extent for Confirmations of Participations. Even though Confirmations of Participation do not reveal the scope of what has been learned in the course, about 20 percent of the participants add a Confirmation of Participation to their application for a new job. In comparison to no more than one quarter of our survey participants, who add the considerably higher-value Record of Achievement to their applications this is in our opinion a lot. We expected more of the following statements of our participants within the open survey questions: "Usually I only refer to finished courses with a Record of Achievement. The Confirmations of Participation don't count too much for me" or "I think the own advance is very important and is the focus for every course. Only over the Records of Achievement you will get details about the new skills". Interestingly, even freelance consultants added their certificates in their project portfolios to document their knowledge. As "employers are putting increasing emphasis on learning as a skill in its own right" [4], Records of Achievement show, that our participants are interested in the field, willing to keep up with new developments and that they are self-driven and eager to learn, even when there is no direct relation to the job.

About ten percent submitted their certificates to the Human Resources department of their employer, list completed courses in their annual review, shared them with their manager or commented at least to some colleagues that they had participated. About five percent are interested to share their certificates via social media, such as Twitter (see Fig. 5) or add them to their website. Fun fact: Some survey participants even framed their certificates and have hung them up at their home or office walls. 15 survey participants submitted their certificates to the registrar's office at their university to receive ECTS Points. By now, we know from one of them, that the university accepts the certificate and granted the recommended two ECTS credits. In the context of OpenWHO, "the interactive, web-based, knowledge-transfer platform offering online courses to improve the response to health emergencies" [25], some learners are interested in CME-points (Continuing Medical Education). With regard to openSAP, some survey participants want to use several of these documents to prepare for an official (SAP HANA) certification, "It looks like this course is turning toward a degree" [26]. Concerning our second research question, we have to recognize that there seems to be a merely vague usage of our MOOC certificates in the near future.

3) Automated online proctoring of MOOCs – first Results

Nevertheless, 111 survey participants (that are about one quarter of all learners who had ever booked a Qualified Certificate) even invested money to receive a Qualified Certificate on openHPI. The amount of men, who booked a Qualified Certificate is slightly, but not significantly higher than the amount of women. On average, each of them booked a little more than two Qualified Certificates. Interestingly, among women, the average number of booked Qualified Certificates is a bit, but not significantly higher than among men. Our survey participants completed almost every course in which they have booked a Qualified Certificate.

Table I shows in regard to all nine courses, in which we offered a Qualified Certificate, that those participants, who show some monetary commitment are less likely to drop out. However, to conclude that a mandatory fee for the courses might help to reduce the dropout rates, very probably will turn out to be a treacherous thought as the number of participants will be reduced dramatically as well. In order to achieve comparable results, we used the term "success rate" in a traditional way, not taking to account the participants' goals when they started the course, instead only considering participants who completed the course with a Record of Achievement or a Qualified Certificate as a success. We work with the number of users who have enrolled before course middle and have at least

Fig. 5 Sharing of a MOOC certificate on Twitter

TABLE I. ENROLLMENTS, NO-SHOWS, BOOKED QUALIFIED CERTIFICATES (QC), SUCCESS RATES (ROA & QC)

Courses in which we offered a Qualified Certificate	*Enrollments/ No-Shows (a)*		*Issued RoA (b)*		*Booked/Cancelled QC (c)*		*Issued QC (d)*	
	N	*Rate*	*N*	*Rate*	*N*	*Booking Rate/ Cancellation Rate*	*N*	*Rate*
Internetworking2016	7551/2359	31.2%	1320	25.4%	58/1	0.77%/1.7%	47	82.5%
Semanticweb2016	5001/2559	51.1%	416	17.0%	38/2	1.24%/5.3%	29	80.6%
Webtech2017	7653/1833	24.0%	1340	23.0%	62/1	0.82%/1.6%	50	82.0%
Mainframes2017	3026/1356	44.8%	437	26.2%	25/0	0.83%/0%	23	92.0%
Imdb2017	5276/2874	54.5%	453	18.9%	34/0	0.64%/0%	27	79.4%
Bigdata2017	9373/4204	44.9%	916	17.7%	109/0	1.16%/0%	69	63.3%
Intsec2018	7734/3170	41.0%	972	21.3%	52/0	0.67%/0%	46	88.5%
Semanticweb2018	4980/3303	66.3%	315	18.8%	42/0	0.84%/0%	28	66.7%
Mainframes2018	2534/1560	61.6%	224	23.0%	20/0	0.79%/0%	18	90.0%

a. Enrollments at course middle/No-shows at course middle. No-shows are users that have registered for the course but never have visited a single item during the course runtime.

b. General success rate of the course: Issued RoA/(Enrollments at middle - No-shows at middle)

c. Booked and paid QC/cancelled orders. Cancellation is possible before the first assignment has started.

d. Success rate

TABLE II. NUMBER OF SUCCESSFUL PARTICIPANTS LISTED IN THE TOP 5, 10, AND 20%

Courses in which we offered a Qualified Certificate	*Top 5%*			*Top 10%*			*Top 20%*		
	P	*N*	*QC (%)*	*P*	*N*	*QC (%)*	*P*	*N*	*QC (%)*
Internetworking2016	97.5%	74	0 (0%)	94.7%	65	6 (9.2%)	88.7%	132	10 (7.6%)
Semanticweb2016	93.7%	23	0 (0%)	90.3%	21	2 (9.5%)	86.6%	43	3(7%)
Webtech2017	100.0%	199	10 (5.0%)	-	-	-	96.2%	70	3 (4.3%)
Mainframes2017	98%	22	1 (4.6%)	96.8%	23	0(0%)	95.3%	43	3(7%)
Imdb2017	97.5%	27	2 (7.4%)	95.8%	20	0(0%)	92.4%	52	4 (7.4%)
Bigdata2017	98.1%	47	2 (4.3%)	93.6%	47	0 (0%)	86.7%	93	11 (11.8%)
Intsec2018	98.1%	52	2 (3.8%)	96.6%	46	3 (6.5%)	94.2%	97	3 (3.1%)
Semanticweb2018	97.0%	16	1 (6.3%)	95.2%	16	0 (0%)	92.3%	32	4 (12.5%)
Mainframes2018	99.1%	12	0 (0%)	98.3%	12	0 (0%)	97.2%	24	4 (16.7%)

e. P shows the minimum percentage of points that had to be achieved to be listed in the top x%.

f. N is the number of participants that achieved the points.

g. QC (%) is the percentage of participants out of N that booked a Qualified Certificate.

visited the course once as and have at least visited the course once as the total for our attrition rate calculations. Only those participants had the chance to complete the course with a sufficiently good result. "However, while these more restrictive definitions of 'serious students' help drive the completion rates higher, they would shrink the number of students that MOOCs claim to have" [27]. In this context MOOC providers find themselves in a position between Scylla and Charybdis, on the one hand boasting with ever larger numbers of participants and on the other hand working with somehow realistic completion rates.

Table II shows that the participants, who booked the Qualified Certificate are not necessarily all to be found among the top performers of those learners, who received a Record of Achievement by earning more than 50 percent of the maximum number of points from all graded assignments (multiple choice and multiple answer quizzes, programming exercises and/or peer assessments). However, taken into account that only very few participants have booked the Qualified Certificate, they are on average proportionally overrepresented in the group of top performers, especially among the top 20 percent. The top percentages are calculated automatically by the platform based on the relative rank of the participants' ordered achieved points. The high demands on minimum percentage of points that have to be achieved to be part of the top section often dates from several bonus quizzes offered to compensate assignments that have been missed by the participants. A detailed analysis of the distribution of learners' results will be interesting for future work.

For nearly half of our survey participants, who booked the Qualified Certificate the main reasons have been on the one hand to improve their employability and on the other hand out of personal interests and even just for fun. A considerable amount of nearly 40 percent of this sub-sample of our survey participants stated that they were curious about the newly developed technical feature, which they wanted to test. For a

little less than 20 percent the main reason to book the Qualified Certificate has been on the job training. More than five percent want to earn credit points for their studies by submitting the Qualified Certificate and three survey participants answered: "The main reason to book the Qualified Certificate has been my employer who requested or recommended it".

Six out of 21 users, that answered to the question who paid for the Qualified Certificate, (nearly one third, whereas these small numbers reduce the significance of the results) received full financial support from their employer. Only two employers (less than 10 percent) refused to pay the fee. Most of the participants (almost 50 percent) stated that they have not asked for financial compensation, because the "relatively low cost of 60 € for the certificate would not justify the red tape related to a reimbursement by my employer"[2]. A similar situation applies in terms of time provided by the employer to participate in the courses. Most participants never asked their employer if they could spend time for the training during work. Less than 30 percent of our survey participants spent time for the course at work, but no more than four hours per week. About every second learner attended the rest of the course at home[3] (see Fig. 6).

By asking the early adopters, we tried to figure out for which reasons the participants booked Qualified Certificates. Figure 7 shows that most participants in the Semanticweb2016 course booked the certificate for on-the-job training, while the reasons for booking a Qualified Certificate in the Internetworking2016 and Webtech2017 course have been more diverse. Two participants stated that after paying for the course, their motivation for actually completing the course increased, which was their main reason for booking the Qualified Certificate although their employer would have reimbursed them. From the participants' demographic data, we can see that the majority of those who have booked the Qualified Certificate are 30, 40, 50+ and probably not students. The few participants that intended to get the ECTS points accredited for their university studies were asked at which university and for which courses of study they intend to use the recommended ECTS credits. The results show that half of the students were studying at a distance university while the other

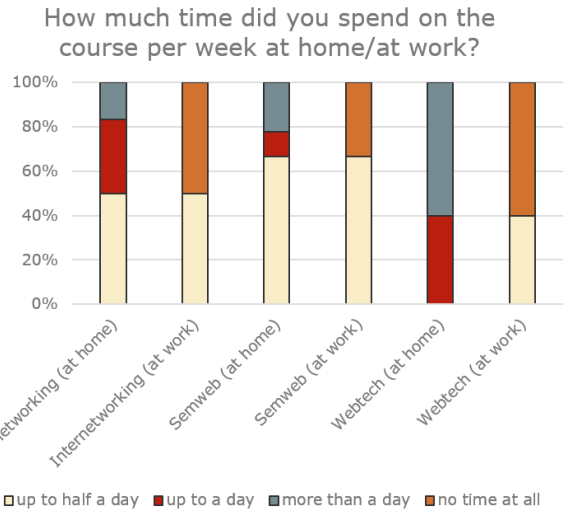

Fig. 6 Time spent on the course at home and at work, own calculation

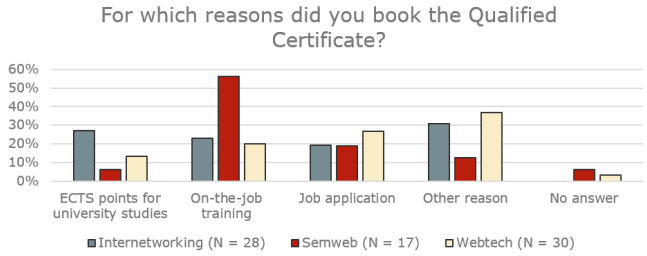

Fig. 7 Reasons for booking a Qualified Certificate

half studies at regular universities where their physical presence is obligatory. Most of them stated they want to use the certificate for IT related studies. Only one participant stated that her field of study is physics. Concerning the booking and payment process, the participants reported only few negative experiences. Most participants stated that the setup and calibration process worked well for them. As a non-technical issue, many participants were concerned about the positive outcome of the online-proctoring. For example, they were uncertain how much they were allowed to move in front of the camera or cover part of the face for some time, e.g. by their hand or a glass. For this reason, some participants felt uncomfortable during the online-proctoring as they focused on moving as little as possible. Users were concerned that the proctoring fails in case they need to go to the restroom or rearrange the setup while an assessment is running. To dispel the users' fears we improved our instructions and FAQ section. Despite those issues, participants also commented that the online-proctoring was an overall positive experience and that they will take more courses with paid certificates. Concerning our third research interest, we found out that those learners who booked the Qualified Certificate were very successful in completing the course and receiving a good result, but only a few of them intend to earn credit points for their studies.

4) Perceived perspective of employers

Indeed, McIntyre notes that a certificate, which is proved to be genuine, does not help to verify the acquisition of education

[2] free-text answer to an open survey questions

[3] Suitable to "growing numbers of flexible anytime, anywhere learners" [5], 94 percent of our "24/7 connected" [5] survey participants usually study alone, e.g. because they live in an area a bit remoted without knowing other learners (on the course they chose) in their area, they are not learning regularly, use the time they have, e.g. at night, so it is not possible to study in a team. Nevertheless, some of them talk to friends, colleagues or classmates, who can help them or just keep a sharp eye on them. A few participants plan to be more sociable and to meet like-minded IT enthusiasts. Among those learners, who meet with others in person to work on the course material, most of them learn in pairs. Less than one third meets with other learners in groups of 3 to 5 people and about 10% team up in learning circles with 6+ learners with whom they have good fun and are very productive.

[15]. Nevertheless, 58 percent of our survey participants who booked the feature of a Qualified Certificate have applied for a new job since then (see Fig. 8) and 72 percent of those stated, that the Qualified Certificate as an additional qualification in their application portfolios helped to get a new job. On the other side, 28 percent believe that the employers have not been interested in that kind of certification. With the available data, we were not able to make significant statements about our last research question on employers‘ perspective toward MOOCs. We can only report a perceived tendency of noticing MOOC certificates by employers [28, 29].

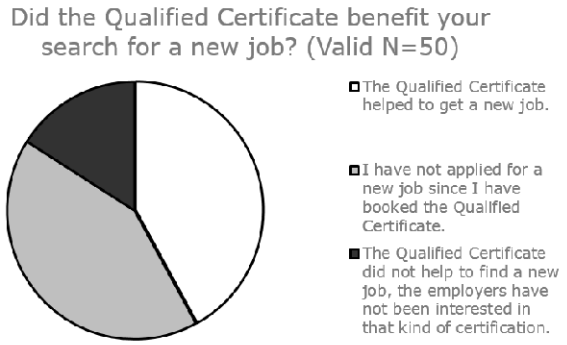

Fig. 8 Advantage of having a Qualified Certificate for finding a new job, own calculation

VI. Discussion, Implications and Conclusion

MOOCs are still an attractive learning format to easily access high-level learning content from well-known educational institutions at an unusual time of day or even from areas a bit remoted. Unfortunately, to date, there are limited studies investigating on used application possibilities of MOOC certificates at scale. The purpose of this paper therefore was to shed light on openHPI learners' motivation to work on MOOC exercises, on their actual application of MOOC certificates and employers' acceptance of MOOCs by asking the 187,000 registered users of our platform. Despite of limitations in terms of regional and gender distribution, the examination of our survey participants surprisingly has revealed that the majority of our current target group wants to receive a graded certificate predominantly out of forward-looking motives. It could be promising to acquire learners, who intend to make use of the course content immediately, too.

Nevertheless, the findings of this paper have indicated most learners can apply the knowledge and competences acquired in our MOOCs immediately in their daily life, e.g. to better understand complex topics in the news or to do their current job better. There is also evidence, that a decent number of one quarter of our survey participants added their Records of Achievement or Confirmations of Participation to their application portfolio for a new job. In respect to gender, there are small, but significant differences in the meaning that the knowledge and competences that our learners have acquired in our courses affect men's daily life a little bit stronger than the daily life of the interviewed women.

In regard to the group of learners who booked the Qualified Certificates as a more "valuable" certification, the analytics data shows that the success rate of those participants is significantly higher as amongst those who have not booked the Qualified Certificate. This, however, was expected as learners are more committed and the number of not motivated participants is reduced. In our opinion it should not lead to the recommendation of demanding a fee for the courses as we prefer to have e.g. 1,000 successful learners out of 100,000 course participants than e.g. 99 out of 100. The participants in the evaluated surveys represent those early adopters and therefore these survey results are particularly valuable for us.

When asked, many employers already support innovative learning formats and allow their employees to participate in a MOOC partially during their working hours or even pay the fee for a Qualified Certificate. In addition, the majority of our survey participants who booked the feature of a Qualified Certificate and have applied for a new job since then think, that the certificate helped as an additional qualification in their application portfolios to get a new job. Despite of this observed tendency, we have to consider that employers' information on MOOCs was derived from answers of participants and reflects their belief. In addition, there are a number of hidden variables from the recruiting process that are impossible to control in our real educational setting and consequently non-experimental study design.

With all due respect to these findings we have to consider the following restrictions of our survey results: As in every quantitative survey with predominantly polar questions, the possible answers were some kind of selective. Furthermore, most questions were asked retrospectively and the answers of our survey participants implicate a subjective estimation. Therefore, some learners may make their participation in MOOCs plausible. This can lead to a certain kind of bias. Even the survey period at the end of the year 2018 affect some responses which contain New Year's resolutions.

To facilitate the immediate usage and recognition of MOOC certificates our survey participants recommend within the open survey questions that MOOC certificates should show the "Hours of effort", start and end dates, because in their country this information is necessary if they want to use a certificate in their curriculum vitae. Further experiments may point out whether these adaptions can promote the applicability of MOOC certificates. Additionally, a wider range of topics, e.g. data protection, project and quality management, and agility could be helpful to incorporate MOOC certificate in different employment markets.

Further multivariate statistics will shed light on underlying mechanisms of possibilities to develop the careers of men and women by learning with MOOCs and using alternative digital credentials. There might be interesting regional differences e.g. in investing money into MOOCs via booking the Qualified Certificate, too. Furthermore, an analysis and survey of our customers as well as partnerships, that did not come to existence, can shed detailed light on employers' motivation or even restrictions and constraints regarding MOOCs as well as their long-term effects concerning learning, job performance, engagement and productivity.

REFERENCES

[1] openHPI, https://open.hpi.de/ (last access on March, 24 2019).

[2] School of Design Thinking Hasso Plattner Institute, Thinking new, working differently. Retrieved April 2, 2019 from https://hpi.de/en/school-of-design-thinking/design-thinking.html.

[3] openHPI, Records on openHPI. Retrieved April 2, 2019 from https://open.hpi.de/pages/document_types.

[4] The Economist, Lifelong learning is becoming an economic imperative, 2017. Retrieved March 22, 2019 from https://www.economist.com/special-report/2017/01/12/lifelong-learning-is-becoming-an-economic-imperative.

[5] D. S. Calogne and M. A. Shah, "MOOCs, Graduate Skills Gaps, and Employability: A Qualitative Review of the Literature", June 2016 [The International Review of Research in Open and Distributed Learning, Vol 17, No 5 (2016)].

[6] C. E. McLoughlin, "The pedagogy of personalised learning: exemplars, MOOCs and related learning theories", in J. Herrington, A. Couros, and V. Irvine (Eds.), Proceedings of EdMedia 2013–World Conference on Educational Media and Technology 2013, pp. 266-270. Victoria, Canada: Association for the Advancement of Computing in Education (AACE). Retrieved April 8, 2019 from https://www.learntechlib.org/primary/p/111968/.

[7] K. Jordan, Massive Open Online Courses Completion Rates Revisited: Assessment, Length and Attrition, June 2015. Retrieved June 21, 2019 from www.irrodl.org/index.php/irrodl/article/view/2112/3340.

[8] H. Albert and M. Sekhon, "Seven 'C's ensure learner engagement in corporate MOOCs. Learning Solutions Magazine 2015 [Web log post]. Retrieved April 8, 2019 from https://www.learningsolutionsmag.com/articles/1635/seven-cs-ensure-learner-engagement-in-corporate-moocs.

[9] T. Staubitz, H. Traifeh, and S. Chuijfi, Introduction to Successful Remote Teamwork on openHPI, 2019. Retrieved April 8, 2019 from https://open.hpi.de/courses/international-teams2019.

[10] S. M. Krauss, "How Competency Based Education May Help Reduce Our Nation's Toughest Inequities," Lumina Issues Papers, October 2017. Retrieved April 8, 2019 from https://www.luminafoundation.org/files/resources/how-cbe-may-reduce-inequities-1.pdf.

[11] J. Reich and J. A. Ruipérez-Valiente, The MOOC pivot, What happened to disruptive transformation of education? Massachusetts Institute of Technology, Cambridge, MA, USA. Retrieved March 29, 2019 from https://www.sciencemagazinedigital.org/sciencemagazine/11_january_2019/MobilePagedArticle.action?articleId=1455537&app=false#articleId1455537.

[12] A. W. Radford, B. Conningham, and L. Horn, MOOCs: Not just for college students–how organizations can use MOOCs for professional development. Employment Relatiosn Today 2015, 41(4), pp. 1-15. Retrieved April 9, 2019 from https://onlinelibrary.wiley.com/doi/epdf/10.1002/ert.21469.

[13] A. Hui, Are Udacity nanodegrees worth it for finding a job? Retrieved April 14, 2019 from https://www.mooclab.club/threads/are-udacity-nanodegrees-worth-it-for-finding-a-job.2082/.

[14] ICDE Working Group on The Present and Future of Alternative Digital Credentials (ADCs), January 2019. Retrieved April 15, 2019 from https://icde.memberclicks.net/assets/ICDE-ADC%20report-January%202019%20%28002%29.pdf.

[15] C. McIntyre, How Employers View MOOC Certificates in 2018, Jul 2018. Retrieved March 18, 2019 from https://www.mooclab.club/threads/how-employers-view-mooc-certificates-in-2018.10099/.

[16] S. Gatuguta-Gitau, MOOCs: Employers view, a brief snapshot, 2017. Retrieved March 18, 2019 from https://www.qs.com/moocs-employers-view-a-brief-snapshot/.

[17] R. T. Franco, Interview with MoocLab.club's CEO Carolyn McIntyre, March 2015. Retrieved April 3, 2019 from http://moocstream.blogspot.com/2015/03/mooclabclub-interview-with-ceo-carolyn.html#.XKSAl1UzaUk.

[18] MoocLab, MOOC Transcript Builder. Retrieved April 8, 2019 from https://www.mooclab.club/pages/acadenic_transcripts/.

[19] V. Reda and R. Kerr, "The MOOC BA, a new frontier for internationalization", IEEE, September 2018, Madrid, Spain [LWMOOCS V – Learning with MOOCS 2018, pp. 94-97].

[20] Commonwealth of Learning (COL), Guidelines for Quality Assurance and Accreditation of MOOCs, June 2016.

[21] openSAP, Retrieved March 28, 2019 from https://open.sap.com/.

[22] mooc.house, Retrieved March 28, 2019 from https://mooc.house/.

[23] Linåker, J., Sulaman, S. M., Maiani de Mello, R., and Höst, M. Guidelines for Conducting Surveys inSoftware Engineering, 2015. Retrieved June 21, 2019 from https://portal.research.lu.se/portal/files/6062997/5463412.pdf.

[24] T. Staubitz, J. Renz, C. Willems, Ch. Meinel, Supporting Social Interaction and Collaboration on an xMOOC Platform, In Proceedings of 6th Annual International Conference on Education and New Learning Technologies (EDULEARN2014), 7-9 July, 2014, Barcelona.

[25] World Health Organisation, Welcome to OpenWHO. Retrieved April 15, 2019 from https://openwho.org/.

[26] J. Littenberg-Tobias and J. Reich "It looks like this course is turning toward a degree": Rethinking professional education with a blended MicroMasters program, IEEE, September 2018 [LWMOOCS V – Learning with MOOCS 2018, pp. 22-26].

[27] P. Lee, D. Stewart, C. Calugar-Pop, Technology, Media & Telecommunications Predictions 2014, London.

[27] C. Friedl, T. Staubitz, D. Jansen, Flexible, self-directed and bottom-up: Are employees overtaking their Human Resource departments with MOOCs, Learning with MOOCS 2018 (LWMOOCS V), 26-28 September 2018, Madrid.

[28] BizMOOC – Knowledge Alliance to enable a European-wide exploitation of the potential of MOOCs for the world of business Programme: Erasmus+, Retrieved 22 June, 2019 on https://bizmooc.eu/.