Universitätsverlag Potsdam

Article published in:

Universität Potsdam
Universitätsverlag Potsdam

EMOOCs
14 – 16 June, 2023
Hasso Plattner Institute
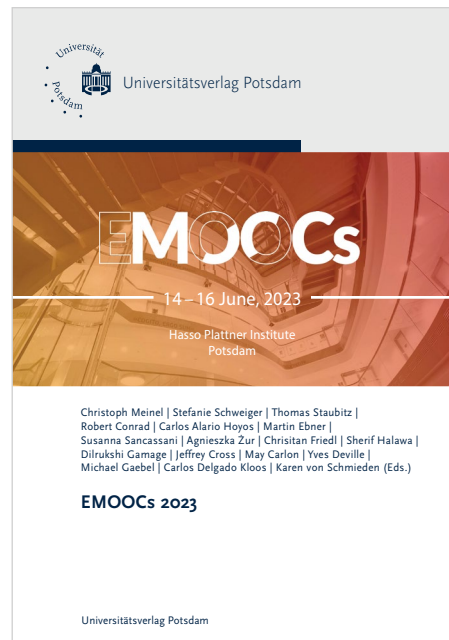Potsdam

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EMOOCs 2023

Universitätsverlag Potsdam

Impact of Mooc and Other Online Course Development on Campus Education

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The TU Delft Extension School for Continuing Education develops and delivers MOOCs, programs and other online courses for lifelong learners and professionals worldwide focused on Science, Engineering & Design. At the beginning of 2022, we started a project to examine whether creating an online course had any impact on TU Delft campus education. Through a survey, we collected feedback from 68 TU Delft lecturers involved in developing and offering online courses and programs for lifelong learners and professionals. The lecturers reported on the impact of developing an online course on a personal and curricular level. The results showed that the developed online materials, and the acquired skills and experiences from creating online courses, were beneficial for campus education, especially during the transition to remote emergency teaching in the COVID-19 lockdown periods. In this short paper, we will describe the responses in detail and map the benefits and challenges experienced by lecturers when implementing their online course materials and newly acquired educational skills on campus. Finally, we will explore future possibilities to extend the reported, already relevant, impact of MOOCs and of other online courses on campus education.

1 Introduction

With a clear mission to "educate the world and improve the quality of campus education", the TU Delft Extension School for Continuing Education works with faculties and external partners to develop and offer online courses and short learning programs to equip professionals and lifelong learners to solve today's global challenges.

Its commitment to deliver high-quality, stimulating and engaging online learning experiences that meet learner's needs is underpinned by a robust quality assurance structure at institutional, portfolio and course quality level. One of the course

quality elements is providing instructors with dedicated training and intensive guidance on how to design and moderate an online course. For lecturers, this creates opportunities for professional development. The course content, openly licensed, can be used in the delivery of on-campus courses. Moreover, the adaptation of online, digital teaching skills and reuse of online resources fosters a development towards more education modernization such as open education [5]. In March 2020 the University had to switch to emergency remote teaching due to COVID-19 lockdown. To what extent did lecturers bring online course experiences and resources to their campus courses? And was this beneficial for the quality of campus education?

Our colleagues published an article on the support lecturers received during these lockdowns [8]. In the current paper, we specifically examine the impact of online course development on campus education from a lecturer's perspective. Besides mapping the reuse of materials, this article focuses on the effect on the lecturers who created an online course. In order to conceptualize the impact on campus education, we follow Desimone's conceptual framework for online professional development [4]. The mechanism to affect educational change is prompted by a) the teachers' practical experience with online professional development, b) altering their knowledge, skills, beliefs and attitudes, c) resulting in changed classroom practices, to finally d) improve student outcomes [7]. Hence, in this study, impact is operationalized as the professional development of the lecturers as well as the application of online teaching materials and eventually learner outcomes.

We describe the results obtained by surveying TU Delft lecturers involved in developing and teaching the online courses and programs of the TU Delft Extension School. Through the analysis of responses, we aim to map the benefits and challenges experienced by lecturers when implementing their online course materials and newly acquired educational skills in their campus teaching practice.

2 Online Course Development Benefits Campus Education

The online survey to collect lecturers' views on the impact of online materials on campus education was designed using Qualtrics (Qualtrics, Provo, UT) and consisted of 23 questions of the kind multiple-choice, Likert-scale, slider, or open textbox. In January 2022, we contacted all lecturers that have been involved in the development of one or multiple MOOCs or other online courses with the Extension School. These 245 lecturers were contacted by email and asked to complete the survey using an anonymous link. Participation was entirely voluntary; it was permitted to withdraw at any time and to omit answering any question. The

survey data were only collected after gaining consent from the participants. For the data analysis we included the most completed latest response from each IP address to prevent multiple responses from the same lecturer. The descriptive statistical analysis was performed using the R statistical package [6].

We received 68 responses, equal to a response rate of 27.7 %. For web-based surveys this falls within one standard deviation of the average response rate of academic studies in the behavioral sciences (M = 38.8 %, SD = 15.1), and fits the norm [3]. The response rate could vary per question due to the absence of forced responses and the survey flow. In the figures in this paper, we indicated the number of respondents (n) for each question. The mean survey duration was 11 minutes per respondent, indicating that the quality of the responses was sufficient. In the following sections, we will describe the results regarding the current impact on lecturers (2.1) and on campus (2.2), and the future possibilities of increasing the use of online materials on campus (2.3).

2.1 Building and delivering an online course aided lecturers with skills and materials

A key element of the Extension School's strategy to guarantee course quality is to provide instructors with dedicated training and intensive guidance on how to design and moderate an online course. In the survey, 64 % of respondents indicated that on a personal level, the designing and delivery of an online course enhanced their professionalization and fostered the acquisition of new skills (Figure 1A). The online experience also helped 38 % of responding lecturers to redesign and rethink their campus education (Figure 1A). All these are valuable impacts for campus education.

Figure 1B shows that lecturers experienced the acquisition of improved teaching materials (78 %) as the biggest impacts (defined as having the largest fraction that indicated a moderate to major impact), followed by the availability of more educational examples (62 %) and an improvement in the overall quality of their teaching (60 %). We expected results to show that lecturers would spend less hours on preparing class materials when they could reuse their online materials on campus. A previous study also reported that one of the main reasons for teachers to reuse resources is efficiency (time gain) [2]. However, most instructors in the current study do not report a large positive impact on this aspect (Figure 1B).

If lecturers indicated a major impact in Figure 1B, they were asked to elaborate on the experienced impact. The elaborations for example specify major impact on new organization or format for campus teaching (n = 8), more diverse learning materials (n = 5) and enhanced educational transferable skills (n = 4). One of the remarks often mentioned is that the developed online materials and the acquired skills

and experiences were especially beneficial during the transition to online/remote teaching due to the COVID-19 lockdown periods.

Did the incorporation of online material always lead to improved campus education? Although 60 % of lecturers indicated that the quality of their teaching improved (moderate to major impact), others indicated in open text boxes that the teaching quality reduced, the workload increased and/or that passing rates went down. These discrepancies indicate that lecturers might need support on how to implement online resources to achieve better results on campus and to prevent lower passing rates.
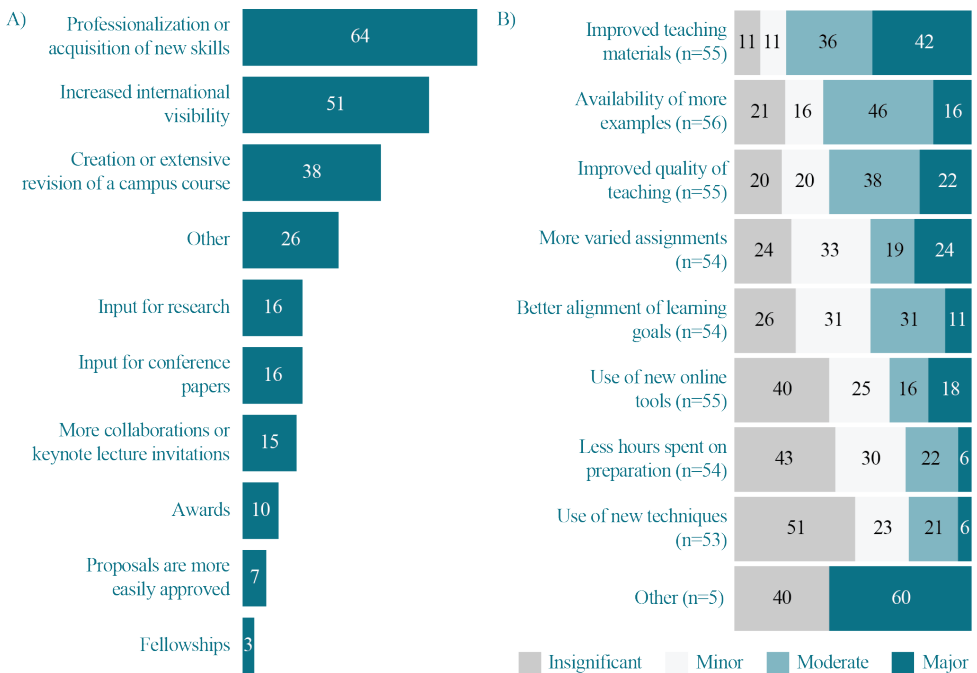
Figure 1: Building and delivering an online course aided lecturers with skills and materials. The figures show the impact of building and delivering an online course on a personal level (A, n = 61) and in general (B, n is indicated in the figure). The percentage of lecturers selecting an answer is indicated in the bars, multiple answers could be selected by one lecturer in Figure 1A.

2.2 Materials built in online courses are reused by lecturers in their class education and benefit campus students

Most responding lecturers (82 %) reuse online resources in their campus education. Videos (93 %) and quizzes (56 %) are reused most often, followed by case studies and self-assessments (both 27 %) (Figure 2A). About 60 % of the lecturers who reuse videos indicate that they reuse at least half of all the videos from their online course on campus. In line with a previous study [2] that shows that more than ten different types of on- and offline materials were reused by teachers, Figure 2A shows an extensive list of reused materials, including interactive PDFs, examples from online course participants, peer reviews, games, simulations, VR environments and online labs.

The online resources were predominantly reused in Master courses with 75 % of lecturers who reuse materials reporting reuse at this level. This is followed by Bachelor level courses with 50 %, and by pre-university/bridging level courses with 5 %. The median class size indicated by the lecturers was 100 students. These students were given access to the resources in various ways with the largest group of instructors (55 %) providing the materials through the university LMS Brightspace. The resources were integrated in their campus courses by 70 % of the responding lecturers, mostly as preparation before class.

Figure 2B shows that 83 % of lecturers indicated a moderate to major overall benefit for students. Diving into this benefit in Figure 2C, we see that 69 % of lecturers noticed a moderate or major impact with regards to an improved learning experience for the students. This is followed by 49 % who noticed better engagement face-to-face in class. Although a large fraction reported an improved learning experience, we see that especially the fraction noticing "major impact" is lower on "better students' output in any format" (12 %) and on "increased knowledge transfer by higher student answers" (15 %). This indicates that getting the best knowledge transfer when using online resources is possible as 12 %–15 % indicate a major impact on improved outcomes, but that other lecturers do struggle with getting better output from students while implementing online resources with improved learning experiences (Figure 2C).

Did the development of online course(s) only benefit the involved lecturers and their campus courses? From the survey results we can conclude that this is not the case. Although most instructors (56 %) indicated that they are not aware of their materials being reused, a large fraction (44 %) reported to be aware of the reuse. From answers in the elaboration box related to this question, we deduced that some lecturers know of instances of reuse within TU Delft during lockdown, both to replace guest lecturers, and to fill in the course gaps that arose due to the

sudden move to online teaching. A few reported to know of instances of reuse by other universities and organizations.

How about the reuse of online materials on campus that were created by others? Only 30 % of responding lecturers reuse online resources from others. In the elaboration box we read about incorporating materials by TU Delft colleagues as well as from other universities. These materials are varied: talks/lectures, videos (including lab videos and short movies), documents, reference images, calculation tools, and Miro boards. The main reason mentioned by the 70 % who do not reuse materials by others is the lack of those materials in the field of interest or the lack of a good overview of what is available.
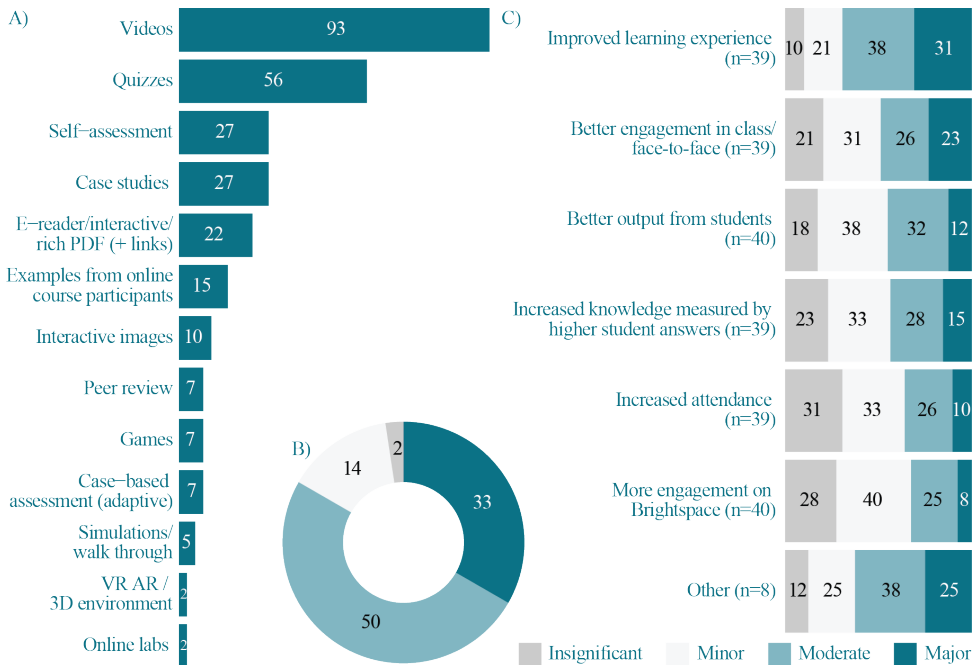
Figure 2: Materials built in online courses are reused by lecturers in their class education and benefit campus students. The percentage of lecturers selecting an answer are indicated in the bars. **A)** Responding lecturers (n = 41) indicated one or multiple resources from their online course(s) that were reused on campus. **B)** Overall benefit of using the online material for campus students according to the responding lecturers (n = 42), legend depicted in the figure. **C)** The figure shows the impact that responding lecturers (n is indicated in the figure) noticed on students. Same legend as Figure 2B.

2.3 Increasing the reuse of online educational resources into campus education requires appreciation, recognition, and support

Lecturers also reported constraints in the incorporation of online resources into campus education. These constraints mainly involve time limitations; perceived differences in the academic level of online and campus courses; the availability of suitable material; a lack of support by management; and the potential negative perception by students or peers. Suggestions on how to implement online resources to achieve better results by further extending the already relevant impact of online education on campus, include appreciation, recognition and support by management, and a searchable database to promote and facilitate reuse.

3 Conclusion

This survey project mapped the benefits and challenges associated with the impact of online course development on campus education. An advantage of the approach is the ability to collect both quantitative and qualitative feedback from a group of 68 lecturers involved both in online and campus education. The results showed that developing an online course with the TU Delft Extension School was beneficial for campus education in at least two ways. First, lecturers could implement the universal skills acquired during the online course development process on campus education. The online development inspired them and potentially made them better equipped to redesign and rethink campus education. As a second perspective, the reuse of online materials on campus, was reported to be beneficial for students as well as for the instructors creating the campus course.

While the above two ways lead to a general valuable impact, the acquired skills and reusable material turned out to be especially beneficial for campus education in the last years. They facilitated the transition to online teaching and learning during COVID-19 lockdowns for our responding online instructors. This is in line with a report on blended learning during the COVID-19 pandemic on Open Educational Practice (OEP) – whereby staff and lecturers share, contribute to, and reuse materials with an open license and openly collaborate, discuss, and brainstorm – was reported to be supportive for emergency educational shifts [8]. A large fraction (44 %) of lecturers reported to be aware of the reuse of their online resources by others mostly on campus, but some also reported global reuse. This showcases that the online development process results in Open Educational Resources (OER).

However, of the surveyed, online experienced lecturers only 30 % reused materials created by others, meaning that they still experience barriers or do not want

to implement OER created by others. These barriers are probably even higher for lecturers who are not involved in online education themselves. According to the canvassed lecturers who are involved in both online and campus education, further extending the campus education impact requires several factors. Main reported factors were: providing lecturers with support on how to reuse online resources to achieve better results with students; clear appreciation, recognition, and support by management; and the availability of a searchable database to facilitate reuse of materials. Searching and evaluating resources were also indicated by previous studies (e.g. [1]) to be barriers for OER reuse.

To reach the entire potential impact of open education on campus, all lecturers should have the time and skills to access, adapt and use online OER. Lecturers who are not themselves involved in online education might need other types of support to implement more online resources in their campus teaching.

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