

HOW OPEN SOURCE TOOLS COULD HELP REMOTE LEARNING DURING THE FIRST LOCKDOWN IN HUNGARY? – CASE STUDY OF UNIVERSITY OF PUBLIC SERVICE

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DOI: 10.24989/ocg.v341.13

Abstract

This paper analyses how these open source tools could help remote learning at the University of Public Service during the spring semester in 2020 and how their usage rise significantly compared with the previous period.

Covid-19 has had serious consequences in all aspects of people's everyday life – including higher education. Forced emergency responses made a significant impact on the digital transformation of higher education. In Hungary, the University of Public Service switched from attendance education to remote learning within ten days.

Using case study methodology, this paper analyses how open source software usage changed at the first lockdown. The transformation period was between 12-22 March 2020, and online education started on 23 March 2020. The end of the examined period is the end of the 2020 autumn semester. The examined institute is the University of Public Service. This research focuses only open source tools, including the already utilized accessed Moodle course management system.

This paper is highlighting the relevance of the usage of open source software in the given timeframe. The "public money – public code" principle is also emphasized as one which could be an especially key issue in the University of Public Service as this institute prepares students to work as public servants in the future.

1. Introduction

The novel coronavirus (SARS-CoV-2) pandemic has had serious consequences in every aspect of people's life – including solving how to run higher education online. Even though some tools had already been used to share course material or even encourage interactivity, distance learning was not that popular within Hungary. There was no significant demand for it before, but with the quick closure of the institutes, universities had to find rapid solutions. Without opportunities for public procurement to purchase software, usage remained with already used or open source options.

The institute used in this case study – the University of Public Service in Hungary – lecturers and students had to switch from attendance education to remote learning within ten days in March 2020. The change appeared fast and in many aspects: students had to leave their dormitories and move home, find a proper environment there, set up a good enough IT base, change their mindset – so did the teachers. The latter had to change the way of teaching, get used to teaching in a yet unusual and

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– in many cases – uncomfortable situation. Obviously, it needed a lot of administrative support, either.

This paper's central question focuses on which online platform could best fit the circumstances, so do requirements of rational usage of public money at a state university – with particular highlight to open source concept – and how these opportunities could evolve with time. This paper also assumes that the usage of analyzed platforms increased spectacularly, and the covid-19 pandemic boosted higher education to meet modern technology opportunities.

2. Methodology

The scope is the University of Public Service in Hungary. This research focuses only on the open source tools. The analysis highlights the findings related to the already utilized accessed Moodle course management system, as other public platforms (like Big Blue Button) did not spread widely. Therefore data of usage analyzed came from Moodle E-learning platform.

This paper's main research question is: (1) how the usage of open source teaching platforms changed at the University of Public Service due to the novel coronavirus (SARS-CoV-2) pandemic in 2020?

To analyze it, we need to understand the theoretical background of why to prefer open source options, which public platforms have been used since the pandemic started and how the university itself has tackled to go remote on short notice. To understand how the chosen institute could switch to distance learning in ten days, we need to analyze university regulations and recommendations by the rector and the chosen University's Operational Corps.

The choice of research strategy was based on considering three conditions: "(a) the type of research question posed, (b) the extent of control an investigator has over actual behavioral events, and (c) the degree of focus on contemporary." [1, p5.] Following this guideline, the authors chose case study methodology to use as to how "question is being asked about a contemporary set of events, over which investigator has little or no control." [1, p9.]

3. Literature review

3.1. Covid-19 related higher education recommendations

The meaning of blended learning has changed since its first appearance in 1999, and all understand it based on their need. The core idea is the combination of classroom and online learning or face-to-face (oral, non-verbal) and written education, where teachers' roles can vary. Based on a definition tree diagram in case teacher and students are at the same time "co-present", and there are content and/or communication technically mediated blended learning occurs. [2]

Online and blended learning had already had growing popularity and strategic priority at colleges and universities in 2019, but decisive and determinant steps have not been forced before the covid-19 lockdown. As a consequence – although not every experience is positive and not everyone is happy about going online – quality growth and "many faculty and students now better understand and appreciate the value of asynchronous (D2L, Canvas, Blackboard, Moodle) learning management systems and synchronous tools for collaborative group work (Zoom, FaceTime, Hangouts)." [3, pp310-311]

Development, investment, and training seem to appear as a recognized crucial point both in human resources and technology infrastructure. [3] Simultaneously, "capacity building and competencies of both teachers and students to facilitate their remote teaching and learning experiences" [4, p8] must be prioritized. The focus has to be put on skills development, such as using online platforms and tools and designing "an effective online course" [4, p8] – as some even say, design for teaching is the main point, not the technology. [3]

At a time of crisis, adaptation can be quicker, as we experienced in the last year. Strategies and solutions had to be developed quickly, and correction mechanisms had to appear based on experiences gained. A recommended way is "[i]ntegration of formal and informal learning settings, along with Open Education and Open Science" with the cooperation and shared knowledge within the university community. "Resources can be Open, Universal and-or Free (OUF), and they have to be correctly tagged and used, to this matter." [4, p8]

3.2. Open source - public money, public code

Based on the Open Source Initiative, open source denoting software for which the original source code is made freely available that anyone can inspect, modify, and enhance and redistribute. [5] The European Union has an open source license, "The European Union Public Licence (EUPL)" yet since 2009, but its usage not mandatory. Its purpose is "to encourage public administrations to embrace the free and open source model." [6]

The "Public Money - Public Code" is a campaign by Free Software Foundation Europe. Their main aim is to encourage the politicians to "Implement legislation requiring that publicly financed software developed for the public sector be made publicly available under a Free and Open Source Software license." 203 organizations and 30151 individuals already support this call for action by signing the open letter to use taxpayers' money wisely in this aspect. [7]

4. Tools

4.1. Moodle

Moodle is the world's most popular open source learning management system, supporting both blended learning and 100% online courses and available in more than 120 local languages. It "has been adapted for use across education, business, non-profit, government, and community contexts" and "designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalized learning environments." [8] It can be extended by plugins and customized in any way and tailored to individual needs. About its usage statistics, see Figure 1.

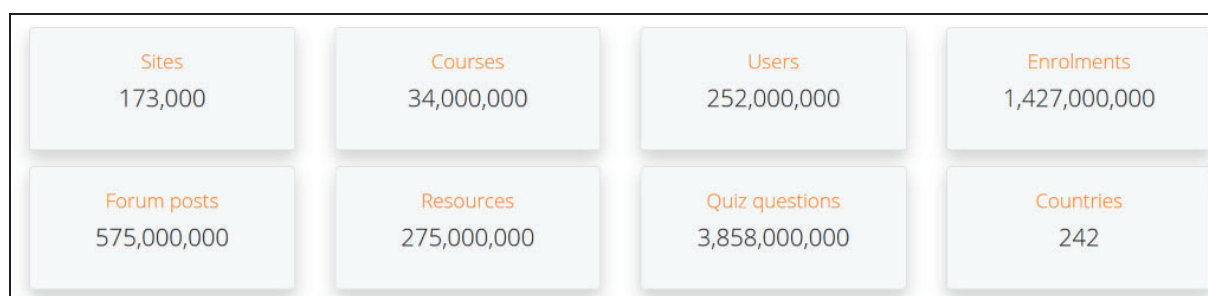


Figure 1: Moodle global statistics [9]

4.2. Big Blue Button

Big Blue Button (BBB) is an open source web conferencing system designed for online learning. BBB is an HTML5-based web application that runs within a web browser and does not require installing any software, unlike many commercial web conferencing systems. There is no mobile app to download or install, but BBB can run within a mobile browser.

BBB integrates seamlessly with Moodle using plugin. An incoming release is planned to Integrate the BBB plugin into Moodle. [11] It is designed for collaboration and engagement, focusing on virtual office hours/tutoring, flipped classroom, student collaboration, and fully online classes. Its features include real-time sharing of audio, video, presentation, and screen – along with collaboration tools such as interactive chat (public and private), multi-user whiteboard, shared notes, polling, and breakout rooms. BBB can record one's sessions for later playback. [10] One of its advantage for teaching that participants can get the right to present their screen without getting other extra rights (for example recording). Therefore currently it is one of the most advanced tools for online teaching.

Despite its advantages, it does not reach the popularity of MS Teams at university level in Hungary.

5. Covid-19 provisions: University of Public Service

The Government Decree 40/2020. (III. 11.) on the declaration of state of emergency [12] – as a consequence of novel coronavirus (SARS-CoV-2) pandemic outbreak – affected the operation of the given university. The rector declared the period between 12-22 March as an educational break to prepare for distance learning from 23 March 2020. Till 3 July 2020 semester was completed with online learning, which meant pre-recorded lectures and online submitted assignments via Moodle or email. Video lectures were available at the Ludovika Webinar [13]. Big Blue Button face-to-face interaction software could be available but has not been used, although it could complete the open source learning tool requirements if they would like to organize blended learning. Its advantage would have been on one hand that in this period only on-premise solutions were allowed at the university, on the other hand, Big Blue Button has already had functionalities specialized for teaching what MS Teams is just currently developing.

The autumn semester 2020 started as attendance education, but based on Government Decree 484/2020 [14], the rector declared at 11 November 2020 online education again [15], started at 16 November 2020. It appeared as blended learning: Moodle and MS Teams were, the two branches of online learning and face-to-face interaction, decided to be used. Although blended learning provides a more effective learning experience, MS Teams does not fit open source tools' requirements. Moodle still fits the public money – public code idea.

At the same time - within Moodle – an internal training system has been set for teachers to learn how to use and design better online teaching.

6. Research findings: usage of open-source tools at the chosen university

The University of Public Service is a state university with four faculties located in Budapest and Baja. The number of students in the spring semester 2020 was N=5479, while in the autumn semester N=5908. At the same period number of teachers was N=731 and N=853.

The number of usages of Big Blue Button was not noteworthy; therefore, we cannot make a comprehensive data-based analysis. In 2020 Big Blue Button was used in 93 courses altogether.

To measure the usage of Moodle, the resources were set as a baseline. This case resource is an item that a teacher can use to support learning, such as a file or link uploaded together with assignments or tests (see resource usage frequency in Table 1.). The starting date was the first week of 2020 (2020 week1 =0). Figure 2 shows data starting in 2020 as data from 2019 remained close to the amount we can see till 2020 week 9. The date of the exam period can differ in different faculties, the Figure 2 indicates the most common period. Learning assets are resources that are used to deliver information through a learning management system or portal for training and development.

Analyzing data, two peaks appear: 9 March 2020 (week 11) and 2 November 2020 (week 45). Week 11 was synchrony with the declaration of state of danger and closing universities, but peak at week 45 was two weeks before online education started again in the second semester and one week before the rector announced it. It might have based on two facts: on the one hand, usage of Moodle does not fall since the first lockdown, on the other hand, the number of Covid-19 cases rising in the country could make the suspicion for a second closure.

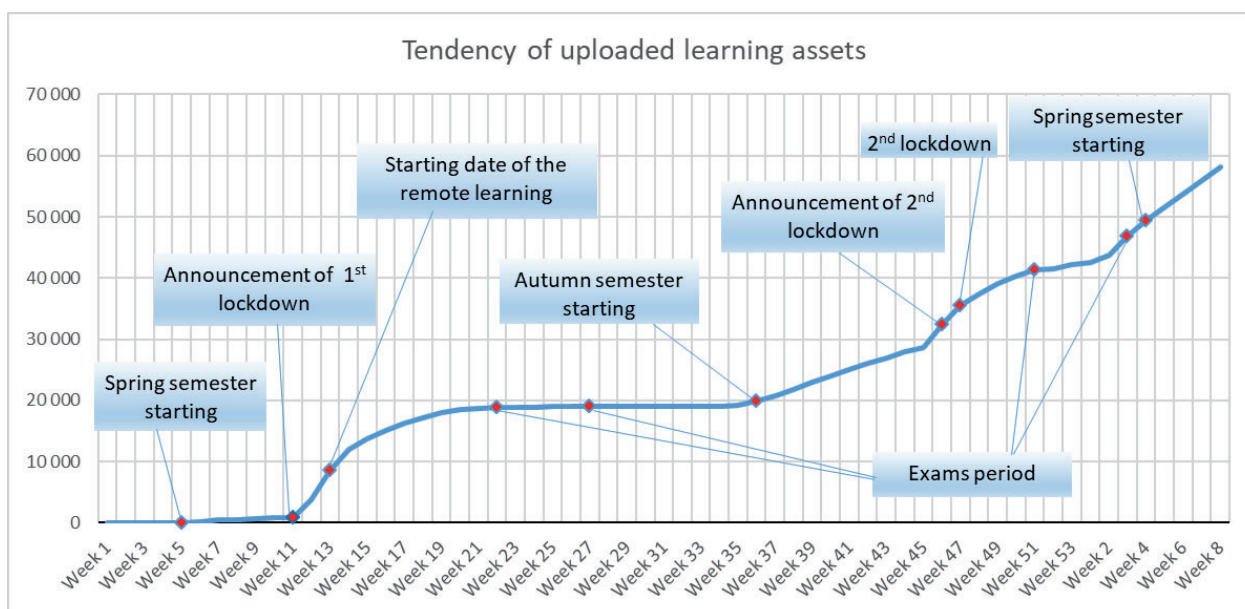


Figure 2: Number of uploaded resources (files, links) between 2020-2021.

Interesting to highlight from Figure 2 that although the autumn semester started with classroom education usage of Moodle still increased. It can indicate educators understood the potential of using this tool as an added value for their teaching (blended learning).

Figure 3 shows the peaks even more spectacular. That figure indicates the number of logins and unique logins to the University of Public Service Moodle system between 31 January 2018 and 31 January 2021. Since the beginning of the pandemic, the drop happened during the summer holiday.

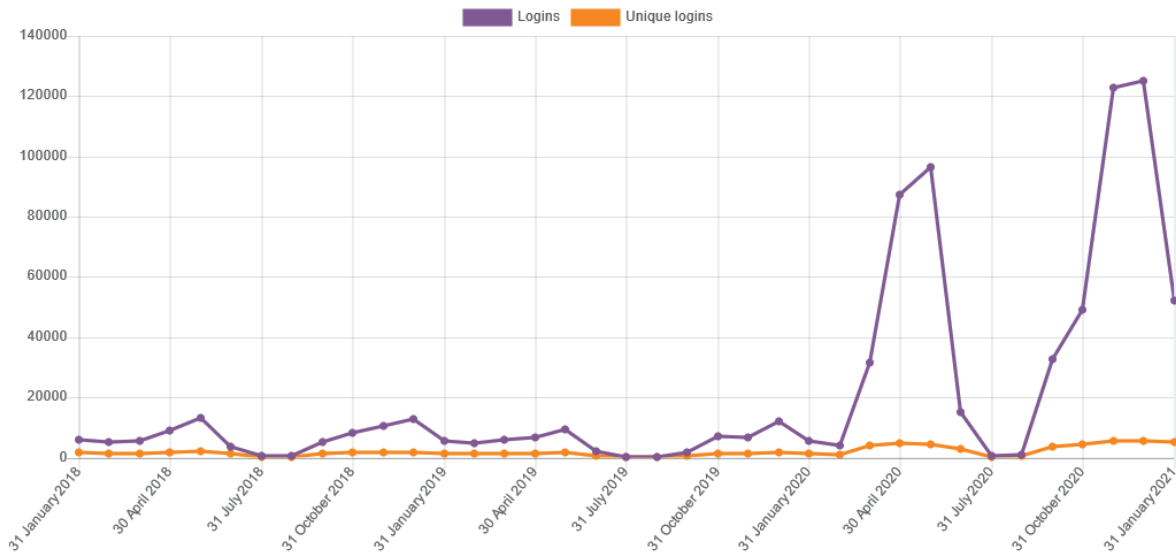


Figure 3: Moodle login data between 2018-2021.

To analyze in more detail, Table 1 and Figure 5 presents how many courses used any of the listed resources in the given semesters. An assignment could be both small tests, quizzes during the semester, or exams. Worth mentioning that at the end of the 2020 spring semester exams could be completed only with assignments, but at that time many educators asked for it via email.

	Resource	2019/20/2 (2020 spring semester)	2020/21/1 (2020 autumn semester)	Total
1.	File	1 300	1 567	2 867
2.	Label	65	1 839	1 904
3.	Assignment	566	537	1 103
4.	Quiz	283	665	948
5.	URL	378	411	789
6.	Folder	205	215	420
7.	Forum	131	54	185
8.	Page	89	75	164
9.	Big Blue Button	24	69	93
10.	Chat	57	29	86

Table 1: Ten most commonly used learning assets

As one could expect most popular option was file sharing within Moodle’s basic features. Label resource rose up in the second examined semester as there has been an option that Moodle users with Microsoft 365 accounts can create Teams meetings within Moodle with an installed plugin. It means that starting of blended learning caused the rise (Figure 4). [16] Numbers also highlight that Forum and Chat were not popular among educators.

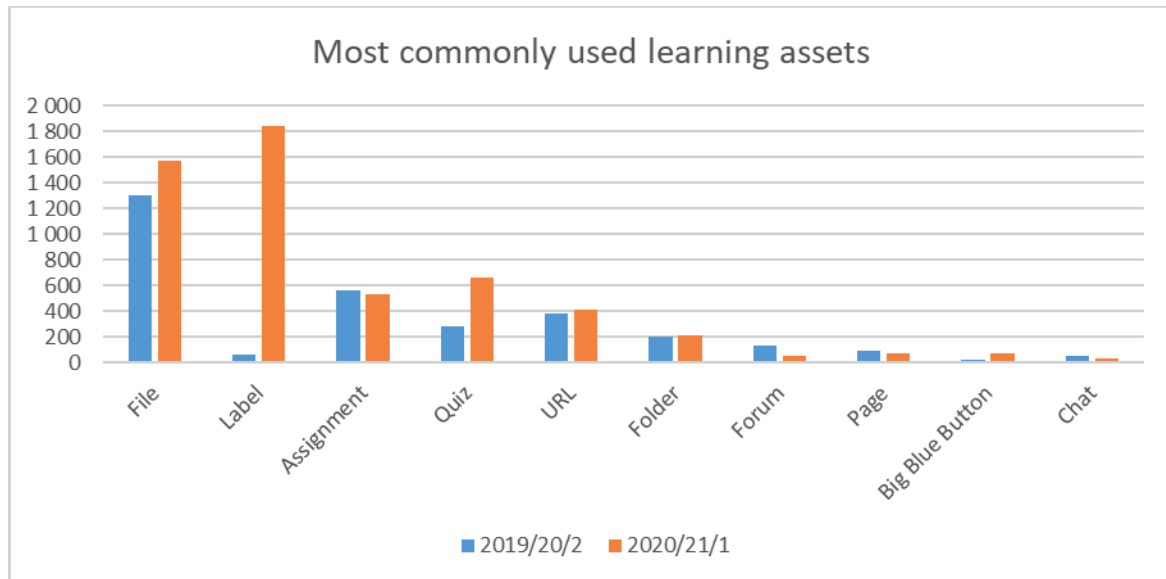


Figure 4: Most commonly used learning assets in Moodle

7. Conclusions

As universities in Hungary had to turn to online education because of the Covid-19 pandemic on short notice, they had to turn to feasible solutions. The time frame was not enough for public procurement, so they had to turn to already used tools and/or start to use open source solutions.

The University of Public Service has had Moodle open source tool already had used at the institute, but it could not reach its real potential till the crises. For blended learning, a face-to-face tool was needed to be added, but instead of open source Big Blue Button, MS Teams appeared as a solution since the autumn semester. With doing so, open source and public money – public code recommendations had been realized partially.

The big question is how will higher education look like after the pandemic? What strategy to plan with? [cf. 3] Authors hope that Moodle system's wise usage will remain at the university as a tool of blended learning – even when the second branch of it can be a real face-to-face lecture.

This paper's limitations are that it could not analyze students' and lecturers' perceptions about online education, so do their opinion about using different online tools and their preferences about it. It cannot focus on the IT "infrastructure" of actors. It must have excluded other challenges and various circumstances that could affect online learning as well, such as digital inclusion or administration challenges. Further research should be done to investigate them.

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