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Jelena S. Anđelković[1]
University of Belgrade – Faculty of Organizational Sciences,
Department of Human Resources Management
Belgrade (Serbia)

Nikola D. Petrović[2]
University of Belgrade – Faculty of Organizational Sciences,
Department of Human Resources Management
Belgrade (Serbia)

*CHAPTER 24*

# COMPARISON OF MOODLE LMS AND MS TEAMS FOR ONLINE AND HYBRID ESP INSTRUCTION: LESSONS LEARNED

Abstract: COVID-19 pandemic caused a sudden transition from traditional to Emergency Remote Teaching – ERT (Hodges, Moore, Locke et al. 2020), in which educational institutions around the world adopted online, blended and hybrid teaching models and implemented them using various learning management systems (LMSs) and/or complementary tools and similar platforms such as *MS Office 365, Google Meet, Zoom, Webex*, etc. At the beginning of the pandemic, the Faculty of Organizational Sciences, University of Belgrade, adopted *MS Teams* platform as an optimal tool for the new and unexpected ERT situation. This, however, was not the first implementation of LMSs and similar learning environments at FOS, as several versions of *Moodle LMS* had been used even before and continued to be used in parallel with *MS Teams* for teaching content delivery in remote teaching study programs, testing and assessment in several courses at undergraduate level.

This paper aims to comparatively analyze the use of *Moodle LMS* and *MS Teams* in the context of teaching English for Specific Purposes (ESP) at the Faculty of Organizational Sciences (FOS), University of Belgrade, using the models of on-

[1] jelena.plecas@fon.bg.ac.rs; https://orcid.org/0000-0001-8286-1047
[2] nikola.petrovic@fon.bg.ac.rs; https://orcid.org/0000-0001-5977-7509

line and blended learning and teaching. The platforms were compared according to the following criteria: 1) instructor – student communication and interaction, 2) delivery and management of educational content, 3) testing and assessment, 4) learning analytics, 5) user experience.

The results of the analysis indicate that the two platforms have similar technical functionalities in terms of the second criterion. With the third, fourth and fifth criterion, *Moodle LMS* proved more useful in the given context, while *MS Teams* exceeded *Moodle LMS* regarding the first criterion. Overall, the results indicate that *Moodle LMS* is more expedient in the given context, especially with regard to learning analytics, as this functionality facilitates the improvement of the teaching process, and thus may lead better student achievement as the ultimate goal of teaching.

Keywords: *Moodle LMS, MS Teams, Emergency remote teaching (ERT), online teaching and learning, English for Specific Purposes (ESP).*

## INTRODUCTION

With the start of the COVID-19 pandemic many educational institutions worldwide were compelled to temporarily close their premises. The sudden and forced transition to alternative forms of instruction, known as Emergency remote teaching – ERT (Hodges, Moore, Locke et al. 2020), should, however, be distinguished from online teaching. While the latter involves systematic models, careful instructional design and months of preparation, ERT represents a "temporary shift of instructional delivery to an alternate delivery mode due to crisis circumstances" that "provides temporary access to instruction and instructional supports in a manner that is quick to set up and is reliably available during an emergency or crisis" (ibid.). In COVID-19 pandemic-caused ERT, educational institutions were mostly left to their own devices to come up with quick solutions in less-than-ideal and mostly stressful circumstances. The most frequently used tools for delivering ERT at the start of the pandemic became synchronous collaborative tools (such as *MS Teams, Zoom, Webex, Google Meet*, etc.), as these proved to be able to most easily and synchronously substitute the physical presence of an instructor and traditional classroom settings (Bond, Bedenlier, Marín, et al. 2021). Learning Management Systems (LMSs) such as *Moodle LMS* were also used to a significant extent, especially at universities that had already had and used them before the crisis (Bond, Bedenlier, Marín, et al. 2021). Other ERT tools included text-based tools (e.g. email) and multimodal production (pre-recorded video materials), etc (ibid.).

One of the most commonly used collaboration platforms at the start of the pandemic became *Microsoft Teams*, a part of *MS Office 365* commercial software package (in addition to *Word, Excel, PowerPoint, Outlook, OneDrive, SharePoint,*

*Forms,* etc.). Even though initially intended for business rather than for educational purposes, the creators of *MS Teams* adapted it to the new circumstances, presenting it as "a cloud app digital hub that brings conversations, meetings, files and apps together in a single Learning Management System (LMS)" (Microsoft 2018), thus making it convenient for ERT and comparable to the actual LMSs.

Learning management systems (LMSs), technologies specifically designed for online learning, enable the creation, management and delivery of educational content (Sabharwal, Chugh, Hossain, et al. 2018). These integrated software systems are convenient for the creation of virtual learning environments (VLEs) and even virtual universities (Coates 2005). LMSs were extensively used even before the pandemic for delivering education and training courses online (Sabharwal, Chugh, Hossain et al. 2018), but also in blended learning situations, as a supplement to traditional face-to-face classroom teaching, as a way to further engage students in learning and offer them opportunities to experience learner autonomy. Since they were created at the University of Illinois in the 1960s, these systems evolved into cloud-based and open-source platforms (Pankaja 2015 in Sabharwal, Chugh, Hossain et al. 2018) with a number of functionalities almost exclusively intended for educational purposes. Probably the most popular among currently used LMSs is *Moodle* (Modular Object-Oriented Dynamic Learning Environment) because of its user-friendliness, flexibility and accessibility (Anđelković-Labrović, Petrović, Anđelković at al. 2023). Since *Moodle LMS* is an open access platform, it enables individuals and educational institutions to adjust it and make it more in line with the needs and expectations of both students and instructors.

This paper aims to compare the technical functionalities of *Moodle LMS* and *MS Teams* platform in the context of teaching tertiary courses in English for specific purposes (ESP) at a business-oriented university during and after the COVID-19 pandemic. After the review of the relevant literature, the authors present the research context and compare the functionalities of the two platforms considering the two instructional models used (ERT during the COVID-19 pandemic and blended learning after the pandemic) and the following criteria: 1) instructor – student communication and interaction, 2) delivery and management of educational content, 3) testing and assessment, 4) learning analytics, and 5) user experience. In conclusion, we recommend further research that would enhance the comparability of results within and across subject areas and educational levels.

## LITERATURE REVIEW

Much research has been dedicated to the benefits and challenges of using *Moodle LMS* across educational levels and disciplines, as confirmed by several systematic literature reviews (e.g. Gamage, Ayres, Behrend 2022; Ziraba, Akwene, Nkea

et al. 2020). Since the onset of the COVID-19 pandemic that prompted the use of software platforms other than LMSs for educational purposes (e.g. *MS Teams*), there has been a rise in the number of reviews and comparisons of various (other) software tools used for ERT, online, hybrid and blended learning and teaching. Pal & Vanijja 2020, for example, measured the perceived usability of *MS Teams* as an online learning platform, while Martin & Tapp (2019) emphasize the benefits of using *MS Teams* as a collaborative tool in HEIs following the theoretical framework of social constructivism. Other articles provide surveys of students' perceptions and preferences, improvements of the user experience (Krašna, Pešek 2020; Ngoc, Phung, 2021; Rojabi 2020), discuss whether learning approaches based on these two platforms or their combination have some impact on student performance (Kanetaki, Stergiou, Bekas et al. 2021) or suggest supplementing *Moodle LMS* with collaborative tools such as *MS Teams* (i.e. combining their features) for better learning outcomes in various academic disciplines and courses (e.g. Heinrich, Thomas, Kahu 2022).

Krašna and Pešek (2020), for example, compare the influence that *MS Teams* and *Moodle LMS* have on teaching and learning by selecting the most common tasks that educators and students do using these platforms (content manipulation, communication, activities, and system administration) and comparing how well they are presented and performed using each tool.

In scientific literature, there are few comparisons of learning analytics possibilities of the two platforms. However, in a related issue concerning data, its storage, and privacy protection, reference is given to *Moodle LMS*, as it allows the instructor or educational institution to take responsibility for data management and also permits permanent deletion. In *MS Teams*, data is stored on the owner company's server, tied to the student's identity, and has the potential to further compromise user privacy in subsequent analysis, for example, by linking this data to emails exchanged by the user (Ślósarz 2020). Such findings are relevant to the paper's topic because among the limitations of learning analytics, there is a recognized possibility of building a structure reminiscent of Foucault's Panopticon, in which each individual would have a sense of constant surveillance (Petrović, Anđelković Labrović 2019).

Research articles on implementing *Moodle LMS* and *MS Teams* for language learning in higher education context are not very common. Katić, Šafranj and Zivlak (2022), for example, compare how the outcomes of learning general English and English for specific purposes at university level are affected by the medium of instruction (traditional, *Moodle LMS*, or *MS Teams*) and suggest the synergy of all three for best results. Rojabi (2020) presents a survey of student perceptions regarding the use of *MS Teams* for EFL in HEI in Indonesia, while Stradiotova, Nemethova, and Stefancik (2021) compare student achievement in language tests carried out in two environments: on-site (in classrooms), and online, using *MS*

*Forms* (part of *MS Teams*), *Google Forms* and *Moodle LMS*, but do not discuss the technical functionalities of the three platforms regarding test design, attempt restrictions, and other aspects of online testing and assessment.

## MOODLE AND MS TEAMS FOR TEACHING UNIVERSITY-LEVEL ESP: CASE STUDY

### Study Background

The Faculty of Organizational Sciences (FOS), University of Belgrade, is a business-oriented university with two undergraduate study programs (Management and Organization, and Information Systems and Technologies). The number of ESP courses and enrolled students, the courses' syllabi and learning outcomes changed from one accreditation cycle to the other, with the general trend of reducing the number of mandatory courses and increasing their specialization (Anđelković, Meršnik 2022). During the previous accreditation cycle (2014-2022), for example, there were two two-semester courses in English for Specific Purposes (ESP1 and ESP2) mandatory for all 1st and 2nd year undergraduate students, an additional elective ESP3 course at undergraduate level, and an elective ESP4 course during master academic studies. With the new accreditation cycle of 2021/22, each undergraduate study program received its own specialized and mandatory one-semester long English language course (English for Management 1 - EM1 and English for Information Technologies - EIT), in addition to several other elective courses at undergraduate (English for Management 2 – EM2, English for Academic Purposes - EAP) and master's level (English for Human Resources - EHR, English for Finance - EF).

The first use of *Moodle LMS* at FOS began in the school year of 2007/08, for around 80 students enrolled in Information Systems and Technologies distance learning program. The *Moodle LMS* platform, available at https://dls.fon.bg.ac.rs/, has been used asynchronously for sharing instructors' presentations, pre-recorded video materials and other teaching content for all undergraduate courses. In ESP1, ESP2 and ESP3 the platform was also used for short and pre-scheduled revision tests and quizzes. Though conceptualized as a remote study program, students, at the time unaccustomed to learning online, soon began to supplement it with attendance to in-class lectures, thus creating a blended learning environment for themselves. The use of the platform gradually subsided during the next accreditation cycle and was almost completely forgotten by 2022.

In the meanwhile, in 2018 ESP instructors turned to an improved *Moodle LMS* platform, available at https://e-learn.fon.bg.ac.rs/, and started using it exclusively for mid-term examinations for all ESP1 and ESP2 students. The transfer to online

mid-term examinations was motivated by the need to reduce instructors' workload, as each year between 2014 and 2021 around 1,500 students enrolled in these two courses, which made it very difficult for the four ESP instructors to grade all mid-term exams in the available time period. The platform continues to be used for holding ESP1 and ESP2 mid-term exams for students who have not yet passed these exams until the present.

With the start of the COVID-19 pandemic in spring semester of 2019/20, the faculty quickly responded to the crisis and in a matter of days replaced traditional face-to-face classroom teaching with *MS Teams* online environment, offering both instructors and students excellent technical support and assistance. Though the teaching completely returned to classrooms in spring semester of 2021/22, *MS Teams* continues to be used in all courses at FOS, mostly for information sharing.

After the pandemic and with the new accreditation cycle that started in school year 2022/23, came new and improved *Moodle LMS* platform (https://nastava.fon.bg.ac.rs/). This platform is used in only several courses at FOS including the English for Management 1 (EM1) and English for Information Technologies (EIT). The platform is currently used alongside *MS Teams*, but for different purposes: while *MS Teams* remains convenient for information sharing, *Moodle LMS* is currently used for both delivering teaching content asynchronously and for testing in mid-term and final examinations.

## Study context

The previous section provides an overview of *Moodle LMS* and *MS Teams* used in ESP courses at FOS since the school year 2007/08. To compare the functionalities of the two platforms, however, we will focus on the period during and after the COVID-19 pandemic (since the school year 2019/20 onwards), and on the courses, each alternately taught by two ESP instructors, using both platforms simultaneously in either following either ERT or blended learning educational model (Table 1).

Table 1 suggests the two platforms have not been used for exactly the same purposes at all times in the given period. Additionally, the extent of *Moodle LMS* use has gradually increased, while the use of *MS Teams* has been almost completely reduced to information sharing. These changes in use are partly to be explained by the differences in technical functionalities present in the two platforms. The following chapter will focus on outlining these differences.

Table 1: Use of *Moodle LMS* and *MS Teams* in ESP courses at FOS during and after COVID-19 pandemic

| Course | School year | Educational method | Approx. no. of students per school year | Moodle used for: | MS Teams used for: |
|---|---|---|---|---|---|
| **English for Specific Purposes 1 (ESP1)** | 2019/20 - 2021/22 | ERT and blended | 800 | mid-term examinations and online quizzes (https://e-learn.fon.bg.ac.rs/) | synchronous lectures and asynchronous teaching content delivery, information sharing, chat, discussion forums |
| **English for Specific Purposes 2 (ESP2)** | 2019/20 - 2021/22 | ERT and blended | 600 | mid-term examinations and online quizzes (https://e-learn.fon.bg.ac.rs/) | synchronous lectures and asynchronous teaching content delivery, information sharing, chat, discussion forums |
| **English for Information Technologies (EIT)** | 2022/23, 2023/24 | Blended | 650 | mid-term and final examinations, online quizzes, asynchronous teaching content delivery (https://nastava.fon.bg.ac.rs/) | information sharing, chat, discussion forums |
| **English for Management 1 (EM1)** | 2022/23 | Blended | 400 | mid-term and final examinations, online quizzes, asynchronous teaching content delivery (https://nastava.fon.bg.ac.rs/) | information sharing, chat, discussion forums |

## METHODOLOGY

For the purpose of sharing the experience of using the two platforms simultaneously during and after the pandemic, and thus potentially facilitating decision-making in similar teaching and learning contexts, this paper will compare technical functionalities of *Moodle LMS* and *MS Teams* used in four ESP courses with more than 4,800 students enrolled altogether in the period of five academic years (Table 1). The comparison will be made using the following four criteria: 1) instructor – student communication and interaction, 2) delivery and management of educational content, 3) testing and assessment, 4) learning analytics, and 5) user experience. The choice of criteria is based on the functionalities used by ESP instructors and students (as detailed in Table 1). The comparison using the criteria above will for the most part be based on ESP lecturers' perception, the frequency of students' interaction with the two platforms and informal discussions regarding the topic with individual students.

## RESULTS

### *Instructor – student communication and interaction*

Even though *Moodle LMS* offers *Big Blue Button* option for synchronous communication between students and instructors, this option has not been used in our ESP courses, so no parallel can be made with regards to which of the two platforms offers better technical functionalities in this matter. Both platforms, however, have been used for asynchronous communication with students: uploading notifications and encouraging discussion. Students generally showed better engagement with *MS Teams*, as they much more frequently used chat options and reacted to notifications and discussion prompts on this platform, while discussion forums and direct messages on *Moodle LMS* were almost never used.

### *Delivery and management of educational content*

Both *MS Teams* and *Moodle LMS* enable the delivery of educational content in various formats (word documents, presentations, hyperlinks, multimedia, etc.). *Moodle LMS*, however, provides better visibility of the content as it enables the uploaded materials to be organized by instruction topics or weeks. *MS Teams*' advantage is that it is more user-friendly for collaborative work on the same document (e.g. group assignments) and that it offers access to a single storage space for all the uploaded course materials, which simplifies search for particular documents.

### *Testing and assessment*

Provided that the faculty premises are well equipped with computer rooms and good internet access (since Belgrade University's rulebook for examinations and grading requires university examinations, both oral and written, to take place exclusively on the faculties' premises), both *Moodle LMS* and *MS* Teams offer some options for testing and assessment of students. As all ESP examinations at FOS are in written form, we can only compare the technical functionalities of the two platforms regarding the written testing and assessment format.

*Moodle LMS* shows significant advantages over MS Teams regarding this criterion. Firstly, it enables all the testing materials to be stored in a single question bank and retrieved from this bank whenever a new test is created. *Moodle LMS* also offers more diverse types of questions to choose from, a number of restrictions on quiz attempts (e.g. a password, limited number of attempts, precise timing of the quiz, limited access from only certain IP addresses), more diverse review and feedback options, automatic grading for every attempt. *MS Forms* app (which is embedded into *MS Teams* platform) lacks most of these functionalities, which (especially the lack of firm restrictions on quiz attempts) makes it inappropriate for use for mid-term and final exams, and convenient mostly for short informal revisions and quizzes that do not require strict control and/or grading.

### *Learning Analytics*

*Moodle LMS* enables the retrieval of log information that can be exported and analyzed using a number of software tools and for purposes decided by the users. *MS Teams,* on the other hand, provides an overview of the most basic indicators of student engagement which can be further analyzed in *MS Teams* environment. The possibilities for analytics in the *MS Teams* environment are predetermined through a set of indicators regarding students and the class. The advantage of this approach is that educators can easily gain insight with just a few clicks, and that it does not require deep understanding of statistics.

However, the process of extracting insights from *Moodle LMS* is more time-consuming. Log files need to be preprocessed and then analyzed, with both phases requiring a solid knowledge of statistics and understanding of the learning context. The advantage of this approach is that educators are free to determine which set of indicators are appropriate for the situation in question. *Moodle LMS* makes educators more in control of ethical considerations. For example, one can decide to anonymize all the data and focus on the whole picture, while in *MS Teams*, part of the available information is related to the learner's identity.

### *User Experience*

This criterion can be observed from both instructors' and students' perspective. Even though a formal survey has not been conducted, informal discussions with students attending ESP courses at FOS revealed that they find both platforms user-friendly and intuitive to use. A significant disadvantage of *Moodle LMS*, however, is that it is not available as a mobile app, which makes it less responsive and less convenient for use on portable devices such as smartphones. Unlike *MS Teams* which offers both push and email notifications, *Moodle LMS* enables users to get notifications of activities only through email, which also significantly reduces user responsiveness.

## DISCUSSION

Both *MS Teams* and *Moodle LMS* proved very useful and compatible in our ESP courses at FOS in both ERT and blended learning, especially with regard to criteria no. 2 and 3. *MS Teams* has better technical functionalities for both synchronous and asynchronous instructor-student communication and interaction (criterion 1), which points to its advantages for online learning situations. In addition, *MS Teams* is more user-friendly because of the availability of a mobile app and push notifications (criterion 5). *Moodle LMS*, however, has more diverse opportunities for learning analytics (criterion 4). These conclusions are similar to the ones drawn by Krašna and Pešek (2020), as their research also proves that *MS Teams* is more convenient for both synchronous and asynchronous communication and easier to administer, while *Moodle LMS* is better for activities such as instructor and peer-to-peer assessments and quizzes. These authors, however, do not compare the functionalities of the two platforms with regard to testing and assessment and learning analytics.

Table 2. Overview of pros and cons of using *Moodle LMS* and *MS Teams* in blended and online ESP courses

| No. | Criterion | | *Moodle* | *MS Teams* |
|---|---|---|---|---|
| 11 | **Instructor - student communication and interaction** | **Synchronous** | N/A | convenient |
| | | **Asynchronous** | students less responsive | students very responsive and engaged |
| 22 | **Delivery and management of educational content** | | better visibility and organization of teaching content | all teaching content accessible in a single storage space, better for collaborative work |

| | | | |
|---|---|---|---|
| 33 | **Testing and assessment** | better for formal testing because of the restrictions it offers | good for informal testing |
| 54 | **Learning analytics** | numerous opportunities for analytics, but more foreknowledge required | predetermined set of indicators, thus limited opportunities for analytics |
| 55 | **User experience** | less user-friendly (no mobile app, no push notifications) | user-friendly (mobile app, push and mail notifications) |

Another parallel can be drawn with the studies conducted by Florjančič and Wiechetek (2022) and Katić, Šafranj and Zivlak (2022), as they all indicate that the best learning effect is brought about when the two systems are in synergy, i.e. when the features of *Moodle LMS* and *MS Teams* are combined.

## CONCLUSION

The choice of tools to be used as a support to ESP teaching and learning largely depends on the needs of ESP instructors and students, but is also affected by the learning context and the mode of course delivery. The paper analyses the use of *Moodle LMS* and *MS Teams* in four university ESP courses over the period of five academic years, during and after the COVID-19 pandemic, in the context of Emergency Remote Teaching (ERT) at the start of the pandemic, followed by blended learning educational model in more recent years. The comparison focuses on the existence of technical functionalities of the said platforms and is presented with regard to the following criteria: 1) instructor – student communication and interaction, 2) delivery and management of educational content, 3) testing and assessment, 4) learning analytics, and 5) user experience. The comparison suggests that the best results for teaching and learning in the given context are achieved when combining the two platforms, as also suggested by Florjančič and Wiechetek (2022), and Katić, Šafranj and Zivlak (2022).

A potential drawback is that this analysis focuses mainly on ESP instructors' perspective. Students' perspective, on the other hand, is based solely on the frequency of their interaction with the two platforms and informal discussions with individual students. Additionally, the conclusions of this study cannot be applied without hesitation in other subject areas and educational levels, as each one of them has its own needs and specificities, especially regarding criteria 2 (delivery and management of educational content) and 3 (testing and assessment).

Further research may be conducted pertaining to the limitations presented above and involve a more in-depth survey on the topic of other stakeholders, e.g. students and society (as a broader category linked to education). Furthermore, this topic should be approached in other disciplines and levels of education to achieve greater comparability of findings both within and across subjects, educational levels and stakeholder groups.

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