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# Changes of Moodle Usage Trends by Academic Year in a Medical School during the COVID-19 Pandemic

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## Abstract

Owing to the COVID-19 pandemic, many universities have had to use online based education in 2020 which has continued into 2021. However, many universities restarted face-to-face classes in 2021. In this study, the differences in and usage trends of the Learning Management System (LMS) in a medical school were examined. The analysis was conducted using the log counts of eleven activities including assignment submission and viewing on-demand lecture videos. Although 2021 showcased less usage of the LMS than 2020 owing to the restarting of face-to-face classes, some specific usages were higher than in 2020, such as HTML 5 Package (H5P) usage. Additionally, the usages of resources such as PDFs and lecture videos did not differ greatly between 2020 and 2021 when compared to other activities such as quizzes. Although more detailed analysis, including a statistical approach, are needed to clarify the usage trends, these differences would be important in discussing the trends and changes of teaching and learning styles.

*Keywords:* Medical Education, Undergraduate, COVID-19, Moodle

## 1 Introduction

The importance of distance learning in medical education has changed. For example, the World Federation for Medical Education (WFME) published the standards for distributed and distance Learning [1]. In addition to these trends, the COVID-19 pandemic has had many universities shifting to online-based education in 2020, whether it be synchronous or asynchronous online-based education. Although some courses restarted face-to-face lectures in 2021, many universities continued online based education. In the author's university, Moodle has been used continuously since 2012. However, the pandemic has greatly changed the usage of Moodle [2].

In the previous study [3], the difference between pre-pandemic (2019) and post-pandemic (2020) Moodle-usage was examined. Although 2021 also took place after the pandemic, the teaching style differed from 2020. Online-based classes were mainly used in 2020, especially before the summer vacation, while face-to-face courses were restarted again in 2021. However, some bed-side teachings are still based on on-demand teaching or broadcasting via the Web conference system.

In this study, the differences in and usage trends of the Learning Management System (LMS) in a medical school were examined.

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# 2 Methods

## 2.1 Data Gathering

The log data were gathered using the plugin "Configurable Reports", as in the previous study [3]. In this study, the standard log of Moodle (logstore_standard_log) was used.

The standard log has several information sets regarding the students' usage of Moodle, such as user id, created time stamps, types of activities, and the students' actions.

Table 1 shows which activities and actions were used for analytics. For example, only "submitted" logs were counted for the "assign" activity, although other logs such as "viewed" and "updated" are also stored. The activity names with * indicate additional plugins which were not installed in the default Moodle.

In this study, the records from April 1, 2020 to March 31, 2022 were used; the data from April 1, 2020 to March 31, 2021 were classified as the fiscal year 2020, and the rest were classified as the fiscal year 2021. Hereinafter, each is simply referred to as 2020 or 2021, respectively.

Only students' usage logs were used. As Moodle had the cohort of students in each year grade sorted per year, the cohort table and user table were joined to the log-store table to classify the students.

Table 1: The Types of Activities and Actions for Analytics

| Activity / Resource | Actions |
|---|---|
| assign | Submitted |
| bigbluebutton* | Joined |
| database | Created |
| forum | Created / Searched / Viewed |
| h5pactivity | Submitted / Viewed |
| page | Viewed |
| questionnaire* | Submitted |
| quiz | Submitted |
| resource | Viewed |
| url | Viewed |
| videotime* | Viewed |

## 2.1 Data Analysis and Visualization

The data were downloaded using CSV files. As most records were recorded for 2020 and 2021, the data were exported separately according to actions and year, one by one; for example, "the

logs of assign in 2020". All CSV files were combined to one file after being downloaded. The data cleansing and data visualization was done using Exploratory 6.9.6.

## 3 Results

Figure 1 to Figure 11 show the results of usage log counts in 2020 and 2021. M1 refers to 1st year grade students, M2 to 2nd, and so forth.

Figure 1 shows the usage of "assignments". Note that there was a lot of usage by M1 students in 2021 December, although there were not so many in 2020.

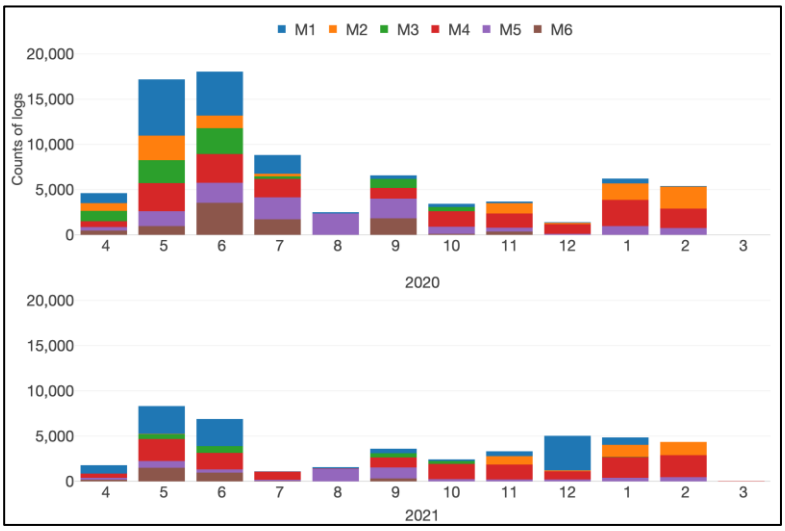


Figure 1: Counts of "assignments" usage logs in 2020 and 2021

Figure 2 shows the usage of "BigBlueButton", which is the browser-based Web conference system. As it was installed in May 2020, there were no logs in April 2020. Although it is possible to use this feature from M1 to M6, it was mainly used by M4 and M5, who's studies focused on bed-side learning.

Figure 3 shows the usage of "database activity". Database activities allow both teachers and students to post recorded entries. The database is sometimes used as a diary or e-portfolio.

The forum's activity logs are shown in Figure 4. "Forum" is usually used for two reasons: to make announcements to students and as a discussion board between students. For this reason, the logs of three kinds of actions were gathered.

The logs of "H5P" (HTML 5 package) are shown in Figure 5. Different from other activities, the use of H5P is limited as few teachers know how to make H5P content.

Figure 6 shows the usage of pages. Slides and materials are usually provided as PDF files (resources), leading to a limited use of the feature.

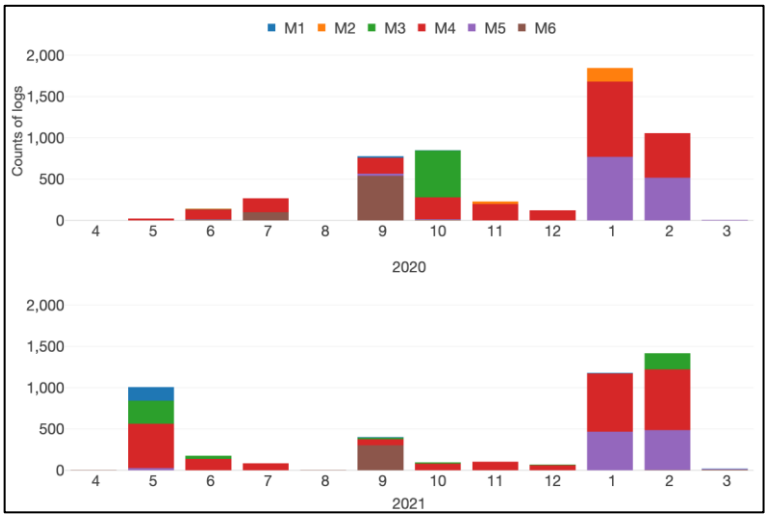


Figure 2: Counts of "bigbluebutton" usage logs in 2020 and 2021

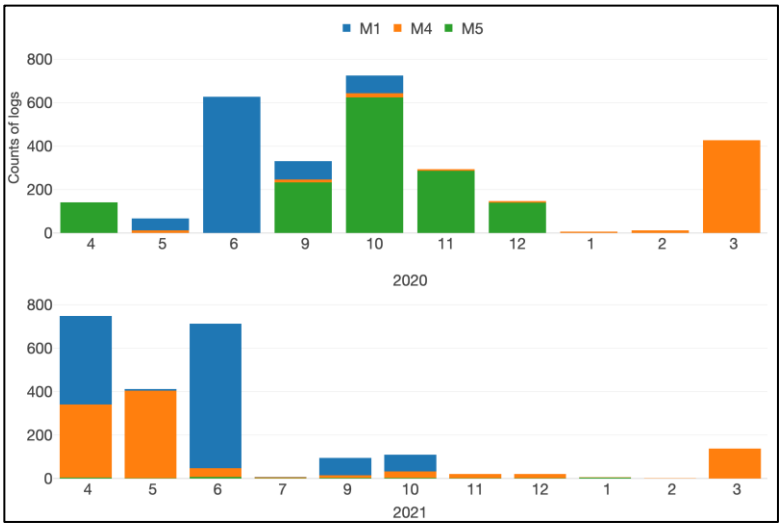


Figure 3: Counts of "database" usage logs in 2020 and 2021

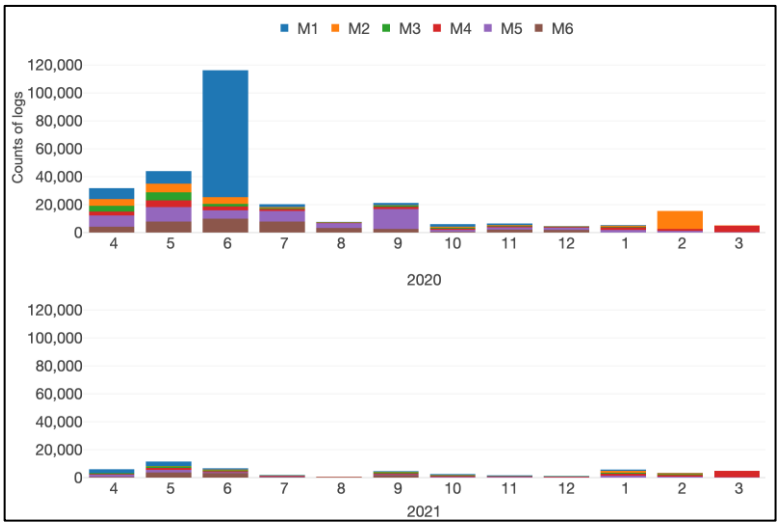


Figure 4: Counts of "forum" usage logs in 2020 and 2021

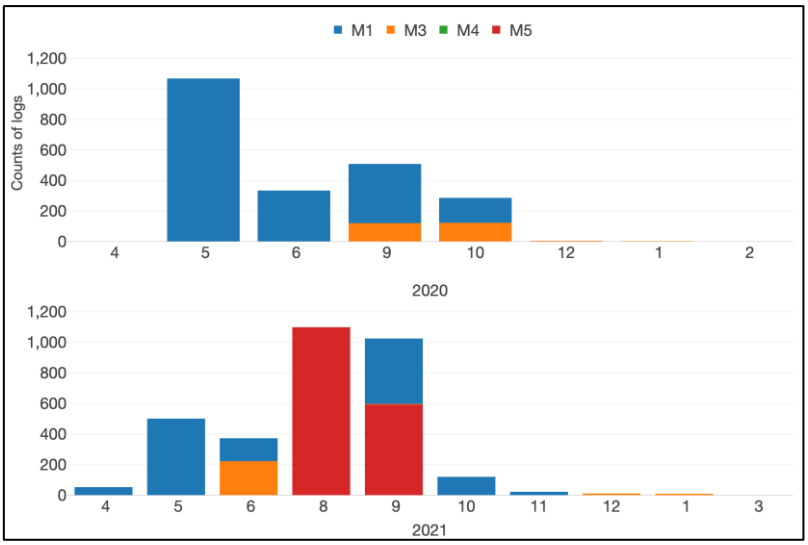


Figure 5: Counts of "h5p" usage logs in 2020 and 2021

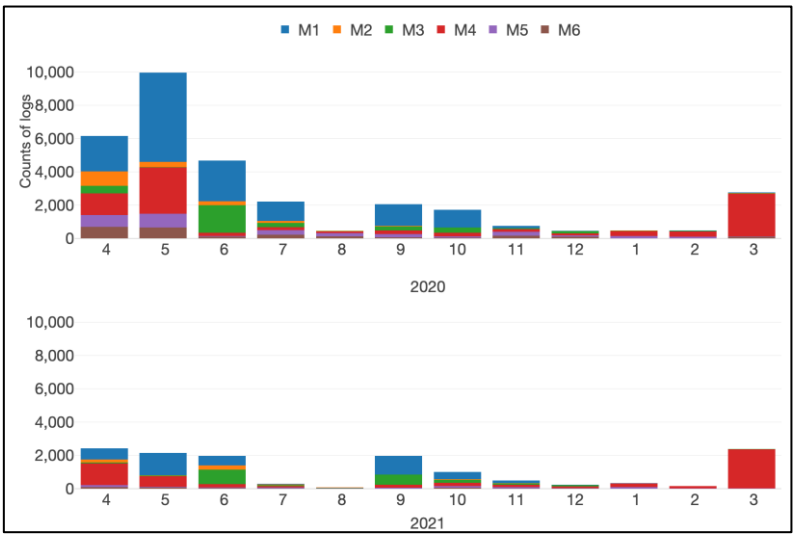


Figure 6: Counts of "page" usage logs in 2020 and 2021

Figure 7 showcases questionnaire usage which was high throughout the year. The questionnaire feature was used for daily health checks in the author's university. Thus, students used this feature almost every day.

Figure 8 shows "Quiz submission". The usage of quizzes tended to rise before examinations, such as in September and January.

Figure 9 shows the usage result of "resources", such as PDF files. As most of the courses used PDFs as the materials or reading assignments for the class, this feature was used in the whole year grade, throughout the year.

Figure 10 shows the results of "URL" (Uniform Resource Locator) usage. URLs are used as links to external sites from Moodle. High usages by M4 students were found in April and March. These URLs are the links to the online medical simulator and other e-learning materials, which were used in the class.

The usage of the "Videotime" plugin is shown in Figure 11. This plugin was installed in May 2020 resulting in no logs for April 2020. This plugin was used to embed the recorded lecture videos which were uploaded to Vimeo.

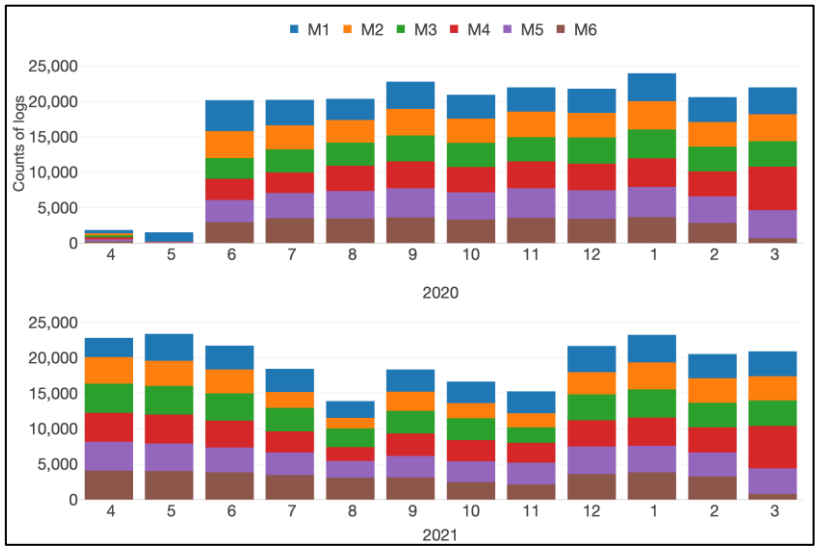


Figure 7: Counts of "questionnaire" usage logs in 2020 and 2021

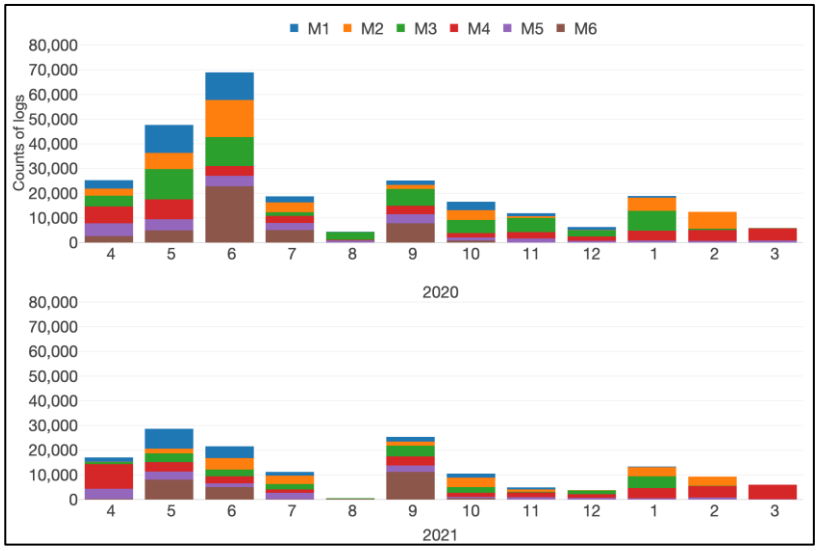


Figure 8: Counts of "quiz" usage logs in 2020 and 2021

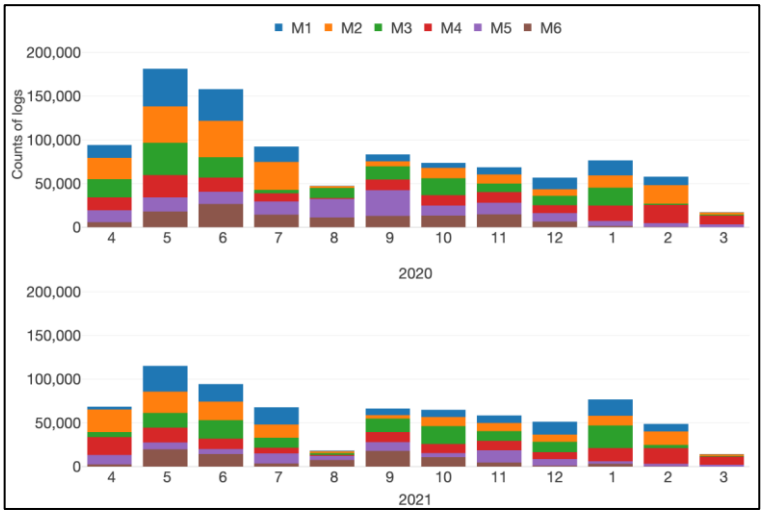


Figure 9: Counts of "resource" usage logs in 2020 and 2021

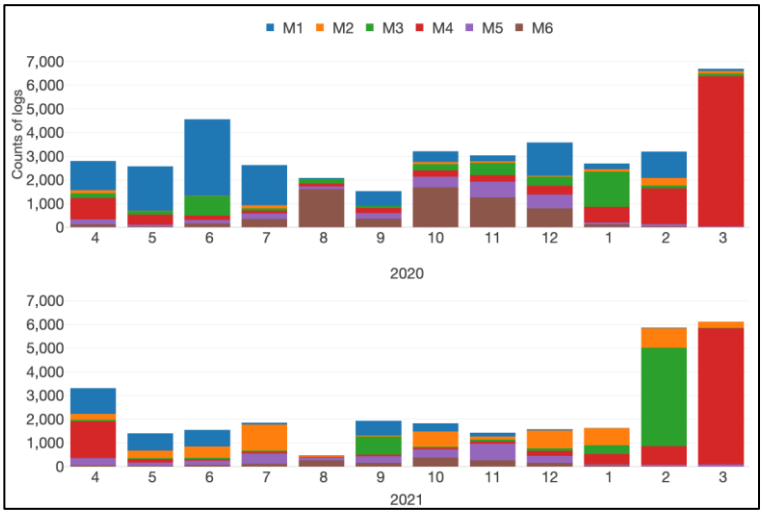


Figure 10: Counts of "url" usage logs in 2020 and 2021

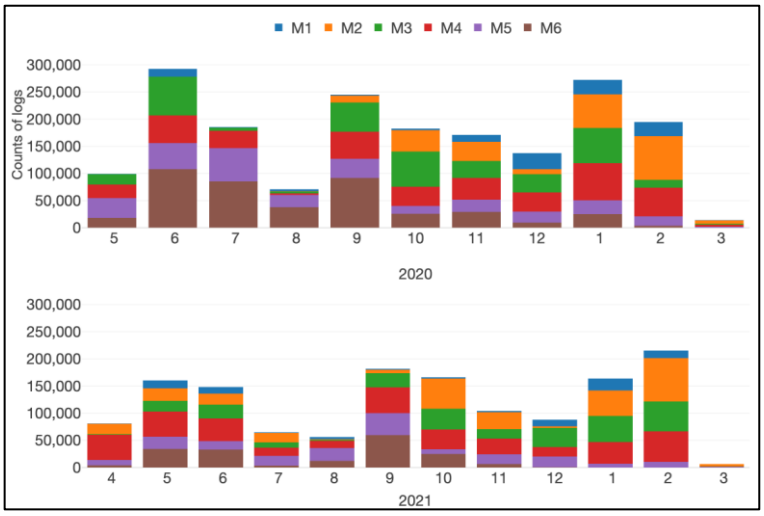


Figure 11: Counts of "videotime" usage logs in 2020 and 2021

# 4 Discussion

Since the face-to-face lectures restarted in 2021, the usage of several activities decreased from that of 2020. In 2020, the online class was primarily used, and some quizzes and assignments were needed to ensure that students learn independently. Therefore, their total logs decreased, as shown in Figure 1 and Figure 8. It is noteworthy that the usage of quizzes in September by M6 and in January by M2, M3, and M4 were still higher than other months and year grades. There are graduation examinations in September (for M6) and students may thus use quizzes repeatedly to study for the examination. A similar situation occurred for M2, M3, and M4 students; there were some examinations in January for these groupings. Students may use quizzes independently to prepare for examinations, whether these are mandatory quizzes or not.

Figure 2 shows that the usage of BigBlueButton for live broadcasting increased in some groupings, such as M4 and M5 in January and February, and M3 in February, fiscal year 2021. The former results were due to the spread of COVID-19 (Omicron) and related difficulties, regarding continued face-to-face bed-side learning for these students. The latter results from teaching medical interviews using simulated patients. As the original setting, with many students and simulated patients, may cause the spread of COVID-19 infection, the session was conducted using online-based education instead.

From Figure 4, Figure 6, and Figure 10, the usage of forums, pages, and URLs showed a decrease largely in May and June for M1. Normally, there are face-to-face sessions and a group-based workshop for the first-year grades in that season. Since the workshops also became online-based in 2020, these activities were used frequently. The workshops returned to the face-to-face style in 2021, and the usages of the activities were decreased. Holding online workshops thus cause an increase of these activities' usage.

Although almost all activities' usage decreased in 2021, Figure 5 shows an increase of H5P usage in 2021. As was noted before, H5P usage is mainly affected by the low number of teachers who can use H5P. As the faculty development courses for the usage of Moodle, including H5P, started in 2022, the usage of H5P may be increased again in the next year.

Figure 9 and Figure 11 show the usage difference of resources such as PDFs and recorded lecture videos. Although the usages decreased, as with other activities, the rate of decline could be considered small. Some teachers use the resources feature as supplementally learning materials, and some teachers use it as the preparation tasks for a flipped classroom. Additionally, students use these materials independently to review the classes, especially before the examination. Therefore, in the future, the usage of these resources will not decrease so greatly.

There are some limitations to this study. Although the number of usage logs were counted, the activity counts were not considered. For example, although H5P logs increased in 2021, the usage of H5P was only one course of Moodle. To the contrary, the increase of quiz usage in September (M6) was the results of several courses, which were mainly for examination preparation.

Another limitation is the lack of statistical analysis. More detailed analyses, such as correlation analysis, should be used in future studies.

# 5 Conclusion

The differences in and usage trends of Moodle in a medical school were examined. There are some specific trends. The usage of assignments for the first-year students was increased in 2021, for the assignment based on the face-to-face discussion. Almost all forums were used little since the discussion can do in the classroom. The usage of quizzes was still high for preparing the examinations. Resources and Vimeo were also used for review.

Although more detailed analysis, including a statistical approach, are needed to clarify the usage trends, these differences would be important in discussing the trends and changes of teaching and learning styles.

# Acknowledgement

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