

Moodle Log Analysis

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Project Introduction

The objective of this analysis is to research how effective the new plug-ins were that are being tested during the Spring 2021 semester and research how students are using Moodle during the 2020-2021 year. The goal is for this analysis to give faculty and instructors a better idea of how students are using Moodle and how they can structure classes that work best with students. Along with providing information on how the test plug-ins were used to aid in deciding which plug-ins should be implemented in future classes.

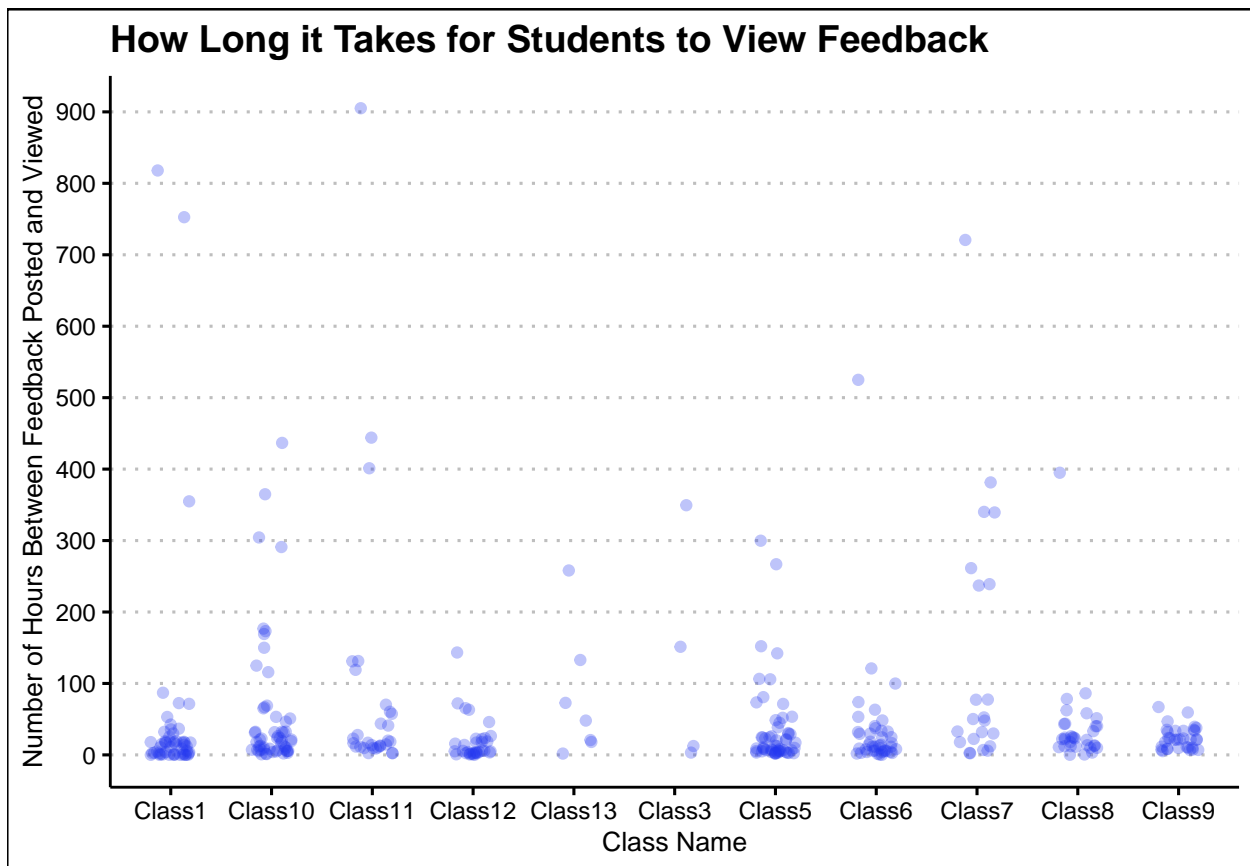
The Data

This research was done with 13 total classes, 5 classes from the Fall 2020 semester, and 8 classes from the Spring 2021 semester that were using the some of the test plug-ins. The majority of of these classes had 10-25 students and class start times from 9:00 - 2:30.

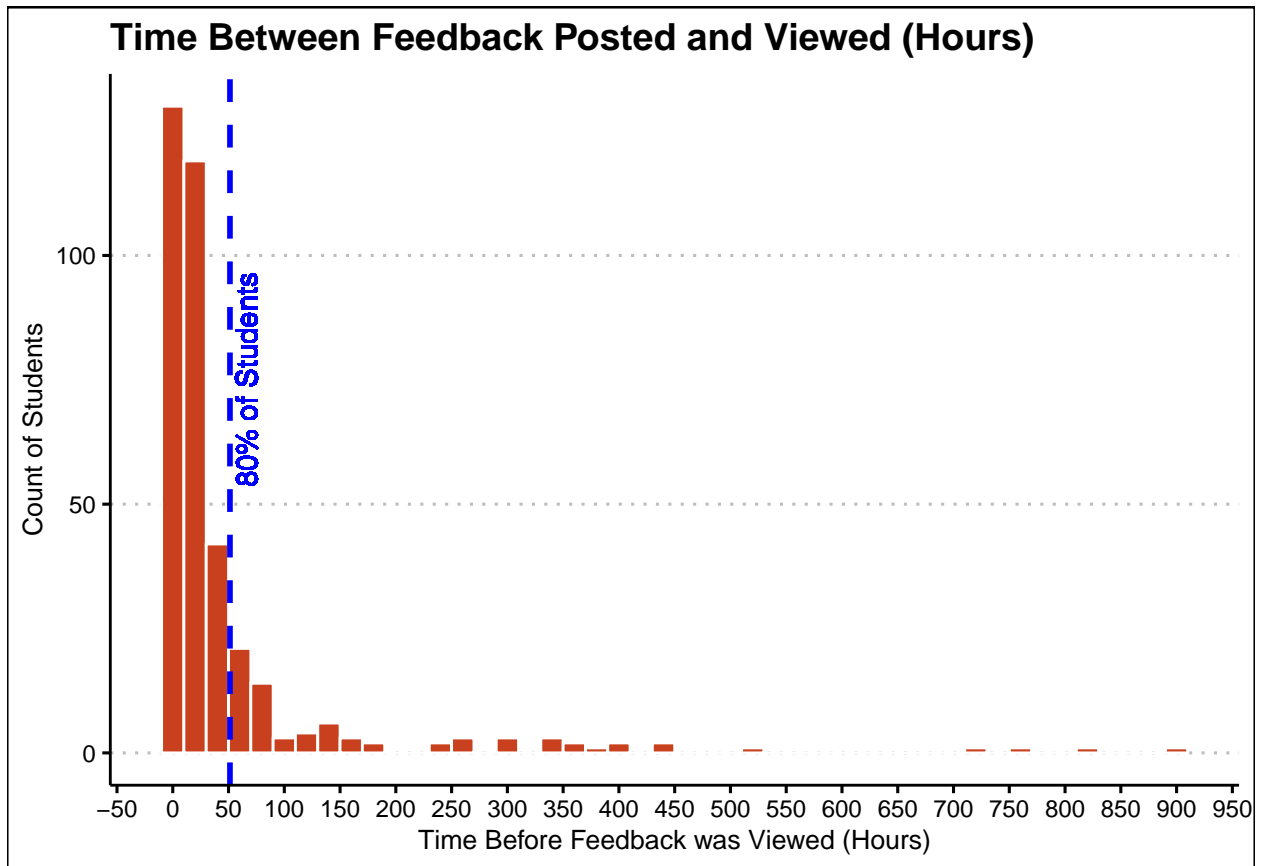
How Long Does it Take for Students to View Their Feedback?

Most students viewed their feedback within a couple days but almost every class had outliers where a student would not view their feedback for days.

Note: This data also does not include students that never checked their feedback.

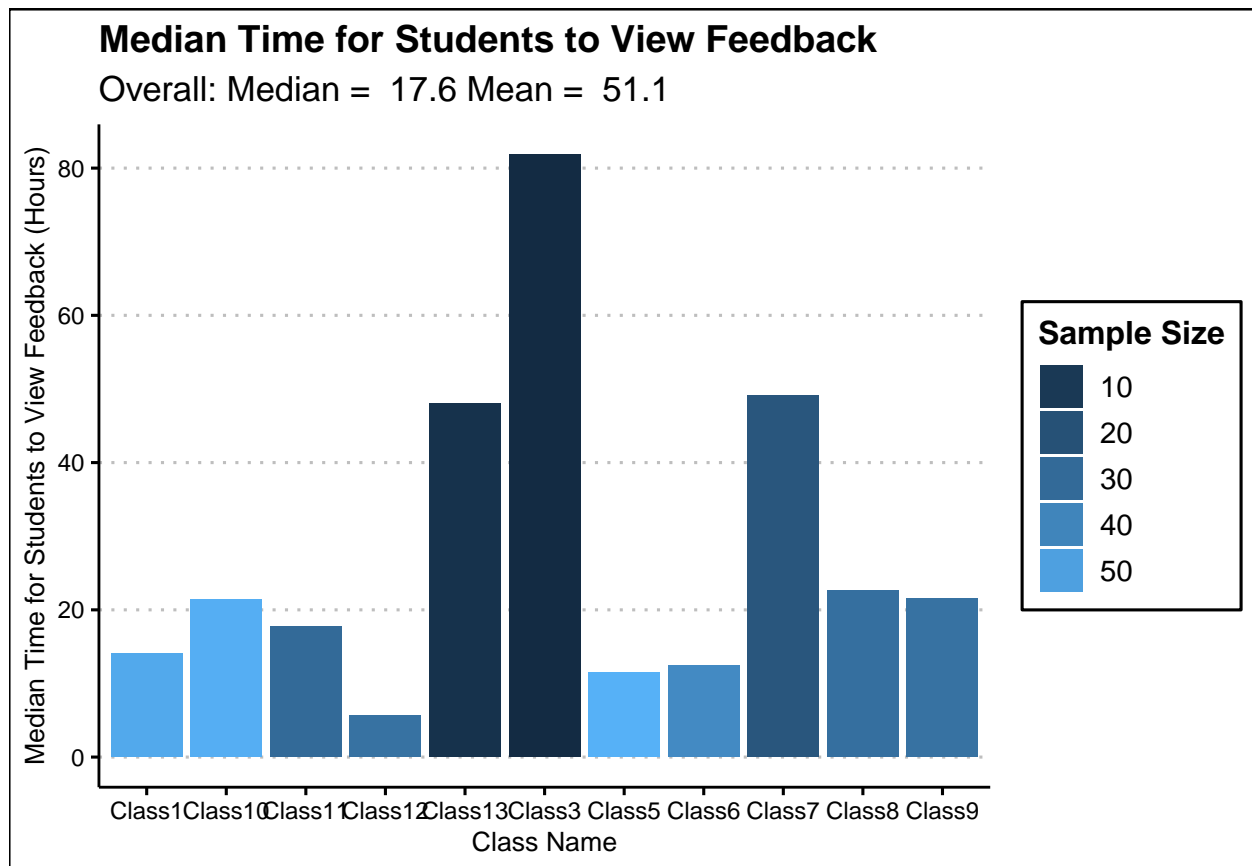


Despite the outliers, 80% of student feedback was viewed within about 50 hours from the time their feedback was posted.



When including all classes, the median time to view feedback was 17.6 hours and the mean was 51.1 hours. Here it is best to focus on the median time to view feedback to lessen the impact of the outliers.

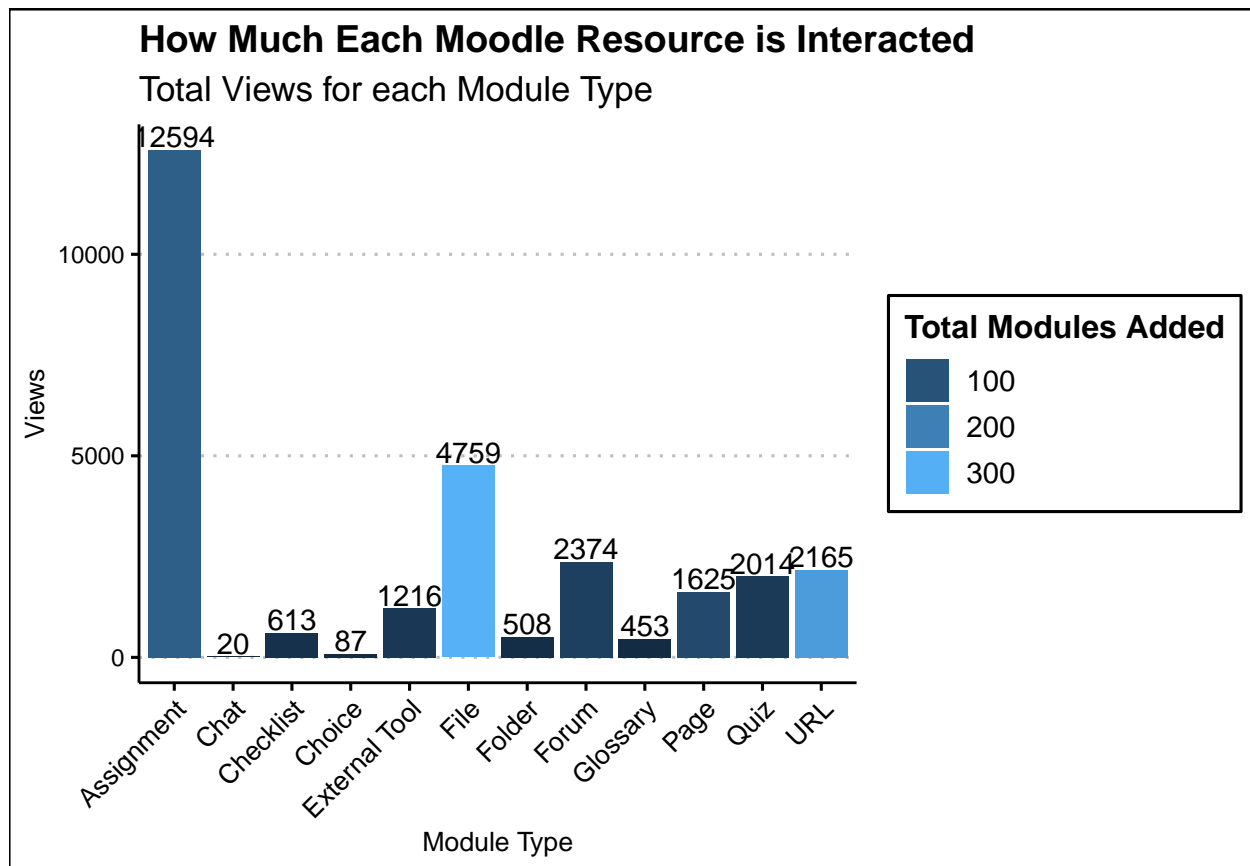
For most classes, the median time to view feedback was at or under 20 hours. This includes many of the classes with the largest sample sizes suggesting that the median time to view feedback is a better representation of how long it takes for students to view feedback than the mean.



Which Moodle Resources get the Most and Least Number of Interactions?

The assignment module type received the most views as expected. The next highest viewed were files, which also had the highest number of modules added so its high view count is expected.

The viewership of URL is surprising since it had a large number of modules added but a low number of views. The other module types having low total viewership is expected given that there was less of those module types posted.

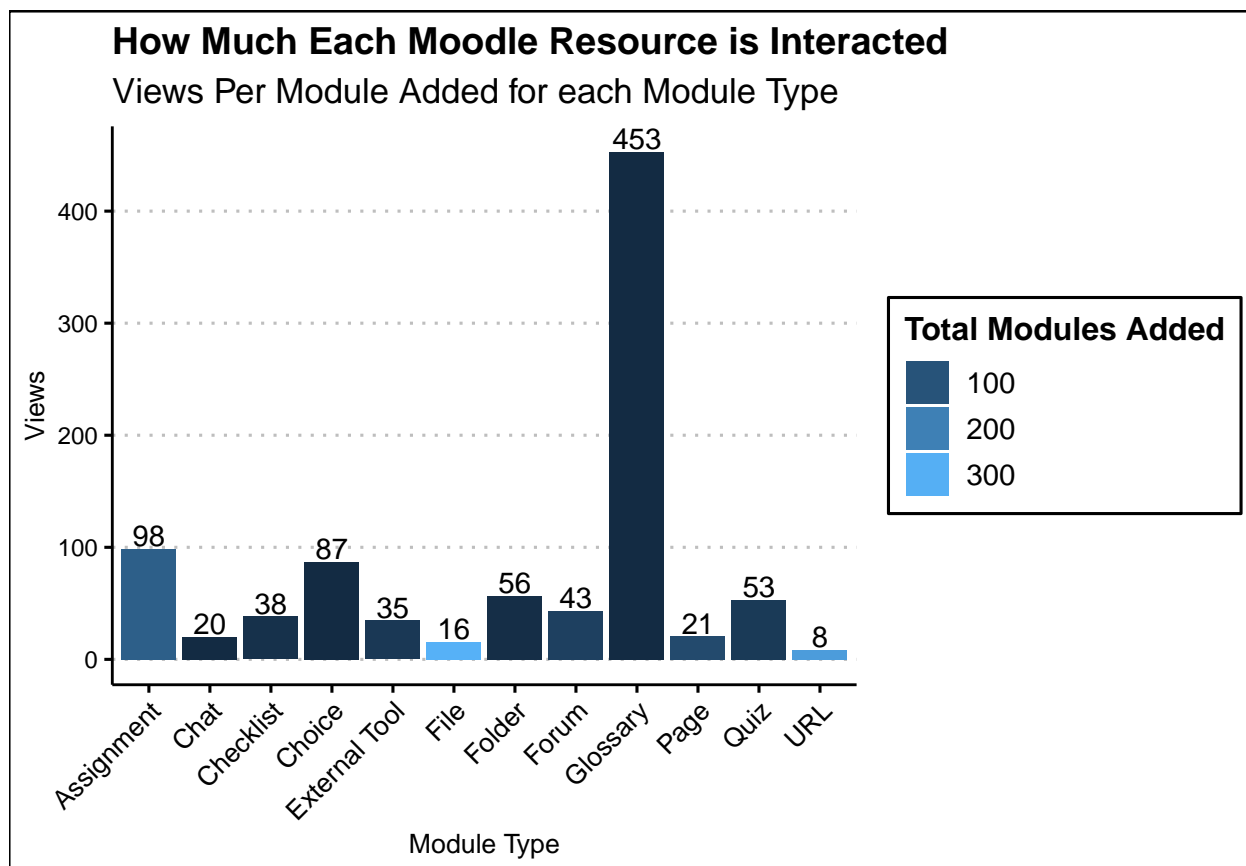


```
## # A tibble: 12 x 4
##   Moduletype TotalModuleviews TotalModulesAdded ViewsPerModule
## * <chr>          <int>          <int>          <dbl>
## 1 Assignment      12594             128           98.4
## 2 Chat              20              1             20
## 3 Checklist         613             16           38.3
## 4 Choice            87              1             87
## 5 External Tool    1216             35           34.7
## 6 File             4759            304           15.7
## 7 Folder            508              9           56.4
## 8 Forum            2374             55           43.2
## 9 Glossary          453              1          453
## 10 Page            1625             79           20.6
## 11 Quiz            2014             38            53
## 12 URL             2165            261            8.30
```

When looking at views per module, glossary is clearly at the top. Only one glossary module was posted in the sample of logs but 450 views is very high and suggests it was used by students frequently. The choice model was similar, it was only used in one course but received quite a few views.

Outside of glossary and choice modules, assignment and quiz modules received the most views per module posted. This is likely because students have to interact with those modules for a grade as opposed to viewing a file or URL that are not always required.

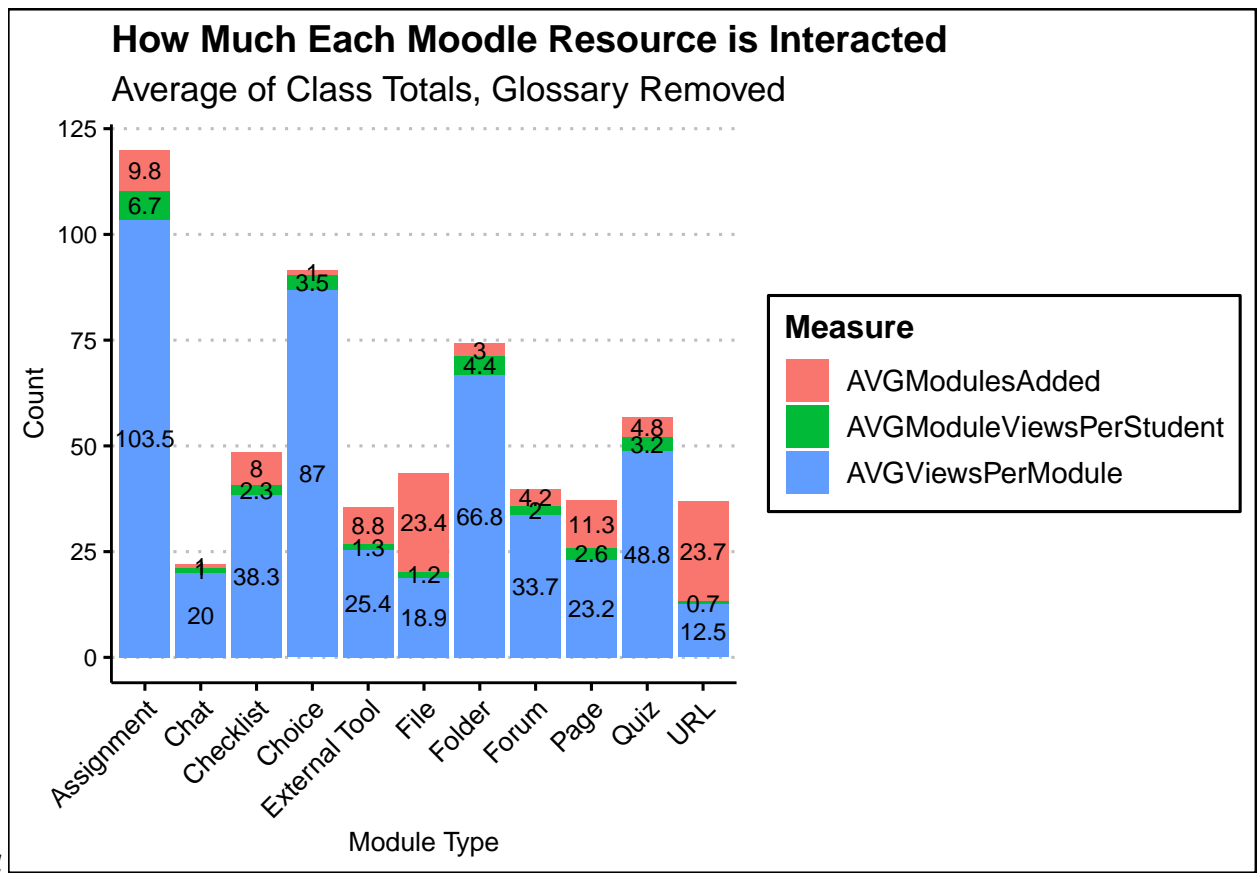
Forums also had an amount of views per module posted similar to quizzes suggesting that when forums are used, students are willing to interact with them as much as they do with important module types like quizzes.



Students viewed most modules 1-2 times with the exception of assignments, choices, folders, and quizzes that were viewed 3-7 times.

File and URL module types were both viewed about 1 time per student. Most lecture materials are posted as those module types so I would have expected them to have more viewership. Two possible reasons to explain this are that students could be returning to downloaded copies of files which would eliminate the need for to view the module again. Similarly they could be going directly to a URL instead of clicking on the module. The other possible reason could be that students are leaving files and URLs open until they are done working with them.

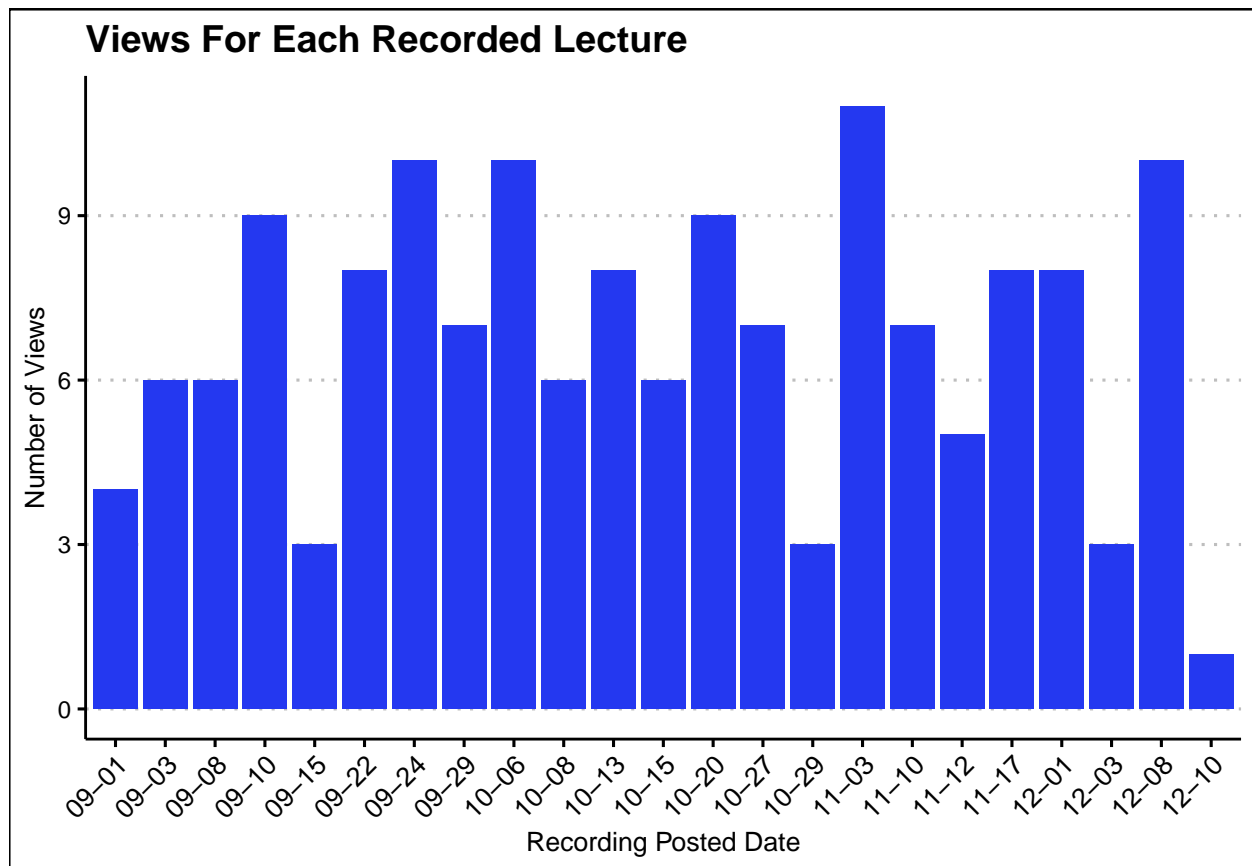
How to Read - The assignment module received an average of 103.5 views on each module posted, each student viewed an assignment module on average 6.7 times, and each class had an average of 9.8 assignment modules



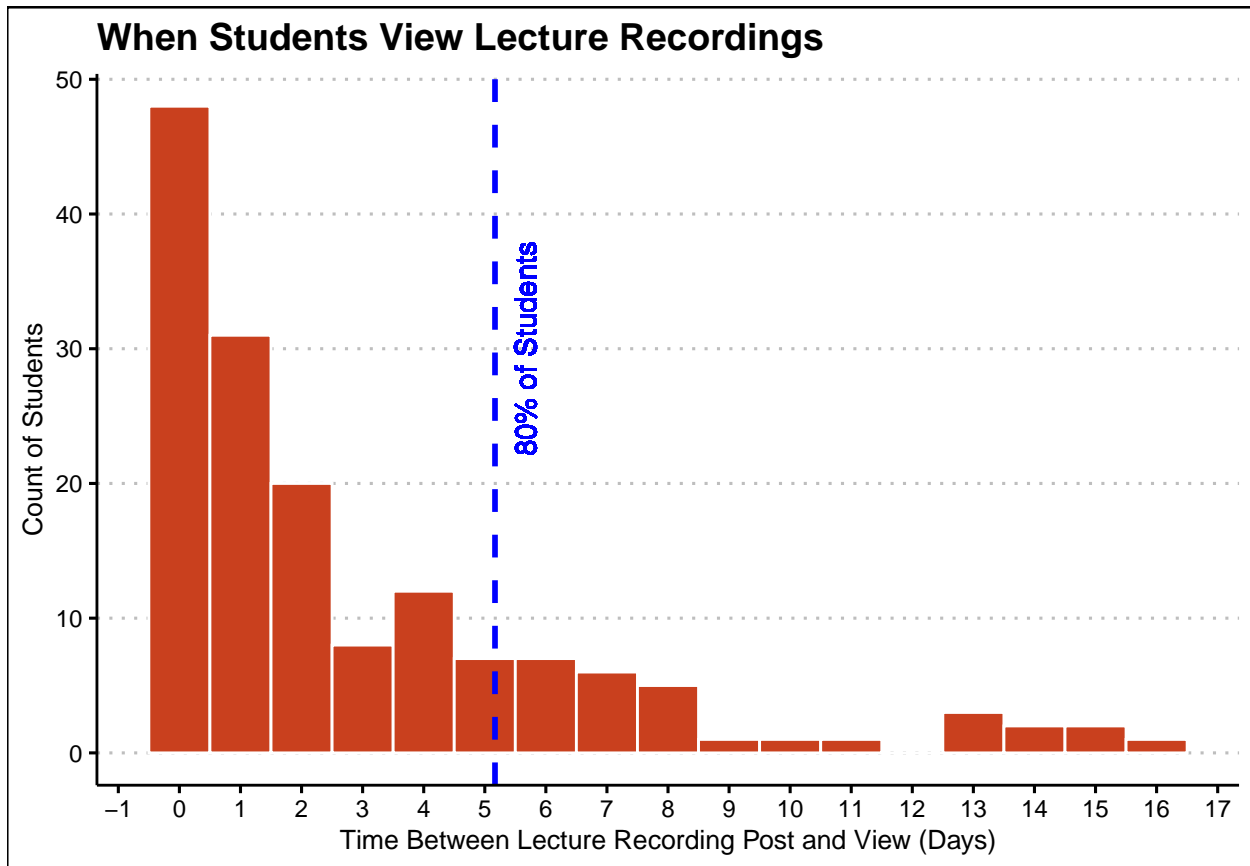
```
## # A tibble: 12 x 4
##   Moduletype   AVGModulesAdded AVGViewsPerModule AVGModuleViewsPerStudent
##   <chr>         <dbl>         <dbl>         <dbl>
## 1 Assignment     9.85         103.         6.69
## 2 Chat           1            20           1
## 3 Checklist       8            38.3         2.30
## 4 Choice         1            87           3.48
## 5 External Tool  8.75         25.4         1.34
## 6 File          23.4         18.9         1.20
## 7 Folder         3            66.8         4.36
## 8 Forum         4.23         33.7         1.97
## 9 Glossary       1            453          19.7
## 10 Page         11.3         23.2         2.65
## 11 Quiz          4.75         48.8         3.22
## 12 URL          23.7         12.5         0.700
```

How Often are Students Viewing Recorded Lectures?

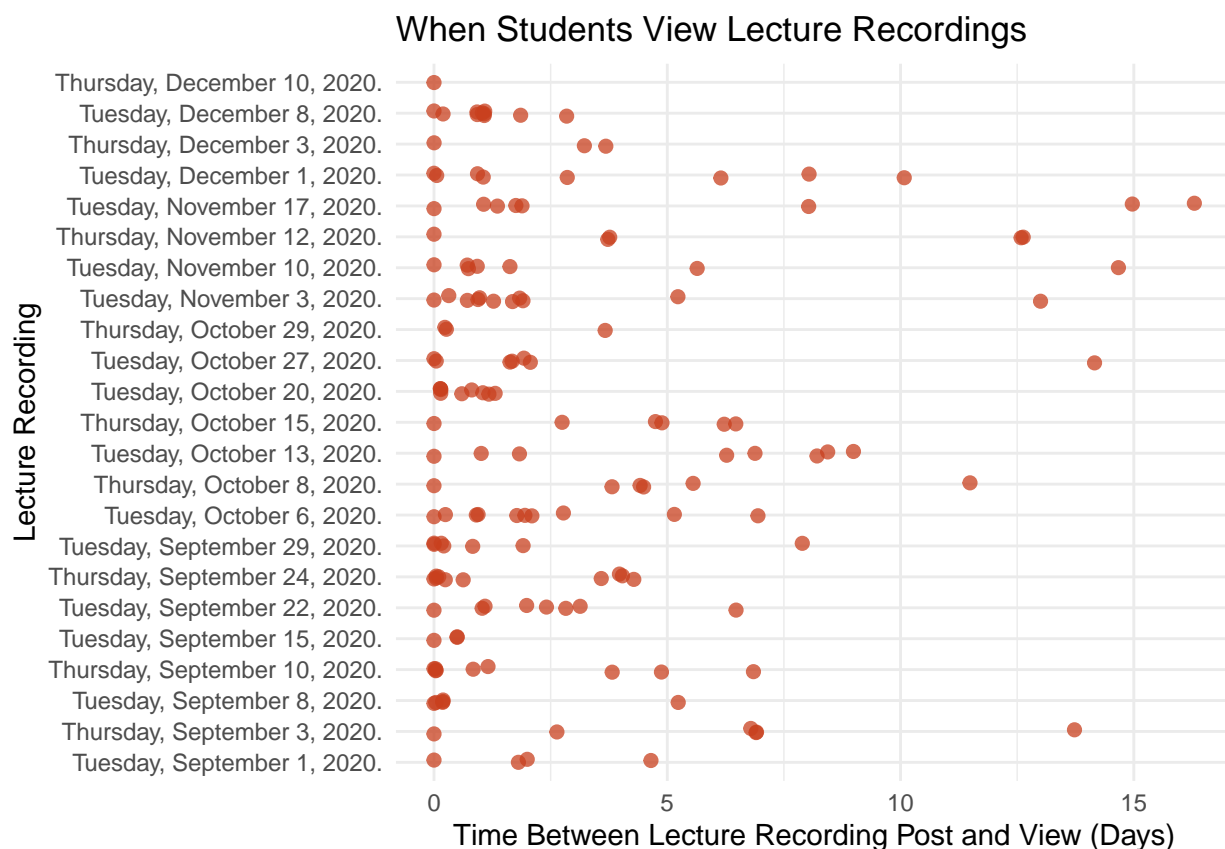
Only one class in the sample of logs posted recorded lectures consistently so this is a small sample size. In that class, viewership mostly stayed the same throughout the semester, each recording was viewed 3-9 times out of a class size of 24.



Most students viewed a recorded lecture within about 5 days of a recording being posted. However another decently sized group viewed recorded lectures 13+ days after the recording was posted.



Examining further, it does seem that there may be two groups of views for recording lectures. The first group views recordings a few days after the recording was posted, likely for homework, missing the class, or just going over it again. A second group views the recorded lecture days after they were posted, likely for test preparation. This trend is strongest in November. Most November lectures received more views 5+ days after the lecture was posted than other months suggesting that the views may have been for preparing for end of semester exams or finals.

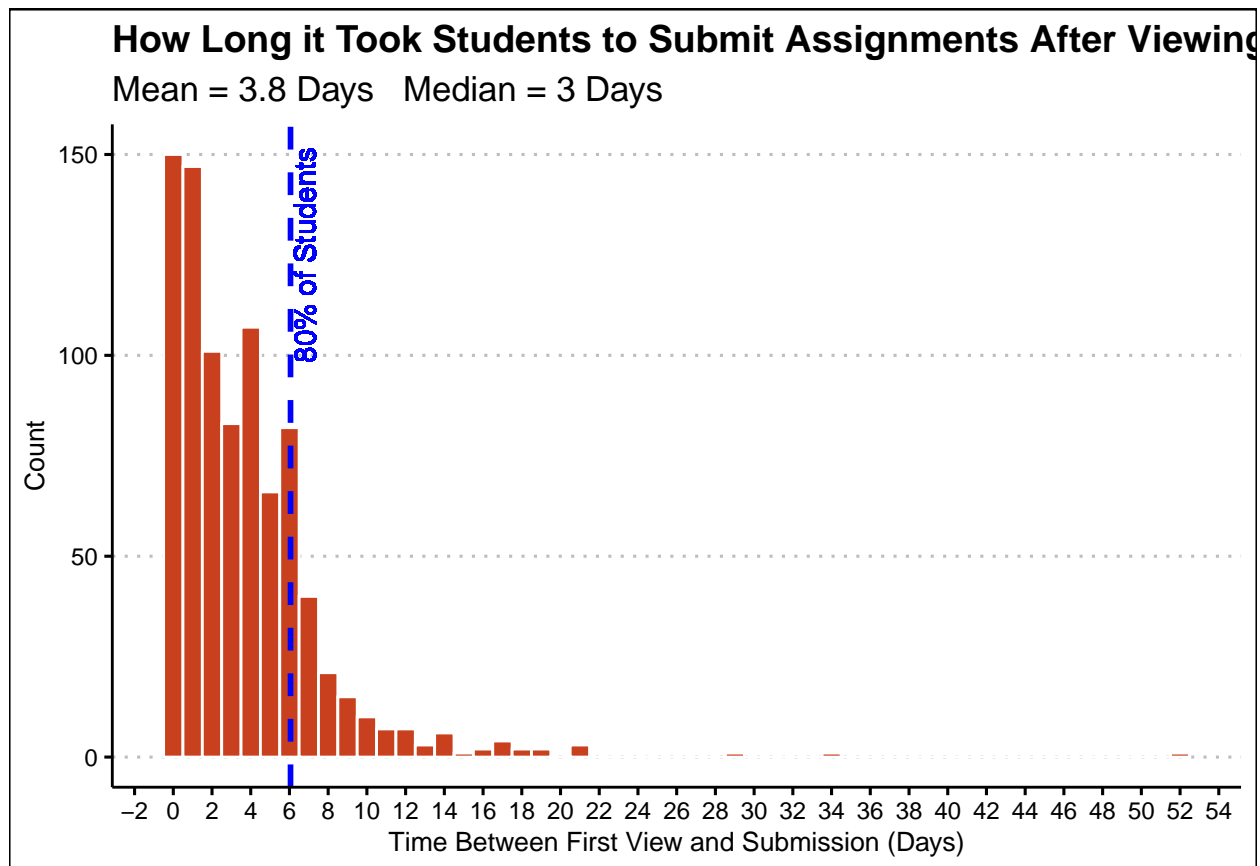


How Long Does it Take For Students to Submit an Assignment After First Viewing the Assignment?

Students turned in their assignments on average 3.8 days after first viewing them. Similar to the time it took for students to view feedback, the median of 3 days is a good representation of the data as result of outliers from students assignments that were viewed many days before submitting.

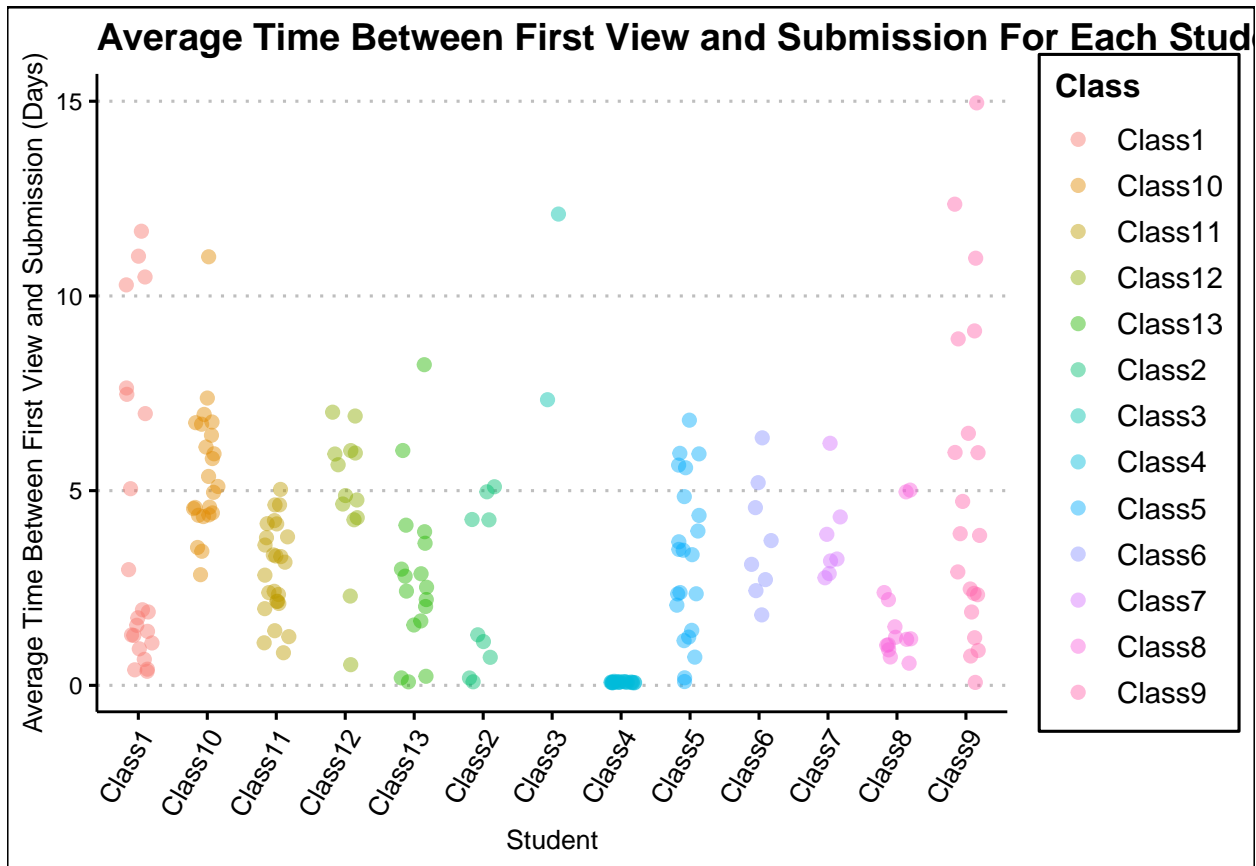
The two highest values of turn in times were 1 and 2 days suggesting that students like to complete assignments quickly once they do look at them. This data is well distributed however and there is a decent number of students in most numbers of days from view to submission.

Note - I removed any assignment that was submitted within 1.5 hours from the first view to remove any in-class assignments or extremely short assignments from the dataset



Looking at the average time from first view to submission for each student by class, it is clear that the times vary between classes. Some classes like class 10 and 11 are grouped tightly while others like class 1 and 9 have turn in times spread out widely.

The diverse levels of submission times between classes suggest that class structure may have a strong impact on how long students spend between viewing an assignment and submitting it but there is not quite enough data here to confirm that assumption.

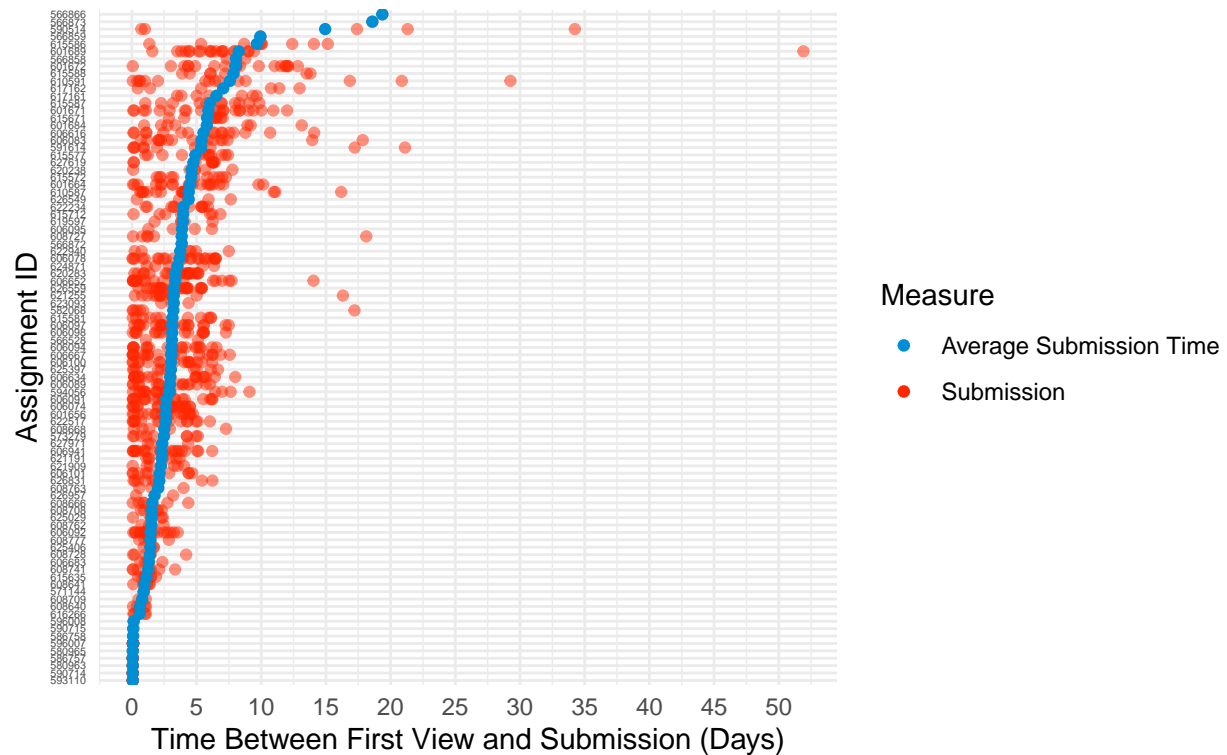


Looking at the average time from first view to submission by assignment rather than class shows that the bulk of the data is under 10 days. Additionally, assignments with higher average view to submission times have a more spread out group of submissions while the lower average assignments tend to have tighter groupings of submissions.

The logs give no clear answer to why the groupings differ because they do not capture assignment due dates. One possible reason could be that when assignments have due dates shortly after they are posted, students are forced to complete the assignment not long after they view it, leading to tighter groups. Assignments posted with longer due means that students are not forced to complete the assignment shortly after viewing, leading to more flexibility in when they complete the assignment and more spread out groupings.

Time Between First View and Submission For Each Assignment

Time of Each Submission and Average Submission Time Plotted

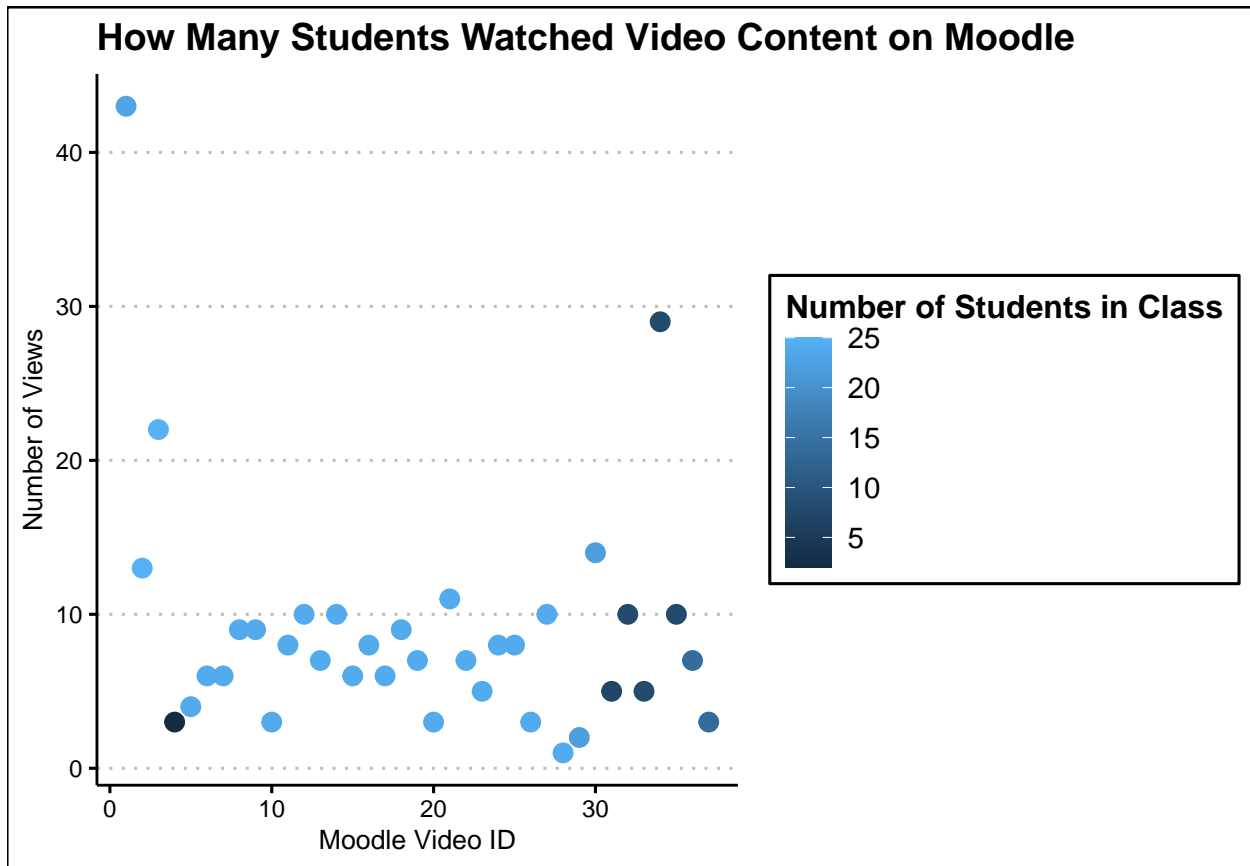


How Are Students Interacting With Video Content Posted on Moodle?

Almost all video content was viewed by a proportionate amount of students in comparison to class size.

Note - I cannot see if a student actually watched a video or how long they watched a video, just that they viewed the module containing the video

Note - There may be missing data here. The logs do not capture what file type a module is, to gather this data I used any module with "Video" or "Recording" in the title which means that videos without clear naming were not used in this visualization.



When Are Student Using Moodle?

This visualization shows how many course views occurred on Moodle during each time of the day, for each day of the week.

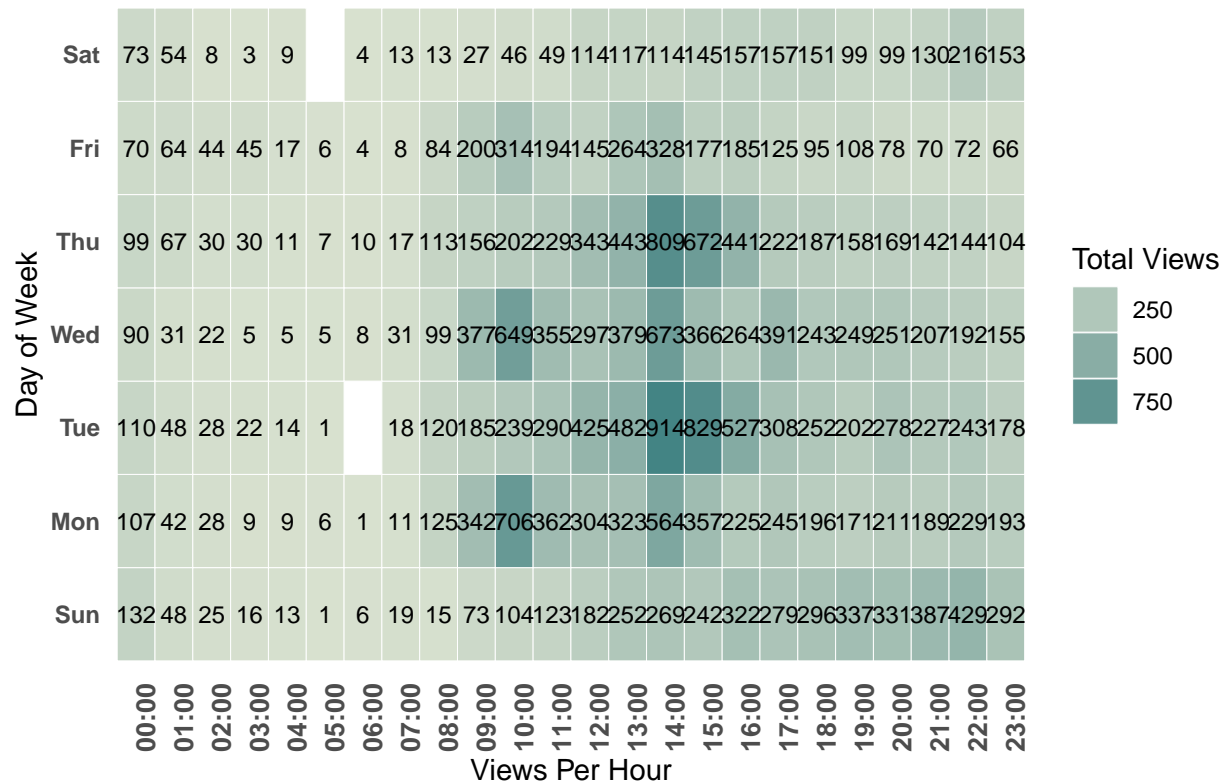
Most activity between 8:00 - 15:00 is due to classes occurring during that time range which brings students on to Moodle.

During the weekdays, with the exception of Friday, student views on Moodle after normal class times peak at about 20:00 and views stay high until 01:00 in the morning. During those weekdays, Tuesday and Wednesday night received more views than Thursday and Friday night suggesting the students spend less time on Moodle at the end of the week.

Friday receives by far the least amount of views with the number lowering right after 14:00 when the main class times start to end.

Sunday is as expected, the day with the most activity. Starting at about 9:00, Students stay fairly active on Sunday until 01:00 in the morning on Monday.

Moodle Views by Day of Week and Hour

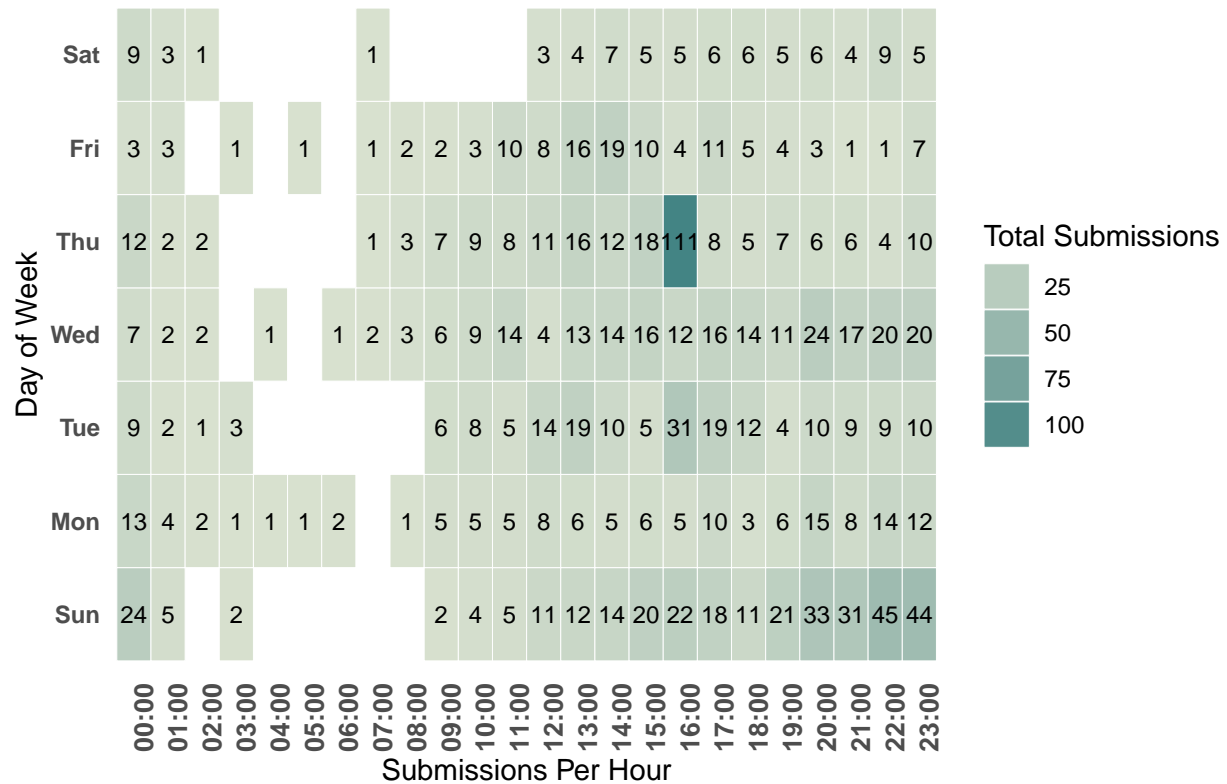


Here is the visualization with assignment submissions rather than course views.

Like in the graph above, the results from 8:00 - 15:00 are likely not indicative of any trends since assignments turned in at that time are likely in-class assignments.

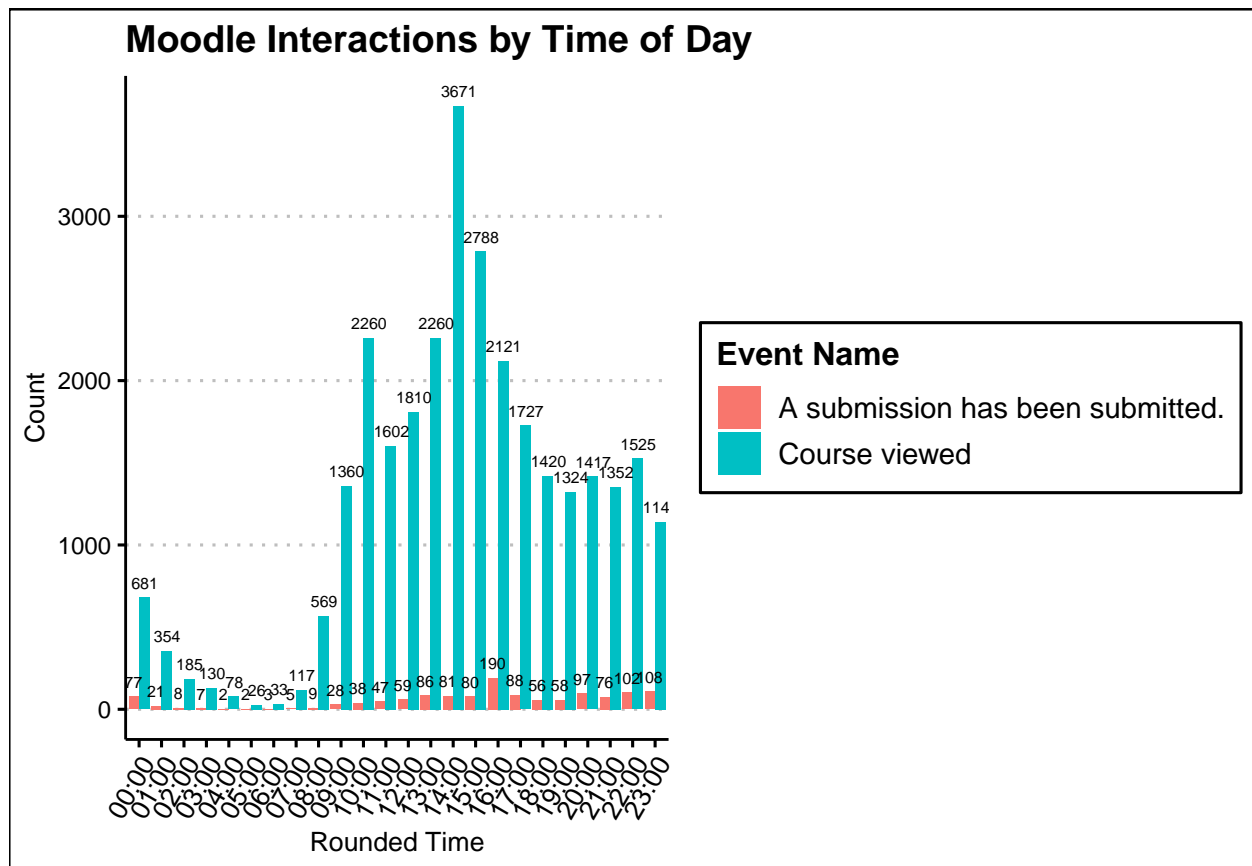
The trend of extra activity on Sunday and Wednesday nights continues here.

Moodle Submissions by Day of Week and Hour

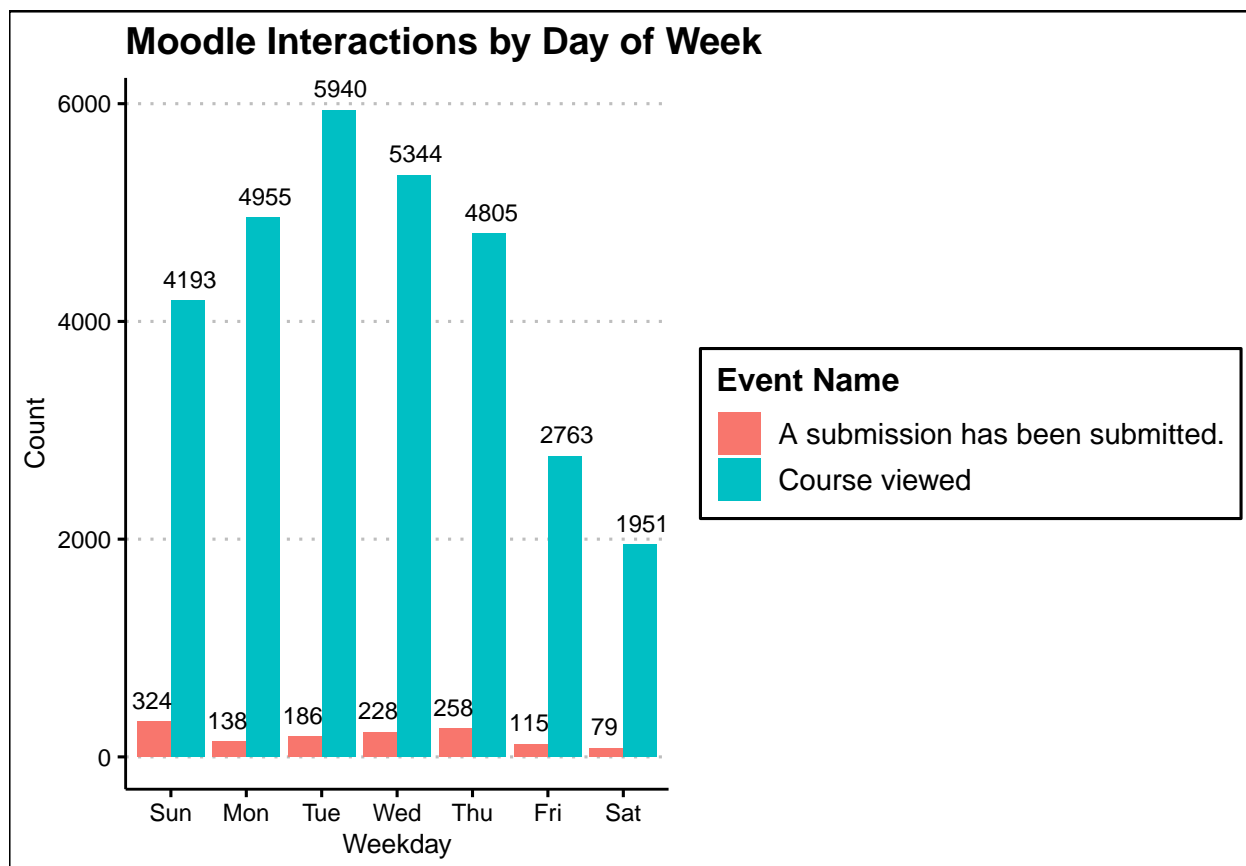


Viewing interactions by only time also shows high usage during the class times from about 08:00 - 15:00.

After 14:00, activity steadily drops until 20:00 suggesting further that this is when a large amount of students start going on Moodle again after class hours. There is also a larger number of assignment submissions starting at 20:00 until 01:00 the next day.



Similarly looking at totals by day of the week, the activity of a week peaks on Tuesday and then falls each day until Sunday. Sunday also has by far the most assignment submissions, further reinforcing that students do a large amount of work on Sundays.

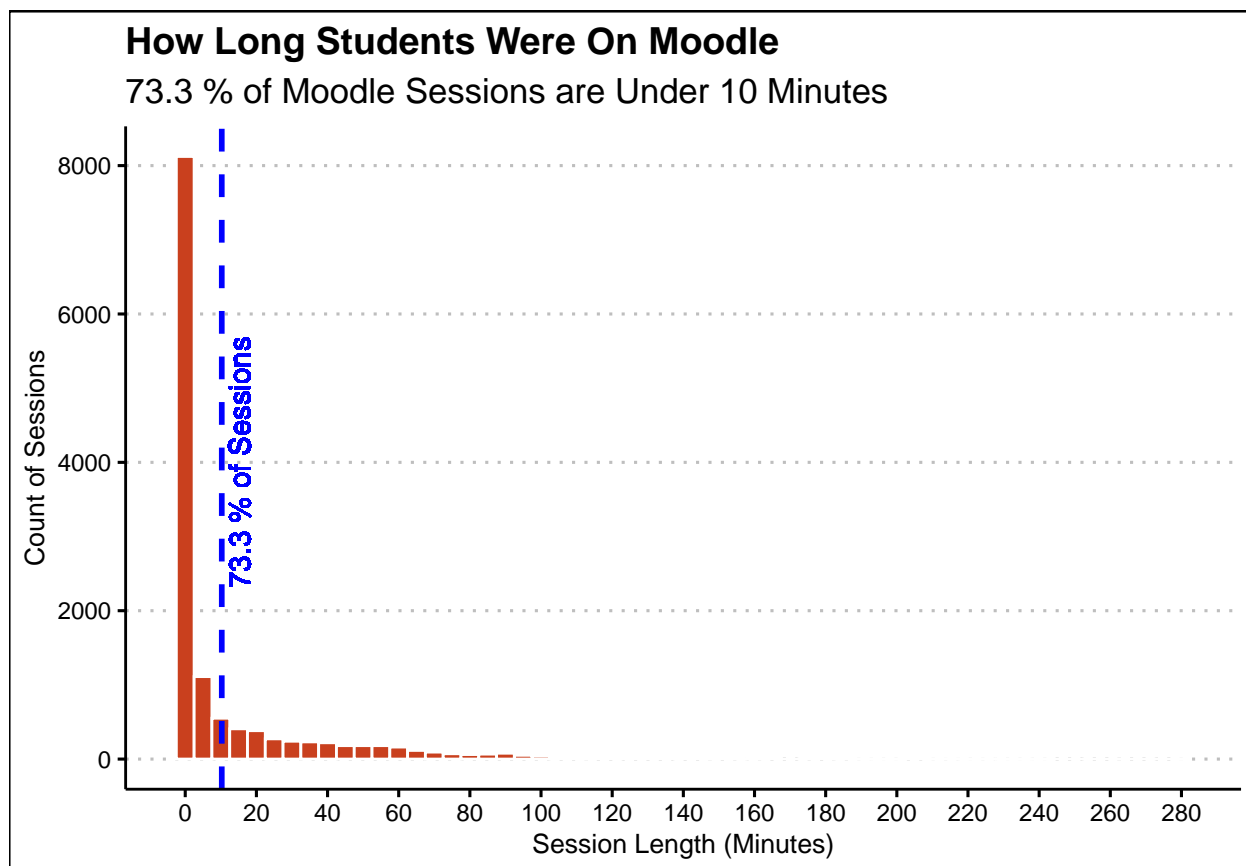


How Long Are Students Using Moodle?

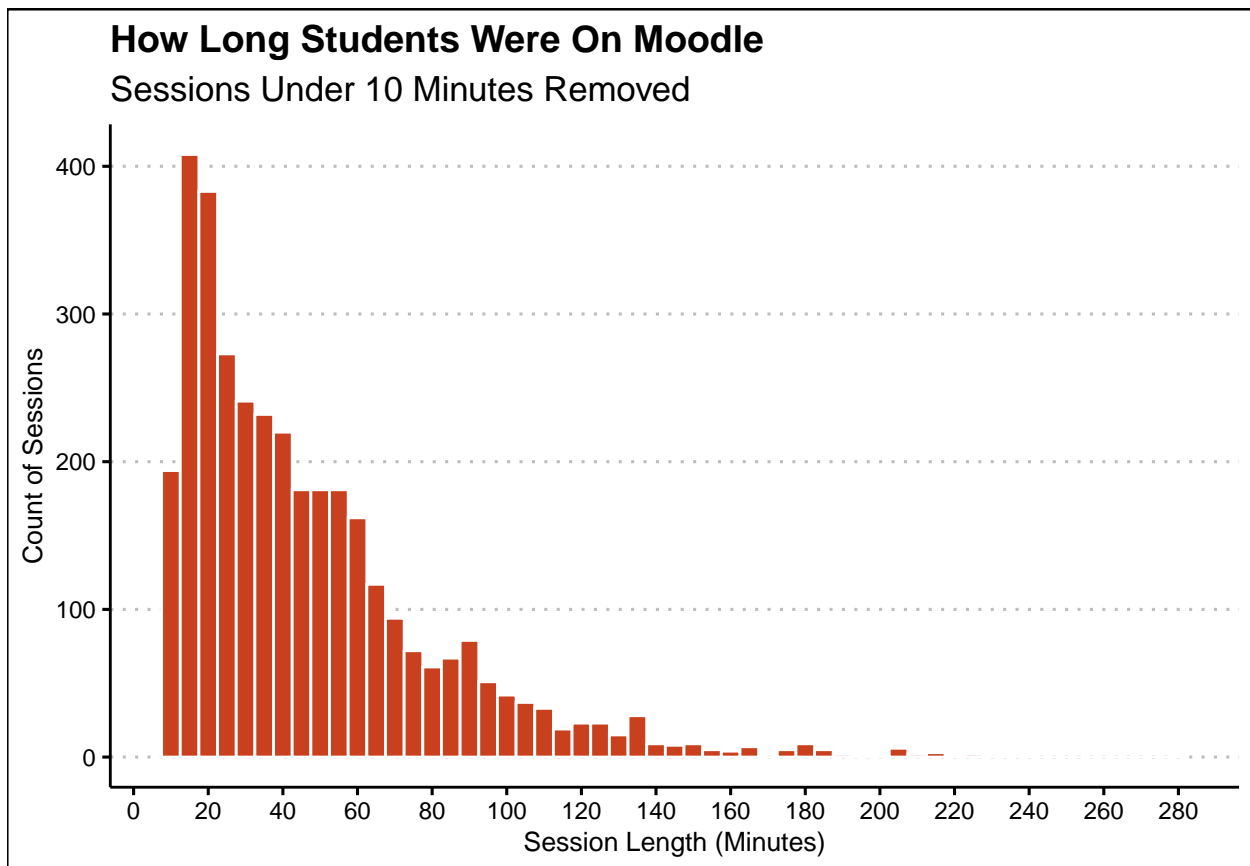
Most Students are not on a Moodle course very long. The average session length was about 13.5 minutes while about 73% of Moodle sessions were under 10 minutes.

*note - These logs only capture how long students spent on **one** Moodle course. If a student were to leave one of the Moodle courses used in this analysis and spend time in one of their other Moodle courses, it will not be tracked. This means that we can assume that students are likely spending the average 13.5 minutes in their other Moodle courses as well.*

Note - A Moodle session's length is defined as the time from the first action taken in a session to the last action taken. If there is more than an hour between a student's last two actions, the current session ends and a new session begins. An hour was chosen because students may be spending a long time viewing a single resource in a module, creating no new log files despite them being on Moodle for an extended period of time.



Here, sessions less than 10 minutes are removed to get a closer look at the medium to long length sessions. The highest two amounts were 20 and 25 minutes sessions. After reaching 60 minute sessions, the number of sessions longer than 60 minutes decreases rapidly. This suggests that when students are doing work on Moodle, most will either switch to a working on a different course or stop using Moodle after about 60 minutes during long sessions.

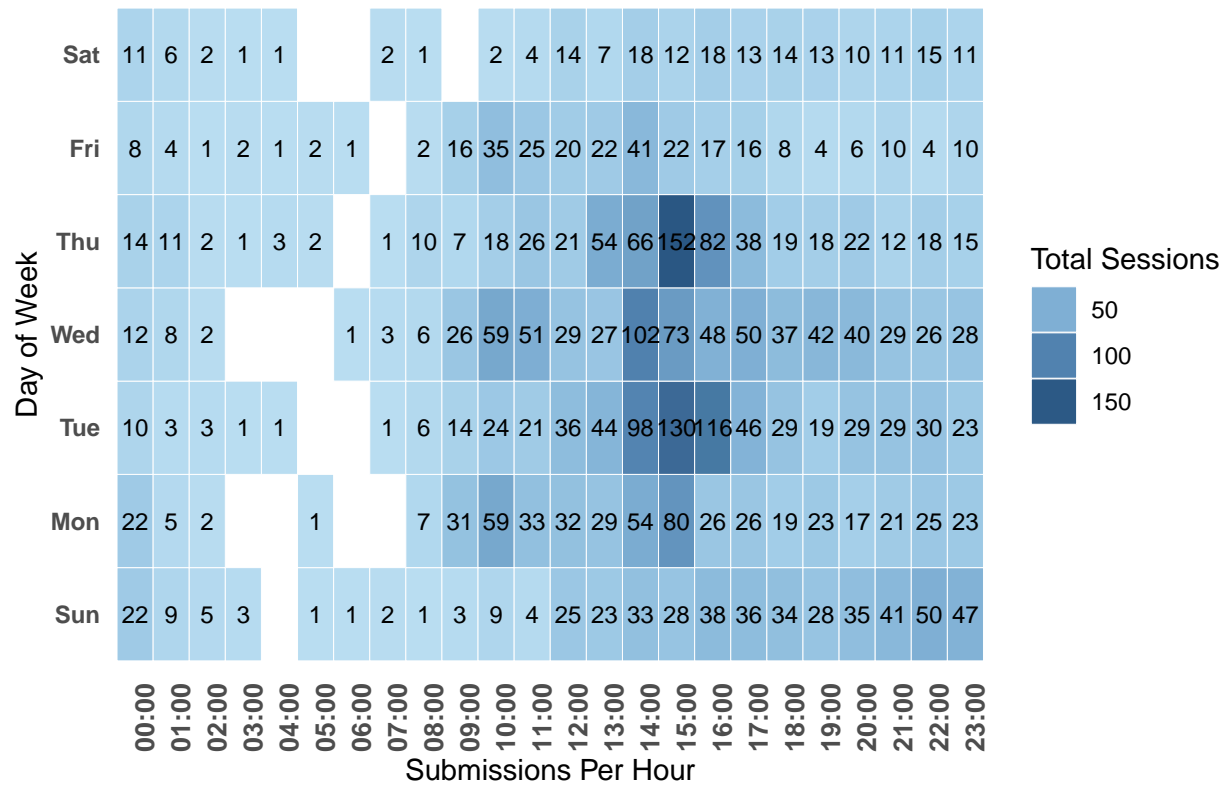


Returning to the time and week visualization with amount of sessions, we can see when students are having short and long Moodle sessions.

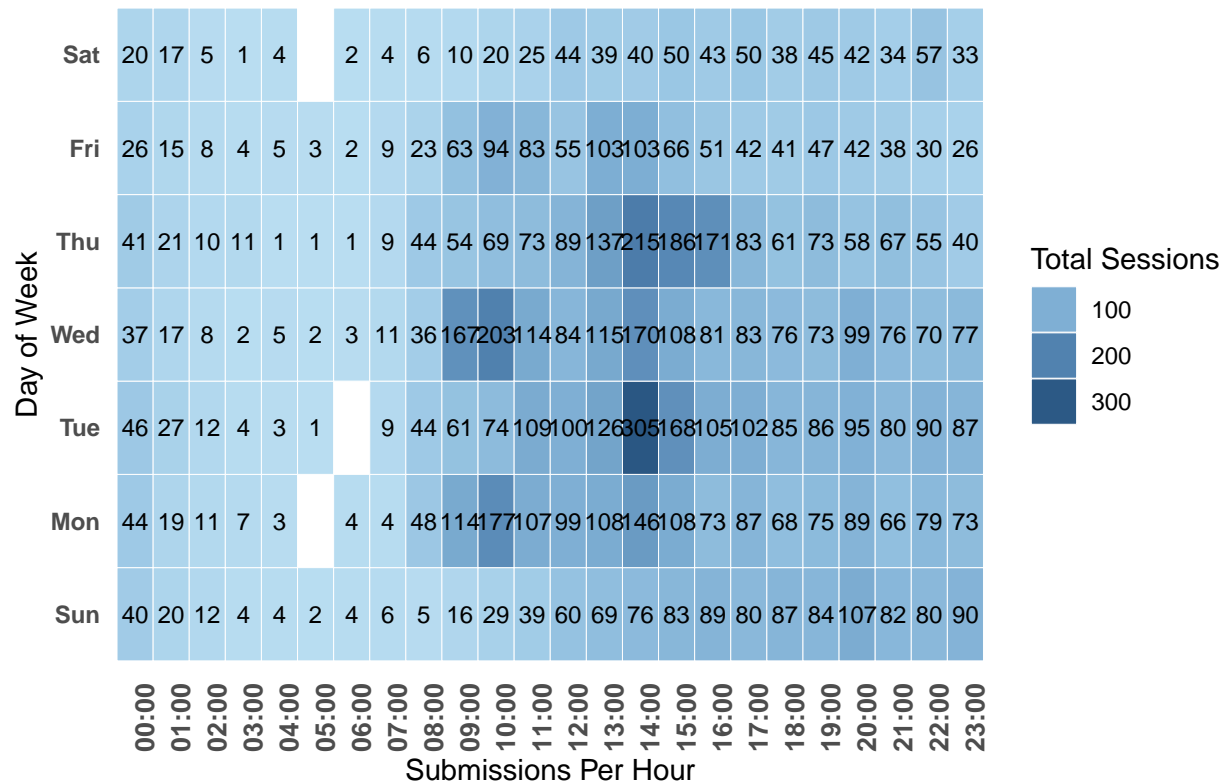
On Monday, Tuesday, and Wednesday there is a similar amount of long Moodle sessions after classes. On Sunday, long Moodle sessions start about 12:00 and continue until 01:00 on Monday.

With the short sessions, one interesting point is that there is a large amount of late night short sessions, likely checking due dates or assignments due in next class.

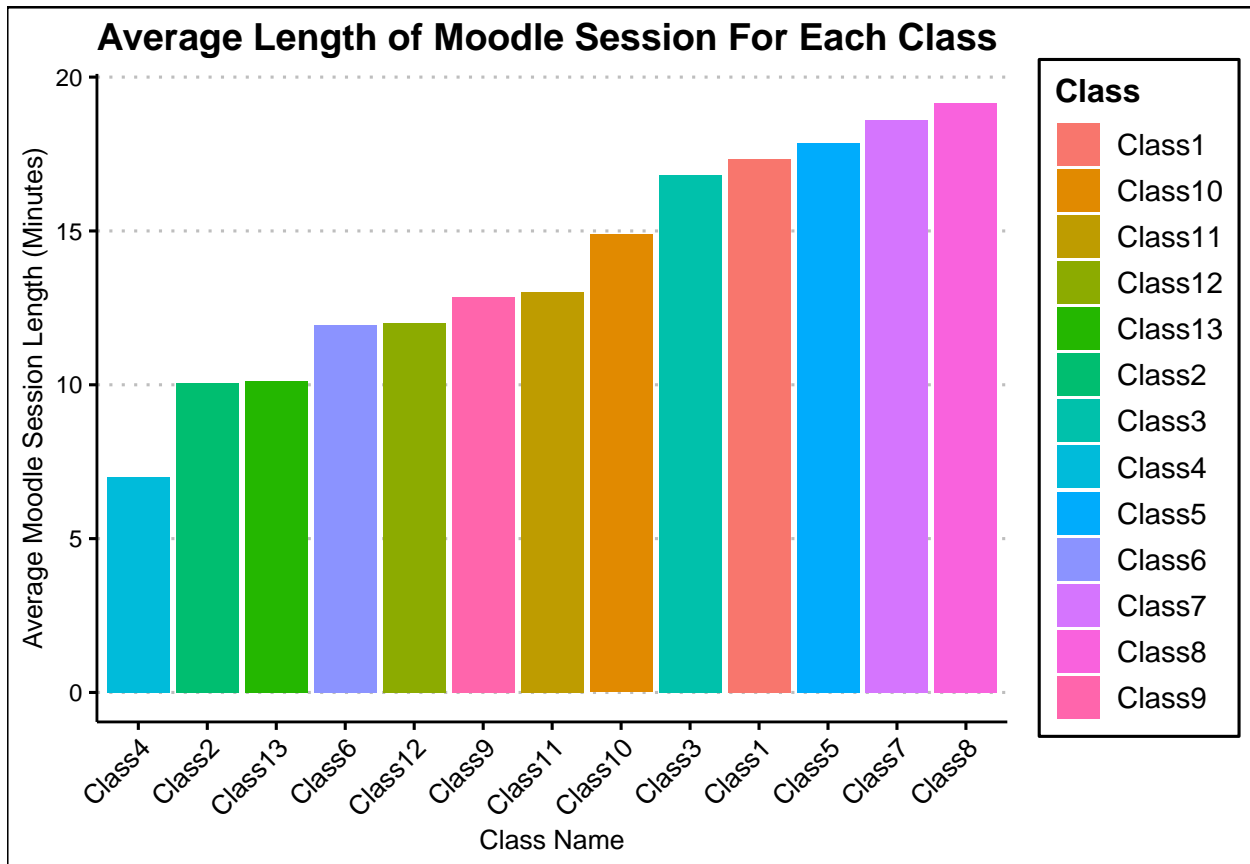
Over 10 Minute Moodle Sessions by Day of Week and Hour



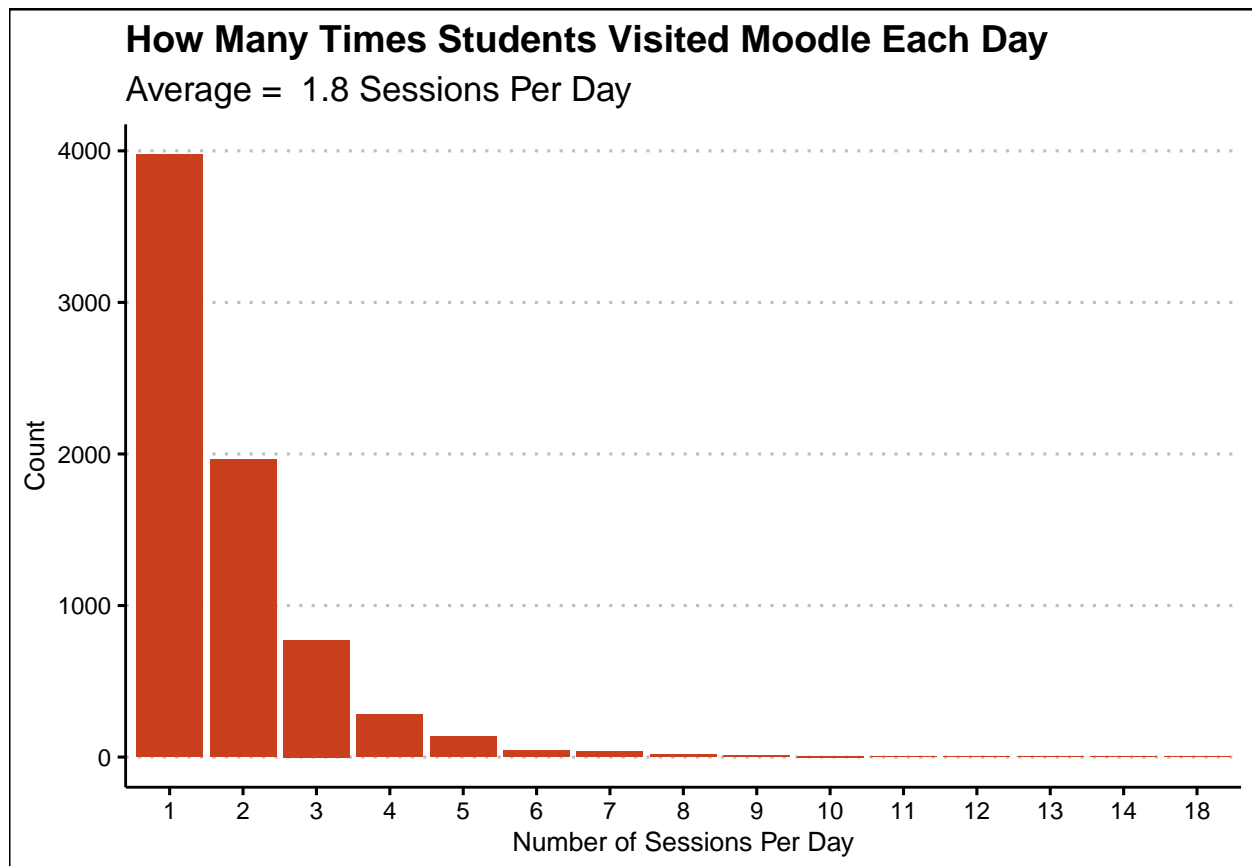
Under 10 Minute Moodle Sessions by Day of Week and Hour



Looking at the average by class, there is quite a difference between classes. The high differences suggest that class structure has an impact on the length of Moodle sessions as well. I would expect classes that commonly have quizzes on Moodle or have a high numbers of weekly modules have longer Moodle sessions on average due to those activities keeping students on Moodle for longer.



Students visited their Moodle course on average 1.8 times a day. Since the logs only capture student activity for one course, we can assume students are checking each of the classes they need to 1.8 times a day.



Checklist Module Analysis

Overall, the new checklist plug-in modules received a good amount of usage in both of the classes they were used in. In each class, the amount of times students looked at checklists seems to be related to how often they actually “checked” activities.

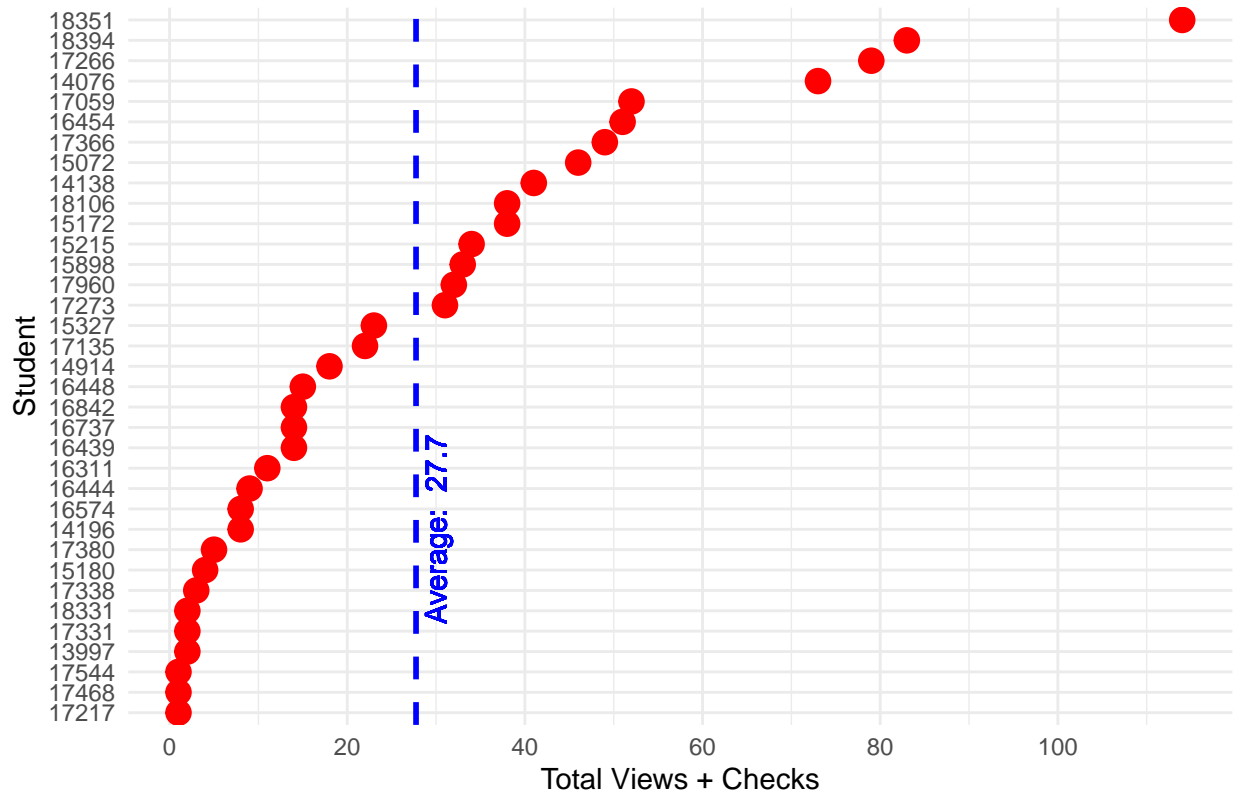
Both classes were very “up and down” in their usage but I assume this is just due to fluctuations in workload each week leading to less checks needing to be made for the weekly list.





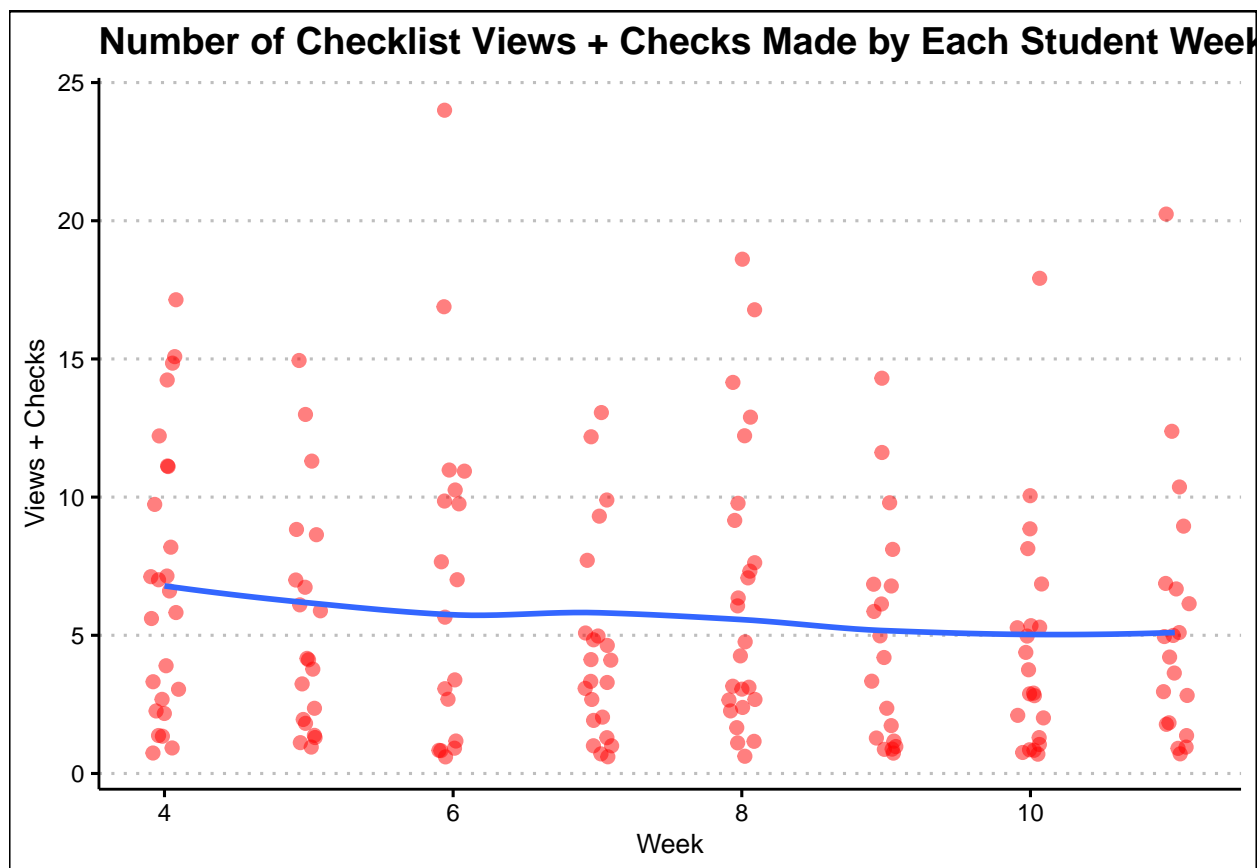
Although there were students that almost completely ignored the checklists, most used the checklists. The average number of views + checks for a student was almost 30 and a decent number of students used the checklist extensively.

Number of Checklist Views + Checks Made by Each Student



Looking at the weekly view, most students had around 5 views + checks each week. Every week has some students using the checklist at high numbers and some barely using it the same week. I think this suggests that the usage of the checklist is dependent on how much the student wants to use the checklist rather than the number of tasks on the checklists. Some will always check off all of their checklist while some will check activities off from time to time.

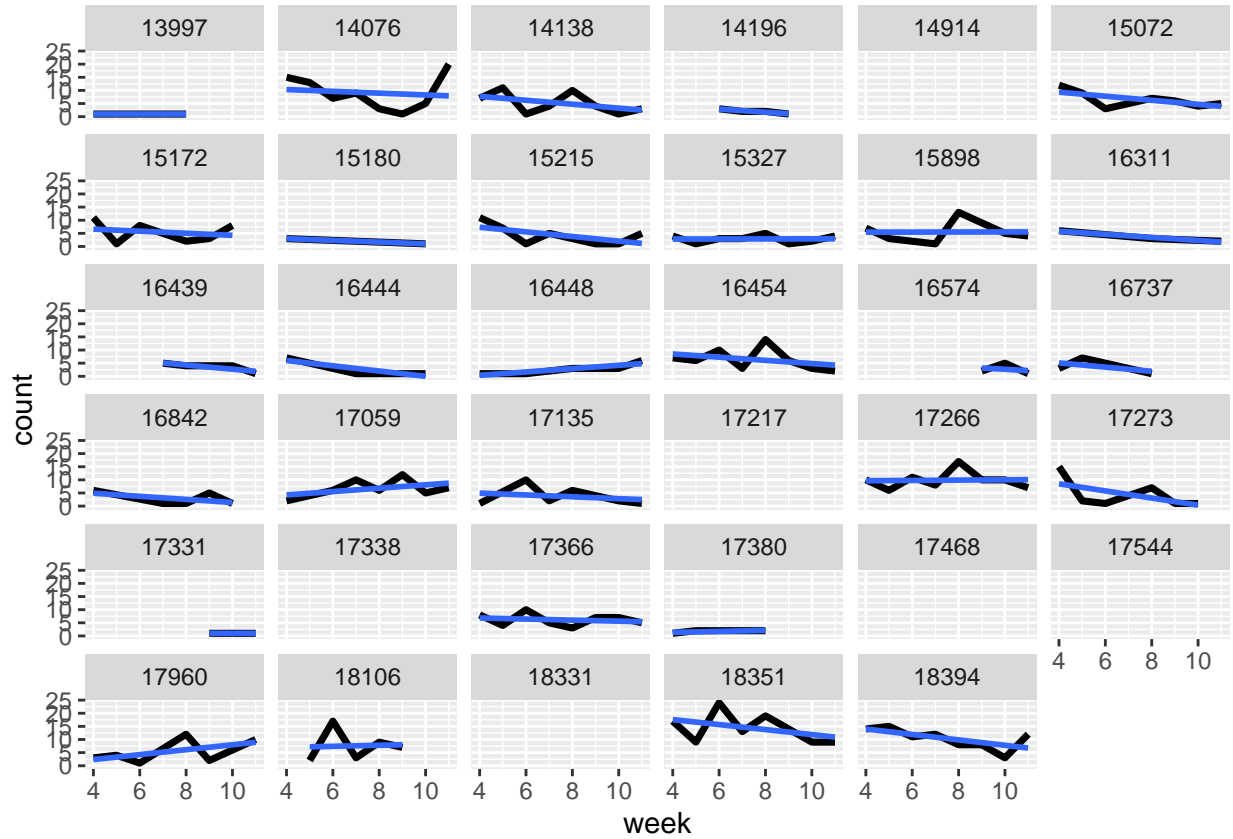
We do see that the usage of the checklists trends down slightly over the course of the semester however it is not by a significant amount.



Here is the usage of each student by week. There is a variety of patterns on display here. The checklist usage for some students was very volatile and for others it stayed the same over the weeks. Some students also used the checklist less as the semester went on and some used it more.

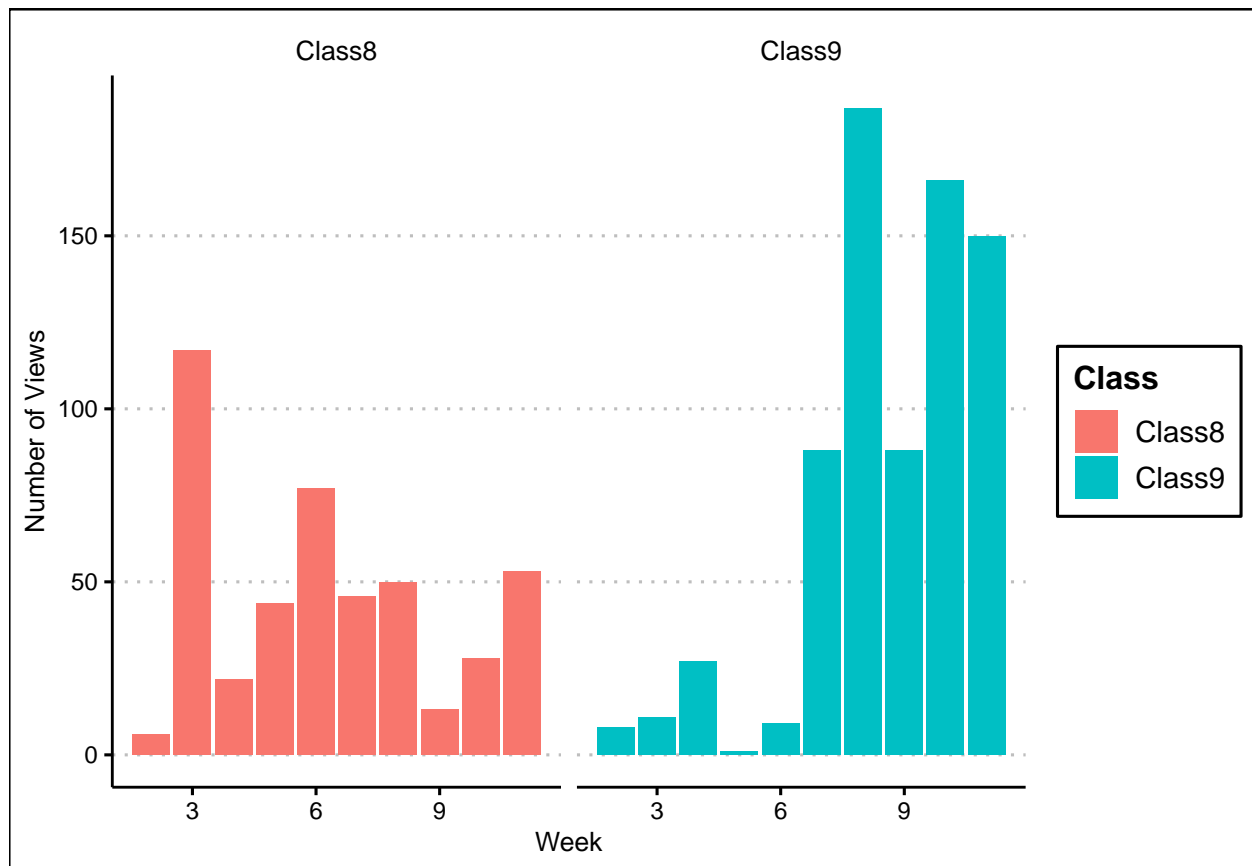
Unfortunately there is not enough data to fully investigate why there are so many different patterns of usage, but checklists were used considerably by students.

Note - Graphs with no line are students that used the checklist only 0 or 1 times.

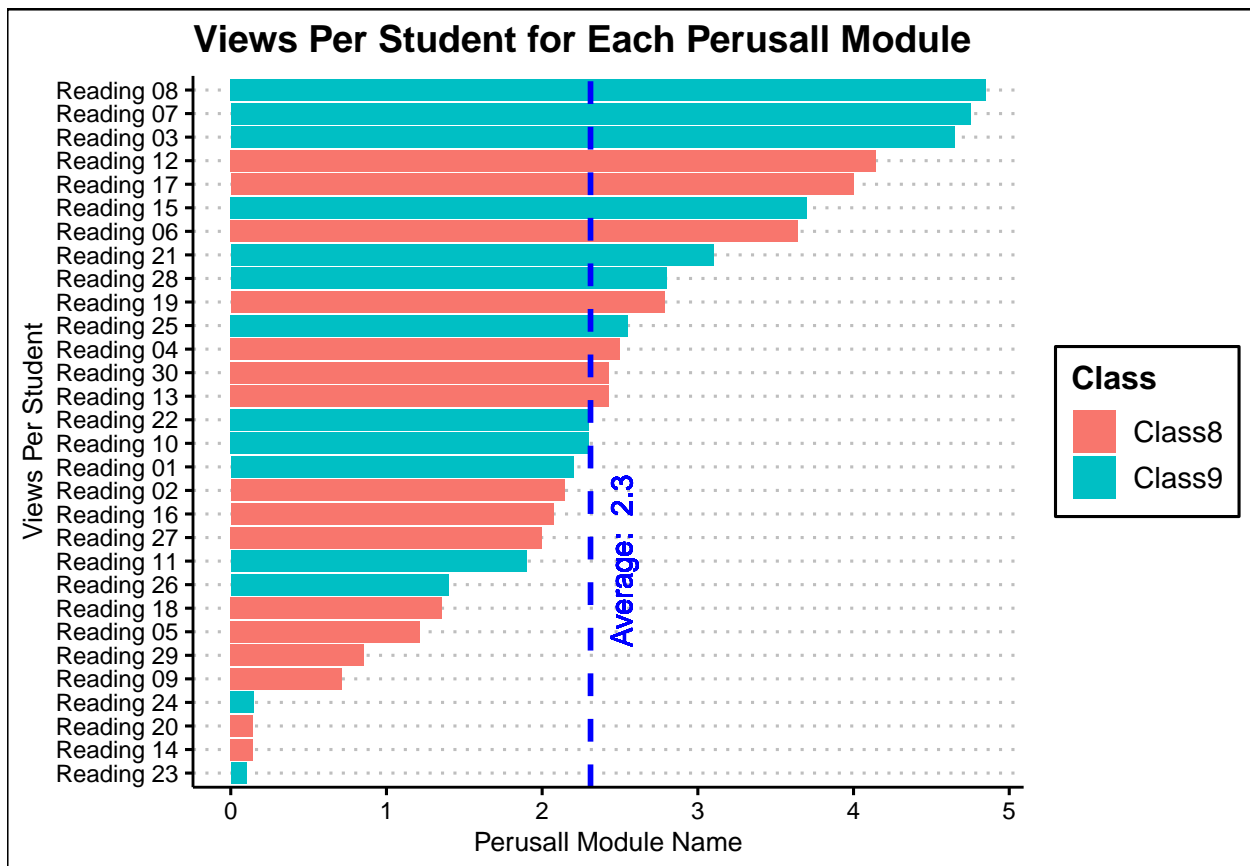


Perusall Module Analysis

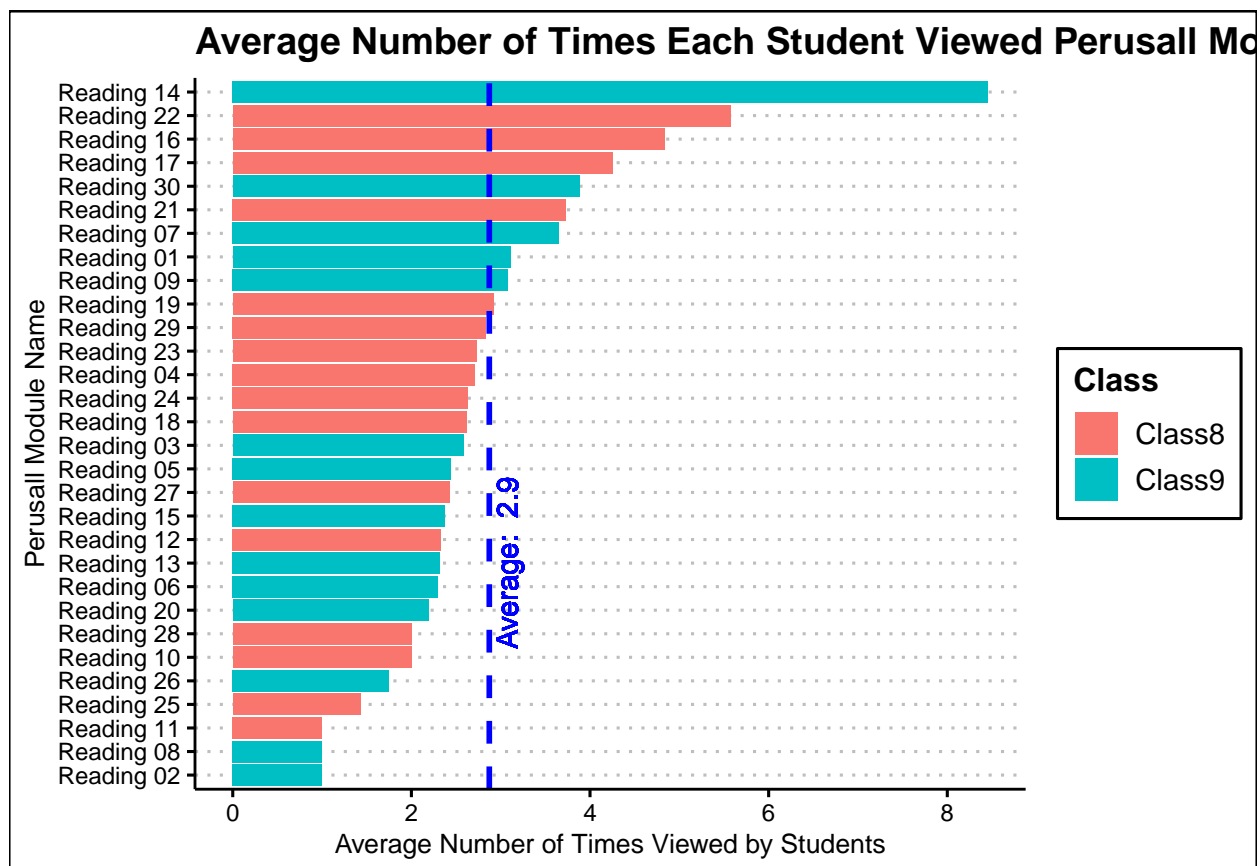
There were two classes that used Perusall in this dataset. The first class had a more balanced amount of activity over the weeks while the second class had a much greater amount of activity in the second half of this dataset.



The views per student of each Perusall module was fairly spread out. Almost every Perusall module was at least viewed 1 time per student and the average was 2.3 views per student.



Perusall modules were viewed by each student an average of 2.9 times. This is positive as noted previously, students viewed URL modules 0.7 times on average and file modules 1.2 times on average.

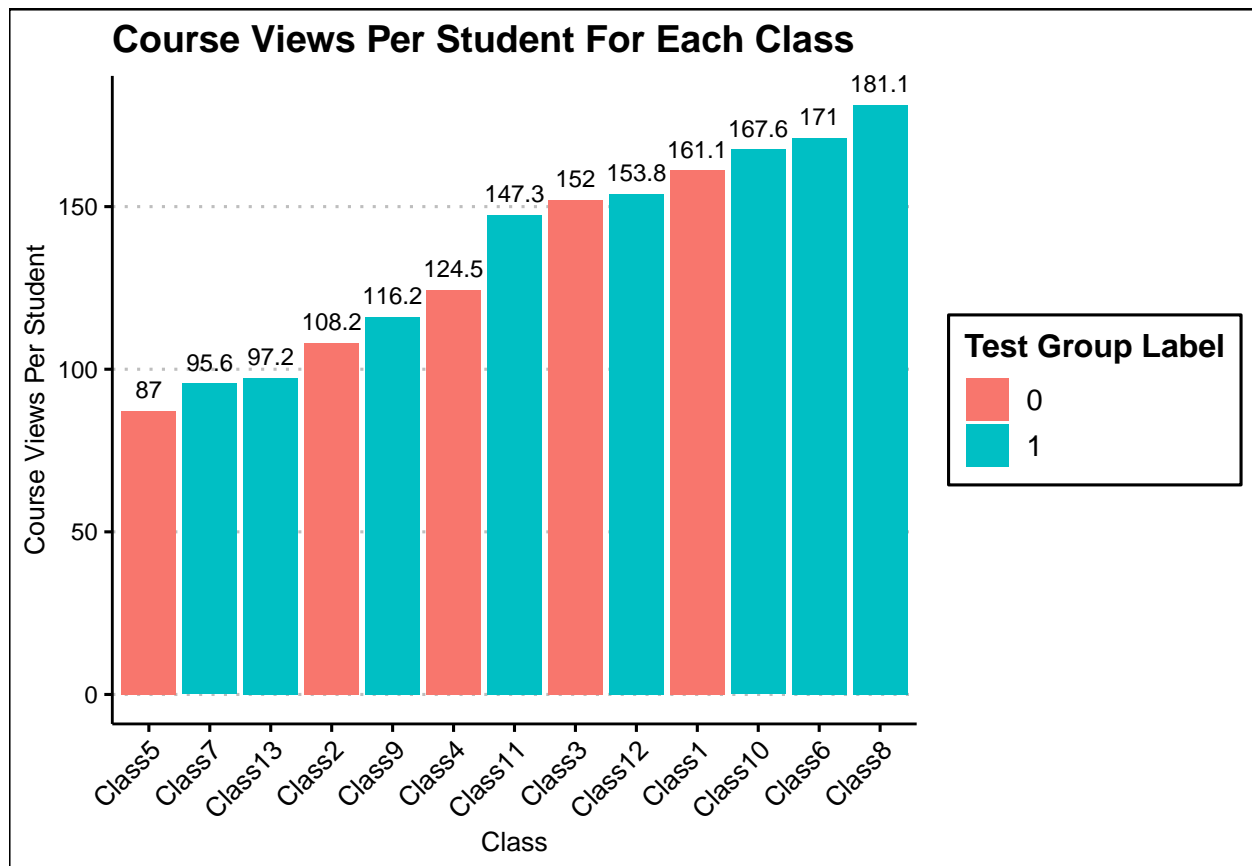


Overall Comparisons Between Test Classes and Regular Classes

While only the Perusall and Checklist plug-ins were captured by the logs, these plug-ins combined with the plug-ins that could not be captured by the logs did seem to have an effect on the test group of classes.

Comparing the views per student of the test classes and the regular classes, the test classes had more views per student. The regular classes had an average of 126 views per student and the test classes had an average of 141 views per student, an increase of 15 views per student.

While we do not have enough data here to confirm that the increase was the result of the new plug-ins rather than normal class variation, having an increase in Moodle activity in the test classes is good news for the effectiveness of the plug-ins.



```
## # A tibble: 2 x 3
##   testgroup median  avg
## *   <dbl>   <dbl> <dbl>
## 1       0    124.  127.
## 2       1    151.  141.
```