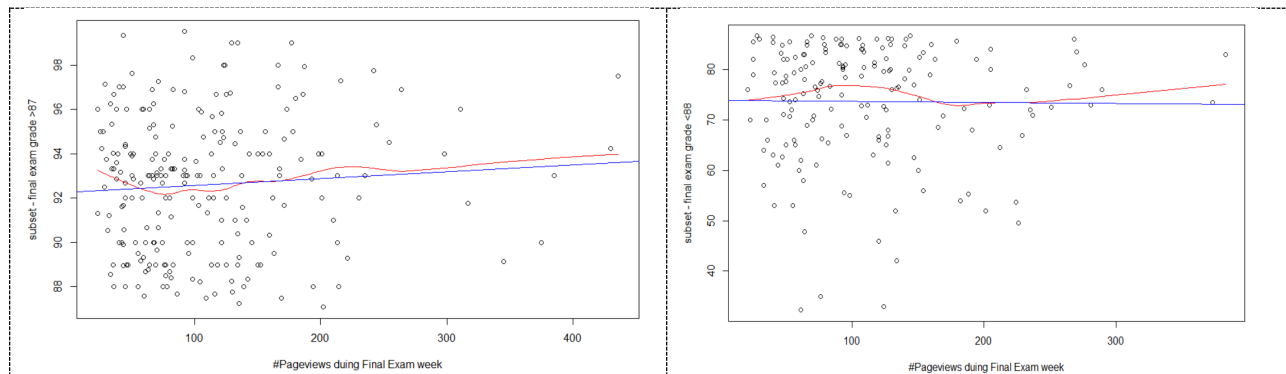


How did Canvas facilitate students' final exam preparation during final exam week?

Being a residential campus, Dartmouth has been using Canvas as an extension to F2F class in content delivery, quiz administration and communication. As such, we were particularly interested in learning how our students use Canvas to facilitate their final exam preparation.

We gathered students' activities data in Canvas during final exam period and students' score on their final exams. Since each course deployed its own grading schema on the final exam, the final exam score was rescaled by referencing the points possible assigned to the final exam. We examined number of page views made by individual students and the time they spent on each page, since the number of views and time spent are highly correlated, we decided to use one variable in the further analysis.

The residual plot and QQ-plots suggest the simple linear regression assumption is not satisfied, thus we employed a natural logarithm transformation on the ID variable, and drew lowess line on the scatterplot and identified one point (87%) that might be of interest. In addition, outliers were identified and removed by referencing both leverage and Cook's distance. Although the log transformation of predictor helped to satisfy the regression assumption, still only less than 1% of the variation could be explained by the model, thus we decided not to introduce the model, but to visualize the results in scatterplot instead.



- Overall, students' performance (points received/points possible) on their final exam covers the range from very low to very high, and quite a few students achieve fair performance on final exam without significant LMS page view activities.
- In average, students, who received grades greater than 87% on final assignments/exams, tended to spend more time navigating through Canvas during final exam week.
- Students, who performed at B level and higher (greater than 87%) on their finals, benefited more from reviewing more course materials and spending more time in Canvas.
- In contrast, the almost horizontal regression curve of students who got less than 87% on their final exam indicates that saturation is reached quickly where reviewing materials during final exam week does not correlated with better performance on final exam. In other words,
- Navigating through Canvas produces marginal effect on final exam preparation of students, who performed at B- level or lower (grades less than 88%)

- The result suggests that Canvas better facilitates performance of students perform at B level and above than it does for B- and below students during final exam week.

Implication:

The analysis is derived from Canvas page view activities of students who use Canvas as an extension of F2F learning. The data suggest that many students used Canvas to review course materials during final exam week, but we have very limited data shows their study activities beyond Canvas and classroom, while students' performance on final exam can be significantly affected by their study activities conducted offline and outside classroom. Therefore, it is instrumental to identify new learning behavior taken place in a variety of digital platforms when we try to understand how our students learn.

Students' pageview data was extracted via API endpoints: `/api/v1/users/#{user["id"]}/page_views`, and student final assignment results were pulled via `/api/v1/courses/#{course["id"]}/enrollments` and `/api/v1/courses/#{course["id"]}/analytics/users/#{id}/assignments`

Graphing and data analysis were conducted in R, sample codes are attached in below:

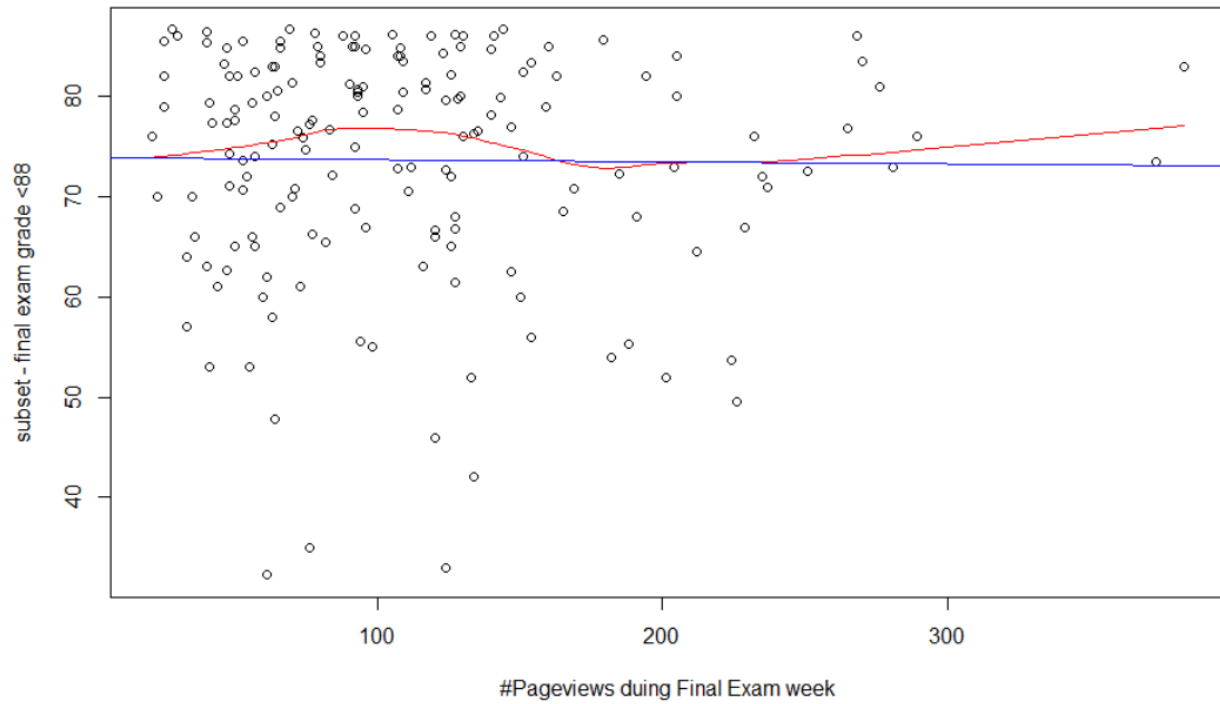
```
FinalExamWeek <- subset(FEP, FEP$Score>0&FEP$numbervisits>20)
```

```
score87 <- subset(FinalExamWeek, FinalExamWeek$Score<87 & FinalExamWeek$Score>25&FinalExamWeek$numbervisits<500)
```

```
plot(score87$numbervisits, score87$Score, xlab="#Pageviews duing Final Exam week", ylab="subset - final exam grade <88")
```

```
abline (lm(score87$Score~score87$numbervisits), col="blue")
```

```
lines(lowess(score87$numbervisits, score87$Score), col="red")
```



```
score88 <- subset(FinalExamWeek, FinalExamWeek$Score>87 & FinalExamWeek$Score<100)
```

```
plot(score88$numbervisits, score88$Score, xlab="#Pageviews during Final Exam week", ylab="subset - final exam grade >87")
```

```
lines(lowess(score88$numbervisits, score88$Score), col="red")
```

```
abline (lm(score88$Score~score88$numbervisits), col="blue")
```

