Effects of Class Time and Length on Student Engagement

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Abstract

This study aimed to examine how the length and start time of a class affected the engagement in that classroom. To examine this, 57 classes at the Rochester Institute of Technology were observed for a variety factors. Class length and start time were then compared with ratings of engagement, the number of people participating, and the number engaged in off task behavior. Neither class length or start time were shown to have a correlation with student engagement, but participation was shown to increase later in the day along with more off task behavior as the length of the class increased.

Keywords: Class Length, Class Time, Engagement

Effects of Class Time and Length on Student Engagement

During enrollment students attempt to secure the necessary classes with professors that they like and with friends that they might be able to complete classwork with. Some students may also find that the length of the class or the start time plays an important role in the classes they select for that semester. As students figure out which classes they should be taking and attempt to create a schedule that works for them it is also important to consider the effects of class timing and length on engagement beyond personal preference.

Being engaged in the classroom by participating in the class activity while avoiding any external distractions is also an important consideration for any college student who wants to learn the material and stay up to date. Students that can stay engaged in the classroom are better at learning the material and have better academic success. (Heng, 2014; Skinner, Wellborn, and Connel, 1990). It is therefore important for students to make informed choices about the classes they take in order to stay engaged and get the most out of their time in class.

Class Length

Class length has been shown to play a role in increasing academic achievement. Ney (2010) found that doubling class time from their usual one-hour length led to improved math and reading scores on standardized tests. Students have also been shown to prefer classes that meet for a moderate amount of time, defined as 2 hours twice a week, and rate teachers higher in those classes (Reardon, Payan, Miller, and Alexander, 2008). This was predicted to be an optimal time as it allowed students to be exposed to a variety of material and teaching techniques before diminishing returns from fatigue. Over prolonged periods of time we tend to lose focus and maintain the same level of activity (goal habituation), but small break or stimuli that refocuses out attention can be used to help alleviate part of this issue (Ariga & Lleras, 2011). Although this

doesn't always happen, longer classes will often have a break in the middle of a two- or three-hour class period giving students time to adjust.

Start Times

Start times are of importance to some students with some, like myself, opting for earlier start times to get classes out of the way while other students choose later start times to give themselves time in the morning and allowing them to stay up later into the night. In the high school setting start times have been slowly shifting later into the day to accommodate the adolescent sleep cycle and social expectation to improve student performance in the classroom. Earlier start times have been shown to lead to sleep deprivation and sleep lag syndrome in the U.S. and have also been correlated with impaired cognition and deficits in memory. (Wahlstrom, 2002), while later start times helped to improve overall attendance and was correlated with better school performance (Brown, 2015). With college students not being too much older than high school students, earlier start times have similar effects of academic ability. Additionally, a student's chronotype or behavior throughout the day based on circadian rhythms can also play a role in determining how engaged students are in class. Earlier class times in universities tend to favor 'morning people' who tend to be more alert and engaged in the early hours of the day., while people with an evening chronotype tend to be more sleep deprived and less engaged (Enright, Tristan, and Roberto Refinett, 2017).

Current Study

For this study I decided to look at how both the start time and length of a class might affect factors such as student engagement, the number of people participating in the activity, and the number of people engaged in off task behavior. Since students are not in charge of scheduling classes and don't always get to enroll in the times they think work best, I predict that earlier class

will lead to lower overall engagement. Despite the negative effects that fatigue can have, I predict that longer class times will actually increase engagement overall as more material can be covered and students are often given breaks in longer classes.

Methods

Participants

In this study we looked at 57 classes at the Rochester Institute of Technology. All participants were students enrolled in undergraduate classes at RIT. This included students taking classes in a variety of different on-campus locations from within different departments. RIT self-reports the overall gender ratio to be 65.9% male and 34.1% female, with some variation between the colleges.

Procedures

Observers collected data as part of a course requirement for Research Methods I with each student, 20 total, observing two of their classes and some choosing to complete an additional two observations for extra credit. Observations were made during the Fall semester between the fifth and twelfth weeks of classes. Observations about the environment, such as weather, day of the week, and location were taken at the start of class. During the class period an observation was made of the number of people participating and engaging with the class material. This involved a brief scan of the room and a tally of people who were engaging in off task behavior such as mobile phone use, lab computer misuse, or talking. Afterwards, the observers recorded reactivity and additional comments. This also included the professor's Student Government (SG) Rating for 'Advanced my Understanding'. For example, I recorded data during a statistics lecture while the teacher was giving a presentation, as well a during a game design class while we were working on group projects in class.

Measures

Each observation looked at many different variables that could affect student engagement. These included variables such as the classroom location, format of the class (lecture / lab / mixed), weather conditions, technology use, and classroom layout. For this study, the class start time and class length were used to find a relationship with student engagement. Engagement was measured by participation in class activities. For lectures this involved taking notes when appropriate, not talking with the people around you, asking questions when a topic became unclear, or giving verbal replies to questions posed by the teacher. In lab setting this also involved appropriate use of the provided technology, on-topic discussion with partners, or completing the assignment / activity for that class.

Results

To determine if student engagement is affected by class start time and the length of the class, both measures were compared with the rating of student engagement on a scale of 1 to 10, the percentage of people participating in class, and the percentage of people engaging in off task behavior.

Class Length

In order to analyze differences between class lengths I decided to categorize the data by length and look at the differences between the means. This was done because of the uneven spacing in minutes between the groups and was aided by there being only 4 possible class lengths.

In 57 classes we observed student engagement seemed to vary greatly between the classes ($M = 6.02$, $SD = 2.22$) with some classes spread out between the minimum score of 1 and maximum of 10 (Table 1). The length of classes seemed to have a slight effect on student

engagement. 50-minute classes ($n = 23$) ratings of student engagement ($M = 5.96$, $SD = 2.48$) were closest to the overall sample with slightly larger variation. 75-minute classes ($n = 21$) ratings of student engagement ($M = 6.24$, $SD = 1.97$) were the highest overall with less variation. 110-minute classes ($n = 12$) ratings of student engagement ($M = 5.58$, $SD = 2.27$) were the lowest overall. There was also a single 170-minute class that was given a rating of 8 for student engagement.

The one-way ANOVA, ($F(3, 53) = 0.48$, $p = 0.70$) demonstrated that there is no statistical significant difference between engagement during different class lengths. Any differences in engagement between class lengths are most likely due to random chance.

In order to look at class participation by class time I used the number of people recorded as participating and the number of people present in the class to calculate a percentage for participation which allowed for comparisons across different class sizes. The percentage of people participating in the class activity ($M = 35.97\%$, $SD = 23.06\%$) was spread similar to engagement with large variation within the different class lengths (Table 2). But variation between 50-minute classes ($M = 36.59\%$, $SD = 20.23\%$), 75-minute classes ($M = 35.09$, $SD = 22.52\%$), 110-minute classes ($M = 33.57\%$, $SD = 29.35\%$) and 170-minute classes ($M = 68.75\%$) didn't change much between the different class lengths. The one-way ANOVA, ($F(3, 53) = 0.72$, $p = 0.54$) demonstrated that there is no statistically significant difference between participation during different class lengths. Any differences in participation between class lengths is most likely due to random chance.

To measure off task behavior across different class sizes, I used the number of people recorded as engaging in off task behavior along with the number of people present in that class to calculate a percentage. Off task behavior had less variation overall ($M = 23.30\%$, $SD = 15.82\%$),

but had much more variation between the different class lengths (Table 3). The one-way

ANOVA, ($F(3, 53) = 3.73$, $p = 0.02$) demonstrated that there is statistically significant difference

between participation during different class lengths. A Tukey HSD test ($p = 0.08$) of the mean

revealed that the largest and only significant difference is between the 50-minute and 75-minute

classes.

Start Times

In order to analyze how start times affected student engagement, participation, and off

task behavior I decided to use regression to explain how they changed over time. Unlike class

lengths, the start times we evenly spaced out by 30 minutes and the times ranged from 9:00 AM

to 5:00 PM.

The results of the regression report to test if class time significantly predicted student

engagement ($M = 6.02$, $SD = 2.22$) indicated that class time explained 0.00% of the variance (R^2

< 0.00, $F(1, 55) = 0.02$, $p = 0.89$). It found that class time didn't significantly predict student

engagement ($\beta < 0.00$, $p = 0.89$).

The results of the regression report to test if class time significantly predicted the

percentage of students participating in class ($M = 35.97\%$, $SD = 23.06\%$) indicated that class

time explained 17.72% of the variance ($R^2 = 0.177$, $F(1, 55) = 11.85$, $p < 0.01$). It found that

class time significantly predict the percentage of students participating in class ($\beta < 0.00$, $p <$

0.01). Converting into minutes and then to percentage I found that the percentage of students

participating in class decreased by 1.91% on average every 30 minutes.

The results of the regression report to test if class time significantly predicted the

percentage of students engaging in off task behavior ($M = 23.30\%$, $SD = 15.82\%$) indicated that

class time explained 3.89% of the variance ($R^2 = 0.039$, $F(1, 55) = 2.23$, $p = 0.14$). It found that

class time didn't significantly predict percentage of students engaging in off task behavior ($\beta <$ 0.01, $p = 0.14$). Although not significant, converting into minutes and then to percentage I found that the percentage of students engaging in off task behavior increased by 0.62% on average every 30 minutes.

Discussion

I originally predicted that earlier class would have lower overall engagement, and while the results showed no correlation for engagement, participation in class did increase as the start times got later into the day. I also originally predicted that despite student fatigue, longer class times would increase student engagement. I found that the percentage of students engaging in off task behavior was the only factor that varied between class lengths, with ratings of engagement not changing much across all the class lengths.

Class Length

Although I was focused on engagement, the results showed that there wasn't a significant difference between the groups when it came to in-class engagement, with a large amount of variation between individual classes. Ratings of engagement were uniformly spread out across our rating of 1 – 10 meaning there is no relationship between engagement and class length. The percentage of people participating in classes were equally as varied. All class lengths had mostly classes with low percentages along with some that had almost full participation. It seems likely that there is another factor influencing participation unrelated to class length that is creating these two different groups for participation.

The percentage of people engaging in off task behavior did show some differences between class lengths that went against my original hypothesis. Students in 50-minute classes were more often engaged in off task behavior while students in 75-minute classes were the less

often engaged in off task behavior. This may be related to RIT scheduling with 50-minute classes being held on Monday, Wednesday, and Friday, containing the days where students may be engaging in off task behavior such as talking or texting about weekend plans and past events. Additionally, 75-minute classes are usually scheduled on Tuesdays and Thursdays in the middle of the week when student are likely more focused on the work in front of them.

Start Times

Class start times also head an impressively non-existent relationship with engagement having equal variation throughout the day. The percentage of people participating in the class activity did have a slight increase as the day went on with equally spread at each of the start times, but the average percentage slowly increasing. Since there was no relationship with engagement or off task behavior, there is likely some external factor not related to how much students enjoy the class. This is possibly the natural circadian rhythm that we experience throughout the day peaking in the afternoon and giving us more energy and affecting our behavior in a way that increases participation.

Limitations and Future Directions

These findings might be generalizable to RIT having covered a variety of different class types that are offered by different colleges. However, this probably doesn't apply to other colleges due to the specific class lengths that RIT uses along with the scheduling of those different class lengths. Looking at class length, independent of day of the week, would help to generalize these findings to a wider range of universities. Additionally, although we defined engagement, participation, and off task behavior as a group; there is likely some individual differences when it comes to rating an entire class as well as when monitoring for specific types of off task behavior. I'm sure I personally missed some clever ways that other students check

their phone in class. Having multiple students recording each of the classes would help to improve the inter-rater reliability of this study.

I would still be interested to see if engagement was significantly different in much longer class times. We recorded a single observation of a 170-minute class which didn't allow for much analysis. Since off task behavior was the only difference between class lengths, it might also be useful to look at how far into the class that off task behavior occurs so that teachers could potentially check-in with students or schedule breaks to keep students on task for the entirety of a longer class.

Considering that daily activities based on circadian rhythms get dialed back at the end of the day I would also be interested to see if participation in evening or night classes is lower. We didn't record any data for these times, but I think they would likely have decreased participation.

Conclusions

Given that enrollment for next semester has already occurred, I was relieved to find out that engagement isn't significantly affected by class length or start time. These findings might be helpful for students who regularly engage in off-task behavior to consider taking longer classes to avoid whatever is causing the increase in distraction. These finding also imply that it might be beneficial for faculty or administrators to schedule project-based classes or labs later in the day to match the levels of student participation that were found.

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Tables

Table 1

Engagement rating (1 – 10) by class length

Class Length	n	μ	σ
50 minutes	23	5.96	2.48
75 minutes	21	6.24	1.97
110 minutes	12	5.58	2.27
170 minutes	1	8	
Total	57	6.01	2.22

Note: Standard deviation for 170-minute class due to sample size of 1.

Table 2

Participation percentage by class length

Class Length	n	μ	σ
50 minutes	23	36.59%	20.23%
75 minutes	21	35.09%	20.52%
110 minutes	12	33.57%	29.35%
170 minutes	1	68.75%	
Total	57	35.97%	23.06%

Note: Standard deviation for 170-minute class due to sample size of 1. Percentage for each class

was calculated by number of people participating at check divided by the number of people

present in the class that day

Table 3

Percent engaging in off task behavior by class length

Class Length	n	μ	σ
50 minutes	23	33.51%	17.60%
75 minutes	21	15.58%	11.44%
110 minutes	12	23.51%	20.14%
170 minutes	1	18.75%	
Total	57	23.30%	15.82%

Note: Standard deviation for 170-minute class due to sample size of 1. Percentage for each class was calculated by number of people engaging in off task behavior at check divided by number of people present in the class that day