


The background features several stylized virus icons, each with a central dark blue circle and radiating lines representing spikes. These icons are scattered across the light blue background, which also includes soft, abstract shapes in shades of blue and purple.

Learning Gap

during COVID-19 Pandemic

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A stylized illustration of a hand in a light blue color, holding a syringe. The syringe has a white plunger and a red needle. The hand is positioned on the right side of the image, with the needle pointing towards the left, as if about to inject or draw liquid. The syringe is partially filled with a red liquid.



INTRODUCTION



1

Background Info

COVID-19 forced an immediate transition from in person lectures to online learning back in 2019.

2

Motivation

Getting the result is a first step towards helping us to discover how to transition back to in person learning.

3


Question of Interest

Is there a gap in the learning experience for students when it comes to online versus in person learning?

4

Hypothesis

There is a learning gap of students between pre/post and during pandemic.



1

Sampling

ABOUT SAMPLING



Data Collection

Surveys are randomly distributed during lectures and tutorials.

SRS

Each individual has an equal chance to be chosen.

Represent the population with less bias.



Logistic Reg

Predictive analysis between nominal, ordinal, discrete and continuous variables.

Odds Ratio

The ratio between given an event A and missing B, and given an event B and missing A.





We have successfully collected

57

valid samples with B (margin of error) = 11% to estimate the proportion of
population



2

Methodologies

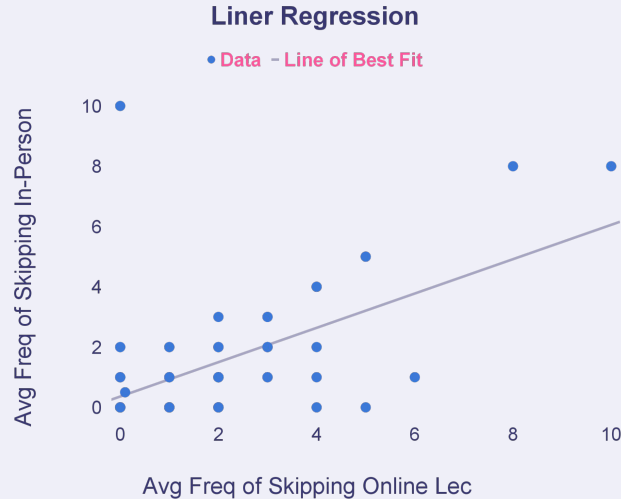


2.1

Linear Regression



LINEAR REGRESSION



X - Explanatory Variable

Average Frequency of Skipping In-Person Lectures

Y - Response Variable

Average Frequency of Skipping Online Lectures

• Slope or $\hat{\beta}_1 = 0.57$

On average, the student skips 43% less in-person lectures than online lectures.

• $H_0: \beta_1 = 0$ vs $H_a: \beta_1 \neq 0$

To test if there is a linear correlation between X and Y.

• P-Value = 3.695×10^{-6}

Reject H_0 since P-Value < Alpha.

Hence, β_1 does not equal to 0 and there is a correlation.

HYPOTHESIS TESTING



Hypothesis Testing of Mean

$$H_0: \mu_1 - \mu_2 = 0 \quad \text{vs} \quad H_a: \mu_1 - \mu_2 \neq 0$$

Null Hypothesis:

The mean of average frequency of skipping online lectures and in-person lectures are the same.

Alternative Hypothesis:

Two averages are different.



RESULTS OF HYPOTHESIS TESTING



Use $\alpha = 0.05$.

- **T-statistics** = 2.0196 with df = 60
- **P-value** = 0.0479
- **CI** = (0.0048, 0.9985)

Since p-value is smaller than the alpha level, so we fail to reject the null hypothesis.

Hence, we conclude that the *average frequencies of skipping online lectures and in-person lectures are similar.*





2.2

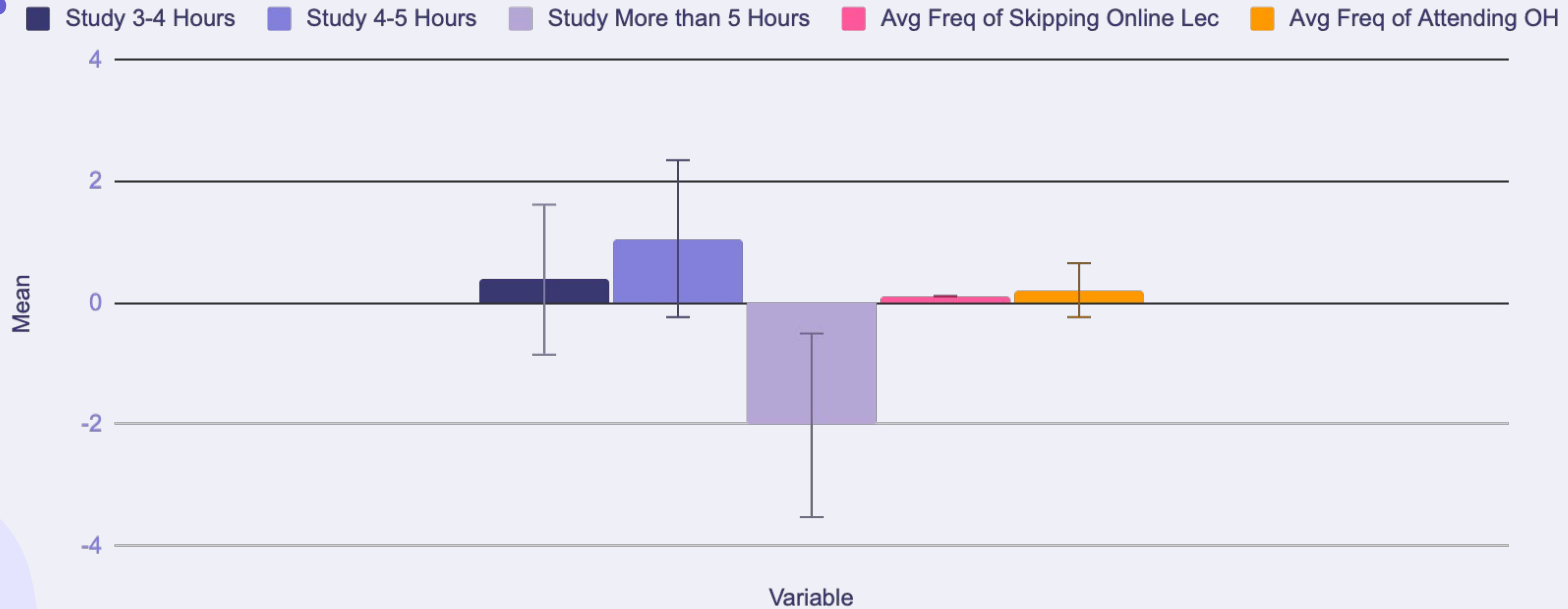
Logistic Regression

Analysis for Pandemic Era



ORDINAL LOGISTIC REGRESSION

Confidence Interval of Variables' Coefficient



ODDS RATIO

1.146

14.6%

100%

2-4 Hours

The odds of being more likely to increase in cGPA is 1.146 times more than the ones who do not study for 2-4 hours.

2.86

100%

186%

4-5 Hours

The odds of being more likely to increase in cGPA is 2.86 times more than the ones who do not study for 4-5 hours.

0.132

-86.78%

100%

More than 5 Hours

The odds of being more likely to increase in cGPA is 86.75% times lower than the ones who do not study more than 5 hours.



3

Limitations & Conclusion



Limitations

Limitations include but is not limited to:

- Small sample size:
 - Processing data got rid of some invalid responses
- Not offering prize might cause students to not fill out the survey as carefully
- Population (STA304) does not reflect students in general



Conclusion

- No significant learning gaps for students before and during pandemic
- However, one should not base the truth based on this one study

Further testing should be conducted with larger sample size and more repetition



THANKS!

By All STA304 Group 2 Members

Does anyone have any questions?



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