CS6460: Intermediate Milestone 2

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# Overview

This milestone documents my progress in my research since week 8, including the preliminary data I have collected, my early conclusion and observations and my ongoing plan for analysis.

You may check the video version of the report by clicking [here](https://drive.google.com/file/d/1QX872s_Jcr_UDRHfW0IfghwBpCvPyc5T/view?usp=drive_link). The presentation slides have been attached as an Appendix to this report.

# Preliminary Data

*Figure 1* shows an overview of the Weekly Feedback I have collected as of this writing (I expected to receive more feedback for the week of November 13 by the end of this week). In the last two weeks, participants have begun to mention keywords such as "busy life" and "not committing to learning as expected" in their weekly feedback. When it started, many participants expressed excitement about this activity.

A screenshot of a survey

Description automatically generated

*Figure 1* – Preliminary Data Collected.

# Early Observations and Conclusions

Here are my findings from observing *Figure 1*:

* The weekly feedback I received dropped significantly starting from the third week, probably because I stopped sending out daily learning reminders in the third week.
* Although the number of weekly feedback decreased in both the control and experimental groups, the current data cannot explain the specific differences.
* If a participant has sent me timely feedback the previous week, the participant will likely send me feedback the following week as well. If participants don’t send me weekly feedback the week before, they will likely not send me feedback the next week either.

Based on these early data observations, I expect the experimental and control groups to diverge in the data over the next few weeks.

# Work I have done And ongoing analysis

## Participant Engagement

After milestone 1, I stopped sending the daily learning reminders and kept asking for weekly feedback every Friday as planned. I automate the sending of reminders through Outlook's scheduled send feature.

## Data Collecting

I will continue to send out reminders to participants to collect weekly feedback every Friday for the next few weeks and invite participants to rate the activity for qualitative analysis during the last week of the study.

## Research on the Types of Charts

I also studied different charts' features and common use cases for data analysis. I plan to determine how my analysis results will be visualized and presented in conjunction with the data I have collected. The options I'm currently considering are:

* Double Bar Graph – Student Engagement Analysis

A double bar graph can effectively compare two data sets. In the context of student engagement analysis, comparing engagement levels between the control and experimental groups could be helpful.

* Line Chart – Student Engagement Analysis

A line chart is great for showing trends over time. It can be helpful to illustrate the change in student engagement over weeks.

* Box Plots – Learning Outcomes Analysis

Box plots help display the distribution and spread of data, particularly for comparing learning outcomes across different groups. They showcase the median, quartiles, and outliers, giving a comprehensive view of the variability in the data.

* Word Cloud – Learning Process Analysis

Word clouds are visual representations where words are sized based on frequency. They can be used to analyze qualitative data, such as student feedback or responses related to the learning process.

I will enumerate the reasons for choosing charts in the final paper.

## Final Paper

After the previous milestone, I started to draft the content of my final paper. I have completed the Introduction (Background and Project Overview), Methodology (Research Design, Data Collection and Analysis Methods) and Discussion (Critique) sections so far. In this process, I found some loopholes in my original research design, so the Methodology section will change accordingly after I confirm the solution. See the next section for details.

# Challenges

As I collected data and continued my research, I realized a hole in my design. Since my research was to examine the effects of interest and self-motivation on Student Engagement and Learning Outcomes in a remote learning context through a controlled experiment, I should have provided the control and experimental groups with the same final test to assess their learning outcomes. However, my current design only considers evaluating the learning outcomes of the experimental group through Duolingo final levels and badges and does not plan for the control group.

Not only was I incapable of designing a legitimate digital test to measure each participant's learning outcomes (since I did not ask them to do any tests at the beginning), but even more so, I was unable to get participants using traditional learning methods to take the Duolingo test (since they were most likely unfamiliar with the app). I am in urgent need of a new solution that could be used to assess the learning outcomes of all the participants.

One possible solution that comes to mind is to focus on the effects of interest and self-motivation on Student Engagement and logically reason through the existing findings to the participants' Learning Outcomes. During the first three weeks of exploring, I have seen many articles discussing the correlation between Student Engagement and Learning Outcomes. I'm not sure it's acceptable to reason out certain conclusions using the data I've collected and the existing hypothesis or findings in the Educational Technology Field. Or is this approach to argumentation a common practice among researchers? Please advise.