

# Effectiveness of Learning Assistant Homework Help Hours

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## Topic & Context

We would like to investigate the impact of Learning Assistants (LAs) by looking at relationships between Learning Assistant Homework Help Hours (LAHHH) attendance and exam scores, as well as perceived success in regards to midterm 1. Additionally, we are hoping to gain insight on the relationship between the change in LAHHH attendance and change in exam success (or exam gains) from midterm 1 to midterm 2. With this information we hope to gain understanding on how LAs contribute to student success in Physics 201 (PH 201).

To be a successful learner of any topic, students must be actively engaged in the material (Handelsman et al. 2004). LAHHH provides an environment where students can actively engage with physics material while being supported by LAs trained in physics education. It is a space where students can integrate new information and restructure their mental models while being supported by trained LAs. We want to maximize the effectiveness of LAHHH in providing such an environment

It is important to recognize LAHHH is benefitting students of a flipped classroom. It is also important to determine whether or not LAHHH is impacting student perceived success.

## Research Questions

- What is the relationship between LAHHH attendance and perceived preparedness for exams?
- What is the relationship between LAHHH attendance and exam scores?
- What is the relationship between change in LAHHH attendance and exam gains from midterm 1 to midterm 2?

## Methods of Inquiry

The focus group of our research were PH 201 students. Students were asked to answer survey questions, created by us, before and after each midterm exam. The survey was given through Turning Technologies QT device. We limited the survey to specific questions regarding LAHHH attendance and perceived success. Additionally, we researched how explicit teacher modeling and the over confidence effect impacts student outcome in order to supplement our research.

## Acknowledgements

We would like to thank Dr. KC Walsh and Dennis Bennett for their contributions to our research project.

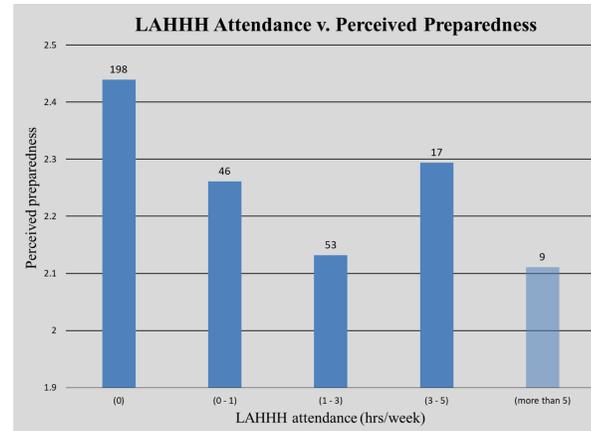


Figure 1: This graph shows the relationship between LAHHH attendance and student perceived preparedness. Students were grouped based on LAHHH attendance, and then the average perceived success was found for each attendance group. Perceived preparedness is based on a 0-4 scale, with 0 being the least confident and 4 being the most confident.

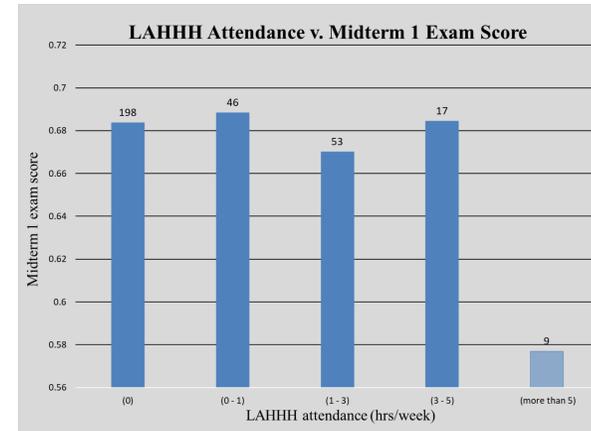


Figure 2: This graph shows the relationship between LAHHH attendance and midterm 1 exam scores. Again, students were grouped based on LAHHH attendance, and the average exam scores were found for each attendance group.

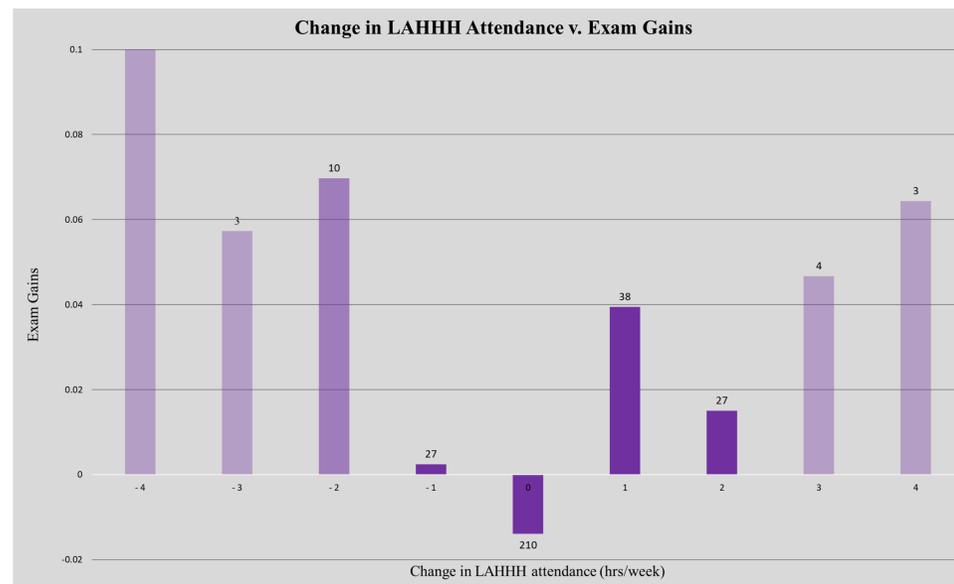


Figure 3: Here we see how the change in LAHHH attendance between midterm 1 and midterm 2 relates to the change in exam scores. The same grouping method was used to show the average exam gain for each LAHHH attendance category.

## Data and Findings

According to Fig. 1, the majority of students that did not attend any LAHHH sessions felt more prepared than students who attended one or more LAHHH hours. Through a linear regression, we found a p-value of 0.0356, which shows moderate significance between LAHHH attendance and perceived preparedness. The correlation coefficient for our data is found to be -0.1170, which suggests there is a negative relationship between LAHHH attendance and perceived preparedness. This shows that the vast majority of students who didn't attend any hours still had a high level of confidence before the first midterm which could be due to other factors.

According to Fig. 2, there is no significant difference between LAHHH attendance and average exam scores for the first midterm, which is supported by our high p-value of 0.2686 after a linear regression. Another point to note is that only 9 students responded with 4 or more hours of LAHHH attendance, so this data point is not as reliable.

According to Fig. 3, there is no significant difference in the change in LAHHH attendance and change in exam scores. After running a linear regression, we found the p-value is 0.1619, which supports our graph findings that there is no significant difference.

## Synthesis and Next Steps

The slight negative correlation between LAHHH attendance and student perceived preparedness suggests that students who attend more LAHHH sessions have lower amounts of perceived preparedness. This may be due to the fact that students who have higher levels of confidence do not feel the need to attend LAHHH.

Lack of correlation between change in LAHHH attendance and exam gains suggests that our study would benefit from considering variables other than LAHHH. There are many resources available to students: Supplemental Instruction, TA office hours, and online resources. We cannot get a truly accurate view of how one of these resources is benefitting students without considering the effects of the others.

This study was made using data on a voluntary basis via Turning Technologies QT device, which biased the data. This bias could be minimized if we manually tracked LAHHH attendance instead of surveying students. If we question students again, we could ask more specific questions that would lead to more quantitative datasets than perception-based answers.

## References

Handelsman J., Ebert-May D., Beichner R., Bruns P., Chang A., DeHaan R., Gentile J., Lauffer S., Stewart J., Tilghman M.S., & Wood B.W. (2004). Scientific Teaching. *Science*, 304, 521-522.