Group C Proposal: by Emily Boncek, Christopher Chang, Kelly Chang, and Stephanie Sindler

Survey of Carnegie Mellon Faculty Regarding Attendance and Student Performance (On Campus)

Why is this topic interesting?

We are interested in conducting a survey of members of the Carnegie Mellon faculty community in order to determine if there is a relationship between whether or not a class has mandatory attendance and students’ performance in the class. This topic is interesting because there is a large disparity in the way classes are structured across various departments of the university, and thus it is possible for two students of different majors to have entirely opposite classroom experiences. More specifically, many humanities courses are small and discussion based, while many science and math courses are large lectures composed of students from varying technical majors. In general, it is not practical for instructors of such courses to require or take attendance because of the large number of students. This survey is interested in determining if requiring attendance has an effect on or can improve students’ performance in classes. We are interested in studying data from past courses, as opposed to data from courses currently ongoing this semester.

Why does this survey need to be done now & who is the client?

This information would be relevant for faculty at the university in helping them define the structure and size limits for their courses. It is also important that this survey is conducted now, as university enrollment is constantly increasing and class sizes continue to grow. The university should be interested in the information from this survey as they consider how many faculty members should be employed for different departments, as well as how they can create an environment where students can be most successful.

What questions we will study:

-What proportion of classes have mandatory attendance, what proportion have attendance optional? Specifically what types of classes are these, and what are the class sizes?

-Overall how does students’ performance compare between attendance mandatory and attendance optional classes? This may be measured as the passing rate for the class, or as the percentage of students who get a specific grade, for example an A or B.

-Is there a class size which is “optimal”?

-To what extent does class size influence students’ attendance, regardless of whether the class is attendance mandatory or attendance optional?

Previous Work:

**Does Mandatory Attendance Improve Student Performance?** *by Daniel R. Marburger*; *Journal of Economic Education; Spring 2006; 37, 2, pg. 148*

Link: <http://proquest.umi.com/pqdlink?vinst=PROD&fmt=6&startpage=-1&ver=1&vname=PQD&RQT=309&did=1038089401&exp=01-22-2016&scaling=FULL&vtype=PQD&rqt=309&cfc=1&TS=1295811338&clientId=3259>

This article examines whether or not instilling an attendance mandatory rule has any effect on student performance within the class, ultimately proposing that this rule should have a positive impact on exam performance. This paper gives an example of results that are directly related to the survey topic that we wish to examine.

Found by: Emily Boncek

**Correlation of examination performance with lecture attendance: a comparative study of first-year biological sciences undergraduates** *by Derek Gatherer and Francis C.R. Manning; Biochemical Education 26 (1998) 121-12; Elsevier*

Link: <http://www.reocities.com/derek_gatherer/biochem_edu.pdf>

This article shows a study in which the authors tested how first-year biology students performed on an exam in relation to how often they attended class. This experiment gives more information on how undergraduate students’ performance is affected by their attendance, which would be very useful to refer to in our project.

Found by: Christopher Chang

**Evaluation of Factors Influencing Student Class Attendance and Performance** *by Stephen Devadoss and John Foltz; American Journal of Agricultural Economics, pgs. 499-507; Oxford University Press*

Link: <http://www.jstor.org/stable/1243268>

This article evaluates the multiple factors that could have an effect on a student’s attendance and their grades: this includes the student behavior, the teacher’s characteristics, and the course’s characteristics. This information could be very useful in developing our survey, and perhaps considering other types of policies that could improve student performance in addition to the attendance policy.

Found by: Kelly Chang

**Impact of Class Attendance Upon Examination Results of Students in Basic Medical Sciences** *by* *Habib-ullah Khan**, Aziz Marjan Khattak, Ihsan-ullah Mahsud, Akhtar Munir, Shaukat Ali, Muhammad Hussain Khan, Muhammad Saleem, S. Hamayun Shah; Gomal Medical College,Dera Ismail Khan, Pakistan*

Link: <http://www.ayubmed.edu.pk/JAMC/PAST/15-2/Habib%20Attendance.htm>

This article shows the results of an experiment in which the authors examined whether students who regularly attended class had better exam grades than those who did not regularly attend class (specifically in a medical school). These results would be useful to keep in mind while doing our survey, as it does show the correlation between good/bad attendance and good/bad test results.

Found by: Stephanie Sindler

Sampling Frame:

The sampling frame is the list of faculty whose email addresses are in the Carnegie Mellon directory or listed on departmental websites. We will probably want to focus on finding faculty for our sample through listing on department websites.

Target Population:

Our target population is Carnegie Mellon faculty members who teach undergraduates at the Pittsburgh campus. The population which we wish to make inferences about is Carnegie Mellon undergraduate students at the Pittsburgh campus. In this case, the sampling frame and target population are the same.

A possible sampling error could be that the number of responses from a specific college may not be proportional to number of available majors in that college. For example, the number of majors in the College of Humanities and Social Sciences is much larger than in the Mellon College of Science, so we would probably not want to sample many more science classes than humanities classes.

We are also concerned about non-response error, as some professors may be sensitive to releasing information regarding grade distribution or class performance. In addition, there is possibility for measurement error because some professors may inaccurately estimate grade distributions, as opposed to others who may be able to provide exact and correct responses through documented records from their classes.

Finally, a source of coverage error may be that there might be some professors who are neither listed in the directory or on departmental websites, for example if they were just recently hired and the relevant listing was not updated.

Mode of Data Collection:

Email online survey, face to face is also possible. Email is most convenient, if professors prefer we can accommodate for face-to-face interviews.

Variables to Measure:

Whether or not the class is curved

Level of course(100, 200, etc)

Whether or not the class it is mandatory
Attendance: percentage of students who attend the class

Performance: Grade distribution

Sampling Plan:

We will construct a random sample of 50% of the departments within each college, therefore obtaining a sample which is proportional to the number of majors available in each school. Initially we will contact all of the professors from the departments in our random sample to provide background information in the survey and ask if they would be willing to participate. Based on those responses, we can gather more information about the courses we wish to include in the sample, including the level of the course and the attendance policy. Once we determine which professors we want to sample based on willingness to participate, we will give them an advance notification reminder with a flier in their mailbox letting them know to expect to receive the survey in their email. If after we send the survey out in email some professors have not responded, we plan to follow up with them in person to remind them to complete the survey. We hope this will alleviate non-response issues.

In the event that our sample is not representative of the target population, the best adjustment we could make would be to increase the number of departments in our sample for each college.

Sampling Scheme:

Our sampling scheme involves a stratified and clustered design. We will first stratify by colleges, so each of the seven colleges of the university will be a stratum. Within each college, we will randomly sample a cluster of departments. We will choose the sample size of the sample of departments to be proportional to the number of departments within that college, so that each college is appropriately represented in the sample. Within each department, we will contact the entire faculty who taught undergraduate courses for the previous semester.

We have chosen this design in order to account for the large variability between courses, departments, and college. Using a multi-level stratified sample with randomly sampled clusters will allow us to make the most accurate comparisons between classes, and we will ultimately be able to make large-scale inferences by looking collectively the comparisons for groups of classes at each level for all of the departments.

Privacy and Confidentiality:

To protect the privacy and confidentiality of respondents, we will not be collecting any personal information about the faculty completing the survey. In addition, no information is collecting regarding the identity of the students in the classes from which grade distributions are being collected. Because we expect the majority of surveys to be completed using an online form, the data will be electronically stored on a private laptop. Any results collected from paper surveys will be manually entered into the same data file.

Questionnaire:

Although we are surveying **faculty** about **student performance,** for this survey each observation unit is an individual **course.**

1. College:

2. Department/Major:

3. Course Number:

4. Size of Class:

5. Attendance Mandatory or Attendance Optional?

6. Is this class lecture only? Are their recitations or labs?

7. What percentage of students enrolled attend class regularly?

0-20% 21-40% 41-60% 61-80% 81-100%

8. Is this a core or major required course?

9. Class Structure: Discussion based or lecture based?

10. Are notes or lectures available for students to view online?

Are they complete or partial notes? (would they require students to be in class to fill in certain sections?)

11. If attendance mandatory:

What percentage of student’s grade is dependent on attendance?

0-10% 10-20% 20-30% 30-40%

12. Grade distribution for a previous semester:

 Number of students receiving an A:

 Number of students receiving a B:

 Number of students receiving a C:

 Number of students receiving D/F:

 Mean Final Grade(if applicable):

Is this distribution consistent with previous semesters?

Sample Size:

In our comparison of performance between classes, we will consider the difference in mean final grade for attendance optional versus attendance mandatory classes.

We will wish to estimate the true difference to within a margin of error of 3 points(given a 100 point grading scale).

As an estimate for the standard deviation associated with this difference, we will use an estimate from a previous study which compared exam performance between students with high attendance and students with low attendance. To obtain an estimate of standard deviation for our purposes, we consider the standard deviations for the exam performance of these two groups. From this study, the standard deviation in score for the high attending group was 13.1, and the standard deviation for the low attending group was 7.1. Since we will be looking at a larger sample of final grades, which we would expect to have less variation than grades for a single exam, so we will use the smaller of these standard deviations as our estimate.

To determine the sample size for each strata, we consider first the number of departments in each college. We have decided to randomly sample 50% of the departments in each college.

Strata 1 – College of Humanities and Social Sciences – 8 departments (randomly sample 4)

Strata 2 – Mellon College of Science – 4 departments (randomly sample 2)

Strata 3 – Tepper School of Business – 1 department

Strata 4 – Carnegie Institute of Technology – 5 departments (randomly sample 3)

Strata 5 – College of Fine Arts – 5 departments(randomly sample 3)

Strata 6 – School of Computer Science – 1 department

We will construct a simple random sample of departments with sample size of 14. If the total number of faculty members at the university is 1,316, and the total number of departments is 24, we estimate the average number of faculty members per department (where some departments may have more than one major) to be 55. If we are sampling 14 departments with about 55 faculty per department, our estimated sample size would be 14\*55 = 770.

Applying the finite population correction for SRS without replacement,

n0 ≥ (1.96)2(7.1)2/(3)2 = 21.52

n ≥ (770\*21.52)/(770+21.52) = 20.93

If we estimate a response rate of about 15%, then we would want to obtain a sample of 140.