

Project Proposals

**1. Faculty attitudes towards plus/minus grading at CMU**

- A. It is interesting because it is unique and not many colleges follow this approach in the grading system. We want to see why Carnegie Mellon decided to take this approach giving the fact that Carnegie Mellon has a lower average GPA compared to other universities across the nation. This specific survey need to be done now because the job market today is still in a downfall, and GPA seems to be an important aspect in job search. Therefore, many students, especially juniors and seniors, seem to have strong opinions on the grading system. Instead of focusing on the students, we are going to focus on the opinions of the faculty. There is a possibility that a trial will go underway in that faculty can assign plus minus grades, but will not appear on the transcript. Will this affect the GPA? What are the faculties' opinions on this system of grading? There is no specific client for this research. At the end, we would like to compare the results of the faculty survey to the survey done by a previous 303 group that focused on students.
- B. The questions we propose to study are the opinions of both the students and the faculty on their opinions about the system. Our group will focus on the opinions of the faculty, and whether or not they approve of the imminent trial of the plus/minus grading. If the plus minus grades do not appear on the transcript, what difference is it going to make from the current grading system? Moreover, we want to compare the opinions between the students and the faculty whether or not plus minus grading helps or hurts the GPA. We want to see what characteristics of this grading system are preferred by which group of faculty versus those who are against it. Whether or not the leniency of the faculty or the difficulty of the class differ among different opinions. We also want to look at whether the low average GPA CMU has relate in any way to having no plus/minus grading.
- C.
  - i. <http://thetartan.org/2008/4/28/news/grading>  
"Research studies +/- grading" by Nisha Phatak, April 28, 2008 from *The Tartan*. This article from the Tartan discusses the result previous project done by 36-303 students on plus/minus grading and students' general attitude towards the grading system. (Erica Choi)
  - ii. [http://findarticles.com/p/articles/mi\\_m0FCR/is\\_4\\_40/ai\\_n27094511/](http://findarticles.com/p/articles/mi_m0FCR/is_4_40/ai_n27094511/)  
"Plus/minus grading: a within instructor comparison" by Michael L. Frank and Linda Feeney, December 2006 from *College Student Journal*.  
The study linked above examines the student and faculty satisfaction with the plus minus grading system at Washington State University. This study found that the largest sample group in favor of switching to the plus minus grading system were students with grades primarily in the B Range. In addition, plus minus grading had no effect on the average grade earned by students at college and that the

majority of students and faculty preferred the current system where plus minus was not incorporated (John Shoup).

- iii. [http://www.wfu.edu/~matthews/plus\\_minus/plus\\_minus.html](http://www.wfu.edu/~matthews/plus_minus/plus_minus.html)

“Evaluation of Effect of the Plus/Minus Grading System: A Computer Model” by Rick Matthews, February 4, 1997.

This study simulated the effects of plus minus grading system through a computer model to look at the change in GPA under plus minus system vs. old GPA without plus minus system. This study shows that there is a difference in GPA by having plus minus grading system. Our survey also needs to look at the effect of the system, and whether students are for or against it. If it helps the student in any way, CMU should begin utilizing the system. (Hye Jung (Allie) Cho)

- iv. <http://web.bsu.edu/cob/econ/research/papers/bsuecwp200401mcclure.pdf>

“Plus/Minus Grading and Motivation: An Empirical Study of Student Choice and Performance”, by James E. McClure and Lee C. Spector, January 2004

This project discusses whether the plus/minus grading system motivates the student from the straight grading system. This study shows was simulated from the Midwestern Universities at United States. This study shows that the characteristics of students, performance of students. Even though due to small size of observation, it was determine to have no significantly more motivation for plus/minus grading system. However, the method and the their analysis seems to be helpful if adapt do the topic for ourselves. (Dong Seob Kim)

- v. [http://www.franke.nau.edu/Faculty/Intellectual/workingpapers/pdf/Morgan\\_Plus-minus.pdf](http://www.franke.nau.edu/Faculty/Intellectual/workingpapers/pdf/Morgan_Plus-minus.pdf)

“Student and Faculty Views of Plus-Minus Grading Systems”

Working Paper Series—07-11 | December 2007, by Jim Morgan, Gary Tallman and Robert Williams.

This working paper discusses how college students and faculty members view motivation for students to work harder. It analyzes various studies conducted in the field to come to the conclusion that students with higher GPAs are more strongly opposed to the system than other students. Faculty and other students that supported the plus/minus grading system believed that the system would help student GPAs and be a strong motivational factor for students. (Aiena Garg)

- D. The population is all CMU faculties, and the sampling frame is CMU faculties are currently teaching this semester and has email address listed in the CMU directory (<http://cmu.edu/directory>). We are going to sample faculties by looking up who are teaching this semester from “Schedule of Classes” (<https://enr-apps.as.cmu.edu/open/SOC/SOCServlet>) for each department. After getting the name of the faculties who are teaching, we can look their emails up from CMU directory.
- E. The target population is all CMU faculties. This target population includes non-teaching professors and advisors. Our sampling frame is faculties teaching at least one course in spring 2010 semester because they are the ones who assign grades to the students. We will face nonresponse error, since not all faculties are going to answer to every email. This can be lessened by an additional mode of survey: face-to-face survey. There may be a possibility of a coverage error because some department faculties may not respond to the survey, which affects our inference on the entire population. There is also a

possibility that some departments have less faculties than other departments. The best way to tackle these survey errors is by face-to-face interviews and appointments.

- F. We first want to begin with sending out emails to briefly let the faculties know about the survey we are conducting. Then, we can add on the face-to-face interview for those non-responding faculties. The survey itself is going to be paper-pencil based where there are questions, and the respondents answer them through the web or by paper.
- G. The variables we want to measure are: departments, the number of classes they teach, the level of classes they teach, the satisfaction of their class, years they have been teaching, and the approval rate of plus minus grading.
- H. Provided above
- I. Provided Separately (IRB)
- J. Provided Separately (Informed Consent)
- K. Our target population is all Carnegie Mellon faculties teaching at least one class this semester. Using the schedule of classes website, we will gather our target population list of those faculties teaching at least one class this semester. Our sample is the target population. We are surveying everyone in the target population, so we will not be sampling from it.

We will first send out an email of the survey on Monday to everyone in the target population. If a faculty does not respond to the survey after the first email and a follow-up reminder, we approach the respondent face-to-face with a survey.

Since we are sampling everyone in the target population, self-selection bias and interviewer selection bias will not be an issue.

Schedule of Classes encompasses every faculty member teaching a class this semester, and the directory online to get the email addresses. Therefore, we will have good coverage of the target population.

We are going to treat it like a Stratified Sample, dividing by different schools to begin with. Within the schools, we will then divide by different departments.

We will send out a follow-up email to remind the nonresponders. If they do not respond to the follow-up, we will approach them through a face-to-face interview either at the end of their class or during off hours in between class times. We will make multiple trials of visits in order to lessen the effects of nonresponse error. Since we are not sampling from a target population, but rather dealing with the entire target population, we do not need to worry about bad representative of the target population.

L.

1. Job title (assistance professor, lecturer, etc)

2. Department you are associated with.

3. Age

4. Gender

5. Highest degree earned

Bachelors Degree      Masters Degree      PhD      Doctorate      Others:  
specify \_\_\_\_\_

6. Years teaching (including years at institutions other than CMU)

7. Years teaching at CMU

8. Number of courses currently teaching in spring 2011 semester?

9. Did you attend schools that implemented +/- grading?

- Yes      No
10. If you said yes in question 9, do you think +/- grading affected your GPA?  
Yes - Positively or Negatively      No
11. Do you assign your letter grade quantitatively or qualitatively?  
Quantitative      Qualitative      Other(please specify)
12. Do you have teaching assistant(s) for the course(s) you are currently teaching?  
Yes      No
13. If you answered 'Yes' in question 12, what range of percentage of grading do TAs do?  
a) Less than 10%      b) 10% ~ 30%      c) 30% ~ 50%      d) 50%~70%      e) More than 70%
14. Do you think +/- grading system will create more work for you or TAs for grading?  
Yes      No      Don't know
15. Have you implemented +/- grading at CMU (for mid-semester grades or for students' reference, etc.)  
Yes      No
16. Have you ever bumped letter grades for students who are on the borderline between two different grades?  
Yes      No
17. If you answered "Yes" in question 16, What are your criteria for bumping a student's grade up? (For example, students' participation in class, continuous improvement in exams or homework)
18. Do you think +/- grading will affect students' efforts that they put into classes?  
Yes      No      Don't know
19. Do you think +/- grading will increase or decrease students' average GPA  
Yes      No      Don't know
20. Do you think +/- grading will increase or decrease students' chances of getting a job?  
Yes      No      Don't know
21. Do you think your students in your class will prefer +/- grading system to the current system?  
Yes      No      Don't know
22. On a scale of 1 to 5, how would you rate your opinion on CMU's current grading system?  
1 (strongly disapprove)      2(disapprove)      3(neutral)      4(approve)      5 (strongly approve)
23. On a scale of 1 to 5, how would you rate your opinion on implementing +/- grading system at CMU?  
1 (strongly disapprove)      2(disapprove)      3(neutral)      4(approve)      5 (strongly approve)
24. If you want to provide more detailed view on +/- grading, please specify here.

M.

Since we are calculating our sample size under the assumption of SRS without replacement, our

sample size  $n \geq \frac{Nn_0}{N + n_0}$ , where  $n_0 = \frac{z_{\alpha/2}^2 (SD)^2}{(ME)^2}$  will be

We have calculated N by counting the number of faculties who are teaching undergraduate course(s) for each department, and summed up all the numbers, which result in N = 1089 (see the attached Excel spreadsheet for information regarding number of faculties for different departments).

We set ME = 0.05 and SD = ½

$$n_0 = (1.96^2)(.5^2)/(0.05^2) = 384.2$$

$$n \geq (1089 \cdot 385)/(385 + 1089) = 284.4, \text{ so we will need sample of at least 285 faculties.}$$

If we assume our response rate to be 50%, we will need at least 570 faculties to get a sample size of 285.