

IMPROVING TEACHING BY ELIMINATING STUDENT DISLIKES

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Abstract

Teachers often do things in the classroom that either build negative or positive rapport with students. This paper is focused on identifying those things that elicit strong negative responses from students and especially those that are readily controlled by the teacher. Teachers often have a sense of things that alienate students, yet it is important to explore this topic since it has such a strong impact on student learning. It is proposed that most of the things identified in this paper require little teacher effort to either avoid or adopt. From this study, the top five things engineering students dislike are: (1) teacher didn't work enough example problems, (2) teacher was difficult to understand, (3) teacher wasn't prepared for class, (4) teacher was boring, and (5) teacher used PowerPoint. Teachers should work to avoid practices that alienate students and likewise adopt or retain practices that engage students. Based on feedback from students about what they both like and dislike, it is suggested that teachers should strive to: (1) enjoy teaching, (2) work example problems, (3) speak to be heard and understood, (4) be prepared for class, (5) show enthusiasm toward the subject, and (6) avoid using PowerPoint.

Introduction

There have been many excellent papers and books written with the intent of helping identify the characteristics of excellent teachers and how teachers can improve in the craft of teaching [1]. There have been attempts to summarize good teaching in a set of rules that a teacher should follow [1]. A two-dimensional model is popular in emphasizing the importance of creating intellectual excitement and interpersonal rapport with students [2]. Good teaching is multifaceted so no single model exists for all to emulate, however, good teaching is largely the product of teacher preparation, effort and a good attitude [3]. The keys to good teaching have been linked to seven things: plan, prepare, organize, communicate, challenge, motivate and lead [4]. There is also the general belief that good teaching is achievable for the average engineering professor [4]. Teachers who adopt proven best teaching practices generally improve student learning, although there continues to be barriers to the adoption of active-learning and student-centered practices [5]. It has been shown that course characteristics, grade distributions and instructor characteristics have statistically significant effects on student evaluation of teaching [6]. The risk of receiving low student evaluations of teaching is a significant barrier to the adoption of best teaching practices. Recently, the Bill and Melinda Gates foundation completed a three-year study with the purpose of identifying and promoting great teaching primarily at the

K-12 level [7]. The foundation released a series of reports on the topic of measures of effective teaching (MET). The final report identified three metrics to identify great teachers: classroom observations, student surveys, and student achievement gains [7]. Overall, there is a strong consensus that for teaching to improve, there needs to be direct, clear and accurate feedback to teachers about what works and what doesn't. Teachers who want to improve need to know where they should improve, and that should be the focus of teacher evaluations [7]. When there is fair and reliable measures of the effectiveness of teaching, it is more likely that teaching and subsequent student learning can improve. Part of improvement is learning where the individual teacher may have short comings.

Prompted by the MET study, this paper takes a fresh look at an old problem of identifying specific things that students say either help or hinder their learning. This paper is focused on identifying specific things that junior-level engineering students have identified in an anonymous survey that is not directed toward an individual teacher or class, but is designed to be sufficiently generic so that it applies to a wide spectrum of teachers. The purpose of this paper is to be sufficiently broad that it provides practical feedback to help the average engineering professor improve in teaching.

Extreme Reactions

A common theme in business is “putting the customer first”. Companies strive to retain existing customers and often conduct customer satisfaction surveys to determine what customers like and dislike. Companies often know their customers, but they can be surprised by customer feedback. It is important that companies identify and work to eliminate things that generate the strongest negative responses from existing and otherwise content customers, as a first priority [8].

A survey of undergraduate engineering students was conducted to learn what teachers do that either delight or disgust students. These are extreme reactions of either pleasure or displeasure. Following the example from business [8], things that students consider to be pleasant or annoying are noted but are not the focus of this paper. It is anticipated that many of the things identified in this paper will be familiar to teachers, but the relative importance of specific things may be different than anticipated.

The Survey

A survey was given to junior-level mechanical engineering students who were enrolled in the Fall 2012 thermodynamics class. The survey was optional although a small grade incentive (adding two points to final exam score) was provided. About 80 students were asked to participate in the survey. The survey was conducted via Google Forms and anonymous feedback was collected from 49 students. The questions on the survey are included in Appendix A.

Likert-style Questions about Terrible and Great Teachers

The first question asked if they have ever had a terrible teacher. The students responded overwhelmingly that they have, as shown in Figure 1. It is questionable that two students selected “strongly disagree” with the statement that they had at least one terrible teacher. This is

believed to be a selection error, based on the responses these students gave for subsequent questions. Both students, gave strong personal statements to question #5 indicating that they have had terrible teachers. It would have been helpful to follow-up with these two students to see if they misunderstood the question and if they intended to select the opposite response, but no follow up was conducted. This shows that survey questions can be misunderstood by students, so one should not be surprised if apparent outliers exist in surveys.

The second question asked if they have ever had a great teacher. This question was intended to balance the survey so students would be thinking of both extremes, and not just focusing on negative things. The students responded overwhelmingly that they have had at least one great teacher as shown in Figure 1. It is questionable that three students selected "strongly disagree" with the statement. This is believed to be a selection error, based on the responses these students gave for subsequent questions since all three students gave strong personal statements to question #8. For both question 1 and 2, it would have been helpful to follow-up with these students to see if they misunderstood the question or if they intended to select the response that was selected.

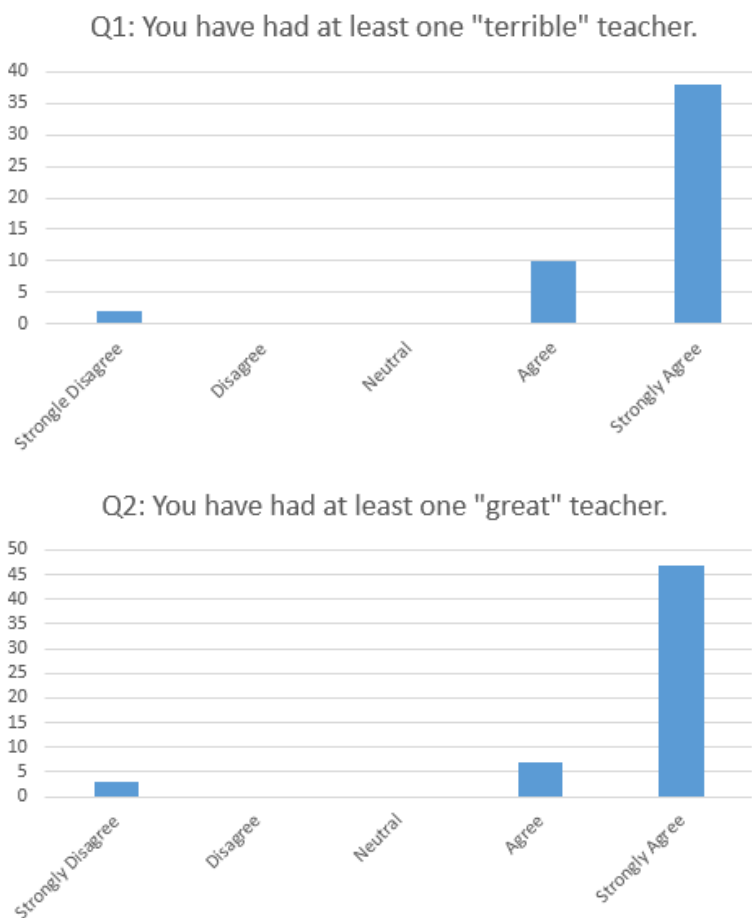


Fig. 1. Results from Likert-style question about terrible and great teachers.

Why a Teacher is Terrible

The third question explored why the terrible teacher was so terrible. For this question, a list of 25 common student complaints were provided as well as a write-in option. The list was intended to help identify those things that are most common among students. Likewise, question #5 provided an open-ended opportunity to describe their experience with a terrible teacher. The number one complain concern terrible teachers what that the teacher was “difficult to understand”. This is supported by additional responses from students provided to question #5:

the teacher spoke in a very monotone voice

Simply could not understand professor. Spoke softly and away from students

he didn't speak loud enough

He also always faced the board when teaching and was always quiet even after we asked him to speak up.

In some ways, faculty could misinterpret this as meaning the teacher had a heavy foreign accent. However, not a single student cited accent as being hard to understand in comments to question #5. In contrast, one student wrote a favorable comment:

Honestly he was hard to understand due to his accent but his enthusiasm and availability for one on one help made up for it ten fold.

It appears most of the time the instructor speaks toward the chalkboard (and not toward the students) and with insufficient volume to be heard by everyone in the room.

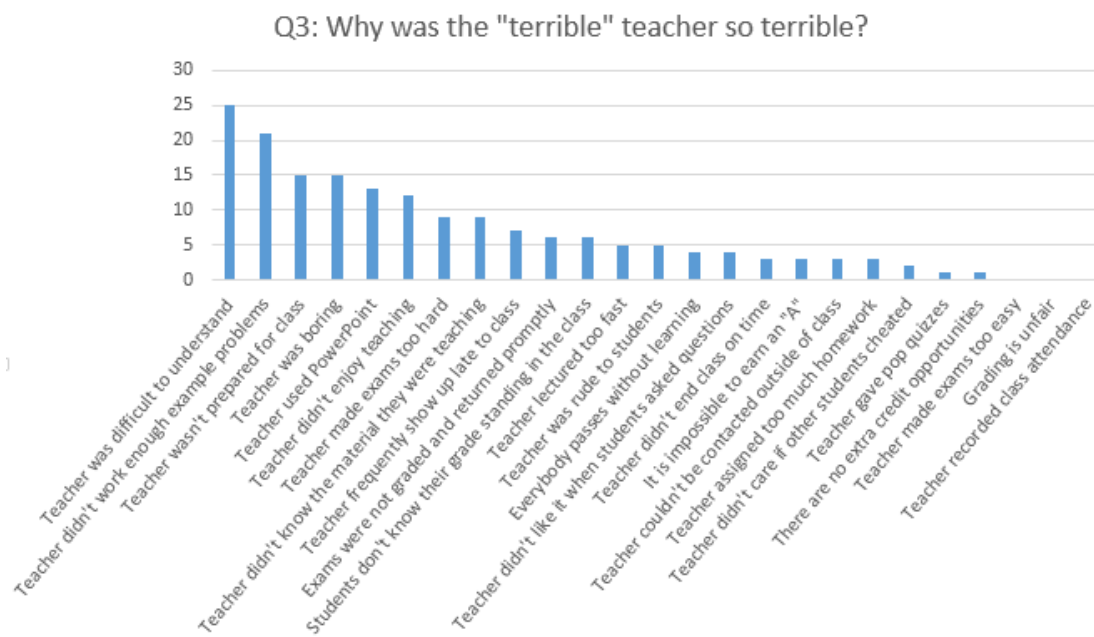


Fig. 2. Results from “terrible teacher” question.

Probably the most surprising result of this survey is the second most highly cited reason students gave for a terrible teacher was the lack of example problems. This was supported by additional comments to question #5.

Did not apply Coursework to real- world applications.

did not do many examples, and just rush through the lecture

Little or no insight was provided. All examples worked in class were directly out of the textbook examples (most of which I had already done by the time I got there).

Example problems appear to be highly valued by students. Examples provide teachers with opportunities to explain solution strategies or provide critical insights into the material. It appears that teachers often spend a disproportionate amount of time deriving or developing the material compared to applying the material. This comment is further supported by how grades are assigned at the end of the semester and by the format of most engineering exams. Grades are determined by performance on exams and exams often require students to correctly apply the knowledge to solve problems. Few exams ask students to develop the theoretical framework for the material. Most students know their performance in the class is assessed by what they can or can't do on exams, so many students are focused on being prepared for exams. This was reflected in comments to question #5

His exams had nothing to do with what he did in class.

Created an environment where the best material to study from is past test from old students. Test should be over selected and discussed topics in class.

The instructor led us to believe one thing and then tested us over the complete opposite.

Tests were completely not based on any HW problems or example problems given in class. Went into test basically completely blind, studying hard almost didn't help.

The third most cited reason a teacher was “terrible” is that the teacher wasn't prepared for class. This was supported by additional comments to question #5.

Being unprepared for the lecture you're supposed to be giving is the ultimate sign that you don't care.

Teacher didn't know the material they were teaching, also he wasn't prepared for class.

The fourth most cited reason was that the teacher was boring. Although the term “boring” could have different meanings, the student's didn't have difficulty with the word “boring” and additional comments to question #5 indicate the teacher didn't create an engaging classroom. In some cases, students felt that the teacher could have been talking to an empty classroom. Comments from students include:

Displayed a lack of excitement or interest in teaching the material. Felt like they were there to teach regardless if we learned or not.

They taught straight from the book. Worked examples from the book, which we could do on our own.

There was no interaction between students and the professor. The professor just went on and on about the topic without asking for feedback from the students.

The fourth and fifth comment appear to be related in that some teachers used PowerPoint to aid them in delivering content without engaging students. It appears some use PowerPoint to minimize class preparation time and this shows when they appear unprepared for class. Student comments include:

Teachers that talk off of a powerpoint without actually ever explaining concepts.

Teacher came to class unprepared, lectured solely off of a powerpoint and had no interest in the students

Use power pint and dont know the material, and most of the times didnt know how to teach or give class

did powerpoint lecture and just click click click

Figure 2 includes all of the responses which need little explanation. It is surprising that being “rude” was not ranked higher in the results. Students don’t like rude teachers, but it was ranked in the middle of the pack. Maybe this shows that rude teachers were rarely encounter by the students who took the survey. However, some comments to question #5 are worth noting:

He was an asshole and got upset and called students out in class for walking out of class early or ...

rude to students, didn't care if anyone learned anything

Other teachers have been flat out rude. They vividly express their discontent with 'our generation' and make no effort to actually teach us, then they are offended as to why students don't want to pay attention in their class.

Why a Teacher is Great

Question 8 asked about great teachers and the results are shown in Fig. 3. The types of standard responses in the survey were designed to be the opposite response for a response to the question about being a terrible teacher. The results show that great teachers enjoy teaching, are prepared for class, apply the material through examples, deliver exciting lectures, really know the material, and are understandable. Although many students may want to earn an “A” grade, it was more important that exams are doable, and that students who don’t learn the material will fail the class than making it possible to earn an “A”. From this survey, a teacher doesn’t need to give lots of “A” grades to be a great teacher. This is supported by comments like

Most of my best professors have been great teachers and brutal testers/graders. Some of my worst grades came from my best teachers.

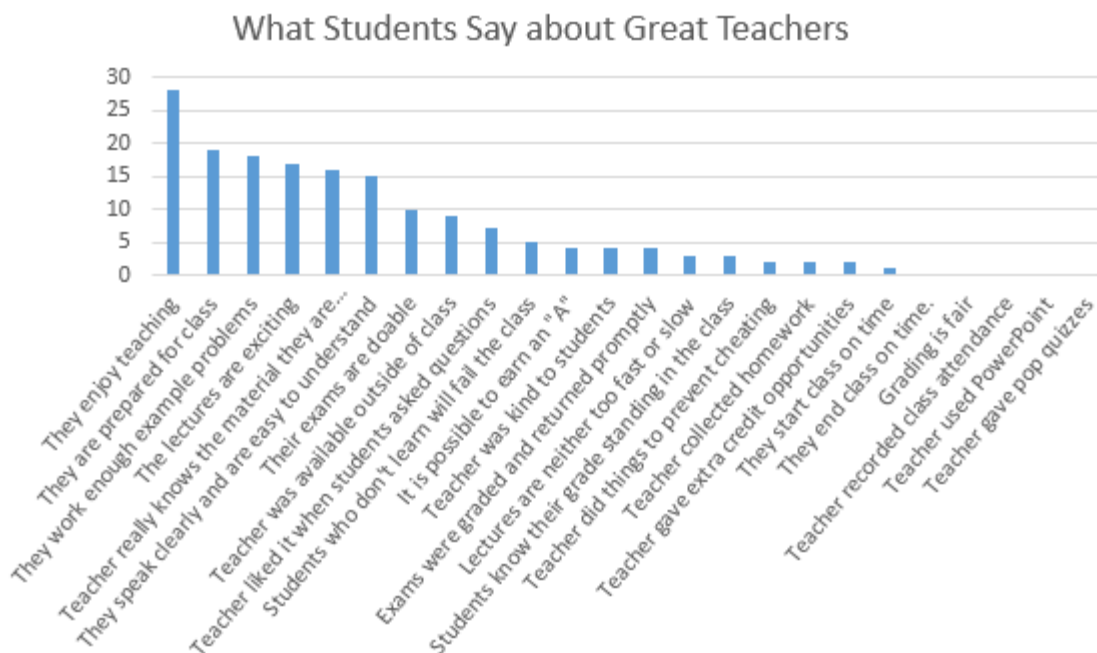


Fig. 3. Results from “great teacher” question.

Composite Ranking for Terrible and Great Teacher

The 24 preselected choices for why a teacher is terrible matched those for why a teacher is great. For example, a terrible teacher was terrible because the “teacher wasn’t prepared for class” while a great teacher was great because “They are prepared for class”. It had the third highest ranking for terrible teacher and second highest for great teacher. It was observed that preparation for class is very important. A composite ranking was generated by pairing the responses and summing the responses from both terrible and great questions. The composite ranking is presented in Figure 4.

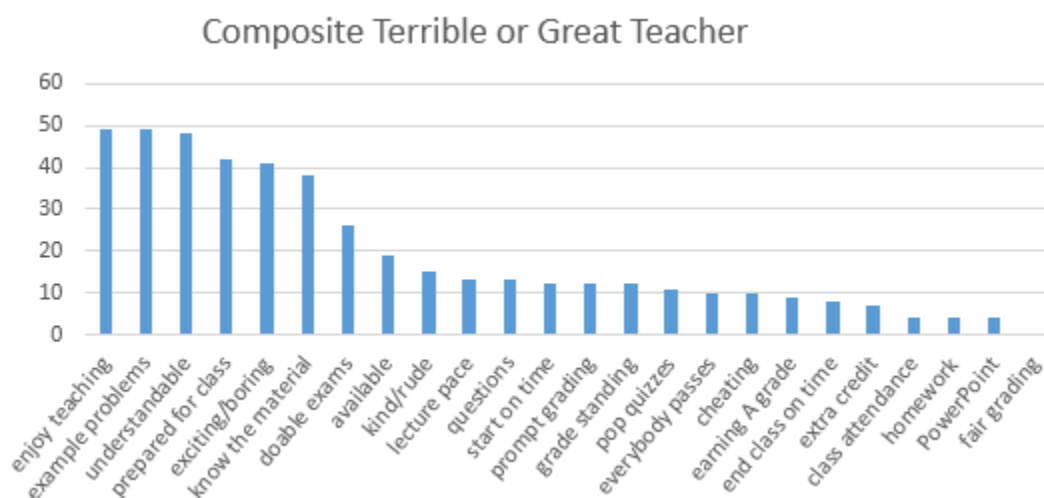


Fig. 4. Results from composite of both “terrible” and “great” teacher questions.

The cumulative citations for both survey questions shows that three items are identified from the survey as being most important with roughly equivalent scores: Enjoy Teaching, Example Problems, and Understandable. It appears that students sense the attitude of the teacher and this strongly impacts their like or dislike of the teacher. It is suspected that the teacher’s attitude toward teaching has a strong impact on student learning. If the teacher enjoys teaching, it shows, and students like it. If the teacher doesn’t enjoy teaching, it likewise shows and students dislike it. Having such a high ranking in the survey was a little surprising. This is a good reminder that teachers need to have a positive attitude toward teaching and never allow outside factors negatively affect what they do in the classroom.

It is also important that teachers work non-trivial example problems, plenty of them, and of the same difficulty as exam problems. It is too common that lectures are filled with theory and only simple example problems are solved by the teacher. Examples provide an excellent means to make the material relevant to real-world applications. It is important that some students commented that example problems should not be trivial nor those already solved in the textbook.

Lastly, teachers need to be heard and understood. Student comments reflect frustration with not being able to hear the teacher as well as frustration with lack of clarity. Here are a number of comments from students that support these findings:

Professor was always very precise and clear about explaining the material. Not in a sense that made me feel I was being treated like a child, but in the sense that the professor really wanted to make sure that we understood the concepts behind the material, and how one idea evolves into another.

The professor spoke with great clarity and taught the material in a way very easy to understand. Also made the lecture fun!

Very clear lectures, exams are fair, professor makes you learn.

A number of students commented on fairness of grading and what was expected on exams. The comments reflect a desire for grading that allowed diligent students to succeed while less-diligent students earn appropriate grades.

Everybody had a fair chance of getting a good grade and learning the material.

These professors actually want their students to do well in their class. Whether they actually do or not is up to the student.

The next three things identified in the survey deal with being prepared, exciting and knowledgeable. These were very highly rated in the overall ranking and supported by student comments.

He was well prepared and made the class fun.

The instructor was always prepared and knew how to explain the material very well to the class. The instructor would also get the class engaged to create a better learning environment.

His lectures all made sense and easy to follow and understand. He knows what he's saying and teaching.

The professor presented the material very well. Everything was explained clearly and whenever a question was asked in class this professor always had the answers. The exams were very related to the material that was covered in class.

Although many of the student comments are interwoven in concepts, the concept of working example problems which were real-world problems, was a recurring theme in many comments about great teachers.

Worked through example problems with student input during class.

Gave great examples and was fair with what he expected us to know for the test

Applied material to real-world applications.

Conclusions

The results of the survey can be used by teachers to either retain and strengthen existing practices or look to adapt/avoid other practices in the classroom. Having established a relative ranking based on student feedback, the anticipated effort a teacher might expend to either adopt or continue implementation should also be considered. Those things that require little teacher effort and have strong student feedback should be adopted by the teacher. Other changes should be judiciously evaluated by the teacher either because it was not ranked highly by students or it may require a high level of teacher effort. Lastly, if something requires a significant amount of teacher effort and is not highly ranked by students, it should be discontinued or avoided. It is logical that teachers should avoid spending significant amounts of time and effort on those things that have little impact. It appears impractical that faculty can devote more time and effort to teaching since there are many demands on faculty beyond classroom teaching.

From this study, teachers should adopt or continue to do the following:

- Show enjoyment in teaching
- Solve example problems in lectures
- Speak to be understood
- Be prepared for class
- Show enthusiasm for the subject
- Know the material
- Make doable exams
- Be kind to students
- Start and end class on time
- Be clear and fair in grading

Those things that a teacher should judiciously consider for avoidance or discontinuance include:

- Using PowerPoint for lectures
- Assigning too much homework

Recording class attendance
 Giving extra credit opportunities
 Ensuring that everyone passes
 Giving pop quizzes

Each of these should be evaluated by the individual teacher, yet if some of the above items require a significant amount of teacher effort, they should be evaluated more closely to determine if the effort should be expended elsewhere. The lack of time is a primary reason teachers chose not to implement net teaching practices in their courses [5]. Without qualification, the use of PowerPoints slides may give a teacher the satisfaction that material is covered with minimal preparation time, but student comments are overwhelmingly against the use of PowerPoints when a teacher uses them as a crutch to accelerate the presentation of material. It can be argued that PowerPoints can be used to create engaging lectures, but from the student feedback in this survey, they are largely used by faculty to quickly present material.

Likewise, the collection, grading and handling of homework should be carefully evaluated. Students learn from doing homework, yet it can be assigned without being collected and graded. Some students lack the discipline to do the homework unless it is collected and graded, yet it is increasingly common that students have access to solution manuals and turn in copied homework [9]. How to handle homework represents multiple considerations that the teacher must weight. If the teacher expends their effort on homework, it probably should be on the development of original problems and not just assignment of problems from the textbook.

There appears to be little justification for taking class attendance, giving pop quizzes, and providing extra credit opportunities. These were not highly ranked by students and should be avoided if they require a significant amount of teacher effort. Lastly, teachers should not strive to make the class so easy that everyone passes. Some students commented that great teachers are challenging and hold high standards for student learning. Some students commented that the best teachers didn't award many "A" grades and also assigned failing grades when appropriate. Terrible teachers may make the class easy to pass to avoid student complaints, yet don't become great teachers by doing this.

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Appendix A

What makes a "terrible" or "great" teacher.

Sometimes students are "disgusted" with a teacher and sometimes they are "delighted". Can you identify a few things that teachers do to arouse strong responses from you? This only applies at the College/University.

1 *

You have had at least one "terrible" teacher.

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree

2 *

You have had at least one "great" teacher.

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree

3 *

Why was the "terrible" teachers so terrible? (pick as many as apply, but please limit to 4)

Teacher wasn't prepared for class
Teacher frequently show up late to class
Teacher didn't end class on time
Teacher didn't enjoy teaching
Teacher lectured too fast
Teacher was difficult to understand
Teacher was boring
Teacher didn't work enough example problems
Teacher made exams too hard
Teacher made exams too easy
Grading is unfair
It is impossible to earn an "A"
Everybody passes without learning

Teacher was rude to students
Teacher couldn't be contacted outside of class
Teacher didn't like it when students asked questions
Teacher didn't care if other students cheated
Teacher recorded class attendance
Teacher assigned too much homework
Teacher used PowerPoint
Teacher didn't know the material they were teaching
Teacher gave pop quizzes
There are no extra credit opportunities
Exams were not graded and returned promptly
Students don't know their grade standing in the class
Other:

4 *

You have told other students about a "terrible" instructor

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree

6 *

You have told other students about a "great" instructor

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree

7 *

Why are some instructors "great"? (pick as many as apply, but please limit to 4)

They are prepared for class
They start class on time
They end class on time.
They enjoy teaching
Lectures are neither too fast or slow
They speak clearly and are easy to understand
The lectures are exciting
They work enough example problems
Their exams are doable
Grading is fair
It is possible to earn an "A"
Students who don't learn will fail the class
Teacher was kind to students
Teacher was available outside of class
Teacher liked it when students asked questions
Teacher did things to prevent cheating
Teacher recorded class attendance
Teacher collected homework
Teacher used PowerPoint
Teacher really knows the material they are teaching
Teacher gave pop quizzes
Teacher gave extra credit opportunities
Exams were graded and returned promptly
Students know their grade standing in the class