Grade Inflation at Georgia Tech

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Abstract

Data showing an increase in grade point average of 0.41 over the past 30 years at the Georgia Institute of Technology were presented. The GPA increased for virtually all departments. Graduate school GPA's also increased. Several unexpected factors were shown to influence grades. For example, Summer school grades were higher than for other terms. Possible causes and consequences of increasing GPA's are reviewed as well as actions which may be warranted to permit return to a grading system that permits greater differentiation between students' performance.

Introduction

An increase in student's grade point average (GPA) has occurred at a large number of universities over the past thirty years. This paper first reviews several thorough studies which clearly document this increase and offer possible explanations for its occurrence. We then present new GPA data and analyses for the Georgia Institute of Technology where data were available to permit examining the increases in GPA as a function of department, upper vs lower divisions, and graduate school.

We then examine whether or not rising grades causes problems for students, faculty, and others. Alternatively, are there positive influences. A conclusion regarding whether we should change the way we are grading will be presented as well as mechanisms for causing change.

Grade inflation has been defined as an upward shift in the grade point average of students over an extended period of time without a corresponding increase in student achievement [Goldman, 1985].

We will use the words "grade inflation," since this terminology is widely accepted, but we do not implying whether there has or has not been a corresponding increase in student achievement. We take this position, upfront, since we do not think it is possible to establish whether there has been a corresponding increase in achievement, given the difficulty in measuring achievement, especially over a time period on the order of several decades. What we are sure of is that at many universities, there has been an increase in grade point averages over the past 30 years. This causes a compression of grades toward the top of the scale, prompting some to prefer the terminology, "grade compression" rather than "grade inflation."

Regardless of its name and regardless of whether there has been a corresponding increase in student achievement, we feel that the trend of increasing GPA with time has negative consequences that are sufficiently important to warrant serious attention. We conclude by presenting recommendations made by us, but mostly by prior authors, on ways to reduce grade inflation/compression. We contend it is important for university professors to grade in a manner that permits more differentiation between student achievement than the current grading system.

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Prior Studies of Grade Inflation

Most of us have heard of the extensive grade inflation at Harvard, and that during the 2001-2002 academic year 90% of their students graduated with honors [Bulk, 2002]. They have received the brunt of the "bad press" on grade inflation, even though grade inflation, or at least an increase in GPA, is well documented for a large number of highly respected universities. One readily available source, a website, shows data for over 30 universities covering time spans of up to 35 years [Rojstaczer, 2003]. The GPAs at these universities have increased by about 0.15 per decade. These results are summarized in Figure 1 [Rojstaczer, 2003].

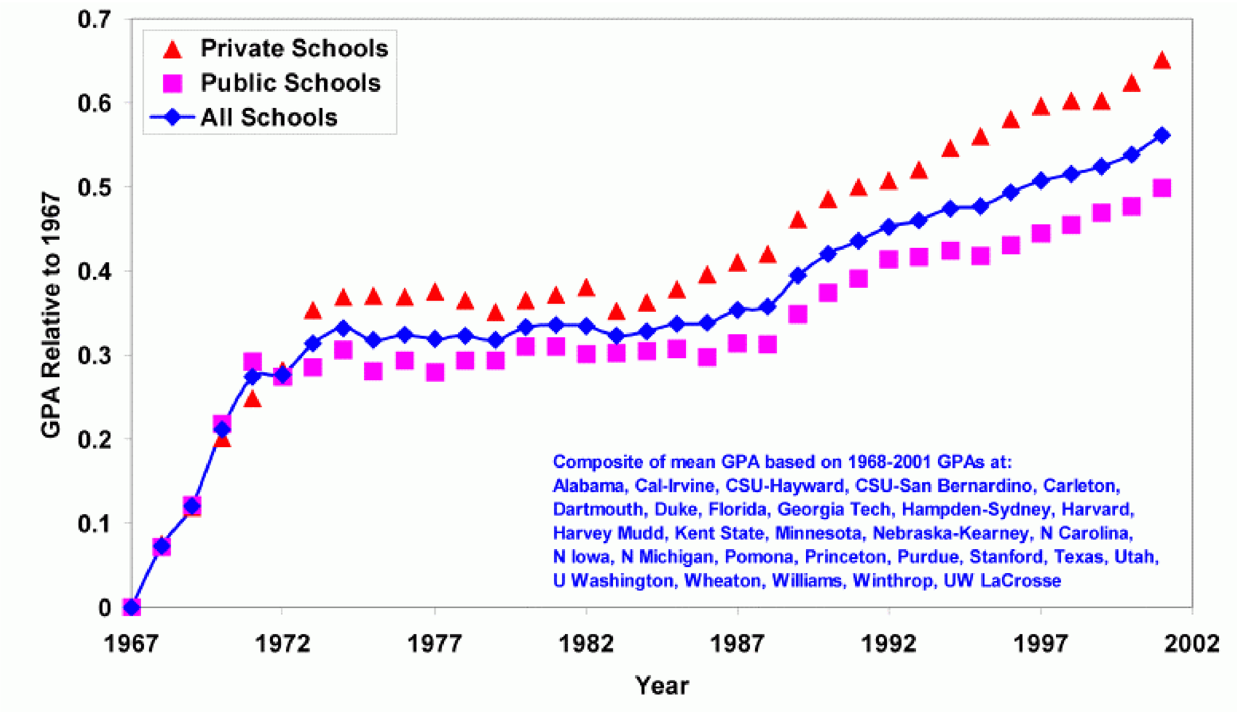

Figure 1. Detailed Trends in Grade Inflation Nationwide

Numerous other studies document increases in GPA [see references 2,4,6,12,14]. A report by the American Academy of Arts and Sciences [Rosovsky, 2002] summarizes several studies involving 180 universities and surveys of over 50,000 students show similar increases in GPAs. Others present data that indicate that if all of the colleges and universities in the nation were considered, there would not, on average, be an increase in GPA over time [Bilby, 2002]. Nevertheless, it is clear that an undeniable increase in GPA has occurred at many prestigious universities. We will not enter into the discussion as to whether a corresponding increase in student achievement has occurred. This has already been thoroughly discussed by a number of prior authors [Kohn, 2002 and Rosovsky, 2002].

Grade Inflation at Georgia Tech

Student GPAs, or grades on an A-F scale that were readily convertible to GPA, and Freshmen SAT scores were available from the `Fact Book` which is published annually and shelved in the Georgia Tech library [Justice]. Georgia Tech's GPA scale is based on an A yielding a GPA of 4.0. The available data dates back to 1977 and permits analyses based on discipline, lower level (Freshmen plus Sophomores), upper level (Juniors plus Seniors), graduate school, and other groupings. Other data, back to 1972, were compiled and made available by the Georgia Tech Office of Institutional Research and Planning.

The Fall term cumulative GPA across the entire university are plotted in Figure 2. The average GPA has increased 0.41 over 30 years, or 0.14 per decade. The increase is very similar to the value quoted previously for many other universities. A study performed by a university committee provides additional detail [Begovic, 2003]. The latter study shows that the percentage of A's has increased. For example, for the undergraduates from 1992 to 2001, the percent of A's increased from 31.6 to 37.8. During the same time period, the percent of B's, C's, and D's decreased from 35.6 to 34, 23.3 to 19, and 6.4 to 5.7, respectively. There was a slight increase in F's, 3 to 3.6 percent.

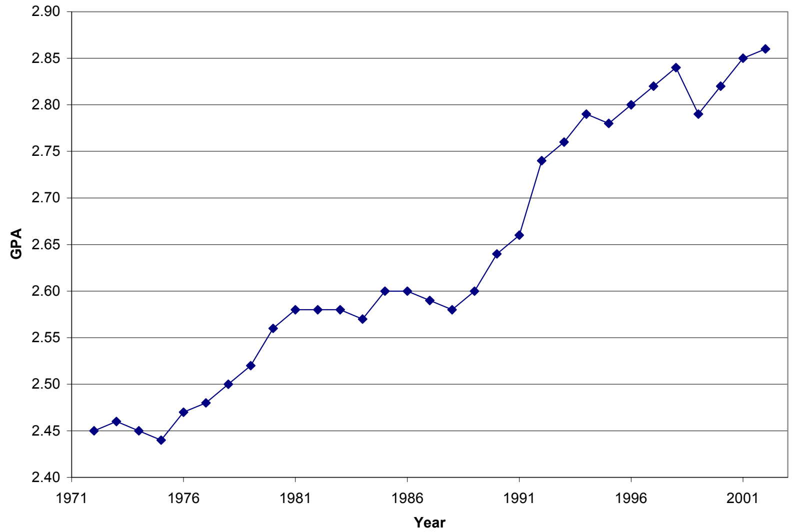

Figure 2. Georgia Tech Fall Term Undergraduate Cumulative GPA.

Figure 3 shows undergraduate GPA for architecture, college of computing, college of science, Ivan Allen college (management), and the college of engineering. These are GPA's for grades given for courses taught in those colleges. For example, the engineering GPA's do not include courses that engineering students took in English, etc. With the exception of the college of computing (for which there is less data), the GPAs have drifted upward since 1977.

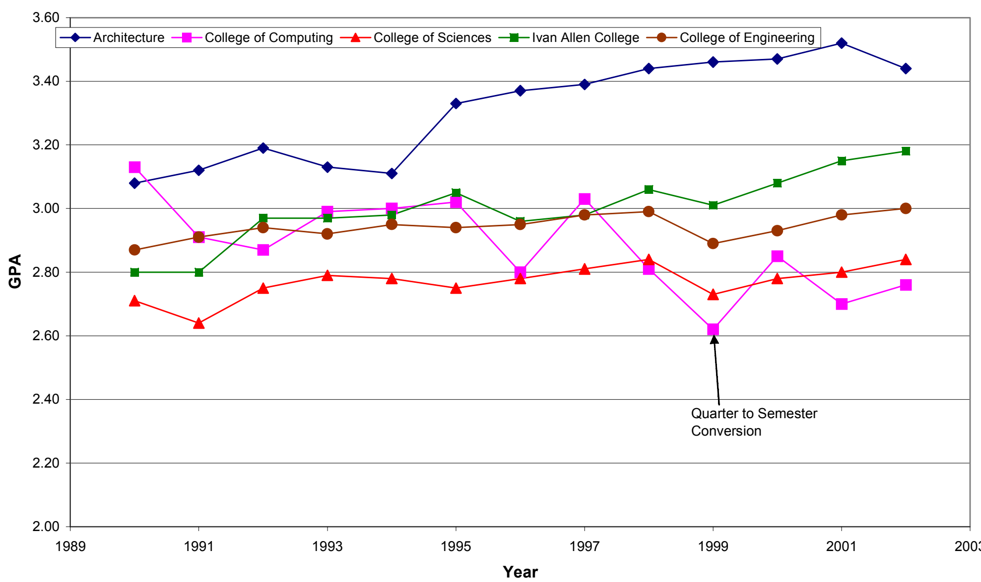

Figure 3. Undergraduate GPA vs. Year for five disciplines.

A large fraction of the students at Georgia Tech are enrolled in engineering. The undergraduate engineering GPA is plotted in Figure 4. The data are for the Fall term and are weighted. That is, a grade of "A" in a four-hour course has the same impact on GPA as four “A’s” in one-hour courses. The shape of the curve is somewhat similar to those in Figure 1. The GPA may have decreased from the mid-seventies to the mid-eighties, but since then, there has generally been an increase in GPA. Overall, there has been an increase of 0.08 per decade. The sharp drop in GPA for Fall 1999 is presumed to be due to the quarter to semester conversion. Both faculty and students reported difficulty in adjusting to the change. The effect of converting to semesters can also be seen in Figures 2 and 3. Whatever the cause for the abrupt decrease in GPA, the effect was short-lived since the GPAs rose to above the pre-1999 levels by 2002.

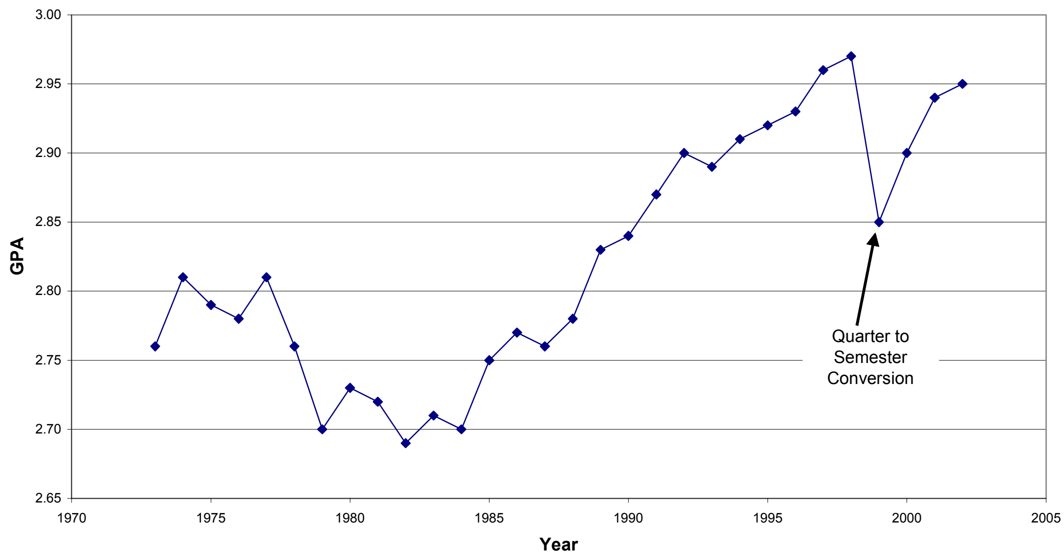

Figure 4. Undergraduate engineering GPA increased 0.08 per decade.

A comparison of the GPA’s of the engineering students with the Fall term Freshmen engineering SAT scores is presented in Figure 5. It is clear that both the GPAs and SAT scores have increased, but one cannot say with any confidence that the higher SAT scores are responsible for the high GPAs. Many prior studies have shown that SAT scores are not strongly correlated with student achievement [Lackey, 2002].

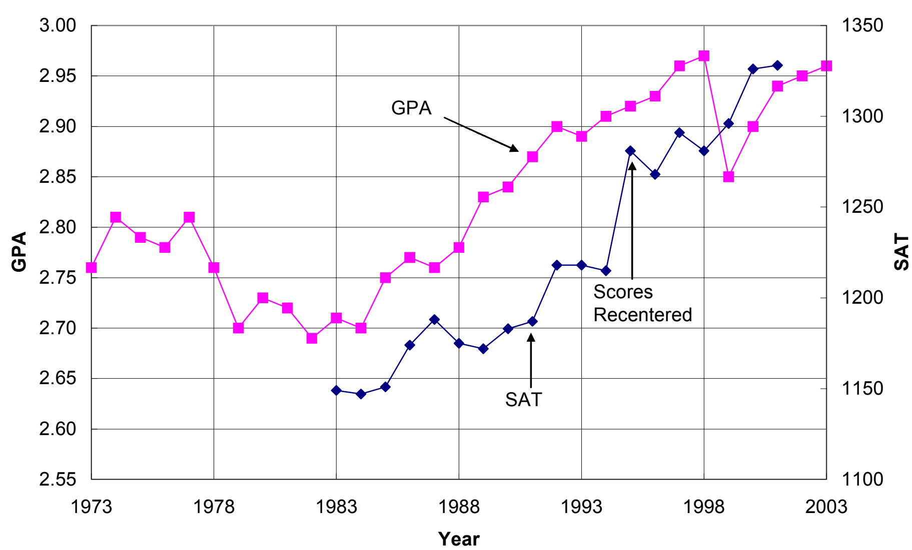

Figure 5. Georgia Tech engineering courses GPA and freshmen SAT scores.

Figure 6 shows the Fall term, weighted GPA's for the lower level and upper level engineering students since 1973. The lines shown are least square fits. The GPA's for the lower level engineering courses did not increase significantly, while on average, the GPA's for the upper level courses increased 0.10 per decade.

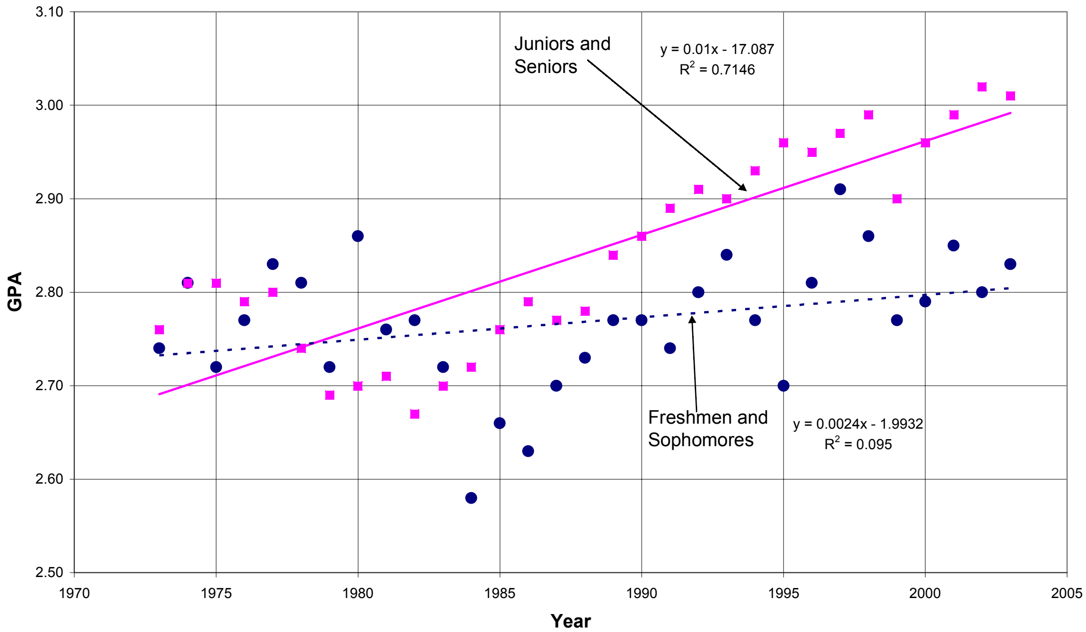

Figure 6. GPA vs. Year for lower level and upper level engineering students.

The weighted Fall term GPA's for mechanical engineering courses are compared to Fall term GPA's for all engineering courses in Figure 7. The trends are very similar. Figure 8 shows the mechanical engineering data divided into lower and upper level. There is no statistically significant trend for the lower level GPA's, but the GPA's for the upper level mechanical engineering courses increased 0.11 per decade. There is greater than 99% confidence that increase has occurred.

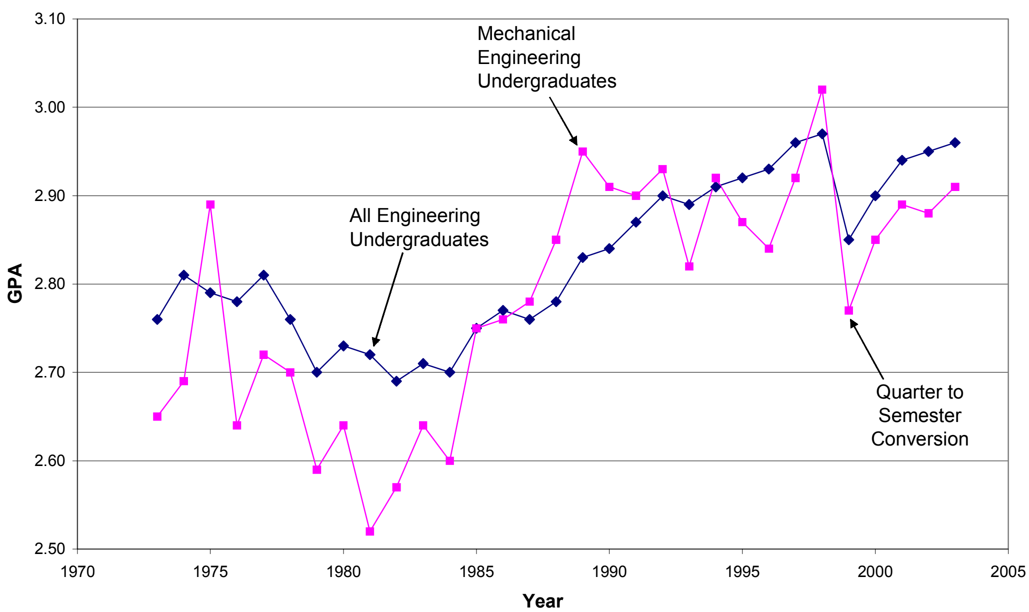

Figure 7. Comparison of mechanical engineering undergraduates to Georgia Tech engineering undergraduates.

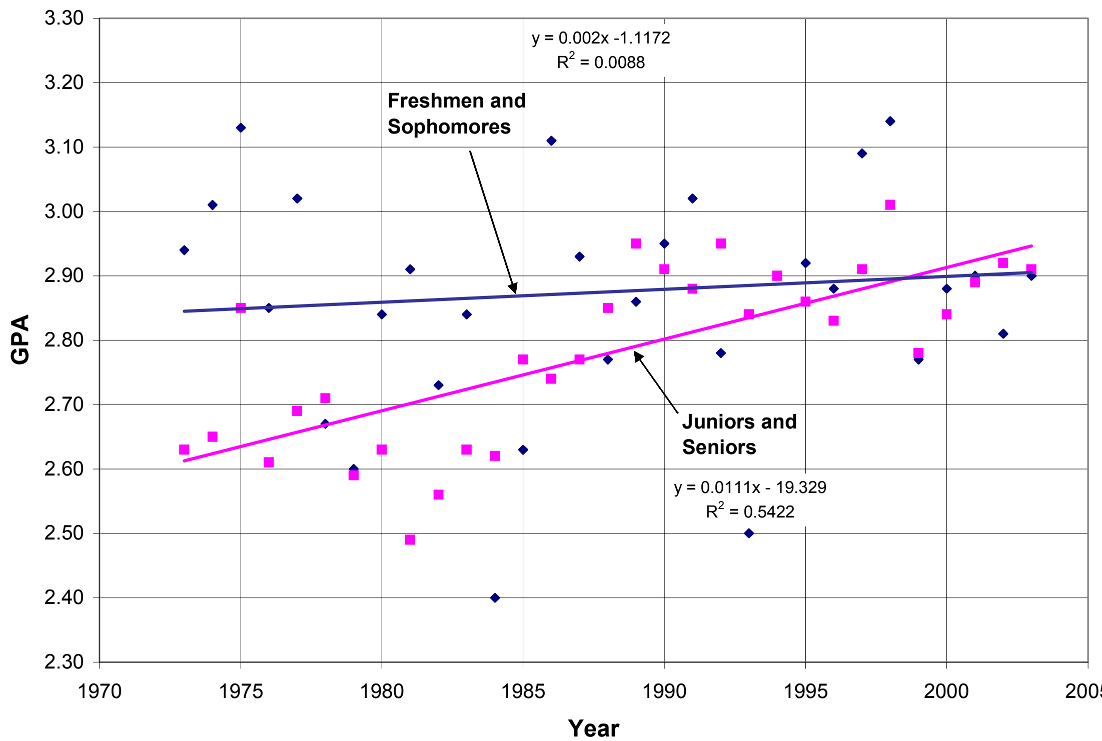

Figure 8. Mechanical engineering upper level GPA outpaced lower level.

Figure 9 shows that grades tend to be higher during Summer school. The plot is for mechanical engineering undergraduate courses.

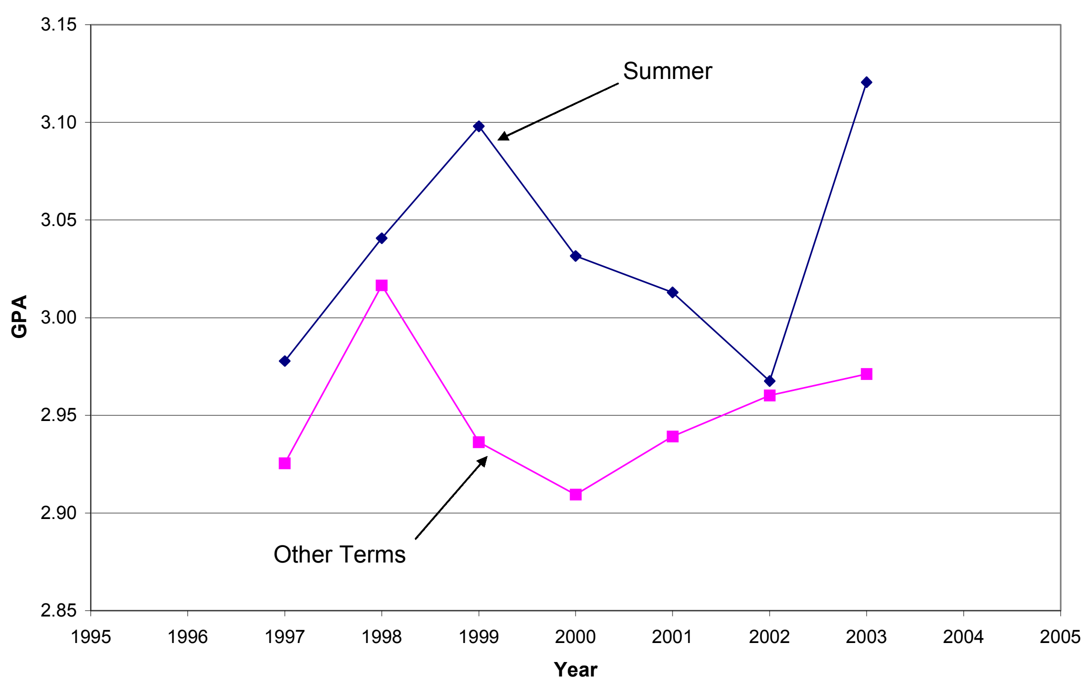

Figure 9. Grades during the summer tend to be higher.

Data were also available for mechanical engineering graduate school courses. Figure 10 shows that the GPA increased 0.10 ± 0.03 per decade, where the uncertainty reflects the 95% confidence interval.

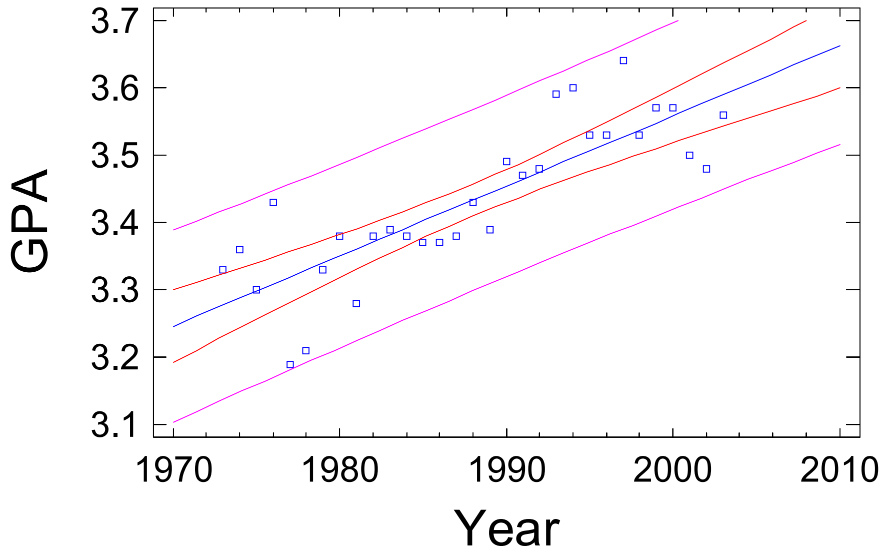

Figure 10. Mechanical engineering graduate school GPA increased 0.10 per decade over 30 years.

Reasons for Grade Inflation

When we first started writing this paper, we intended to try to identify causes for grade inflation. After becoming more familiar with the abundance of literature on the topic, we concluded that it was impossible to definitely identify real causes. Further, numerous possible causes had already been identified and discussed adnauseam. Below, we briefly list possible causes without any attempt to rank, justify, or discredit them. In some instances, references that provide a discussion are provided.

1. Better students, higher SAT and ACT scores [3,6,14].
2. Worse students, lower SAT scores, larger percentage of population attend university. This is offered as evidence that students are not better, so grade inflation is occurring [4,9,14].
3. Professors influenced by desire for good Course Evaluations by students [6,14,15].
4. Salary, promotion, and tenure influenced by Course Evaluation by students.
5. Fewer credit hours taken [9].
6. Fewer credit hours outside major [9].
7. Students able to withdraw before receiving a poor grade [9,14].
8. Students allowed to remove low grade when a course is repeated for a higher grade.
9. Better teaching [11].
10. Professors grade easier to boost retention, student morale, to permit retention of scholarships, or to prevent drafting during Vietnam war era [14].
11. University funding tied to "through-put rate" [12,14].
12. More student begging [6].
13. More cheating.

14. Use of computers.

15. Easier grading, or students now given higher grade for same quality work.

16. More student remedial courses [9,14].

17. Increased number of Adjunct Professors.

18. Less rigorous course content [14].

19. Students taking fewer hours per term [6].

Is Grade Inflation a Problem?

Most, but not all [see references 1, 11] agree that an upward shift in grades without a corresponding increase in student achievement is a problem. We belong to the increasing number who feel that grade inflation presents several problems [see references 1, 4, 6, 14]. We are even convinced that grade compression, i.e., higher grades with or without an increase in student achievement, is a problem. To us, grade compression is most unfair to the very best students who share A grades with students who achieved less. Similarly, the better students who receive "B's" share them with less able classmates. The better, A and B students may be discouraged from achieving their full potential. This lack of differentiation between students presents a problem for potential employers, graduate school admission officers, and in the awarding of fellowships/scholarships, both within and across universities. Employers, graduate school administrators, and others are forced to place more emphasis on less quantifiable factors. Transcripts lose some of their value. Grade inflation and compression may cause students to select a major field of study based on whether that department typically gives high grades. Inflated grades are also unfair to students in that they are deprived of good feedback. Others feel equally passionate and skillfully articulate that grade inflation is a problem. For example, the following was taken from an excellent report on grade inflation [see reference 6].

" Most importantly, inflated grades are a form of intellectual dishonesty and may discredit a great profession. If the teacher-scholar cannot or will not distinguish ranges of quality in performance within his or her own scholarly and professional practice by his or her own pupils, the teacher and the pupils will lose respect for the profession, as will the society in which the profession exists and whose support it needs."

Solutions to Grade Inflation

While most professors are not lawyers, we often act as if we are. We can take either side of an issue and discuss it at length. Having read numerous papers on grade inflation, whether or not it has occurred, and whether or not action is needed, we join those who have concluded that it is time for change [see references 1, 4, 5, 6, 12, 14]. Let us begin dialogue in our departments where grade inflation has occurred as well as across the university. First, we must convince our departmental and university faculty and administration that a reduction of grade compression is needed. Self action is preferable. Listed below are some of the actions that have been suggested by others [see references 1, 2, 4-6, 12, 14].

1. Provide each faculty member with data showing the GPA for the courses they have taught over the past three to four years along with the ratio of the class GPA to the cumulative student GPA, and letter grade percentages.

2. Chairs and program heads should regularly receive a report on grading trends for all individuals in their departments. Chairs could decide if this information should be distributed or discussed at meetings of the department faculty.

3. Clear written policies and guidelines on grading, within units, should be prepared and distributed to the faculty, including new tenure-track and adjunct faculty. These should address:

   a. What work merits a grade of A, B, C, D, or F.

   b. What is the acceptable range of class GPA. Is this range advisory or mandatory?

4. Stipulate that grade distribution be centered around a B or some other grade. Some have suggested a target GPA of 2.6 to 2.7. Budgetary punishment if the target is not met.

5. Provide median grade for a given class on the transcript or give students rank or percentile in a class.

6. Institute a balanced method of teacher evaluation including peer evaluation

7. Consider instituting the plus – minus system, i.e., A+, A-, etc. grades could be given.

8. Consider abandoning policy of erasing D and F grades when students retake the course and obtain a better grade.

9. Begin dialogue within the department on the importance of change. Most of us would agree that a voluntary revision of the grading system is preferable to some of the forced changes listed above. In that light, it is time for self action.

Acknowledgement

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W. Jack Lackey

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Since 1997, Dr. Lackey has developed and taught an undergraduate course on materials selection and failure analysis and two graduate courses emphasizing processing of advanced ceramic coatings and composites and the interrelationships between processing, microstructure, and material properties. He has also taught an undergraduate course in materials science and engineering and a graduate course on nuclear materials.

Dr. Lackey currently advises five graduate students. Their research areas are: 1) laser chemical vapor deposition rapid prototyping of electronic devices, carbon nanotubes, and structural nanolaminates, 2) processing of fiber-reinforced composites possessing a laminated matrix for enhancing fracture toughness, and 3) development of an improved process for carbon-coating of mechanical heart valves. He has published 106 refereed papers and has 15 patents.

He is the proud father of co-author Laura W. Lackey.