Int. J. Engng Ed. Vol. 22, No. 1, pp. 130–139, 2006
Printed in Great Britain.

0949-149X/91 $3.00+0.00

Grade Inflation: Potential Causes and Solutions

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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 grade point average (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 GPAs are reviewed as well as actions that may be warranted to allow for a return to a grading system that permits greater differentiation between students' performances.

Keywords: grade inflation; GPA

INTRODUCTION

Grade inflation has been defined as an upward shift in the grade point average (GPA) of students over an extended period of time without a corresponding increase in student achievement [1]. We will use the words 'grade inflation,' since this terminology is widely accepted, but we do not imply 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 grade point averages have increased 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 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.

Grading schemes or the evaluation of student performance varies country by country. Table 1 provides a general comparison of some of the grading schemes employed internationally in an attempt to clarify GPA as used in this paper [2]. Owing to the variety of grading schemes in use, the table is not exhaustive. GPA is calculated by dividing the number of quality grade points earned by the number of credit hours attempted as shown in Equation (1). A detailed example of how GPA is calculated is presented in Fig. 1.

$$\text{GPA} = \frac{\sum(\text{Course credits} \times \text{grade points})}{\sum(\text{Course credits attempted})} \quad (1)$$

Data are presented that exemplify the observed increase in student's GPA that has occurred at many universities over the last thirty years. This paper first reviews several thorough studies that clearly document this increase and offers 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 examination of 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 discussion regarding whether we should change the way we are grading will be presented and we conclude by providing recommendations, made by us and 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 achievements than the current grading system.

PRIOR STUDIES OF GRADE INFLATION

Our awareness of the grade inflation issue was exacerbated by the recent reporting of the extensive grade inflation at Harvard where during the 2001–2002 academic year 90% of their students graduated with honors [3, 4]. They have received

* Accepted August 2005.

Table 1. Summary of selected international university level grading schemes [2]

Country or Region	Grading Scale	Scale Summary
United States, Canada, England, Wales	A–F system	A = excellent B = good C = average D = poor F = failure
Argentina	1–10 scale	10 = excellent 8–9.99 = very good 6–7.99 = good 4–5.99 = sufficient Up to 3.99 = insufficient
Chile	1–7 scale	7.0 = excellent 6–6.9 = very good 5–5.9 = very good 4–4.9 = sufficient 1–3.9 = insufficient
Finland	0–5 Fail/Pass	0 = fail 1–5 = pass
International Baccalaureate	Integer 1–7 scale	7 = highest grade 4 = lowest passing grade
Sweden	Most universities–letter grade Engineering colleges and universities–numeric	VG = passed with distinction G = passed U = failed 3–5 (5 is highest grade) U = fail
Russia, Ukraine, Hungary, Poland	5-point scale	5 = excellent 4 = good 3 = satisfactory or average 2 = unsatisfactory 1 = poor
France, Belgium, Peru	20-point scale	20 = best possible 11 = lowest passing grade
Croatia	5-point scale	5 = excellent 4 = very good 3 = good 2 = sufficient 1 = insufficient
Denmark	10-point scale ranging from 00 to 13	13 = excellent 8 = average performance 6 = minimum passing grade 00 = completely unacceptable
Germany	6-point scale	1 = excellent 2 = good 3 = satisfactory 4 = sufficient 5 = unsatisfactory 6 = poor
Italy	30-point scale	18–30 = passing 0–17 = non passing
The Netherlands	10-point scale	10 = best score 5.5 = lowest passing grade

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 [5]. The GPAs at these universities have increased by about 0.15 per decade and the results are summarized in Fig. 2 [5]. The figure summarizes GPA records from 20 public universities as well as GPA data from both Harvard and Princeton as both private schools have recently been the focus of much press coverage. In an effort to ensure academic integrity and to combat inflated GPAs, both private schools have recently chosen to act by implementing new grading policies that limit the number of A's awarded to students, and at Harvard the number of students eligible to graduate with honors [4, 6].

Numerous other studies document increases in GPA [see references 3, 7-10]. A report by the

Typical GPA Calculation

1. Multiply the semester hours assigned to a course by the grade value of the course

2. Divide the sum of the grade points by the sum of the attempted hours

Term Definition

- Credit hours – course assigned hours
- Grade value – each letter grade is assigned a numerical value
  - A = 4 points, B = 3 points, C = 2 points, D = 1 point, and F = 0 points
- Grade points = Credit hours x grade value

Example Student GPA Calculation

Course	Grade = Value	Credit hours	Grade points
Math 101	C = 2	4	2 x 4 = 8
Chemistry 101	B = 3	4	12
English 101	A = 4	3	12
PSY 101	D = 1	3	3
	Total	**14**	**35**

$$\text{GPA} = \frac{\text{Cummulative Grade points}}{\text{Cummulative Credit hours}} = \frac{35}{14} = 2.5$$

Fig. 1. Detailed example of Grade Point Average (GPA) calculation.

American Academy of Arts and Sciences [10] 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 [11]. 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 [10, 12].

GRADE INFLATION AT GEORGIA TECH

Student GPAs, or grades on an A–F scale that were readily convertible to GPA, and Freshmen

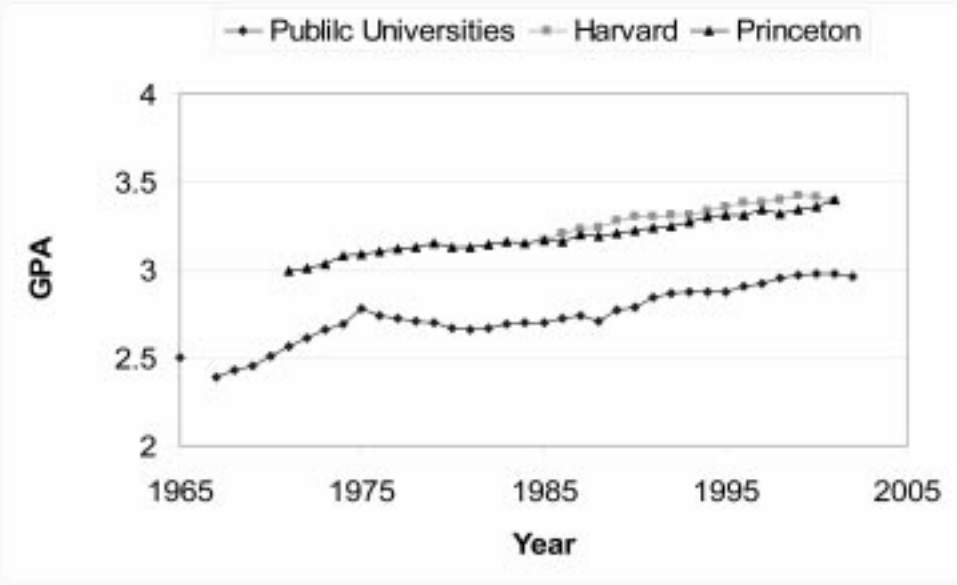

Fig. 2. Nationwide Trends in Grade Inflation. Public university data is the mean GPA based on 1968–2001 data at: Alabama, Arizona, Auburn, Central Michigan, University of Chicago, University of Colorado, University of Florida, Iowa State, University of Missouri, University of North Carolina–Chapel Hill, Michigan, Northern Michigan, Ohio State, Southern Illinois University, University of Texas, Utah, Western, University of Wisconsin–Madison, and Washington State.

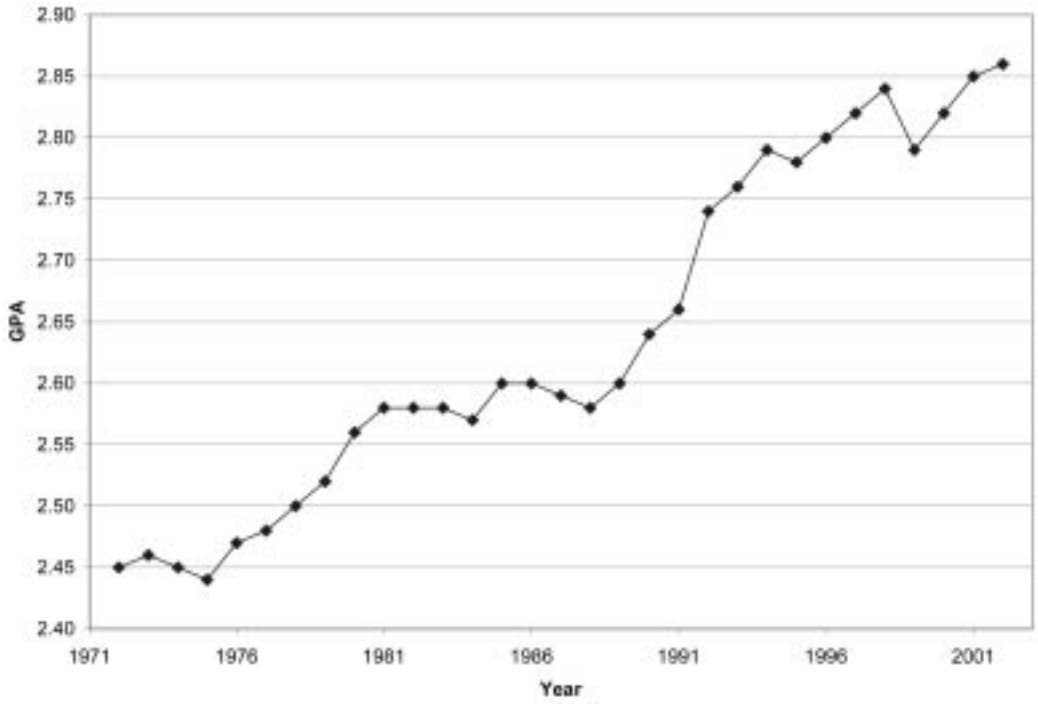

Fig. 3. Georgia Tech Fall Term undergraduate cumulative GPA.

SAT scores were available from the Fact Book, which is published annually and shelved in the Georgia Tech library [13]. The SAT is a trademark for a standardized college admissions exam. In the United States, The College Board administers the exam and their Website provides additional information about the program [14]. Georgia Tech's GPA scale is based on an A yielding a GPA of 4.0. The available data dates back to 1977 and permit 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 Fig. 3. 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. For

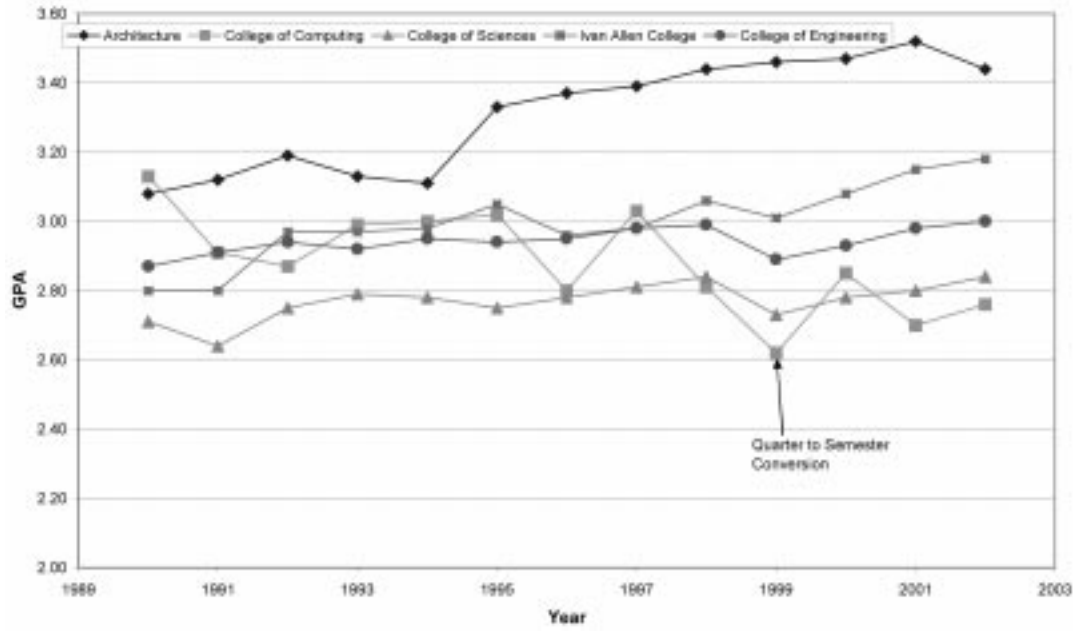

Fig. 4. Undergraduate GPA vs. Year for five disciplines. For clarity, there are three (Fall, Winter, Summer) semester and four (Fall, Winter, Spring, Summer) quarter terms within an academic year.

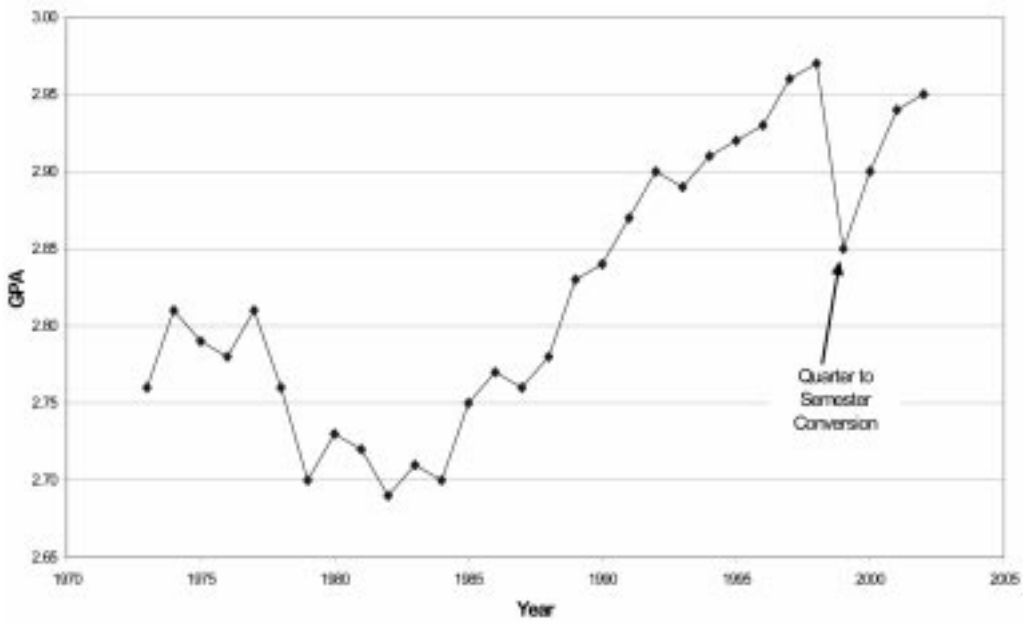

Fig. 5. Undergraduate engineering GPA increased 0.08 per decade.

example, the average GPA at Harvard and Princeton has increased per decade by 0.14 and 0.11, respectively. A study performed by a university committee provides additional detail [7]. 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. A variety of other universities have observed a similar trend.

Figure 4 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.

A large fraction of the students at Georgia Tech are enrolled in engineering. The undergraduate engineering GPA is plotted in Fig. 5. The data

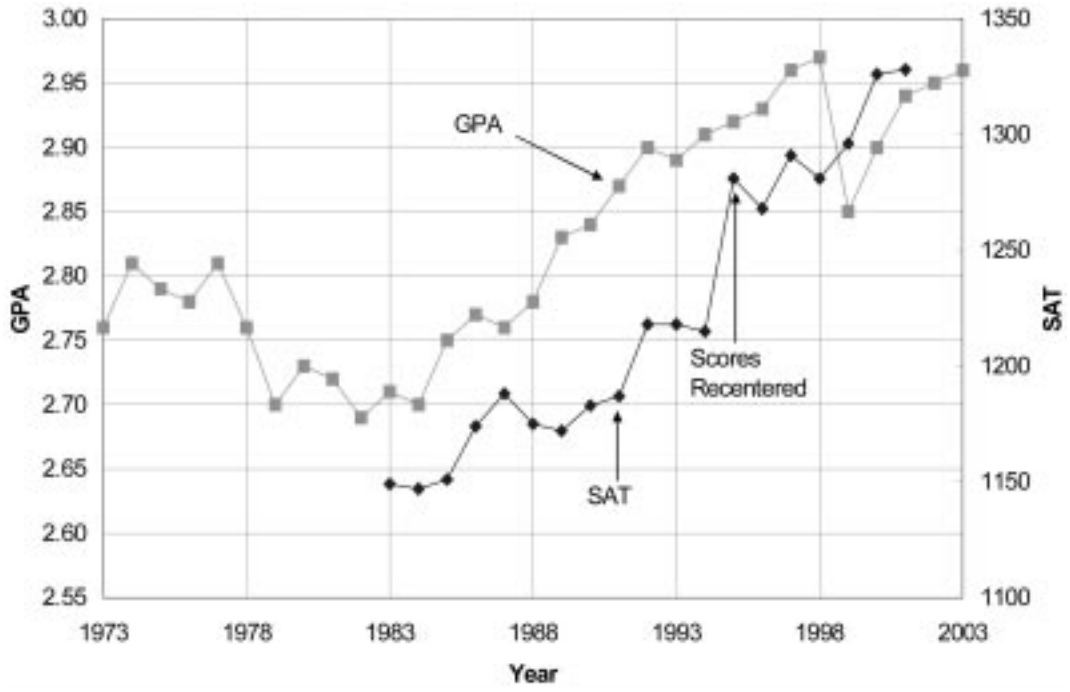

Fig. 6. Georgia Tech engineering courses GPA and freshmen SAT scores.

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 Fig. 2. The GPA may have decreased from the mid-1970's to the mid-1980's, 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 Figs. 3 and 4. Whatever the cause for the abrupt decrease in GPA, the effect was short-lived, since the GPAs had risen to above the pre-1999 levels by 2002.

A comparison of the GPA's of the engineering students with the Fall term Freshmen engineering SAT scores is presented in Fig. 6. 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 [15].

Figure 7 shows the Fall term, weighted GPAs 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.

The weighted Fall term GPAs for mechanical engineering courses are compared with Fall term GPAs for all engineering courses in Fig. 8. The trends are very similar. Figure 9 shows the mechanical engineering data divided into lower and upper levels. There is no statistically significant trend for the lower level GPAs, but the GPAs for the upper level mechanical engineering courses increased 0.11 per decade. There is greater than 99% confidence that an increase has occurred.

Figure 10 shows that grades tend to be higher during Summer school. The plot is for mechanical engineering undergraduate courses. Data were also available for mechanical engineering graduate school courses. Figure 11 shows that the GPA increased 0.10 ± 0.03 per decade, where the uncertainty reflects the 95% confidence interval.

REASONS FOR GRADE INFLATION

At the onset of this project, our goal was to identify causes for grade inflation. After analyzing the Georgia Tech archival data and the abundance of literature on the topic, we concluded that there are insufficient data to definitely identify real causes. Fortunately, possible causes have already been identified and discussed by several authors. 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 [8, 10, 11]. (The ACT is an acronym for 'American College Test' and is used to determine a student's readiness for college level coursework [16].)

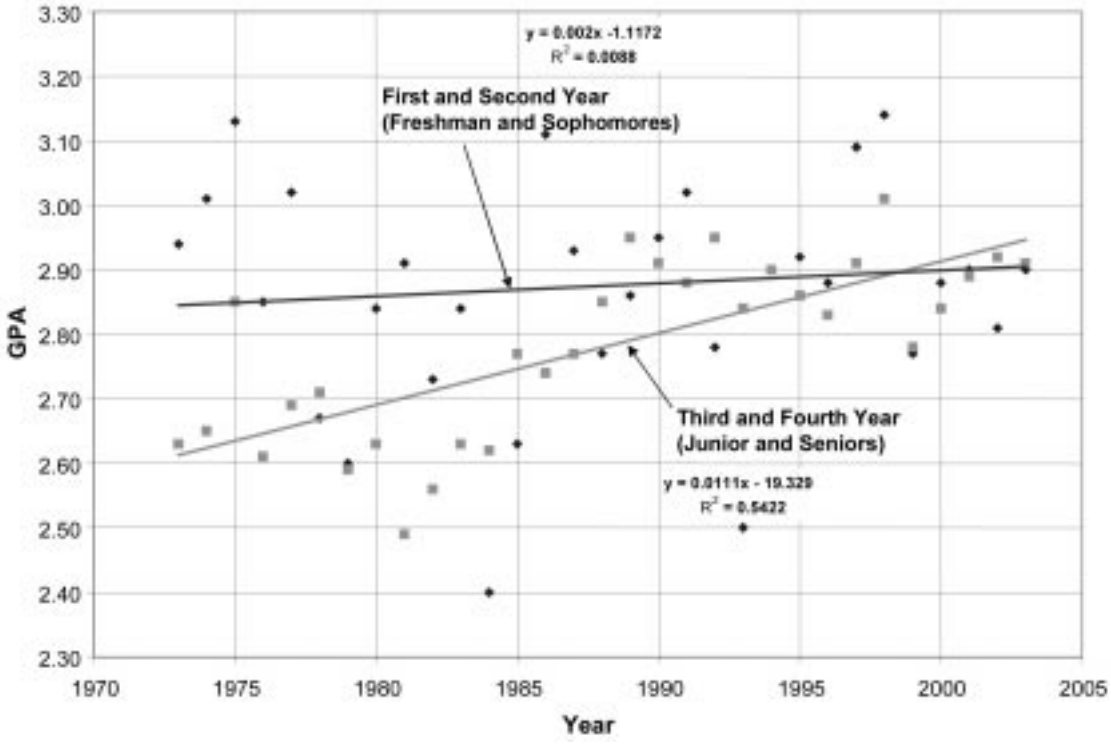

Fig. 7. GPA vs. Year for lower level and upper level engineering students.

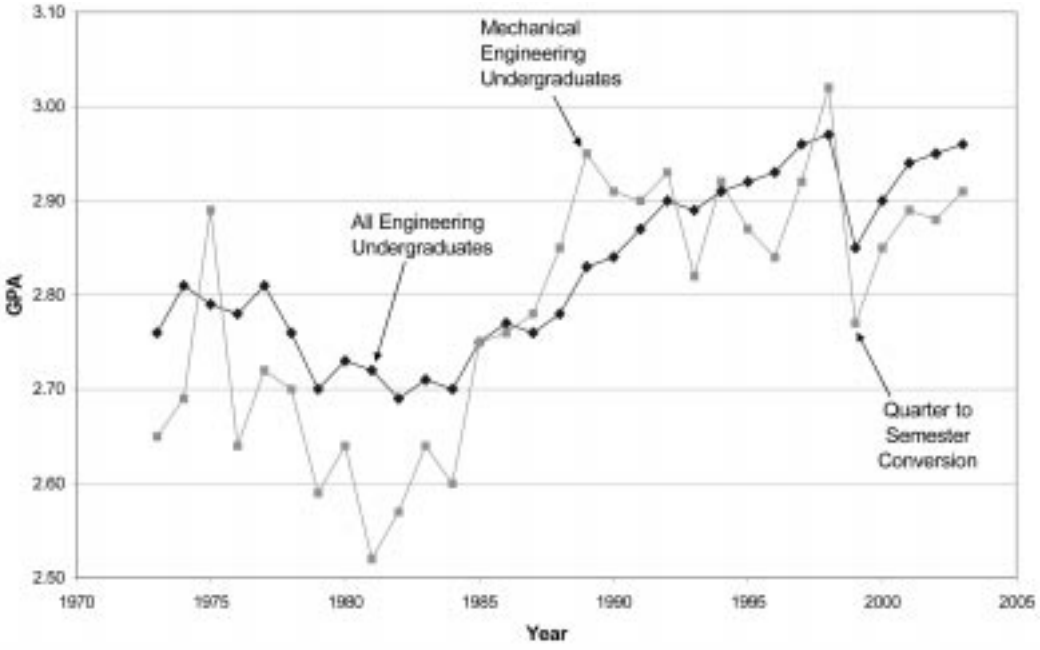

Fig. 8. Comparison of mechanical engineering undergraduates to Georgia Tech engineering undergraduates.

2. Worse students, lower SAT scores, a larger percentage of population attending university. This is offered as evidence that students are not better, so grade inflation is occurring [3, 10, 12].
3. Professors influenced by desire for good course evaluations by students [8, 10, 17].
4. Salary, promotion, and tenure influenced by course evaluation by students.
5. Fewer credit hours taken [8, 12].
6. Fewer credit hours outside major [12].
7. Students able to withdraw before receiving a poor grade [10, 12].
8. Students allowed to remove a low grade when a course is repeated for a higher grade.
9. Better teaching [18].
10. Professors grade easier to boost retention, student morale, to permit retention of scholarships, or to prevent drafting during Vietnam war era [10].
11. University funding tied to 'through-put rate' [9, 10].

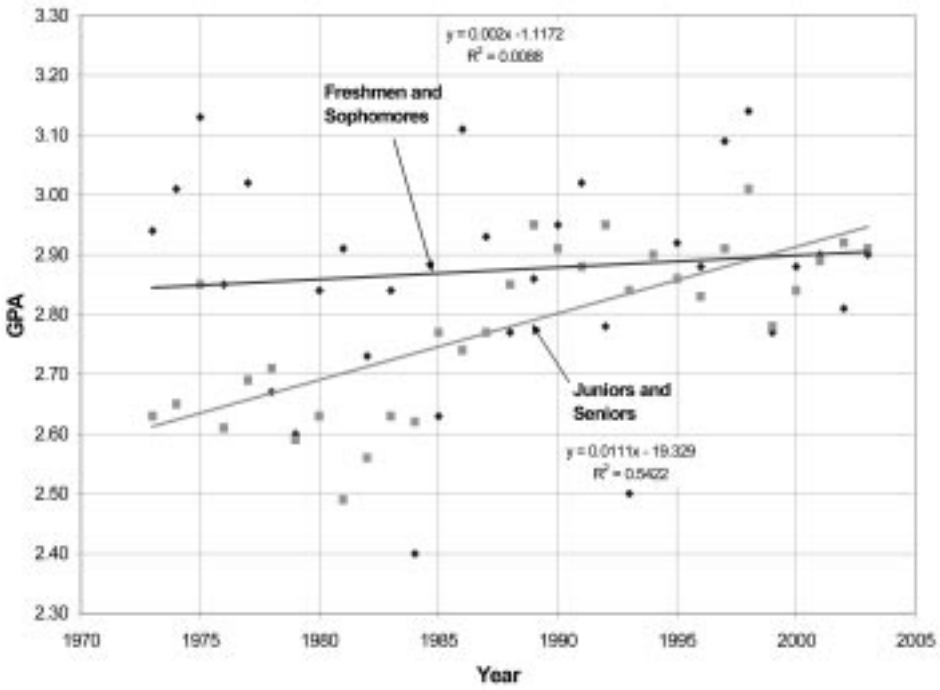

Fig. 9. Mechanical engineering upper level GPA outpaced lower level.

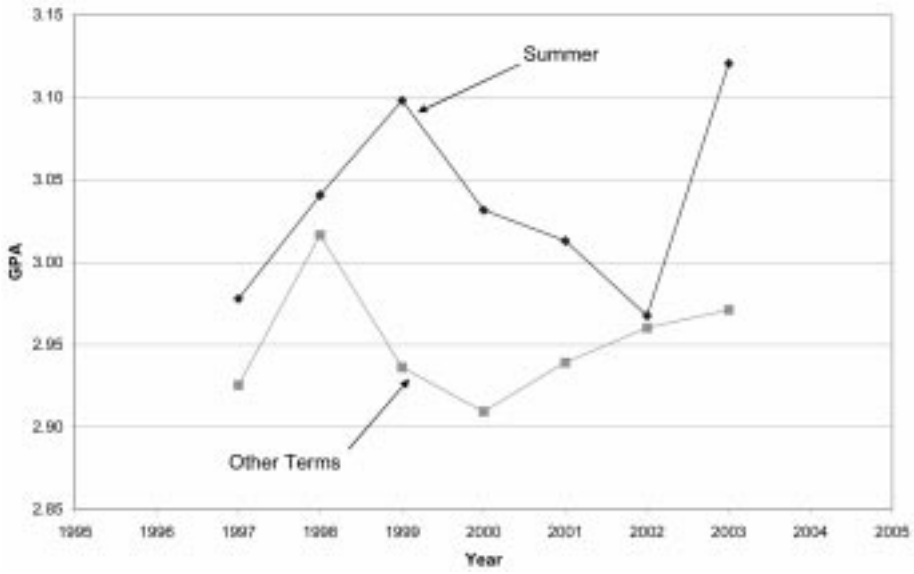

Fig. 10. Grades during the summer tend to be higher.

12. More student begging [8].
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 [10, 12].
17. Increased number of adjunct professors.
18. Less rigorous course content [10].

IS GRADE INFLATION A PROBLEM?

Most, but not all (see [18, 19]) 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 [3, 8, 10, 19]). 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 or similar documents that detail the academic record of an individual at a university 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

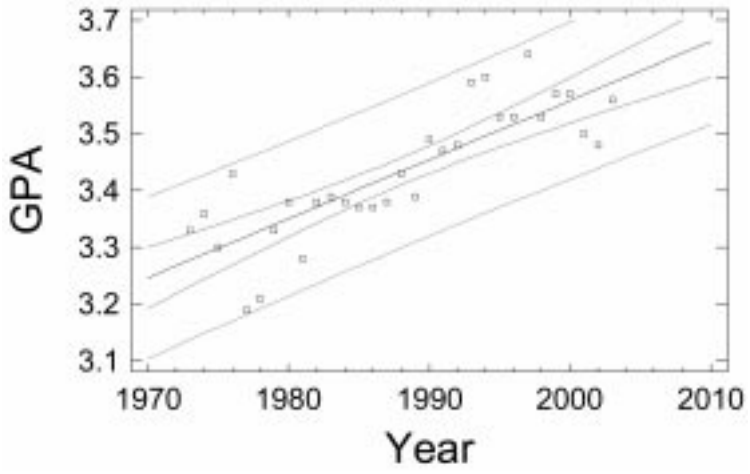

Fig. 11. Mechanical engineering graduate school GPA increased 0.10 per decade over 30 years.

example, the following was taken from an excellent report on grade inflation [8].

> '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 were. 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 [3, 8–10, 19, 20]. 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. We conclude our remarks by listing some of the actions that have been suggested by others that may prevent further grade inflation [3, 7–10, 19, 20].

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.

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.

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:

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

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

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.

Provide median grade for a given class on the transcript or give student's rank or percentile in a class.

Institute a balanced method of teacher evaluation including peer evaluation.

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

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

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.

Acknowledgements—The very capable assistance of Ms. Lesley Hamm and Ms. Sandra Bramblett of the Office of Institutional Research and Planning, Georgia Institute of Technology is greatly appreciated.

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