How Enhanced Transcripts Can Help Evaluate Graduate School Applications

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Abstract

In 2013, a bill was introduced in the Texas Legislature which would require public institutions to issue transcripts that include the median grade awarded in the class as well as the student's earned grade. This requirement is similar to enhanced transcripts implemented at other academic institutions. The proponents of enhanced transcripts cite the growing trend that grade distributions vary widely based on the instructor for the same class at the same institution. Students use grade distribution information to decide which instructors to take, as well as avoid, since many students consider earning less than an "A" grade to be unacceptable. Proponents of enhanced transcripts hope to discourage grade inflation. This paper reviews the status of enhanced transcripts and recommends a scheme to evaluate a student's overall academic performance using enhanced transcript information. Two schemes are discussed for grades with and without plus/minus designations. In the future, the use of mean class grades on enhanced transcripts may provide another mechanism to evaluate applicants for admission to graduate school programs.

Introduction

A bill filed in March 2013 in the Texas legislature[1] would require all public colleges and universities in Texas to include the median grade assigned in a class along with the individual student's grade earned in the class. Currently only the student's grades are reported on transcript. The proposed bill would include information only about the median grade and not the range of grades issued in the class. The proposal has exemptions for small classes, yet it would require "the median grade that was awarded to all student in the class" be included on the transcript. The institution shall place the median class grade, "immediately to the right of the student's individual grade." Given that most universities report letter grades on transcripts, the median letter grade for the class would be reported if this bill is to become law. Although the bill died in 2013, it is anticipated it could be considered again in the next biennium session of the Texas legislature.

The primary motivation for the bill is to combat grade inflation[2,3]. A discussion of grade inflation along with elevated recommendations of students continues to stimulate a healthy debate both inside and outside academia[4,5]. There is little debate whether grade inflation exists, and the debate often centers on understanding why it is happening[5]. Explanations range from changes in our culture, student diversity, grading policies, student evaluations, course costs, part-time faculty, etc. The Texas bill is proposed by State Rep. Scott Turner, who with extensive research conducted by the Texas Public Policy Foundation, has cited national research

documenting grade inflation at institutions of higher education[6]. A long term study over approximately 60 years (1940-2010) shows the steady increase in grade point averages for public schools and private schools. The problem appears to have become significant from the late 1960s to the early 1970s. Overall, the average GPA has increased to be over the 3.0 on a 4.0 scale. In many institutions, the "A" grade is the most common grade awarded and the "C" grade is rarely given[7]. Overall, it is proposed to add context to the grade earned by a student so that when one attempts to evaluate the performance based on a transcript, the relative performance of the class is readily available[8,9].

Since 1994, Dartmouth has included the median grade given in classes and class enrollment on transcripts[10,11]. This was motivated to reduce grade inflation, yet is has been found to only illuminate grade inflation. Because many students expect high grades they are often award high grades[12]. Since being implemented, the overall GPA has continued to rise at Dartmouth[11]. The median average grade in departments/majors range from 3.90/4.00 in Theatre to 3.22/4.00 in Chemistry. Of the top 20, mores departments/majors are in language and the arts. Of the bottom 20 (having the lowest GPA) most are science, mathematics and engineering. It has been suggested that having lower grades issued in STEM fields discourages students from pursuing these majors[4]. Students actively seek classes and instructors in which to easily earn "A" grades and the advent of internet resources is making the search easier for students[13,14].

At the University of North Carolina-Chapel Hill, beginning in the Fall 2014, the transcript will include (1) the student's grade, (2) the median grade of classmates, (3) and the number of student in the class[15,16]. The additional information on the transcript shows the student's performance relative to their peers. The proposed contextual grading is expected to place the "spotlight" on courses with high grade distributions. Transcripts typically have the semester and cumulative Grade Point Average (GPA). It will now show the student's Schedule Point Average (SPA) which is the average grade for the students taking the same courses that semester. The SPA measures the rigor of the semester of classes and provides additional context for the grades earned. At UNC-Chapel Hill, a 2009 study showed that 82% of all grades were A's and B's, and there was systematic grade inequality among different departments and instructors.[15] The push for enhanced transcripts has been pursued for many years since changes of this nature receive much resistance to change.

Many institutions have descriptions of grades as shown in Table 1. The "A" grade is often described as being outstanding which would indicated it would not be the most often grade awarded in a class. Likewise, the grade of "C" traditionally had the interpretation of being satisfactory or slightly below average. It appears to be a growing trend that universities avoid defining grades where a student is above average or below average, or compared to the performance of other students in the class. Some describe grades such that all students in a class are "excellent" and have "superior achievement". Some institutions only state that the student's

performance in academic work is expressed by the following grades with the traditional list of A=4.0, B=3.0, C=2.0, D=1.0 and F =0 for computation of a grade point average.

Table 1. Common explanation of grades.

Grade Symbol	Grade Points	Meaning of Grade, U. of Texas at San Antonio[17]	Meaning of Grade, U. of Houston[18]
A	4.00	Outstanding	Excellent, superior achievement
B	3.00	Above Average	Good, exceeding all requirements
C	2.00	Slightly Below Average	Average, satisfactorily meeting all requirements
D	1.00	Well Below Average but Passing	Poor, passing
F	0.00	Failure	Failing

Grade Variations between Instructors

There are many internet sources where the public can find grade information, such as www.myedu.com. Many students used grade information to evaluate which instructor to take and which to avoid. Calculus I is an important prerequisite class for engineering majors. A survey of grade distributions show a significant variation between grades given by instructors for the same Calculus class at the same institution. Figure 1 shows grade distributions for 4 instructors. One instructor assigned about 43% "A" and a total of 13% DFW (non-passing grades of D or F or withdrawal) while another instructor assigned about 4% "A" and about 72% DFW. Students consult this website and leave feedback on individual faculty. Below are examples of student feedback about instructors (from www.myedu.com):

> u get weekly quizzes which are easy and he gives a test review which is basically the test maybe a lil different. i got an a easily in this class.

> There were only 2 Test and then a final and before each test, even the final, he gave out a sample test which was very similar to the actual test and worked it out for the class.

Many comments are about how easy the class is to earn an "A" grade. Students like instructors where there is a high probability they will earn an "A" grade with minimal effort. There are few comments that the instructor is "too easy" and no comments were found where a student complained that an instructor gave too many "A" grades. Often, the most highly rated and often recommended instructors are those who issue a high percentage of "A" grades. This is consistent with Johnson's evaluation of the link between grades and student evaluations of instructors.[4]

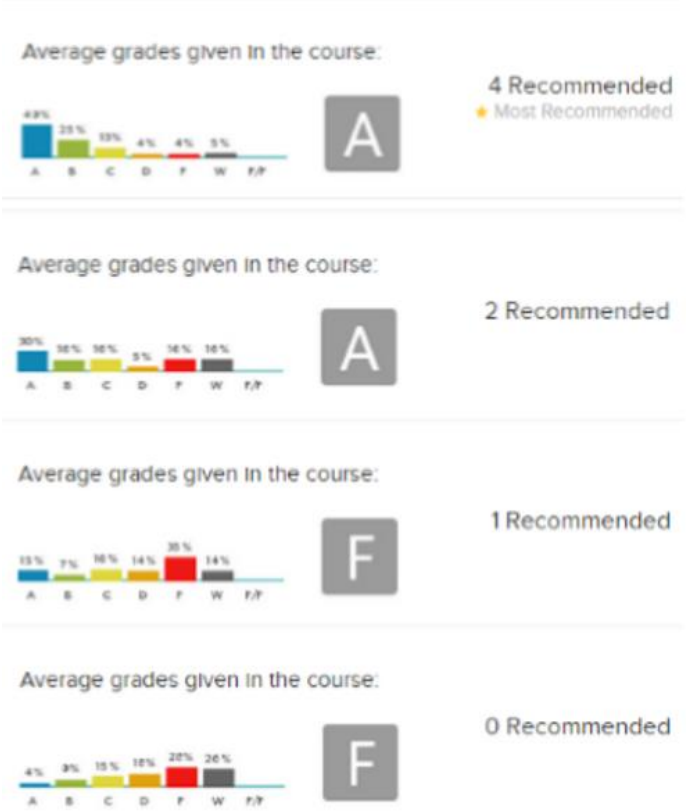

Figure 1. Grade distributions for 4 instructors (instructor names are listed to the left of the distributions but are not shown here) who teach the first Calculus course at the same university. From www.myedu.com

The data represented in Figure 1 is considered reliable and has been checked with the grade distributions issued by the authors of this paper. The site, www.myedu.edu, says it "works directly with universities to post their official course grade records, including average GA and average drop rates for classes." It is believed that grade data is obtained from the university through freedom of information requests.

Grade Variations between Courses and Colleges

The primary variation in grade distribution comes from the instructor. To a lesser extent, there can be variations in grades between courses, especially gateway courses versus service courses where students have the option to avoid the class completely. Another significant source of grade variation comes when an academic program has a minimum GPA requirement for students to continue in the program. One example is in the College of Education where future teachers are educated. It is reasonable that future teachers should be above average and the expectation is that they have a minimum 3.0 GPA. In these majors, a "C" grade effectively is a failing grade. The "A" grade is the expected grades of most students and a significant number of students in the College of Education graduate with very high GPAs compared with the rest of University.

Figure 2 shows typical grade distribution for a required, sophomore-level course in the College of Education and the College of Engineering. For the grades shown, there are no +/- grades included. For the first distribution shown, the median grade is a "B" and for the second it is a "C". It is common to find significant variations in the grade distributions such as these.

Figure 2. Typical grade distributions for required sophomore-level courses in the College of Education (top) and the College of Engineering (bottom).

Evaluating an Enhanced Transcript

One goal of this paper is to explore how an enhanced transcript might be used to evaluate a student seeking admission into a graduate engineering program. One proposed method is to adjust the course GPA based on the median class GPA. This is consistent with the typical questions included on most recommendations that faculty complete for students to be admitted to graduate school. A reference is asked to assess the applicant in relation to a peer group, which is often the group of students earning the same degree at the university. The reference is often asked to rank the applicant in small groups to distinguish between "fairly exceptional" (top 10%), "exceptional" (top 5%), and "truly exceptional" (top 1-2%). The particular reference form may have different wording, but references are asked to try to distinguish the applicant and to describe the group from which the applicant is being compared. Enhanced transcripts offer a unique opportunity to quantify the relative performance of a student compared with the undergraduate students who earned the same engineering degree at the same institution.

A hypothetical case is presented here based on a plus/minus grading system which is increasingly common in many universities. The system compares the grade earned in 11 key courses identified in many mechanical engineering undergraduate programs. The student grade and class median grade is available for each of the classes. The traditional numerical equivalent is used for the grading system: A = 4.0, A- =3.67, B+=3.33, B=3.0, B- = 2.67, C+ = 2.33, C = 2.00, C- = 1.67, D+ = 1.33, D = 1.00, D- = 0.67, and F = 0.00. It is proposed that the class GPA for the student be adjusted by 0.33 based for every grade increment difference between the

student grade and class grade. For example, if the student earned a grade of B+, the raw GPA would be 3.33 for that class. If the median class grade was B+ then there would be no adjustment. If the class grade was B, then the student GPA would be adjusted to 3.33 + 0.33 = 3.66. The adjustment can be either upward or downward, depending on the class mean GPA.

The scheme is shown in Table 2 for illustration purposes, for a hypothetical students who earns all B+ grades. The raw GPA for the student is 3.33, however, when the class median grade is used the adjusted GPA can increase, remain unchanged, or decrease. For the first case, the "B+" student would have an adjusted GPA of 4.0 and would appear more worthy of admission to a graduate school for the first case. In the last case, the B+ student would have an adjusted GPA of 3.09 and appear less worthy of admission based on this metric. It is anticipated that many other factors will continue to be used to make admission decisions about students.

Table 2. Computation of adjusted GPA accounting for median class grade.

			Above Class Avg.		About Class Avg.		Below Class Avg.	
Course	**Grade**	**GPA**	**Class Grade**	**Adj. GPA**	**Class Grade**	**Adj. GPA**	**Class Grade**	**Adj. GPA**
Statics	B+	3.33	B+	3.33	B+	3.33	B+	3.33
Dynamics	B+	3.33	B+	3.33	A-	3.00	A-	3.00
Thermodynamics	B+	3.33	C	4.66	B	3.66	A-	3.00
Materials	B+	3.33	B-	4.00	B+	3.33	B+	3.33
Measurements	B+	3.33	B+	3.33	A-	3.00	A-	3.00
Solids	B+	3.33	B-	4.00	A-	3.00	A	2.66
Fluids	B+	3.33	B+	3.33	B	3.66	A-	3.00
Controls	B+	3.33	C+	4.33	B+	3.33	B+	3.33
Heat Transfer	B+	3.33	C-	5.00	B	3.66	B+	3.33
Machine Element	B+	3.33	C-	5.00	B+	3.33	A	2.66
Mechatronics	B+	3.33	B	3.66	B+	3.33	B+	3.33
Average		**3.33**		**4.00**		**3.33**		**3.09**

Overall, the proposed scheme applied to high GPA applicants would tend to increase the GPA of applicants where they performed distinctly above average compared to students at the same institution. For high GPA applicants, the proposed scheme is less likely to result in a lower adjusted GPA since the class median grade would need to be above the students earned grade for this to happen. It appears more likely that the adjusted GPA would be significantly higher for students with modest GPA (say in the 3.0 to 3.6 range) from rigorous institutions where few high grades are awarded.

Application to Two Student Transcripts

The proposed scheme is applied using a limited database of grades assigned to mechanical engineering undergraduate students from 2008 to 2011. During that time, the University did not have the plus/minus grading system. Hence, the proposed method is tested on the grades without plus/minus designations. In total 22,000+ student course grades were evaluated in Calculus, Physics, General Engineering, and Mechanical Engineering courses. Senior level technical elective courses with fewer than 10 students were neglected from the computation. Likewise classes in humanities, writing, government and other subjects were neglected. In the sample analyses, 425 students earned 15 or more semester credit hours (typically 5 or more classes), and 98 students had a GPA >3.0 for those classes evaluated.

The grades for two students are shown in Table 2. The first two columns identify the subject (sub) and course (crs). The next column identifies the grade earned (grd) and the mean class grade (Gc). The class grade, Gc, is calculated neglecting student withdrawals. The traditional student numerical grade, Gs, and modified student grade, mGs are the last two columns. If the class grade is between 2.25 and 2.75, there is no adjustment made to the students class grade (Gs = mGs). If the class grade was lower than 2.25, then students modified grade was increased, and likewise when the class grade was greater than 2.75, the student's modified grade was decreased. The maximum change was limited to 1.0, which represent a whole letter grade. The adjustment scheme is shown in Figure 3 based on earlier work of the authors[19]. The mean class grade is computed numerically on a 4.0 scale.

Results shown in Table 3 show a reduction in the GPA for Student A, and an increase for Student B. The change is based on consideration of the class grades. When the class grades are high, then it is less meaningful for a student to earn a high grade, hence it is down-weighted in the modified GPA calculation. Likewise, the opposite is also true. Although not shown, both students have course attempts that resulted in withdrawal from courses. Withdrawals are not used in the computation of the original GPA nor the adjusted GPA.

Based on the historical grade distribution in senior-level courses, many course regularly have high GPA. For example, the capstone senior-design class often has class GPA higher than 3.5. In these courses, it is rare for a student to earn a "B" or lower grade. Based on the proposed scheme, this would down weight "A" grades in these classes to "B". Essentially all students taking these classes will successfully complete the undergraduate program in engineering, hence, these courses may be excluded from a modified GPA computation. The proposed scheme may be more suitable to be applied to core required engineering courses that have a more normal grade distribution. Or, if a modified GPA is computed as discussed, there may be more pressure on the instructor for courses to award a broader distribution of grades, and not necessarily award all students "A" grades.

Table 3. Computation of adjusted GPA accounting for median class grade.

	Student A							Student B					
	sub	crs	grd	Gc	Gs	mGs		sub	crs	grd	Gc	Gs	mGc
1	EGR	2103	B	2.67	3	3	1	MAT	1223	A	1.78	4	4.94
2	EGR	2323	B	2.22	3	3.07	2	MAT	2213	B	2.15	3	3.20
3	EGR	2513	C	2.39	2	2	3	EGR	2103	B	2.36	3	3
4	EGR	3323	F	2.59	0	0	4	EGR	2323	A	2.16	4	4.18
5	EGR	3323	B	2.59	3	3	5	EGR	2513	A	2.24	4	4.02
6	ME	1301	A	3.31	4	3.00	6	EGR	3323	B	2.59	3	3
7	ME	1402	A	3.33	4	3.00	7	PHY	1903	B	1.42	3	4.00
8	ME	3113	C	2.11	2	2.27	8	PHY	1923	A	2.48	4	4
9	ME	3173	B	3.44	3	2.00	9	ME	1402	A	2.89	4	3.71
10	ME	3241	A	4.00	4	3.00	10	ME	3113	B	2.37	3	3
11	ME	3243	B	3.07	3	2.35	11	ME	3173	A	3.04	4	3.41
12	ME	3263	A	3.16	4	3.18	12	ME	3241	A	3.76	4	3.00
13	ME	3293	A	1.52	4	5.00	13	ME	3243	B	2.35	3	3
14	ME	3323	C	2.13	2	2.24	14	ME	3293	B	1.88	3	3.75
15	ME	3513	B	2.78	3	2.94	15	ME	3513	B	2.57	3	3
16	ME	3663	A	3.24	4	3.02	16	ME	3663	A	2.63	4	4
17	ME	3813	F	2.20	0	0.11	17	ME	3813	B	1.79	3	3.91
18	ME	3813	B	2.02	3	3.47	18	ME	3823	B	1.95	3	3.60
19	ME	3823	B	2.63	3	3	19	ME	4293	B	2.46	3	3
20	ME	4293	A	2.46	4	4	20	ME	4313	A	2.47	4	4
21	ME	4313	A	2.47	4	4	21	ME	4523	B	2.80	3	2.90
22	ME	4523	B	3.07	3	2.37	22	ME	4573	A	3.64	4	3.00
23	ME	4573	A	3.64	4	3.00	23	ME	4603	B	2.57	3	3
24	ME	4603	B	2.57	3	3	24	ME	4702	A	2.65	4	4
25	ME	4702	A	3.59	4	3.00	25	ME	4802	A	3.35	4	3.00
26	ME	4802	A	3.35	4	3.00							
27	ME	4811	A	3.62	4	3.00							
28	ME	4813	A	3.70	4	3.00							
			GPA=		3.04	2.76				GPA=		3.44	3.52

Summary and Conclusions

There is a trend to add class grade information to transcripts. In many cases, the enhanced transcript include the median class grade, either as a letter grade or as the numerical computation of the class grade point average. The motivation for enhanced transcripts is to highlight grade inflation and hopefully reduce the occurrence of grade inflation. There is a potential benefit of enhanced transcripts as it gives an opportunity to evaluate a student's academic performance

relative to their peer group. This may be useful in the evaluation of applicants to a competitive graduate school program where there are many applicants with high GPAs.

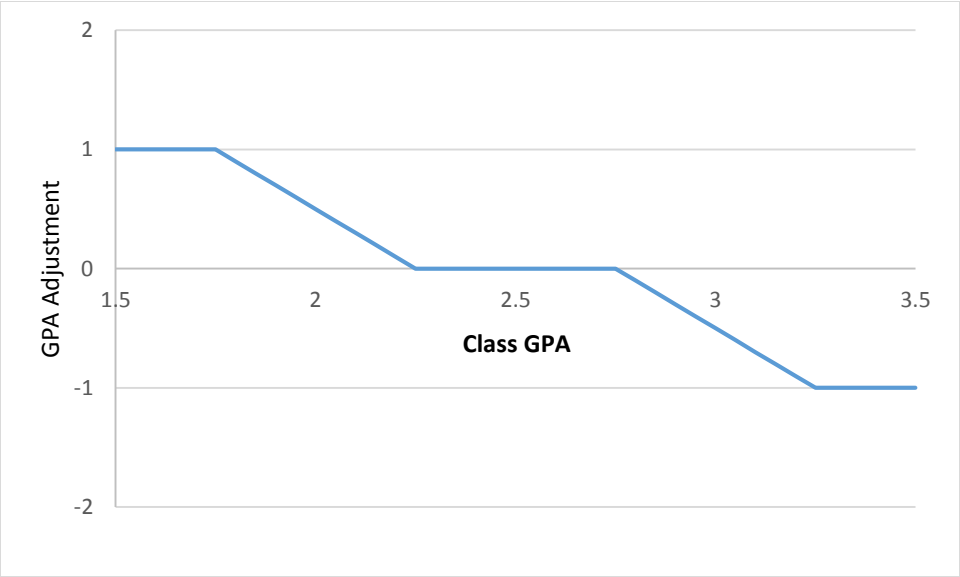

Figure 3. Grade adjustment based on class grade point average[19]. The maximum increase is 1.0 when the class GPA < 1.75 and maximum decrease is -1.0 when class GPA>3.25.

An adjusted overall GPA is proposed to assess the relative academic performance of a student using the information found on enhanced transcripts. This appears to be most useful in assessing the performance of applicants to graduate school and could also be used in evaluating job applications. For a traditional 4.0 scale plus/minus grading system, it is proposed to adjust the student course grade point based on the difference between the earned grade and class grade. One method is discussed based on the use of a plus/minus grading system. A hypothetical student with all "B+" grades in 11 core engineering classes is shown as an example, and the final adjusted GPA can be higher or lower based on the mean grade awarded in the classes. A second example is shown for a traditional grading system without plus/minus designations. In this example, a weighting scheme adjusts the numeric weight of the grade based on the class GPA. Grades from two students are evaluated showing the scheme will yield a lower modified GPA for some as well as increase for others.

Overall, there appears to be a growing trend for Universities to issue enhanced transcripts. As a result, it appears that graduate admissions could benefit from using an adjusted GPA taking into account the mean class grade reported on enhanced transcripts. At this time, it appears to be most logical to apply it to a select group of core courses deemed most critical to future success in the graduate program.

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