

## **ASSISTING STUDENTS WITH GPA CALCULATIONS**

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In recent years, many college students have been taking longer to graduate. As of 2016, the average college duration for undergraduates in the United States is now close to 6 years. As a result, many students are facing challenges in order to stay in school over the enrollment period. One area of concern is the minimum grade point average to stay in good standing as a student. Sometimes this requirement is a function of the school policy, or it could be a financial aid issue, or scholarship criterion. Data shows that students with higher GPAs are more likely to graduate and more likely to graduate "on time." This presentation will illustrate a new model that can be used to predict student GPAs and thus serve as a tool to increase retention and graduation rates. The model will be illustrated with examples and adaptations for use at different types of colleges and universities.

Most institutions of learning use a GPA system to assess students. Unfortunately, the measure produced doesn't always reflect a meaningful or reliable number. According to Soh (2011) GPAs are the product of professors applying "subjective quantitative judgment" to produce a number that appears to be an "objective quantitative judgment." As a student accumulates grade points and as their overall GPA begins to represent a larger quantity of classes taken, the actual worth of the GPA value becomes less reliable. However, as Soh points out, despite becoming less accurate, as a GPA evolves it will begin to look more and more precise. A GPA such as 3.120 or 2.856 would lead one to believe that those numbers must be meaningful if the precision is such that 3 decimal points are used. This encourages administrators and other decision makers to place more value on the GPA value as it appears to be a credible and unbiased calculation.

Soh (2011) points out several flaws with the modern/conventional GPA calculations. The first problem is that all classes are counted equally. A business major with an overall GPA of 2.8 could actually be a better business student than a business major with a 3.3 GPA. The student with a 3.3 GPA may have a higher GPA because they performed well in non-business courses. In reality the student with the 2.8 GPA may have a 3.5 GPA in business courses but have a low GPA in non-business courses. The student with an overall 3.3 GPA may have a 3.0 GPA in business courses. By combining all classes and not distinguishing classes pertaining to a student's major from classes pertaining to the liberal arts portion of their degree, one could get the wrong impression of a student's true ability in their chosen field.

Two more problems Soh (2011) identifies in regards to GPA calculations are:

- 1) The same grade in different courses doesn't equate to equal performance in both courses. Take the example of an Accounting major. Is it logical to conclude that the grade of A in Accounting 201 is as meaningful as an A in Accounting 401. GPA calculations do not take into account the fact that it is much harder to earn an A in an upper level course than a lower level course.
- 2) Current GPA calculations are analogous to a multiple regression problem that doesn't assign any weights to the individual variables. Two students could have the same GPA but this doesn't mean they earned the same grades in each course. Assuming two students took the exact same courses, there are multiple ways each student could receive different grades in each class and still have the same GPA (see Exhibit 1). Student 1 may receive a lot of A's in their first semester only to receive terrible grades in their second semester. Student 2 may be a solid B student and who never gets any grade below C. By doing a visual comparison of the two students, it would seem that Student 2 is more reliable and consistent. However, both students have the same 2.9 GPA.

Soh (2011) offers a few possible solutions to the problems found with current GPA calculations. One possible solution would be to separate relevant from less relevant grades. If a student is applying for admission to graduate school that offers an MBA, then it would be useful to separate the grades the student received in business-related courses. Another possible method of determining a more meaningful GPA may be to use the mode or median in terms of letter grade. If a student earns a B more than any other grade, then it may be as simple as assigning the student a B to represent their overall grade profile.

A student's mental approach and mindset in regards to college can have a definite impact on their GPA. Maleva, et. al (2014) conducted a study which focused on a student's attribution style. The way a student perceives events has a direct correlation with their GPA. If a student has an optimistic approach to grades, they tend to blame external factors for bad grades. A student is far more likely to regroup and improve their grades if they believe the cause for prior low grades was due to external factors that are unlikely to persist. For example, if a student believes a particular professor was too difficult, they will attribute poor performance to that factor. If they do well in other classes under other professors, then they will attribute poor performance to the professor, not themselves. Therefore, going forward, if they don't encounter the same professor again, the student will believe they will do well in each class. Professor is just one factor. If a student is optimistic, they won't attribute poor grades to themselves. They look at situational factors and don't lose confidence. In contrast, a student with a pessimistic approach will blame internal and unchanging factors (such as their belief regarding their own intelligence) and view their grades as something they cannot improve. This leads to depression which in turn leads the student to give up and not persist in their academic efforts.

Maleva, et. al (2014) noted that attribution style isn't specific to academics. A person can approach all aspects of life from an optimistic or pessimistic mindset. Also, there is some question as to the validity of using attribution style to predict GPA. While statistically significant, as a predictor, there are things other than attribution style which could account for GPA results. Other factors such as age, gender, cultural background, IQ, and SAT scores can play a role in GPA as well. It is problematic to attribute psychological factors to GPA but if a school were able to find common factors amongst students with lower GPAs it could conceivably intervene and address specific issues.

Grades are an imprecise measure and GPA can be correlated with many different factors. Dickinson and Adelson (2016) warned that the manner in which certain information is obtained can have an impact on results. For example, if a researcher wants to determine the impact of student-teacher relationship on GPA, the manner in which that question is asked can have an unintended influence over the results. College often use scores on state assessment tests. Dickinson and Adelson (2016) caution that this may not be the proper way to predict college GPA. State assessment tests are typically multiple choice and in some cases easier to answer than more detailed questions that could be administered by individual teachers. Further, GPA sometimes reflects a professor specific method of grading such as using a curve.

Often, the potential of a student can be determined relatively early in their academic career. Gayles (2012) performed a study which showed a very high correlation between a student's first year GPA and their Cumulative GPA at Graduation, the likelihood a student will graduate with honors, and the likelihood a student will graduate within 6 years. Gayles found that this correlation is highest in regards to African American students, so first year GPA should be of particular interest to HBCUs.

Another issue that needs to be examined is the quality of a student's classmates and the impact group work may have on GPA. Grzmek, et. al (2014) hypothesized that all things being equal, all students will seek to maximize their GPA. Their belief was that students with high GPAs would be less welcoming of group assignments and would prefer they be assigned to groups that possess the following traits:

- 1) Group members are of similar ability
- 2) Group is small in size
- 3) Students not carrying their weight can be expelled
- 4) Each member is graded individually based on their contribution as opposed to a single group grade being assigned.

Likewise, Grzmek, et. al (2014) hypothesized that students with low GPAs would be more welcoming of group assignments because groups offer potential benefits. If the group is diverse, then the contribution of the lower GPA student is mitigated and combined with the better contributions of students with high GPAs. If expelling members of a group is not allowed, it adds even more protection for the lower GPA student. If each member of the group is assigned the same grade, the lower GPA student would benefit.

Interestingly, Grzmek, et. al (2014) concluded that business majors are less opposed to group work than non-business majors. They postulate that this may be a result of the fact that business students understand the need to work in groups in their professional careers or the fact that business professors assign individual grades even in group situations.

Our GPA calculator was designed with these studies in mind.

Norfolk State University uses Datatel Colleague for student registration and grade information. It provides a simple platform for exporting grades. These grades could then be placed in our GPA calculator and in that format could be used to assist students in estimating the grades they need to improve their GPA or reach a target GPA. New classes can easily be added to the calculation of overall GPA. In addition, if a student retakes a course at NSU, the student's subsequent attempt replaces the first attempt. The first attempt, for purposes of GPA calculations, is treated as though it never occurred. Therefore, if a student retakes a class that they originally failed, their GPA would improve dramatically if they earned an A on their second attempt.

The grade records for 50 different students were exported from Datatel and imported into our spreadsheet. The GPA calculated by our spreadsheet was compared to the GPA calculated by the Datatel system to ensure the accuracy of the spreadsheet's GPA calculation.

We then devised a metric based on Koper, et. al (2015). That study argued that GPAs are often unreliable and do not represent the true value of the student's capability. As a means to adjust for GPA inflation and inaccuracies they devised a method to determine 'Real GPA' which adjusted grades for class averages and the GPA for an average student at a university.

The system we devised is for a business major. Specifically an accounting business major. We took the GPA of a recent NSU School of Business Graduate who earned their Master's Degree in Accounting from The College of William and Mary and was hired by a national CPA firm. As an accounting student, this person represents an ideal trajectory in terms of academic and professional accomplishment.

Borrowing from Koper, et. al (2015) we devised two separate alternate measures of this student's GPA. Given the student's subsequent academic success in a graduate program at another school, one could view that student's GPA as ideal. If that is the case, then the GPA could be adjusted so that their nominal (NSU calculated) GPA of 3.740 represents a 4.0 GPA.

If that is the case, then a class by class comparison of this student's performance with the performance of another NSU accounting major would be useful. If a student earned a better grade than the ideal student, their GPA would increase relative to the ideal student's GPA. If a student earned a lower grade, their grade would reflect the same relative decrease compared to the ideal student's GPA.

In this study, the ideal student's GPA was compared to a student who had an overall GPA of 2.538. If this GPA were compared to the ideal GPA, the Real GPA of this student would be stated as 2.738. The Real GPA in this case is higher than the nominal GPA. Simply put, if the ideal student's GPA represents a 4.0 on an adjusted scale, this student's GPA represents a 2.738 GPA on that same adjusted scale. Psychologically speaking, if a student is given an adjusted GPA higher than their nominal GPA, it could serve as positive motivation and increase confidence. This would be especially useful for students with a pessimistic mindset.

Also, by taking the entire overall academic performance of the ideal student, the concepts of first year GPA, final GPA, and student graduating with honors (the ideal student graduated Summa Cum Laude) are all taken into account. Further, this student successfully completed a master's degree. Therefore, it can be argued that if another student's GPA closely resembles the ideal student's GPA, they are likely to succeed in post-graduate efforts. In addition, a student majoring in accounting or another business major is likely to have the same professors. As a result, any effects from group work would be accounted for as student grades are being compared for the same class and the same professor in most cases.

Koper, et. al (2015) tried to calculate a nominal GPA based on individual average class grade and average student GPA. In our model, we calculated a second Real GPA which restated the ideal student's GPA assuming that the average grade in each class is a B and that the average student GPA is 2.5. The College of William and Mary requires a 3.10 undergraduate GPA to be considered for admission. Presumably, that is the quality of work a student needs to exhibit at the undergraduate level. Each undergraduate school would need to apply its own circumstances to calculate a Real GPA similar to the one we calculated for our student. Under our second Real GPA calculation, the ideal student's GPA of 3.740 was deflated to 3.116, which just happens to coincide with William and Mary's GPA

requirement. Though our study examined only one student's GPA, further testing would have to be applied to determine its accuracy. However, the fact that the second Real GPA calculation for this student matched William and Mary's minimum GPA requirement and our student successfully completed their master's degree at William and Mary, at first glance, this calculation seems to be accurate.

Our average student's nominal GPA of 2.538 would be adjusted to 2.115 in regards to our second Real GPA calculation. This means that for purposes of graduate school, the average student would be a full grade point below the 3.10 minimum requirement. Based on these calculations, the average student would have a very difficult time succeeding at the post-graduate level.

It is crucial for Colleges and Universities to demonstrate that they place a high priority on their students. The students are the customers. Therefore, any tool to assist students in planning and reaching their goals is very important. Our GPA Calculation Tool looks at student GPA from different aspects. It can not only calculate a student's nominal GPA, but also their Real GPA in terms of an ideal student's GPA, and their Real GPA adjusting for average grades and average GPAs. This tool can be used to help a student improve their GPA and it shows how they measure up against our best students. It also can be used to calculate a student's chances of success at the post-graduate level.

#### Exhibit 1:

	Student 1	Student 2
	Grade	Grade
Class 1	A	B
Class 2	A	B
Class 3	A	B
Class 4	A	C
Class 5	A	B
Class 6	A	B
Class 7	C	B
Class 8	F	B
Class 9	D	B
Class 10	C	B
GPA	2.9	2.9

#### References:

- Dickinson, E. R., & Adelson, J. L. (2016). Choosing Among Multiple Achievement Measures. *Journal Of Advanced Academics*, 27(1), 4-22. doi:10.1177/1932202X15621905
- Gayles, J. (2012). Race, Late Bloomers and First-year GPA: Predicting beyond the Freshman Year. *Educational Research Quarterly*, 36(1), 13-29.
- Grzimek, V., Marks, M. B., & Kinnamon, E. (2014). Do Differences in GPA Impact Attitudes About Group Work? A Comparison of Business and Non-Business Majors. *Journal Of Education For Business*, 89(5), 263-273. doi:10.1080/08832323.2013.872591
- Koper, P. T., Felton, J., Sanney, K. J., & Mitchell, J. B. (2015). Real GPA and Real SET: two antidotes to greed, sloth and cowardice in the college classroom. *Assessment & Evaluation In Higher Education*, 40(2), 248-264. doi:10.1080/02602938.2014.904272

- Maleva, V., Westcott, K., McKellop, M., McLaughlin, R., & Widman, D. (2014). Optimism and College Grades: Predicting GPA From Explanatory Style. *Psi Chi Journal Of Psychological Research, 19*(3), 129-135.
- Soh, C., (2011). Grade point average: what's wrong and what's the alternative?. *Journal Of Higher Education Policy & Management, 33*(1), 27-36. doi:10.1080/1360080X.2011.537009