

Analyzing Grade Inflation in Engineering Education

Raul Ramirez-Velarde^[0000-0001-7186-1914], Laura Hervert-Escobar^[0000-0003-2465-7106] and Neil Hernandez-Gress^[0000-0003-0966-5685]
Tecnológico de Monterrey. Eugenio Garza Sada 2501 Sur, Col. Tecnológico, Monterrey, N. L., Mexico, 64849.

Abstract. Grade inflation is a complex phenomenon observed predominantly in institutions like the Tecnológico de Monterrey and English-speaking universities, with sporadic instances in certain European regions. Its causes are multifaceted, ranging from competition among universities for prestigious opportunities to shifts in teaching and evaluation methods. Efforts to curb grade inflation, such as limiting grade distribution and publishing course averages, have had mixed success. We carry out both ChatGPT led and traditional bibliographical research to understand its causes, identify successful strategies, and adopt a collaborative, systemic approach that can effectively control grade inflation without compromising teaching standards or exacerbating student stress.

Keywords: Grade inflation, Education Evaluation, Teaching standards.

1 Introduction

Grade inflation is defined as the tendency for average grades to increase over time, resulting in a higher proportion of students receiving high grades compared to previous periods. Grade inflation is present at all levels of higher education all around the world. Is a global phenomenon that has many negative implications on the quality of engineering education. As we will see, many prestigious universities have tried to control it with limited success.

In this paper, we first explore grade inflation on a global level, and then make recommendations for controlling grade inflation within Tecnológico de Monterrey. This is conducted in two parts. **First**, a **conversation with ChatGPT** is undertaken to quickly summarize the problem and attempt to obtain bibliographic references. In the **second** part, a bibliographical review is conducted without ChatGPT assistance using **traditional bibliographic sources**. Finally, in the third part, we produce recommendations for grade inflation control policies that can be adopted by higher education institutions.

2 First Part: A Conversation with ChatGPT

Researcher: At university level, what is understood as grade inflation?

ChatGPT: Grade inflation at the university level refers to the phenomenon where there is a **consistent increase** in average grades over time without a **corresponding increase in the quality of student performance** or academic standards. In simpler terms, it means that students are receiving higher grades for the same level of achievement compared to previous years. This trend can occur across various disciplines and institutions and may have several underlying causes, including changes in grading practices, academic policies, student expectations, and institutional pressures. Grade inflation can have implications for academic integrity, credibility of qualifications, and perceptions of student achievement.

Researcher: What are the characteristics of grade inflation at university level?

ChatGPT: Grade inflation at the university level typically exhibits several characteristics:

1. **Consistent Increase in Average Grades:** One of the primary characteristics is a steady rise in the average grades awarded to students over time. This increase often occurs across multiple courses, departments, or even entire institutions.
2. **Increasing Disproportion of high Grades:** There is a disproportionate increase in the number of A grades compared to lower grades. A higher percentage of students are receiving A grades, contributing to an overall upward shift in the grade distribution.
3. **Narrowing Grade Distribution:** Grade inflation often leads to a compression of the grading scale, with a higher proportion of students receiving top grades (A's or equivalent) and fewer students receiving lower grades (C's or below). This narrowing of the grade distribution makes it challenging to differentiate between levels of student achievement. This is called Grade Compression.
4. **Decrease in Academic Rigor:** Grade inflation may coincide with a perceived decrease in academic rigor, where it becomes easier for students to earn higher grades without demonstrating a commensurate level of knowledge or skill mastery.
5. **Inconsistent Performance:** Despite receiving higher grades, students may not necessarily demonstrate improved academic performance or mastery of course material. This discrepancy between grades and actual performance is a hallmark of grade inflation.
6. **Normalization of High Grades:** There may be a societal expectation or norm that students should achieve high grades, leading to pressure on instructors to assign inflated grades to avoid student dissatisfaction or complaints.
7. **It's Pervasive:** Grade inflation may not be limited to specific departments or disciplines but can be observed across various fields of study and institutions, albeit to varying degrees.

Researcher: What are the negative effects of grade inflation in university level engineering education?

ChatGPT: Grade inflation in university-level engineering education can have several negative effects:

1. **Diminished Academic Rigor:** Grade inflation may lead to a decrease in academic rigor within engineering programs, as students may perceive that they can achieve high grades with minimal effort. This can compromise the quality of education and the development of essential engineering skills.
2. **Impact on Motivation:** Students may have less motivation to strive for excellence if they perceive high grades as easily attainable. This can affect overall motivation to engage deeply with the material and pursue academic challenges.
3. **Undermining Student Effort:** In an environment of grade inflation, students may perceive that they can achieve success with minimal effort. This undermines the value of hard work and may contribute to a culture of academic entitlement.
4. **Misleading Transcripts and Mismatch between Grades and Competence:** Inflated grades may no longer accurately reflect students' actual competence and mastery of engineering concepts and skills. Employers and graduate programs rely on grades as indicators of proficiency, and grade inflation can lead to a misrepresentation of students' abilities.
5. **Erosion of Credibility:** Grade inflation undermines the credibility of academic credentials earned in engineering programs. If grades are inflated, employers, licensing bodies, and professional organizations may question the rigor and quality of engineering education, potentially leading to a loss of trust in graduates' abilities.
6. **Reduced Motivation for Excellence:** When students perceive that high grades are easily attainable, they may become less motivated to strive for excellence and may prioritize achieving high grades over genuine learning and skill development. This can hinder their long-term success in engineering careers where competence and innovation are essential.
7. **Decreased Differentiation among Students:** Inflated grades make it challenging for employers and graduate programs to differentiate among engineering graduates based on academic performance. This can result in difficulties in identifying the most qualified candidates for employment or further academic pursuits.
8. **Decreased Accountability from Faculty:** Faculty members may face reduced accountability for maintaining high academic standards if there is pressure to inflate grades. This can impact the overall quality of the education provided. **Impact on Accreditation and Ranking:** Grade inflation may affect the accreditation status and rankings of engineering programs. Accreditation bodies assess the quality and rigor of engineering education, and grade inflation may raise concerns about the program's ability to adequately prepare students for professional practice.
9. **Mismatch in Student Expectations:** Grade inflation can create a mismatch between students' expectations of their academic performance and the actual demands of the engineering profession. Students may enter the workforce with inflated perceptions of their abilities, leading to challenges in meeting employer expectations and performing job responsibilities effectively.
10. **Long-Term Implications for Engineering Profession:** If grade inflation persists unchecked, it can have long-term implications for the engineering profession as a whole. A workforce with inflated academic credentials may struggle to meet the evolving demands of the industry, potentially affecting innovation, safety, and public trust in engineering solutions.

Addressing grade inflation in engineering education is crucial to maintaining the quality and integrity of engineering programs and ensuring that graduates are adequately prepared for the challenges of professional practice.

Researcher: According to published bibliography, what are the main causes of grade inflation?

ChatGPT: According to published literature, several main causes of grade inflation have been identified. These include:

1. **Changing Grading Standards:** Some studies suggest that there has been a shift in grading standards over time, with instructors becoming more lenient in assigning grades. This leniency may be influenced by a variety of factors, including a desire to keep students satisfied or institutional pressures.
2. **Student Expectations and Consumer Mentality:** The perception that higher education is a service that students pay for has led to a consumer-oriented mentality. Instructors may feel pressure to meet students' expectations for high grades to ensure positive evaluations and maintain enrollment.
3. **Grade Compression:** Grade compression occurs when the range of grades awarded becomes narrower, making it more difficult to distinguish between high and low performers. Some argue that this compression is a result of grade inflation, as higher grades become more prevalent.
4. **External Pressures and Accountability:** Universities face external pressures for accountability and may be influenced by factors such as rankings, accreditation, and funding. In response, institutions may be inclined to maintain or increase average grades to present a positive image.
5. **Student Evaluations of Teaching (SETs):** Research has shown a correlation between lenient grading and positive student evaluations. Instructors may be motivated to give higher grades to receive positive feedback from students, which can impact their teaching evaluations and, in turn, their professional standing within the institution.
6. **Competitive Environment:** Concerns about student retention and attracting new students, particularly in a competitive higher education market, may drive institutions to maintain high average grades to appeal to prospective students and their families.
7. **Pressure on Faculty:** Faculty members may face pressure to give higher grades to avoid negative evaluations, especially in institutions where student feedback significantly influences faculty evaluations and promotions.
8. **Lack of Standardization:** Differences in grading practices and standards among courses and departments within an institution may contribute to grade inflation. The lack of standardization makes it difficult to maintain consistent grading practices.
9. **Merit-Based Financial Aid:** The relationship between high grades and financial aid or scholarships can create incentives for students to seek higher grades. This, in turn, can lead to increased pressure on faculty to inflate grades.

10. **Faculty-Student Relationship:** Positive relationships between faculty and students may lead to reluctance to assign lower grades. This is sometimes referred to as the "pleasing the professor" phenomenon.
11. **Generational Changes:** Changes in the characteristics and expectations of incoming student cohorts can influence grading practices. Some argue that newer generations of students may expect higher grades for their efforts.

These causes are often interconnected and may vary in significance depending on the specific context of each institution. Additionally, new research may continue to shed light on additional factors contributing to grade inflation.

Researcher What are the main published bibliographical references for grade inflation?

ChatGPT: ChatGPT's answer was 6 bibliographical references that were verified using Google Scholar and turned out to be non-existent.

Researcher What policy and methodological changes have been successfully implemented to reduce grade inflation?

ChatGPT: Addressing grade inflation often requires a multifaceted approach involving both policy changes and methodological adjustments. While there isn't a one-size-fits-all solution, several strategies have been suggested or implemented to mitigate grade inflation. It's important to note that the effectiveness of these measures can vary across institutions. Here are some policy and methodological changes that have been considered or implemented:

Several policy and methodological changes have been implemented to successfully reduce grade inflation. These include:

1. **Standardized Grading Guidelines:** Implementing clear, institution-wide grading standards to ensure consistency in evaluation criteria. Providing faculty with guidelines on how to assign grades based on specific learning outcomes helps maintain transparency and fairness in grading practices.
2. **Regular Grade Audits:** Conducting regular audits of grading patterns to identify departments or courses with unusually high grade distributions. Reviewing and discussing grading practices in departments helps ensure alignment with institutional standards and promotes accountability among faculty members.
3. **Grade Distributions Transparency:** Making grade distributions public to increase transparency and accountability. Sharing information on grade distributions with students, faculty, and administrators fosters a culture of openness and encourages discussions on grading practices.
4. **Faculty Development:** Providing training and workshops for faculty on effective grading practices. Faculty members can benefit from learning about research-based strategies for fair and consistent grading, as well as techniques for providing constructive feedback to students.

5. **Revision of Grading Policies:** Reconsidering and revising grading policies, including the use of curve grading systems. Implementing policies that discourage grade inflation and emphasize the importance of maintaining academic rigor can help address systemic issues contributing to inflated grades.
6. **Institutional Culture Shift:** Promoting a culture that values high academic standards and emphasizes learning outcomes over grades. Recognizing and rewarding faculty for maintaining rigor in their courses can help reinforce a commitment to excellence in teaching and assessment.
7. **Use of External Examiners:** Introducing external examiners or peer review processes to evaluate the fairness and appropriateness of grading practices. Seeking external input on grading standards helps ensure objectivity and provides valuable insights for improving assessment practices.
8. **Incentives for Honest Grading:** Recognizing and rewarding faculty who maintain high standards in their grading. Ensuring that promotion and tenure decisions consider a commitment to maintaining academic rigor encourages faculty members to prioritize fairness and integrity in their grading practices.
9. **Implementation of Plus-Minus Grading Systems:** Transitioning to a plus-minus grading system, which provides more granularity in assessing student performance and can reduce grade inflation by distinguishing between marginal differences in achievement.
10. **Assessment of Learning Outcomes:** Shifting the focus from grades to a more comprehensive assessment of learning outcomes. Emphasizing the importance of formative assessment and feedback throughout the course helps ensure that grades accurately reflect students' mastery of course content and skills.
11. **Grade Normalization:** Implementing policies to normalize grades across courses or departments. Adjusting grades based on historical performance data to account for variations in grading practices.
12. **Incentivizing Rigor:** Creating incentives for faculty to maintain high academic standards. Recognizing and rewarding faculty who uphold rigorous grading practices, possibly linking evaluations and promotions to the maintenance of academic rigor.

It's essential to recognize that these measures may have different impacts depending on the specific context of each institution. Successful strategies often involve a combination of policies and practices that are tailored to the unique characteristics of the institution and its academic programs. Regular assessment and adaptation of these strategies are crucial to ensure their effectiveness over time.

End of Part 1, ChatGPT assisted research.

3 Second Part. Traditional Bibliographical Search

Although ChatGPT couldn't find bibliographic references on grade inflation, only on effective assessment techniques (not shown); conducting a traditional bibliographical research did yield a significant number of references. Grade inflation has been

under discussion since the 1970s, with the topic resurfacing each decade. The bibliographic references presented span from 1991 to 2021, encompassing 30 years of discourse on grade inflation. The discussion is structured into the same sections as with ChatGPT:

1. The causes of grade inflation
2. The effects of grade inflation
3. Policies and methodologies aimed at controlling grade inflation.

We will find that the results seen in the bibliography are largely contained within the responses provided by ChatGPT. To continue this investigation, we define grade inflation as the increase in the average final grade across various courses required for obtaining a university degree and the rise in the number of maximum grades awarded.

3.1 Causes of grade inflation

In the early 1990s and at the beginning of the millennium, when discussions about grade inflation began, some research indicated that grade inflation did not exist. For instance, Kohn in 2002 [1].

There are also studies suggesting that the primary cause of grade inflation is simply that students are getting better, such as Jephcote et al [2] and Bar et al [3]. However, much of the literature mentions that rigorous statistical studies do not show that students are improving; rather, there is evidence indicating that students are spending less time studying and that other factors are at play.

Regarding other causes, two important references are Lindsay, and O'Halloran and Gordon. Based on these two references, we will compile a list of causes and indicate authors who agree. According to Lindsay, the main causes are a list of beliefs that rigorous statistical studies **have shown to be mistaken** [4]:

1. Grades do not influence faculty evaluation.
2. Student evaluations of their professors are a reliable measurement of institutional effectiveness.
3. Abundance of high grades in a course indicates high student achievement.
4. The selection of programs and courses is not affected by the grade expected by students.
5. In loosely regulated environments, the meaning of a numerical grade is not consistently and objectively the same across different classes, departments, majors, and institutions.

In reality, research has shown the following [4]:

1. Differences in grading practices by professor's **bias students' evaluations of the professor**. There is a relationship between the grade students expect and the expected grade point (EGP), Eiszler C. F. [5].

2. Student evaluations of professors are **not a reliable indicator of a professor's effectiveness in the classroom** and can only explain a small portion of the variance in learning.
3. High grades in students **cannot be associated with high levels of achievement** and learning.
4. Differences in grading leniency have a substantial impact on student enrollment and **cause fewer students to select fields that are more demanding in grading.**
5. There are systematic **differences in grading leniency among disciplines, departments, and instructors**, and these differences cause serious inequities in establishing student competency levels.

According to O'Halloran and Gordon [6], the causes of grade inflation can be classified based on their origin into **endogenous** and **exogenous** factors and based on the related actors into **social, institutional, departmental, and individual factors**:

Exogenous Factors

Exogenous factors are generally social factors, which are due to the environment in which higher education institutions operate.

1. **Regulatory environment.** Accreditation processes establish minimum standards in terminal efficiency, time to first employment, acceptance percentage in graduate school.
2. **Competitive environment.** Institutions compete with institutions at their same level, trying to demonstrate that they improve learning outcomes. A rigorous assessment of an institution may disadvantage its graduates when compared to graduates from another institution with higher grades for employment and graduate school access. Nordin et al [7], Finefter-Rosenbluh and Levinson [8] agree on this.

The rest of the factors are endogenous, or internal to the institutions.

Institutional Factors

3. Allowing students to **drop courses** until very late in the semester. Typically, the courses that are dropped are those in which the student has obtained low grades.
4. **Poor course distribution**, which allows students to **take fewer courses in mathematics, sciences, foreign languages**, etc., which typically give lower grades.
5. The use of **student evaluations of faculty** as the sole source of performance evaluation in the classroom.

Departmental Factors

6. The difference in the average grades obtained in different departments causes students **not to select subjects** in which their average may decrease. Also, Lindsay [4].

Individual Factors

7. The need for students **to maintain their GPA to retain scholarships** drives them to select majors and courses where they can achieve higher grades with less risk.
8. **Student evaluations of professors.** Professors who are not full-time or those who are just starting tend to give higher grades to avoid confrontations with students and not jeopardize their professional careers by receiving poor evaluations. Additionally, professors, departments, and institutions are penalized when grades are low, Finefter-Rosenbluh and Levinson [8], Germain and Scandura [9], Stroebe [10].
9. **Grade distribution is not merit-based** and responds to rather vague notions.
10. The **use of curves** to improve exam outcomes.
11. Allowing students **to select the best grades to calculate the final average.** For example, if a student submits 4 assignments, allowing them to receive a low grade on one and only selecting 3 for the final average.
12. Providing **multiple opportunities** to submit assignments and take exams.
13. **Avoiding conflicts with students and parents.** Students have an idea of how much they have learned and exerted themselves and may initiate conflicts with professors to raise their grades to what they believe they deserve or need. Sometimes parents support their children. Also, Donaldson et al [11].
14. **Reducing academic requirements** to meet outcome expectations. Professors simply lower academic requirements so that high averages and outstanding grades align with expectations.

To these factors, according to Donaldson et al [11], the following should be added:

15. **Lack of training** for evaluators to use concrete merit-based criteria.
16. **Evaluator-student relationship.** As evaluators get to know the students better, they are reluctant to give low grades or do not wish to harm their future prospects. Paskausky et al [12], Finefter-Rosenbluh and Levinson [8] agree on this.
17. **Design of assessment tools.** Sometimes, assessment tools lend themselves to giving high evaluations, such as peer evaluations or rubrics with very generic indications in the delivery of practical work.
18. Many students failing the course **reflects poorly** on the professor's image.

The effects of grade inflation

Grade inflation has a plethora of negative effects that can be challenging to identify because they are not always evident. Let's begin with Lindsay [4]:

1. **Dilutes the value of schools, departments, and faculty with high academic standards.** According to Paskausky et al., it casts doubt on the competencies of graduates [12]. And according to Finefter-Rosenbluh and Levinson, a) universities cannot use grades to identify outstanding students, and employers cannot distinguish them, and b) it reduces academic standards and undermines faculty integrity [8]. According to Stroebe, it incentivizes poor teaching practices, and grades lose their value as a measure of teaching effectiveness [10].

2. **Discourages effort in students.** And according to Bar et al., students know which professors give higher grades and which professors are better evaluated, and they prefer them [13]. According to Finefter-Rosenbluh and Levinson, a) Poor effort receives average grades, b) Students have an inflated idea of their actual capabilities. Stroebe agrees [10], as do Rojstaczer and Healy [14].
3. **Makes it difficult for employers to distinguish student performance levels.** Tyner also agrees [15]. Consequently, according to Paskausky et al., it casts doubt on the competencies of graduates [12].
4. **Discourages the recruitment of students in engineering and sciences.** Sabot and Wakeman-Linn agree [16], as do Stroebe [10], and Rojstaczer and Healy [14].

Additionally, according to Sabot and Wakeman-Linn [16]:

5. **Creates differentiation in the average grades at the departmental level.** Departments of humanities, political science, philosophy, and art have higher averages than departments of economics, chemistry, and mathematics.
6. Students whose majors belong to departments with high grading averages **respond less to incentives to achieve good grades.**
7. Grades of students in majors in departments with high averages are **less predictive of future success** and do not allow differentiation in student competencies such as skill, knowledge, organization, motivation, etc. On this, Stroebe and multiple other references indicate that student effectiveness in subsequent courses is reduced [10].

Policies and methodologies attempting to control grade inflation

The literature indicates that only a handful of grade inflation control practices have been implemented and have worked, albeit at a significant cost. Some, like the control of the maximum number of grades that can be awarded, have even been abandoned after a while. Let's first review the proposals. Let's begin with Lindsay [4]:

1. **Dialogue between institutions and areas of knowledge.** That is, a comprehensive reform in the evaluation process that has winners and losers. Sabot and Wakeman-Linn mention [16], related to this, a) policies must be developed to equalize the averages of different departments, and b) differences in averages between departments should only be due to a design that responds to specific needs.
2. **Training for teachers and establishment of rules and best grading and evaluation practices.** In other words, evaluation workshops. Donaldson et al. agree [11], suggesting that workshops train teachers to use reasoned evaluation, providing evidence for grading decisions and specific criteria. Even O'Halloran and Gordon suggest measuring academic rigor [6]. There is a zone of rigor that is the middle ground. If students feel that it is necessary to attend class to learn, the teacher will be better evaluated. For example, if techniques are used explicitly designed to prepare students to achieve the best result in their exams, students will be more convinced that they are being treated fairly. Additionally, establishing evaluation rules clearly from the beginning also convinces the student that the teacher is treating them fairly.

3. **Limiting grade distribution:** a) The average must fall within an interval (e.g., 85 ± 5) or b) the accumulation of grades must be limited. Butcher et al. agree [17], as do O'Halloran and Gordon [6].
4. **Reporting adjusted grades on transcripts or alternatively the student's position in the group.** Stroebe also agrees [10]. Adjustment sometimes involves reducing the grade by a certain percentage, something that students naturally see as very unfair. Bar et al. add [3] that the average assessment of each professor should be published. This measure was implemented and abandoned because in the Cornell University system, students have a lot of freedom to choose their courses. Students preferred courses where the reported average was higher, which further fueled grade inflation. Finefter-Rosenbluh and Levinson suggest doing more [8]: a) include on the report card not only the grade but also the average, median, mode, grade distribution, and the student's position in the class (or at least whether their grade is above or below average), and b) pay more attention to the differences between the maximum and minimum grades than to the group average.
5. **Control the maximum number of high grades** that can be awarded in a group (e.g., 35% of grades between 90 and 100). This eliminates cooperation among students and increases stress because it creates a competitive environment.
6. **Decrease the role of SETs in evaluating teachers' performance in promotions and salaries to eliminate the incentive to give better grades in exchange for better evaluations.** O'Halloran and Gordon add [6], a) do not base teacher evaluation solely on student opinion but use a multi-source approach that takes into account not only student opinion (which is a valuable tool) but also the learning resources portfolio and visits from specialists and other teachers in the classroom. Additionally, they suggest b) not using the same evaluation method for teachers at all levels. Teachers at the beginning of their careers are more vulnerable than teachers with an established career.

And according to Finefter-Rosenbluh and Levinson [8]:

7. **Use standardized exams.** Gershenson also suggests [18].
8. **Increase rigor.** That is, be stricter in the criteria for achieving certain grades.
9. **Combine the grade awarded by the teacher with the grade achieved on a standardized exam using adjustable percentages.** However, it is mentioned that these percentages can be sources of bias if not properly adjusted.

The traditional bibliographical research results just presented agree with the results given by ChatGPT. There is no contradiction and most of ChatGPT results have been validated with reviewed bibliographical references.

4 Third Part: Recommendations for Controlling Grade Inflation

One of the main issues affecting institutions that have implemented controls on grade inflation is that, indeed, the grade average of graduates decreases and puts them at a disadvantage against graduates from other universities of the same level. This indicates

that the problem is systemic. The solutions implemented must involve the largest possible number of participants. In other words, the problem should preferably be addressed by initiating a dialogue between similar institutions with the aim of disadvantaging those institutions that do manage to control inflation. The same applies to schools, departments, and naturally individuals. An institution that effectively controls grade inflation may experience a decrease in enrollments, as demonstrated by multiple references mentioned above. A department that implements control measures may find that faculty evaluations decrease, that some courses have fewer students, and that student averages also decrease. There are multiple references that prove that a strict professor will face tougher student evaluations unless they control several circumstances that can mitigate the impact.

If measures were to be implemented to control grade inflation, focus should be on the most mentioned causes: **Evaluation instruments and student evaluations of professors. Institutional policies** would come next.

Evaluation Instruments

1. **Assessment workshops.** To standardize evaluation criteria across subjects, departments, and schools, it would be convenient to develop workshops where professors practice grading different assessment instruments, such as challenges, engineering exams, humanities and administrative sciences exams, and final projects. It is important that rubric designs contain 100% clear and realistic criteria. It is absurd for 80% of the group to receive an outstanding evaluation.
2. **Standardized final exams, especially in the early academic periods.** On every occasion where student grades did not correspond to their actual learning, it was because they were compared against standardized exams, such as the SATs in the U.S. Therefore, developing standardized exams for a larger number of subjects can help control grade inflation. This would probably be more effective in the initial semesters to ensure high academic levels in basic subjects.
3. **Exams developed by other professors.** If it is not possible to develop standardized exams for all subjects, at least the final exam presented should not be developed or graded by the instructor, but by another professor.
4. **Audit or reflection on evaluations.** It would be convenient to routinely conduct an exercise to review and reflect on the final grade awarded by the professor to a group of students, listening to the professor's reasoning and contrasting it against the opinions of other professors. This should not necessarily mediate any incidents or dissatisfaction but rather serve as a calibration reflection.
5. **External evaluators.** The caveat is that often, no training is provided to the training partner on evaluating the deliverable. Additionally, it is possible to bring in external evaluators for all types of teaching methods, even for traditional classes with assignments and exams. Naturally, the cost of bringing in external evaluators is high, so careful selection must be made of those subjects that require an external evaluator with a high level of excellence and academic rigor.

6. **In the early courses, perhaps the first two years of the degree, standardize the obtained grade and report the group's average.** Grade standardization involves subtracting the mean and dividing by the standard deviation. Suppose for a subject α , Professor A assigns the following grades: 73, 76, 77, 78, 81, and Professor B assigns the following grades: 86, 86, 87, 88, 88. The average of group A is 77, while the average of group B is 87. The dispersion of grades is also greater in group A than in group B. In group A, the difference between the highest and lowest grades is 8, while in group B, it is 2. The worst graded student in group B, student 6, has a grade of 86, which is higher than the best grade in group A, which is 81 from student 5. Under these circumstances, it seems that student 6 is a better student than student 5. However, if we subtract the mean from each grade and divide it by the standard deviation, standardization returns the grade in standard deviations from the mean. Thus, group A has -1.37, -0.34, 0, 0.34, and 1.37, while group B has -1, -1, 0, 1, and 1. In this way, student 5 in group A has a grade that is 1.37 standard deviations **above the mean**, while student 6 in group B has a grade that is -1, that is, one standard deviation **below the mean**. In group A, the minimum passing grade of 70 has a standardization of -2.4 (standard deviations from the mean), so in a group of 30 students, the probability of failing is 0.012. In group B, the standardization of 70 is 6.38×10^{-17} , which makes the probability of failing zero.

It is important to clarify *that we cannot know if the difference in the group average is because Professor A is stricter in grading or because Professor B is a teacher who inspires students to excel*. The only way to know would be to a) compare against standardized exams, b) review by professors who teach the same course, or c) track student grades in subsequent courses. However, we no longer have the image that student 6 is surely better than student 5. Perhaps, it is quite the opposite.

7. **In advanced courses, perhaps in the last two years of the degree, control distribution by limiting the number of maximum grades that can be awarded.** In courses with many projects, limiting the number of maximum grades can create an environment of healthy competition that can showcase those teams that truly make an exceptional effort.

Teacher Evaluation

8. **Retain student evaluations of their professors as a valuable feedback tool.** This evaluation provides very valuable information that must be considered to improve groups. However, it must be understood that this evaluation measures student satisfaction in the course, not their learning or the teacher's performance in the classroom. This evaluation gives students a voice that must be heard and considered, as long as it is truthful and well-intentioned.
9. **Use a portfolio of learning resources and visits from pedagogy specialists and colleagues from the field of knowledge in the classroom (or record the session).** The literature clearly indicates that using student evaluations of professors as the sole instrument to measure a professor's performance in the classroom, in such a way that it is a very important factor in hirings, promotions, and salary increases, is one of the main causes of grade inflation. It is important, therefore, to develop a

multidimensional system for evaluating a professor's performance in the classroom. This should include portfolio review, student results in standardized exams, student performance in subsequent courses, evaluation by both pedagogues and professors from the same area, etc.

10. **Celebrate rigor and high academic standards.** There are many types of awards and distinctions given to professors within and outside the institute. Some individuals are rightly distinguished for their excellent results in student evaluations, others for being leaders in their area of development, others for their ability to attract students, etc. But do we celebrate rigor and high academic standards? How could we measure this? After all, a professor's job, above all, is to achieve in the student a deep understanding of complex phenomena. How exactly does a university measure the level of rigor and demand, and its effects over time, and how are professors who have largely been responsible for the institution's great prestige celebrated? This is an open question.

Institutional Policies

11. **Do not allow students to drop a course in which they are failing too late in the academic period.** Naturally, eliminating courses with poor performance will increase the average grades. It has the same effect as allowing a student to choose their best graded assignments to calculate their grade in the subject.
12. **Do not allow grade curves on exams.** Curves favor students with better performance. And if a grading correction system is developed that helps students with poor performance in the same way (for example, adding X points to all students' grades), it will also raise the institution's average grades.
13. **Limit flexibility in selecting elective courses to prevent students from hunting for grades to improve their average.** Make a proper combination of disciplines when choosing subjects to not allow students to enroll subjects to improve grades.

5 Conclusions

Grade inflation is a phenomenon primarily observed all around the world. The causes of grade inflation are diverse, including competition among universities for positions in prestigious graduate programs and employment opportunities, changes in evaluation methods resulting from shifts in teaching methods—from predominantly final exam-based assessments to a combination of continuous assessment tools, projects, and teamwork—and student evaluations of their professors, among other factors. Setting limits on grade inflation is not straightforward, and ideas such as controlling grade distribution by capping high grades, establishing a range for the group's average grade, or publishing course averages, historical group medians, or students' positions within the group alongside their grades have either failed, had limited success, or fostered an undesirable development environment. However, by understanding the causes of grade inflation, and identifying successful cases, it is possible to control the phenomenon without increasing student stress or creating a hostile environment.

References

- [1] A. Kohn, «The dangerous myth of grade inflation,» *The chronicle of higher education*, vol. 49, n° 11, p. B7, 2002.
- [2] C. Jephcote, E. Medland y S. Lygo-Baker, «Grade inflation versus grade improvement: Are our students getting more intelligent?,» *Assessment & Evaluation in Higher Education*, vol. 46, n° 4, pp. 547-571, 2021.
- [3] T. Bar, V. Kadiyali y A. Zussman, «Online Posting of Teaching Evaluations and Grade Inflation,» University of Connecticut, Department of Economics, 2014.
- [4] T. K. Lindsay, *Combating the “other” inflation: Arresting the cancer of college grade inflation*, Texas Public Policy Foundation, 2014.
- [5] C. F. Eiszler, «College students' evaluations of teaching and grade inflation,» *Research in Higher Education*, vol. 43, pp. 483-501, 2002.
- [6] K. C. O'Halloran y M. E. Gordon, «A synergistic approach to turning the tide of grade inflation,» *Higher Education*, vol. 68, pp. 1005-1023, 2014.
- [7] M. Nordin, G. Heckley y U. Gerdtham, «The impact of grade inflation on higher education enrolment and earnings,» *Economics of Education Review*, n° 73, p. 101936, 2019.
- [8] I. Finefter-Rosenbluh y M. Levinson, «What is wrong with grade inflation (if anything)?,» *Philosophical Inquiry in Education*, vol. 23, n° 1, pp. 3-21, 2015.
- [9] M. L. Germain y T. A. Scandura, «Grade Inflation And Student Individual Differences as Systematic Bias in Faculty Evaluations,» *Journal of Instructional Psychology*, vol. 32, n° 1, 2005.
- [10] W. Stroebe, «Student evaluations of teaching encourages poor teaching and contributes to grade inflation: A theoretical and empirical analysis,» *Basic and Applied Social Psychology*, vol. 42, n° 4, pp. 276-294, 2020.
- [11] J. H. Donaldson y M. Gray, «Systematic review of grading practice: is there evidence of grade inflation?,» *Nurse education in practice*, vol. 12, n° 2, pp. 101-114, 2012.
- [12] A. L. Paskausky y M. C. Simonelli, «Measuring grade inflation: a clinical grade discrepancy score,» *Nurse Education in Practice*, vol. 14, n° 4, pp. 374-379, 2014.
- [13] T. Bar, V. Kadiyali y A. Zussman, «Grade information and grade inflation: The Cornell experiment,» *Journal of Economic Perspectives*, vol. 23, n° 3, pp. 93-108, 2009.
- [14] S. Rojstaczer y C. Healy, «Grading in American colleges and universities,» *Teachers College Record*, vol. 4, pp. 1-6, 2010.
- [15] A. Tyner y S. Gershenson, «Conceptualizing grade inflation,» *Economics of Education Review*, n° 78, p. 102037, 2020.
- [16] R. Sabot y J. Wakeman-Linn, «Grade inflation and course choice,» *Journal of Economic Perspectives*, vol. 5, n° 1, pp. 159-170, 1991.
- [17] K. Butcher, P. J. McEwan y A. Weerapana, «The effects of an anti-grade inflation policy at Wellesley College,» *Journal of Economic Perspectives*, vol. 28, n° 3, pp. 189-20, 2014.
- [18] S. Gershenson, «Grade Inflation in High Schools (2005-2016),» Thomas B. Fordham Institute, 2018.