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Factors Affecting Students' Grade

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Introduction

This study focuses on some of the factors that may influence students' grade. In the beginning of the class, I wanted to know the students little better. In general, economics study involves a lot of math, but the same thing can be explained using less aggressive mathematical procedures, at least in introductory level. I prepared a questionnaire for students to submit me on the first day of microeconomics class at Rio Grande University. The purpose was to note the background of students on their knowledge in math, so that, I will prepare myself to teach economics at their level of knowledge in math. Hence, I continued to get their information by collecting the answers from students with a questionnaire prepared to reflect their knowledge in math and some other relevant questions before starting to teach the course. This study is based on the answers that students provided to me. And, and as a teacher, I had the access to their grades. Since the questionnaire was presented on the first day of the class, only the students who appeared and submitted the questionnaire on the first day of class are included. The data covers the time from Spring 2002 to Fall 2017. Microeconomics course was being offered every year. However, not all consecutive semesters it was offered.

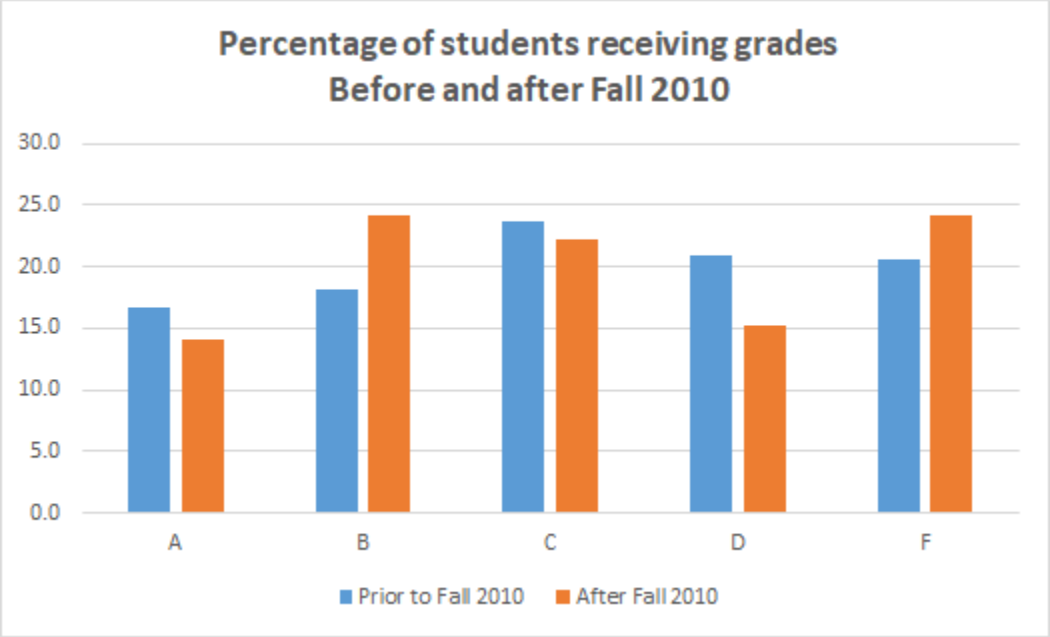
Objectives of the Study

This study is focused primarily to observe:

- ⇨ Does mathematical knowledge really boost scores in economics?
- ⇨ Are students in higher age group more serious in earning higher scores?
- ⇨ Are students in dorm earning higher scores than those who did not stay in dorm? (Should the university encourage/discourage students to live in dorm?)
- ⇨ How average grade is behaving on time basis? Is average grade deteriorating over time?

General Characteristics

Prior to Fall 2010, University of Rio Grande used to have letter grades only. But after that, Rio added '+' and '-' signs to the letter grades to make comparable to grade systems of other universities. Therefore, the basic analysis is also carried out separately for the grades before and after Fall 2010 to compare them.
Following graph indicates the grades before and after Fall 2010.

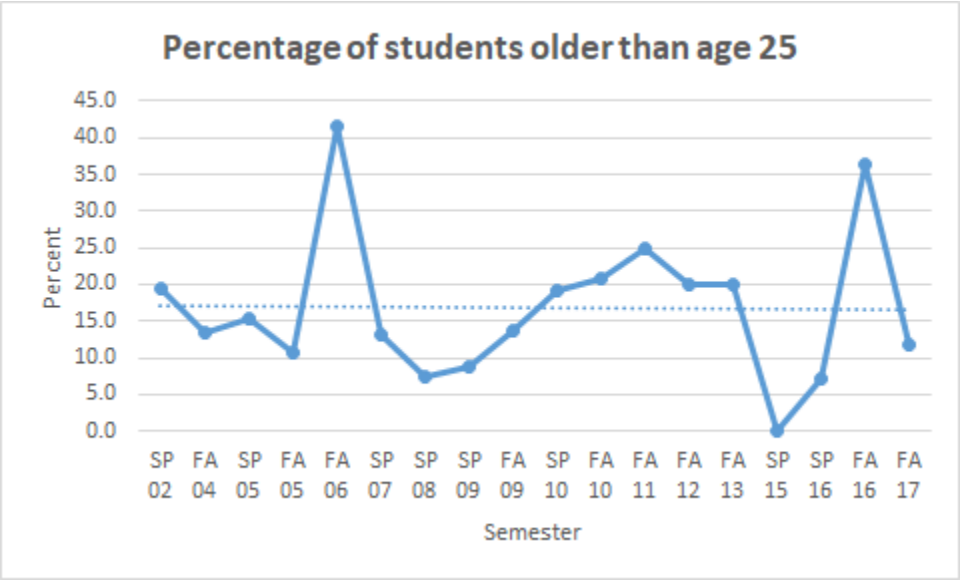


('+' and '-' on any grade is adjusted to the letter grade itself after Fall 2010 for comparison. Further, the failing grade 'F' may not be a true reflection of the students; since some students attended the first day of the class and responded to the questionnaire but dropped out of the class later and they were also termed as failing students in addition to those who actually failed the class on that semester.)

Grade A is considered the best. Percentage of students receiving grade 'A' fell slightly from about 17% before Fall 2010 to about 14% percent after Fall 2010. While the percentage of students receiving grade B increased. Prior to Fall 2010, there were about 18% students receiving grade B while after Fall 2010, there were about 24%. The reason for increased in grade B may be because of the students with grade above B but not quite A could have received B+ and percentage of students receiving grade A may have declined slightly, while the percentage of students receiving grade B increased before and after. It could have happened to other grades as well.

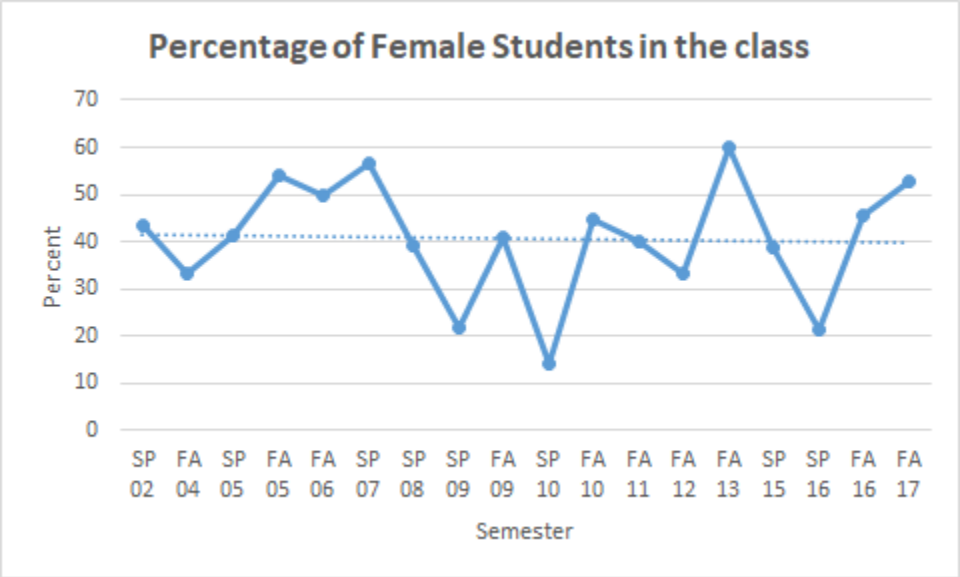
Students receiving grade C were about the same before and after Fall 2010. However, percentage of students receiving grade D declined from 21% to 15%; while failing grade increased slightly from 21% to 24%.
Although the general proportion of students receiving various grades has not changed much, percentage of students receiving failing grade after Fall 2010 has increased slightly. One of the reasons may be because of the fact that the grade D- is considered a failing grade after Fall 2010.

Student population consisted of fresh students coming directly after high school to students waiting to go to college for some years. During the time, they may have gained some work experience too. The questionnaire did not include any question to reflect experience directly, however age may indicate some of that.
Following graph shows the percentage of students older than 25 years of age in various semesters.



During the semesters considered for the study, on an average there were about 17% of the students older than 25 years of age. In Fall 06, the percentage of older students, older than 25 years, reached to nearly 40 % while in Spring 15, there were nil.

Following graph reflects the percentage of female students in the class during the semester under study. In general, percentage of female students has remained lower than that of male students except for few semesters. Out of 18 semesters, female students were more than male students only in five semesters.



On an average, there were about 40% female students in the class.

Factors Affecting Grades

To analyze the factors affecting grade, simple multiple regression is used.

Factors Considered are:

- ⇨ Age
- ⇨ Sex
- ⇨ Credit hours taken during the semester
- ⇨ Full or part time student
- ⇨ Level (Freshman/Sophomore/Junior/Senior)

- ⇨ Own judgement on High School Math
  - How do they see themselves in their knowledge in High School Math?
- ⇨ Scores received in math questions (from questionnaire)
- ⇨ Dorm or outside resident
  - How long they had to drive to reach to school if they did not stay in the dorm (Distance to travel)

The regression result is presented in Table 1 below.

Table 1. Regression Results

Dependent Variable: GRADE	ALL Observations	
Variables Considered	*Coefficients*	*P-value*
Intercept	-18.381	0.000
Attendance	0.236	0.000
Sex	-0.789	0.009
Age	0.059	0.022
Full /Part Time	-0.577	0.444
Dorm	-0.128	0.689
Credit hours	0.045	0.415
Level	0.017	0.913
Self Judgement	-0.658	0.000
Correct answers	0.367	0.000
R Square	0.381	
F -statistic	27.729	

(Note: For calculation purpose, letter grades are converted into numbers with A as 10, A- as 9 and so on.)

There is no doubt that the attendance boosts the grade. This should be true in all areas of study not only in economics. For every 5% increase in attendance level, the grade received by the students is found, in general, to be improved by one grade level.

The knowledge and the interest in math is a core source for the grade in economics as expected. The students who correctly answered more of the math questions have earned better grades. One interesting factor, however, is that the students who boosted about their confidence in math, actually were receiving lower grades. (The question asked was, 'how good do you feel about your knowledge in math?). This may be because they wanted to show off and not wanted to reveal their weaknesses.

It is also interesting to note that the male students are found little weaker in earning their grades.

- Is it because that the female students were more confident in their study or some other reasons?
- Is it true in other areas of study, too?
  - *Female students, whether weak or strong in their high school level of education, in general do not go farther in search of renowned colleges as male students do.*[1]

Further, more matured students seem to be better in earning grades. This may be because matured students may take their study more seriously than students joining right after high school.

Other factors included in the analysis like fulltime or part time students, dorm residents or commuters, level (freshman, sophomore, junior or senior), number of credit hours taken are not found any significant impact in earning grades.

[1] This is simply a presumption; it may not be true. More research in this subject area is needed.

To analyze more on the factors affecting grades, separate regressions for before and after Fall 2010, the year when the grading system changed.

Table 2. Regression Results

(Difference in grades prior and after Fall 2010)

Dependent Variable: GRADE	Prior to Fall 2010		After Fall 2010	
Variables Considered	*Coefficients*	*P-value*	*Coefficients*	*P-value*
Intercept	-15.908	0.000	-23.057	0.000
Attendance	0.220	0.000	0.272	0.000
Sex	-1.022	0.009	-0.199	0.669
Age	0.042	0.263	0.064	0.050
Full /Part Time	-1.231	0.191	1.251	0.349
Dorm	0.169	0.692	-0.668	0.168
Credit hours	0.022	0.765	0.062	0.505
Level	0.051	0.793	-0.071	0.777
Self Judgement	-0.526	0.011	-0.902	0.000
Correct answers	0.337	0.002	0.372	0.003
R Square	0.327		0.523	
F -statistic	13.956		17.212	

(Note: For calculation purpose, letter grades are converted into numbers with A as 10, A- as 9 and so on.)

General result is not very different if we classify students before or after Fall 2010. One factor, grade difference between male and female students almost vanished after Fall 2010.

Age factor appeared more significant in improving grade after Fall 2010. This was not so before Fall 2010. Average age of the students was little higher after Fall 2010.

Staying or not staying in the dorm does not seem to have any effect in the grade in general. However, when the data was separated into two groups, prior to Fall 2010 and after Fall 2010, the result is somewhat disturbing.

Prior to Fall 2010, there was no indication that staying or not staying in dorm would influence grades. But the students staying in the dorm appear to have little lower grade after Fall 2010. (Not highly significant though, its statistical significance level is only 17%)

It can be of concern to the college administration to analyze the factors that contributed to have this reduced grade point average to the students staying in the dorm after Fall 2010. This needs to be explored.

Analysis is also carried out to see whether there exists any difference among commuters and dorm residents.

Table 3: Regression Results

(Difference in grades of dorm residents and commuters)

Dependent Variable: GRADE	Dorm residents only		Commuters only	
Variables Considered	*Coefficients*	*P-value*	*Coefficients*	*P-value*
Intercept	-24.298	0.000	-18.318	0.000
Attendance	0.235	0.000	0.234	0.000
SEX	-1.101	0.064	-0.626	0.079
Age	0.540	0.042	0.059	0.026
Full /Part Time	-1.982	0.526	-0.430	0.593
Distance			-0.003	0.800
Credit hours	-0.010	0.936	0.029	0.639
Level	-0.844	0.033	0.248	0.179
Self Judgement	-0.487	0.136	-0.715	0.000
Correct answers	0.442	0.003	0.312	0.002
R Square	0.373		0.408	
F -statistic	9.292		20.000	

(Note: For calculation purpose, letter grades are converted into numbers with A as 10, A- as 9 and so on.)

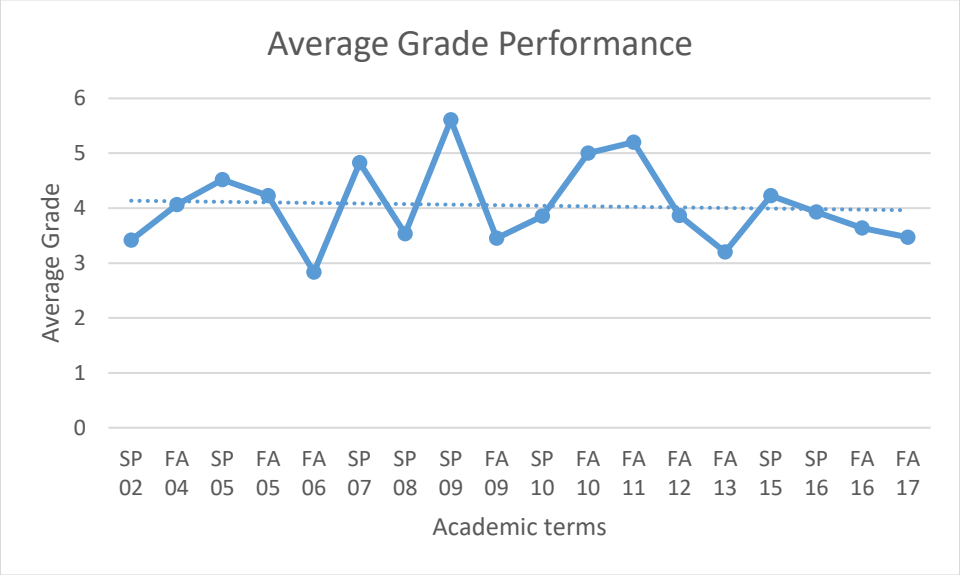
Among the commuters, sex is not found to be a significant factor in earning grades, even though there is still an indication that male students earn little lower grade than female students. But among the dorm residents, males earn a lot lower grade than female students.

Similarly, among the dorm residents, students at higher level (level in terms of freshman, sophomore, junior or senior) are found to have earned significantly lower grade.

Is there any Grade Inflation?

Some studies have indicated that the overall grades had been rising in Vietnam era and in consumer era. (In the Vietnam War era, it was particularly because if a college student flunked in the class, there were chances that he would end up as a soldier. In consumer era, in the early Eighties, students were termed as just the consumers, and to attract them, higher GPAs were being advertised. Early 2000s is also considered as consumer era and similar type of grade inflation was felt.) *(See Gradeinflation.com)*

There is no indication of inflated grades as time passed by at least in microeconomics course at Rio Grande University. With a total of 18-semester average grades examined, there is no indication of inflated grades as time passed by.



(Note: For calculation purpose, letter grades are converted into numbers with A as 10, A- as 9 and so on. Overall average grade is about 4 and it indicates to be equivalent to C)

Even after considering the factors like class size, students' age, proportion of females in the class, dorm, residency, and system of grade change (only letter grade to '+' and '-' attachments in letter grades) there does not seem to have any grade inflation, at least in microeconomics course in Rio.

Probably we can generalize it for overall grades of the students and can say that for the last two decades, there is no grade inflation as suggested by some other studies.

Conclusion

Even though this is simply a case study consisting of students in microeconomics, general nature of factors affecting grade may not be very different to other courses as well.

Students taking fewer credit hours or many credit hours, it has not become a significant factor to influence their grade. This may also be indicated by looking at the status whether they are full-time or part-time students. However, there is an indication of a bit of lower grade for full time students though. In general, students' level (freshman, sophomore junior or senior) is also not a factor to affect grade, but it is found to be a significant factor to lower grades for the students residing in the dorms.

On the other hand, attendance in class, age and sex of students do have significant impact on their grades.

APPENDIX

Table: 1 Average grades Prior to Fall 2010 (Only letter Grades were given)

Grade	Number of Students	Percentage
A	47	16.7
B	51	18.1
C	67	23.8
D	59	20.9
F	58	20.6
TOTAL	282	100.0

Table: 2 Average grades After Fall 2010 (When grades were rearranged including + and – on letter grades)

Grade	Number of Students	Percentage
A	16	10.2
A-	6	3.8
B+	16	10.2
B	13	8.3
B-	9	5.7
C+	10	6.4
C	13	8.3
C-	12	7.6
D+	7	4.5
D	17	10.8
F	38	24.2
Total	157	100.0

Table: 2A Average grades (Modified to compare)

Grade	Number of Students	Percentage
A	22	14.0
B	38	24.2
C	35	22.3
D	24	15.3
F	38	24.2
TOTAL	157	100.0

References

E. Ashby Plant, K. Anders Ericsson, Len Hill, Kia Asberg, "Why study time does not predict grade point average across college students: Implications of deliberate practice for academic performance", 14 August 2004 (Available online)

Stuart Rojstaczer (2002) "Grade Inflation at American Colleges and Universities" (gradeinflation.com) (Available online)

Alexandra Kovalik, (2012) "The Impact of Multilingualism on GPA among College Undergraduates", University of New Hampshire, Durham (Available online)

Ryan Stegall (2012) "A Study in The Grade Point Average of Athletes Vs. Non-Athletes", (Research Paper) Northwest Missouri State University, Maryville, MO 64468 (Available online)