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# Impact of Mentoring Program in the Academic Performance of Students from the Technological Institute of Sonora

# Impacto del Programa de Tutoría en el desempeño académico de los alumnos del Instituto Tecnológico de Sonora

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## Abstract

This research evaluates the impact of tutoring in academic achievement in the Institute. Data from 1812 first-semester students who took tutoring were analyzed. It was found that gender, tutoring and GPA in high school are significantly linked to academic success. Logistic regression indicates that the odds that a student with tutoring will fail are half those of students of the same gender without tutoring. This model also indicates that a difference of one point in GPA in high school has more influence on student success than tutorship.

*Keywords*: Tutorship, educative orientation, academic achievement, quantitative evaluation, academic failure.

## Resumen

Este estudio valora el impacto de la tutoría grupal en la universidad, en el desempeño académico. Se analizaron 1,812 datos de estudiantes de primer semestre que cursaron tutoría. Se encontró que el género, cursar tutoría y el promedio de preparatoria están significativamente relacionados con su rendimiento académico. La regresión logística indica que los momios de reprobar para un estudiante que recibe tutoría es menos de la mitad de los de un estudiante del mismo sexo que no recibe tutoría; indica también que un punto de diferencia en el promedio de calificaciones en la preparatoria tiene mayor influencia que recibir tutoría.

*Palabras clave:* Tutoría, orientación educativa, aprovechamiento escolar, evaluación cuantitativa, reprobación.

## I. Introduction

Tutoring is an educational strategy for providing assistance to students, where teachers monitor quality standards and discuss different topics with the tutee (Ortega, 1994). The aim is to facilitate future adaptation in educational settings and take steps in matters concerning academic performance, which is why tutoring deals with problems regarding study skills, reading and understanding, learning difficulties, exam anxiety, emotional stability, attitudes towards their chosen profession, career options, among other things.

With the emergence of systematized education, tutoring becomes formalized and gradually begins to find a place in most education centers, and then, in time, becomes a generalized practice that gains ever greater importance on a global scale. In this way, the National Association of Universities and Higher Education Institutions (ANUIES, acronym in Spanish, for *Asociación Nacional de Universidades e Instituciones de Educación Superior*) considers tutoring a process whereby students are accompanied during their training, with personalized assistance for students individually or in small groups, given by competent teachers who work from learning theories as opposed to teaching theories, and where the tutor is a teacher who guides, assists and accompanies the student throughout his or her time at the university – leading the student to a comprehensive education and fostering the student's ability to become responsible for his or her own learning and training (ANUIES, 2001).

The aim of tutoring is to facilitate future adaptation in educational settings and take steps in matters concerning academic development. Tutoring deals with problems

regarding completion rate, failure, study skills, learning difficulties, exam anxiety, emotional stability, attitudes towards the chosen profession and career options, among others (Cruz, Echeverría & Vales, 2008).

Tutoring is offered both individually and in groups, and provides extra, personal interaction and support that students (particularly those who are at risk of failing) require. Individual tutoring is characterized by personal assistance from the tutor for each student. The interaction between tutor and student could be in person or virtual, and involves building up trust to strengthen the student's self-esteem and confidence. This means that the aims, strategies, resources, assessment mechanisms, times and places determined by the curriculum must be clearly defined. In group tutoring, the tutor interacts with a group of students, either face-to-face or by distance learning. This requires previous planning in order to set dates, times and topics for meetings (either face-to-face or virtually). The great advantage is that it is possible to reach more tutees at a lower cost in space and time (Calvo, 2006).

When students feel that they possess the learning skills and strategies for success, they are more likely to want to continue and complete their studies (Hendriksen, Yang, Love & Hall, 2005). The tutor must support student learning, be a guide and a leader and provide the necessary tools for them to generate their own knowledge. In this regard, Cruz, Echeverría and Vales (2008) mention that one of the priorities of tutoring is developing strategies, such as text organization, programming study activities, applying techniques that strengthen cognitive skills (among others) that help to facilitate student adaptation to an education environment to improve his or her study skills and increase performance.

According to González (2002), the definitions of academic performance can be divided into two groups: those that define it as a synonym of student achievement, and those that make a clear distinction between the two concepts and consider achievement to be a measure or display of academic performance.

Academic performance is closely related to student learning and is a fundamental product of teaching. Learning is a change in behavior, which is relatively permanent and is the result of experience (Feldman, 2006; Santrock, 2004). Because learning cannot be observed directly, the student must show evidence of the skill learned, which is assessed according to a rubric and is presented as a grade that measures academic performance.

In order to understand and explain academic performance as a phenomenon, it is necessary to define this term and determine the variables that affect whether a student succeeds or fails at school. In this sense, and in accordance with Alves and Acevedo (1999, p.81), academic performance is understood to be "the result of the learning process, through which the teacher, alongside the student, is able to determine how much, and how well, this facilitated learning has been assimilated by the student". Retana (2006) conceptualizes academic performance as a numerical grade that a student obtains as a result of an assessment that measures the product of the teaching-learning process that he or she is a part of.

However, although academic performance is directly linked to the teaching-learning process, one must remember that there are other factors that play a part. In this sense, Ramírez and Vales (2003) identified at least five variables linked to academic performance: how much attention parents pay to their children's performance, the student's family environment, motivational factors, student learning strategies and the style of teaching. More generally, Sánchez and Valdés (2003) note that there is evidence that the most influential factors include the student's own characteristics (intellectual and social skills), his or her family environment and the school's way of functioning.

Based on this, it may be said that the factors that affect academic performance can be divided into three groups: individual characteristics, factors linked to the school and factors linked to family. These factors, alongside others, affect students in such a way that teachers' judgments and student grades are not always a direct reflection of students' intellect (Stufflebeam & Shinkfield, 1995).

On the other hand, according to ANUIES (2001), education authorities' current interest in this phenomenon is mainly due to the new national education policies, which are aimed at keeping students in school and avoiding students dropping out, thus lowering the cost of education. This has led education institutions to develop strategies that have an impact on academic performance, with particular emphasis on first-year students.

Strategies used by education institutions to combat this problem include, notably, teacher training programs, restructuring syllabi (Saravia & Flores, 2005), psychological counseling (Sánchez & Valdés, 2003) and tutoring programs (ANUIES, 2001).

For this last strategy, tutoring is seen as a mediating or facilitating process between the teacher, the students, and the course content. According to García (2001), the tutor's roles include making the course prerequisites clear to the students and helping students who are in difficulty. Another of the main tasks is strengthening course content through discussion, questioning and answering students' queries, and facilitating and fostering the use of libraries, laboratories and all the necessary resources in order to give the student the best possible education. Another of the tutor's essential functions is to serve as a link between the institution's administration and the student. Any question in this regard should be resolved by the tutor (Lara, 2005). The student's academic success depends largely on the tutor's efficiency and ability to motivate the student, taking into account the different needs identified during the tutoring sessions. The result of these actions will necessarily have an effect on students' academic performance (Duart & Sangrà, 2000).

Lacruz (2002) mentions that tutors should benefit student performance, considering them as receivers and developers of their knowledge who act as learning facilitators rather than as knowledge dispensers. That is why one of the priorities of tutoring sessions is to develop strategies that make it easier for the student to adapt to the school environment in order to improve his or her study skills and increase performance.

Tutoring strengthens students' educational development and stimulates the development of intellectual skills that are necessary to increase students' academic performance. This is reflected in the drop in students falling behind, the increase in completion rates, and the improvement in students' average grades.

### 1.1 ITSON's situation regarding tutoring

The individual tutoring program began in August 2000 with the participation of 36 tutors and 49 active students. Its aim was to provide students with support and systematized guidance for emotional, psychological and educational, and social and professional issues, so as to encourage their academic and personal development, leading students to accept and know themselves, and build values and positive attitudes and habits that will support their academic work and comprehensive education by developing a suitable study and work methodology to meet the demands of their chosen career and by fostering a participatory attitude and social skills that will facilitate their integration into an academic and sociocultural environment. In 2002, group tutoring was implemented in order to extend the program's reach and serve the entire freshman population.

A conceptual and methodological model was developed to support the tutoring program, and operates in the following areas: a) psychological issues related to individuals' personal and social aspects; b) educational issues, to deal with matters that affect academic performance and the development of learning skills; c) careers guidance, where the aim is to support the future graduate's profile and guide the student in making connections with the work environment. This model highlights the partnership between the tutor and the student, as it is hoped that tutorship is a dynamic process that involves them both. The tutor should be a guide for and a promotor of the student's comprehensive development, and the student should take responsibility for his or her own education as a person and as a professional.

In applying the model, three levels of intervention were considered: promotion, which is aimed at strengthening students' abilities; prevention, which seeks to foresee any situations that may interfere with students' comprehensive development; and correction, which deals with aspects that may hinder their development. In this way, tutoring aims to serve ITSON students from the moment they enter their study program, throughout their time at the institution and until they enter the labor market (ITSON, 2009).

## II. Problem Statement

According to the *Universidad Juárez Autónoma de Tabasco* (UJAT, 2005), tutoring is widely recognized in England, Germany, France, Spain, Canada and the United States, because academic support activities are coordinated and specialized attention is given to certain personal, social and formative needs. In Spain, tutoring directs students' autonomous learning. In the United Kingdom, the academic tutoring model helps students to solve their learning problems. Virtual tutoring has spread both in Europe and the United States, and this has been fundamental for students to "learn to learn". In Mexico, tutoring only appeared recently in national universities; for example, in the *Universidad Autónoma de Hidalgo*, tutoring is presented as a foundation in academic,

economic, social and personal aspects, and students are offered assistance throughout their time at the university; in the *Universidad de Guadalajara*, all members of the teaching staff must also act as academic tutors for students in order to ensure their comprehensive development. In the *Anáhuac, Iberoamericana* and *Instituto Tecnológico y de Estudios Superiores de Monterrey* (ITESM) universities, a personal tutoring service is provided at bachelor's degree level as a comprehensive support for students, to allow them to tackle learning difficulties and problems in academic performance, help them adjust and fit into the university and the academic environment, and assess students and direct them appropriately. In turn, the UJAT has been working on implementing, and providing training schemes for the Institutional Tutoring Program since 2000.

On the other hand, most higher education institutions are currently facing very high failure, dropout and completion rates, in addition to high numbers of students falling behind, all of which does little to support the quality of educational processes. This is why several approaches have been suggested with the aim of developing an education that encourages more significant learning and trains the student to adjust more effectively to the surrounding environment.

This has led institutions to come up with different strategies to support these students, and thus meet the demands of society by training graduates who are able to join the labor market successfully. For that reason, ANUIES proposes a program called 'Comprehensive Student Development', the aim of which is:

> To support students from the Higher Education System with tutoring and comprehensive development programs, designed and implemented by Higher Education Institutions, so that many students finish their studies in the expected time frame and achieve the education targets set out in the syllabi and study programs (ANUIES, 2000).[1]

From this perspective, higher education institutions have developed their own tutoring programs and ITSON has not been the exception; it has an academic tutoring program in place since 2000. Several problems have emerged during its development, such as a lack of human, financial, material and infrastructural resources, and even when the program is compulsory for freshmen, not all students enroll in the program as they are unaware of its existence, because there are no clearly defined promotion strategies.

On the other hand, there are no concrete results on the application of tutoring programs in Mexico, regarding their impact on improving the quality of education (Sánchez, Vales & Galván, 2005). This is a general problem concerning the lack of any detailed assessment of tutoring programs in Mexico; in ITSON's case, no formal studies have been carried out to confirm whether tutoring has any positive effect on students' academic performance, hence the importance of this study for the university, because if true, the effect of tutoring could be seen in a reduction of the number of students dropping out or falling behind.

The purpose of this research was to assess the impact of ITSON's tutoring program on improving academic performance. This would allow the body in charge of the program

[1] TN: This is the translator's own translation.

to make improvements regarding the design of instructional strategies in accordance with students' characteristics and requirements, and guide tutors in their work in order to support students' needs in a more direct manner, so students may complete their academic program while remaining true to the program's aims and being better adapted, generally speaking, to the institution.

The general aim was to determine the impact of the tutoring program on academic performance in students from ITSON. The specific aims were: 1) to determine whether there was a link between tutoring and the pass rate; 2) to determine whether tutoring and the students' sex have any significant effect on students' pass rate for their first semester at university, and 3) to model the link between receiving tutoring, students' sex, high school grade point averages and students' academic performance.

## III. Method

In order to achieve the aims set out, it was necessary to collect the following variables from students who began their studies in August 2005, the year in which the current tutoring model was implemented: grade point average at high school; average grade for the August-December 2005 period, which was the semester in which the student took tutoring sessions; and variables concerning whether the student failed subjects, took tutoring sessions or withdrew within that period.

Information about the tutoring variable was requested from the Coordination for Academic Development and the rest of the information was requested from the University Records Office at ITSON. The data include records from 1812 students (of whom 930 were female) from the Obregón campus, which has the highest student population.

The data was cleansed by deleting illogical records and incomplete observations. In order to describe the data, the following variables were defined from the information obtained: a) student identification; b) the variable indicating whether he or she took tutoring sessions; c) the variable indicating the student's sex; d) grade point average at high school (PPREP); e) average grade for the study period (PPER); f) failing (R) subjects; and g) the variable (baja) indicating when a student withdraws. PPREP and *r* were taken as a measure of the student's academic success.

The statistical description and data analysis were performed with the SAS (Statistical Analysis System) version 9 software. Because most of the study variables are for classification (sex, whether the student took tutoring, failing subjects and withdrawing), the appropriate technique was used for this kind of data, which is categorical analysis (Agresti, 1990).

Categorical analysis of the data includes analysis of the dependence between classification variables by chi-square testing. This dependence can be explained in terms of odds, odds ratios and relative risks. Furthermore, the odds ratio and therefore the dependence between variables can be modeled using logistic regression (Hosmer & Lemeshow, 2000).

## IV. Results

Analyzing the results began with the numerical description of the data in Table I. Tutoring, sex, failing subjects and withdrawal were all recorded as categorical variables, which is why the mean of 0.3719 in the tutoring variable is interpreted as a percentage; that is to say, 37.19% of students received tutoring (this percentage is low considering that it is compulsory for freshmen to enroll in tutoring sessions); 51.32% of students are female; 44.75% of students failed at least one subject and only 2.15% of students withdrew. The grade point average at high school and average grade at university were recorded on a scale from 0 to 10.

Table I. Numerical description of the study variables

| Variable | Mean | Standard deviation | Number of observations | Minimum | Maximum |
|---|---|---|---|---|---|
| TUT | 0.371 | 0.483 | 1812 | 0 | 1 |
| SEXO | 0.513 | 0.499 | 1812 | 0 | 1 |
| PPREP | 8.179 | 0.957 | 1811 | 0 | 10 |
| PPER | 7.488 | 1.988 | 1732 | 0.875 | 10 |
| R | 0.447 | 0.497 | 1812 | 0 | 1 |

Notes: TUT=Tutoring; SEXO=Sex; PPREP=Grade point average at high school; PPER=Average grade during the period at university; R=Failing subjects

### Aim 1. To determine whether there is a link between taking tutoring and the percentage of students who pass.

If the failing and tutoring variables were independent – meaning that there was no link between them – the pass rate of students taking tutoring and students who do not take tutoring would be equal, meaning that taking tutoring sessions would not affect the percentage of students who pass. In order to analyze this relationship a chi-square test was performed in a contingency table with the variables R and TUT.

In Table II it can be noticed that out of the students who do not receive tutoring (tutoring value of 0), 53.78% failed subjects and 46.22% of students did not fail subjects. In contrast, out of the students who did receive tutoring, only 29.53% failed subjects and 70.47% did not fail subjects. The chi-square test of dependence yields a value of 100.704 and is highly significant (P value smaller than 0.0001); this result indicates that if there is no effect from other variables that were not considered in this study, the failure rate does depend on students taking tutoring.

Table II. Contingency table between the categorical variables 'receiving tutoring' and 'failing'

| Tutoring | Fail | | Total |
|---|---|---|---|
| | 1 Yes | 0 No | |
| 0 Did not receive | N<br>612<br>53.78<br>75.46 | 526<br>46.22<br>52.55 | 1138 |
| 1 Did receive | 199<br>29.53<br>24.54 | 475<br>70.47<br>47.45 | 674 |
| Total | 811 | 1001 | 1812 |

If tutoring was effective, it is to be expected that the odds that a student fails a course would be reduced by taking tutoring sessions. That is why it is necessary to analyze the ratio between the chance of failing and the chance of passing – which is called the odds ratio. For example, the odds ratio of failing to not failing, when tutoring is not taken, is 612/526=1.1634 and the odds ratio of failing to not failing when, on the other hand, tutoring is taken is 199/475=0.4189; this means that taking tutoring reduces the chance of failing.

The odds ratio is 1.163/0.418=2.7772, which is presented in Table III, with 95% confidence intervals and relative risks. The confidence intervals can be interpreted as follows: the odds ratio is statistically not equal to 1 if it contains this value, which indicates that tutoring has a significant effect on reducing the chances of failure. If the odds ratio was equal to 1, failing and receiving tutoring would be independent, meaning that receiving tutoring would not have an impact on pass rates. In this study, the odds ratio is 2.772, which indicates a significant effect from tutoring on reducing the number of students who fail.

The relative risk for column 1 (failing) is the ratio between the chances or the rate of students failing without tutoring, and students failing with tutoring (the percentages in rows). The chances of failing without tutoring are 1.8214 times higher than the chances of failing with tutoring; this shows that the chances of failing with tutoring are lower than the chances of failing without tutoring. For column 2, the relative risk is the ratio between passing without tutoring and passing with tutoring. The chances of passing without tutoring are 0.6559 times the chances of passing with tutoring, meaning that the chances of passing without tutoring are lower than the chances of passing with tutoring.

Table III. Estimators for the odds ratio and the relative risk of failing when taking and not taking tutoring

| Concept | Value | 95% Confidence Interval | |
|---|---|---|---|
| Odds ratio | 2.7772 | 2.2683 | 3.4003 |
| Relative risk (Column 1) | 1.8214 | 1.6018 | 2.0712 |
| Relative risk (Column 2) | 0.6559 | 0.6058 | 0.7101 |

Table III points to a strong link between passing and taking tutoring. However, it could be argued that this link may be explained by the fact that a greater proportion of

students with higher grade point averages at high school take tutoring when they enter university, meaning that the relationship observed between tutoring and failing could in truth be due to the student's average grade at high school. If this were the case, the link between taking tutoring and failing would change with the student's average grade at high school, and specifically, no link would be expected between taking tutoring and failing the first semester at university for students with low average grades at high school.

In order to determine whether the relationship observed between failing and taking tutoring is due to the students' high school grade point average, a stratified analysis was carried out of the odds ratio with the high school grade point averages. To this end, four strata were defined with cut-off points that were close to the values of the three quartiles of the high school average grade. The strata used were: Stratum 1, average grade ≤7.5; stratum 2, 7.5<average grade≤8.1; stratum 3, 8.1<average grade≤8.8 and stratum 4, average grade>8.8. These intervals represent 23.35%, 25.07%, 24.96% and 26.62% of the data respectively.

The odds ratio varied from 1.832 for stratum 2 to 2.832 for stratum 4. The confidence intervals indicate that both the odds ratio and the relative risks, in all the strata, were different to 1. As stated earlier, this indicates a link between taking tutoring and failing. In order to check whether the odds ratio varies between the different strata, the equality hypothesis for the odds ratio between the strata, and the Breslow-Day test were contrasted and this was not found to be significant, meaning that the odds ratio does not change with the high school average grade (which was used for stratification) and therefore the estimator for the non-stratified odds ratio of 2.7772 can be used.

**Aim 2. Do tutoring and students' sex have a significant impact on the pass rate in students' first semester at university?**

In order to answer this question, the degree of dependence between the sex and failing variables was analyzed. It was found that 38.28% of females did not fail subjects. In contrast, 51.59% of male students failed subjects. The chi-square test used to test the dependence between the variables yielded a value of 32.42 and is highly significant (P value smaller than 0.0001). This indicated that the failure rate depends on the sex of the students.

The odds of failing for female students are a little over half (0.5820) those for male students. The 95% confidence interval for the odds ratio does not contain 1, which means that it is significantly different from 1 and that the variables analyzed are dependent on each other.

The chance of failing for women was 0.7420 times the chance of failing for men, and the ratio of female students passing to male students passing and the chance of passing for women was 1.2749 times the chance of passing for men. The relative risks obtained were different from 0.

Because the pass rate for women (61.72%) is higher than for men (48.41%), and it has already been concluded that the pass rate is increased when students receive tutoring, it could be inferred that this result is due to the fact that a higher percentage of women receive tutoring. The Breslow-Day test, used to contrast the hypothesis that the odds ratio when taking and when not taking tutoring is equal for men and women, was not significant. This means that both the students' sex and tutoring have an impact on the percentage of students who pass.

**Aim 3. To model the relationship between receiving tutoring, the students' sex, high school grade point average and the students' academic performance.**

The previous analyses illustrate the dependence between receiving tutoring, students' sex and academic performance measured in terms of the percentage of students passing. In order to respond to this aim, academic performance was modeled using a logistic regression that is able to model classification variables and continuous variables. This kind of regression models the logit function, which is the logarithm of the odds or percentage quotient. The logit function for failing was used according to the tutoring, students' sex and high school grade point average variables. The SAS statistics package was used for this analysis. 1811 observations were used, and, as previously noted, the dependent variable – failing – has two levels, and the reference profile was 'failing' (R=1). The model was highly significant, which shows the importance of the factors studied.

The logistic regression model is interpreted as follows: the logarithm for the odds ratio of a male student failing, with a high school grade point average of *X* and who did not take tutoring sessions, is: Log (Odds without tutoring)=5.5463–0.6510 *X*

The logarithm for the odds ratio for a male student failing, with a high school grade point average of *X* and who did take tutoring sessions is: Log (Odds with tutoring)=5.5463–0.8108–0.6510 *X*

The odds ratio of failing for two male students with equal grade point average at high school, when the first took tutoring sessions and the second didn't, is 2.2497 (the exponential function of the odds ratio logarithm is obtained in order to find the odds ratio).

$$\frac{Exp\ (5.5463 - 0.6510\ X)}{Exp\ (5.5463 - 0.8108 - 0.6510\ X)} = Exp(0.8108) = 2.2497$$

The odds ratio of failing for two students (the first one male, the second one female) with equal grade point average at high school, when they both either took or did not take tutoring sessions, is 1.3551.

$$\frac{Exp\ (5.5463 - 0.6510\ X)}{Exp\ (5.5463 - 0.3039 - 0.6510\ X)} = Exp(0.3039) = 1.3551$$

It is possible to see that the odds ratio of failing for two students of the same sex, when both either took or did not take tutoring sessions and the high school grade point average is one point higher for the first student than for the second student, is approximately half, i.e. Exp(-0.6510)=0.5215.

The odds ratio of failing for two students of the same sex, with equal high school grade point averages, when the first took tutoring sessions and the second did not, is Exp(-0.8108)=0.4445, meaning that the chance that a student who took tutoring fails is less than half (0.4445) that of a student who did not take tutoring. These results are consistent with the analysis performed for the first aim.

## V. Discussion

A preliminary analysis of the data showed that the high school grade point average is the best predictor of academic success in the university student's first semester; this result is in line with studies by González *et al.* (2000) with students from Sonora, who show that the high school grade point average does predict student performance at undergraduate level and the university entrance exam is not a good predictor of academic performance.

For their part, Bazán, García and Borbón (2005) found, in a study with students from Sonora, that students' mastery of methodological and conceptual skills could be significantly explained by self-grading with regard to the students' mastery of the text, scores in verbal reasoning tests and high school grade point averages. Similarly, Bazán, Félix and Gaviño (2006) identified the high school grade point average as the best predictor of indicators of academic performance both at university and in assessments of performance in reading activities and scientific text analysis, in contrast with standardized assessments of verbal and reasoning skills.

This backs up the hypothesis that "grade averages, taken as one of the many indicators of academic performance at a previous educational stage, can be related to the performance of students in assessments at later educational stages"[2] (Bazán *et al.,* 2006). This particular case shows the relationship between taking tutoring, the high school grade point average and academic performance.

The variables 'taking tutoring', 'failing' and 'students' 'sex' are classification variables, which is why methods of analyzing contingency tables were used. The results show a significant increase in the pass rate of students having taken tutoring, although there are family-related and academic variables related to academic performance (Ramírez & Vales, 2003).

The analyses also show that women have a higher pass rate than men, both when having taken tutoring and when no tutoring was taken.

Using logistical regression to analyze the link between failing, taking tutoring and students' sex shows that the odds ratio of failing for a student who receives tutoring is

[2] TN: This is the translator's own translation.

less than half (0.4445) the odds for a student of the same sex who does not receive tutoring when both have the same grade point average at high school. Cruz *et al.* (2008) found similar results with an odds ratio of 0.584, for a set of data from a unit that was external to the institute. This corroborates the impact of tutoring on pass rates.

The data analysis shows that a one-point difference in the grade point average at high school increases the pass rate in a higher proportion than tutoring sessions, as the high school grade point average has a greater impact than receiving tutoring in the odds ratio (0.5215); this finding is in line with Bazán and García (2002: 118), who found that "the high school grade point average has a significant and positive effect on the academic grade at university, and the number of subjects failed has a negative effect…[3]".

Using the odds ratio and logistic regression for categorical variables (where usually only percentages are analyzed) will allow for a qualitative comparison of the different types of tutoring currently offered, if this study is complemented by adding variables that could, supposedly, be linked to academic success.

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[3] TN: This is the translator's own translation.

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