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Influence of admission tests on the academic performance of first-year university students

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Abstract

This work determines the relationship between the score obtained in two subjects that compose the admission test of a recognized Ecuadorian University, and the academic performance in subjects with direct affinity to them. The target group was composed of first year students from three different cohorts, and a cross-sectional study was carried out to determine the relationship between the results of the admission test and the performance in the first and second cycle of university life. The results show a mostly positive association between the score achieved in the subjects of reading comprehension and mathematical comprehension in the admission test and academic performance in related subjects. From this, it can be concluded that the university admission test is a predictor of academic performance during the first year. For future studies, it is advisable to include in this type of analysis other variables related to the entrance profile of firstyear university students.

Keywords: College students, Admission test, Academic performance.

Introduction

Globally, the university enrollment rate increased by 131% between 2000 and 2019, and even more in Latin America, reaching a growth of 152% (UNESCO 2024).. This growth poses challenges for Higher Education Institutions (HEIs), which, through quality educational processes, must transform this educational demand into professional profiles that meet the needs of society and improve the conditions in which it develops. Achieving this includes evaluating each process, from admission to obtaining a university degree, identifying predictive factors that improve academic performance.

Theoretical framework

An ideal college admissions process should theoretically be able to predict how well students will perform academically, regardless of their ethnicity, race, age or gender (Tapasco et al., 2016).

Knowing the relationship between admission processes and student performance is fundamental, considering that it would be important for universities to anticipate the possible academic performance of their students during their first stages of study, which will result in subsequent semesters.

This makes it easier to propose strategies that allow the institution, teachers and the students themselves to improve their activities in the teaching-learning process (Candia 2019).

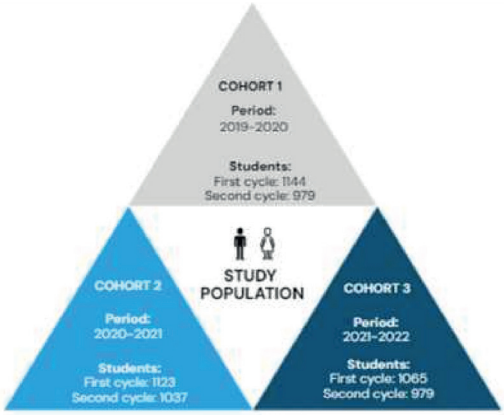
In addition, it will allow obtaining inputs that can be adjusted to the educational field with a view to favoring the training processes of students entering higher education, so that the information derived from the admission tests allows predicting academic performance, a basis for designing and implementing preventive academic support strategies for those cases that require it (Castillo y Rodríguez 2013).

Method

A cross-sectional study with a quantitative experimental approach was carried out. The relationship between reading comprehension and mathematical comprehension scores as explanatory variables and academic performance in related subjects as response variable was established through Spearman's co-relation coefficient.

The group studied corresponds to the total number of first and second cycle students from three different admission cohorts, contemplating pre-, during and post pandemic periods for greater representativeness, using as the only exclusion criterion, students who did not register grades in the subjects related to the study, due to early dropout (see Fig. 1.). The data used were extracted from institutional information from admission reports and academic results by subject and processed in the Stata V15 program.

Fig. 1. Study Population



The degree of relationship between variables, according to the correlation coefficient, was determined on the basis of: perfect negative correlation -0.91 to -1.00; no correlation 0.00; perfect positive correlation 0.91 to 1.00 (Mondragón 2015).

Results

Reading comprehension

Cohorts 1 and 3 (pre- and post-pandemic, respectively) show that there is no significant relationship between the results of this subject and the associated subjects. However, the results of cohort 2, which developed its academic activities during the pandemic, show a significant positive average

relationship (see Table 1). There are no results during the second cycle, since there are no related subjects during the second cycle.

Table 1. Thematic relation of Reading Comprehension, on performance in related subjects.

Subject of the admission test: Reading Comprehension	Spearman correlation coefficient			Level of relationship		
Related subjects:	Cohort 1 (First cycle)	Cohort 2 (First cycle)	Cohort 3 (First cycle)	Cohort 1 (First cycle)	Cohort 2 (First cycle)	Cohort 3 (First cycle)
Reading and writing academic texts	0,111	0,211 ↑	0,301 ↓	Median, not significant	Medium	Median, not significant
Comprehension of scientific texts	0,280	0,353	0,233 ↓	Median, not significant	Medium	Median, not significant

Mathematical comprehension

In the first cycle, performance in the subjects studied, and the relationship with this subject, is positive on average in all cohorts. However, linear algebra, in cohort 1, reaches a higher range of relationship (considerable). It should be mentioned that, in the cohort affected by the pandemic, the relationship is still positive, but decreasing, where univariate mathematical analysis becomes non-significant (see Table 2).

Tabla 2. Thematic relation of Mathematical Comprehension, on performance in related subjects, first cycle.

Subject of the admission test: Mathematical Comprehension	Spearman correlation coefficient			Level of relationship		
Related subjects:	Cohort 1 (First cycle)	Cohort 2 (First cycle)	Cohort 3 (First cycle)	Cohort 1 (First cycle)	Cohort 2 (First cycle)	Cohort 3 (First cycle)
Mathematical fundamentals	0,183	0,133 ↓	0,359 ↑	Medium	Medium	Medium
Linear Algebra	0,562	0,277 ↓	0,298 ↑	Significant	Medium	Medium
Univariate mathematical analysis	0,422	0,110 ↓	0,156 ↑	Medium	Not significant	Medium
Fundamentals of geometry	0,461	0,223 ↓	0,282 ↑	Medium	Medium	Medium

During the second university cycle, there is an average positive relationship with the subjects of Linear Algebra and Univariate Mathematical Analysis in all the cohorts studied. However, the cohorts developed in pandemic conditions maintain a decreasing relationship, compared to the cohort developed in normal circumstances.

Discussion

The relationship between the variables studied is consistent with the findings of Tapasco et al., (2016), when considering the admission test as an important predictor of academic performance of first-year university students.

Some significant relationships in theoretical subjects, which occurred during the pandemic, coincide with Iglesias et al., (2021), who determined that academic performance in remote conditions, due to the health emergency, was significantly better than traditional face-to-face instruction.

This relationship could be attributed to an improvement in teaching-learning strategies and self-regulation of students, who previously developed digital skills to adapt to the system (Allen y Seaman 2017). This behavior differs when analyzing practical subjects, such as those related to mathematical comprehension, which obtained a better performance during traditional instruction.

Analyzing the relationship between admission test subjects and associated first-year subjects is crucial, since studies suggest that if a student performs well in one subject, he/she will do so in the others and during other academic cycles.

Limitations and Future Investigations

Performance on the admission test predicts performance in related subjects. However, it is advisable to know this relationship at the career level, determining the benefit and possible adaptations in this test. In future research, the inclusion of other variables linked to academic performance and disciplinary areas of the university student is proposed.

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