Academic success: challenges and confrontations of poor students of Brazilian public universities

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Abstract − **This study aims to evaluate the satisfaction with academic performance and the factors that influence it in two groups of higher education majors in Technological and Agricultural Sciences and Education, Culture and Art. The sample is composed of 60 students from two Brazilian public universities (age-range = 18-39 years, *Mdn* = 21), graduates of public schools, distributed in a balanced way between the two genders (55% women). Students are predominantly from the first and second years, the most with family income up to two Brazilian minimum wages. We could observe that the students of Technological and Agricultural Sciences showed more dissatisfaction with academic performance than those of Education, Culture and Art. Regarding the factors that influence performance, the majority of students of Education, Culture and Art valued interpersonal factors for academic performance while the majority of Technological and Agricultural Sciences students valued intrapersonal factors. However, this last proposition should be carefully considered once it needs to be replicated with a larger sample, according to the *a priori* power analysis result.**

Keywords – Academic Performance, Higher Education, Poverty, University Students.

INTRODUCTION

In Brazilian universities, the evasion of engineering majors, a reality throughout the country, needs to be analyzed and reflected (Silva, Mainier, & Passos, 2006). Therefore, the analysis of satisfaction and factors influencing performance are relevant variables to understand the factors that lead to the successful completion of those majors (Junior, Silveira, & Osterman, 2012) and prolong permanence (Pereira *et al.*, 2015). Silva (2016) studying the importance of mathematical education to the pedagogical permanence of the quota holders students of the exact sciences concluded the relevance of previous knowledge for the achievement of academic success, since they present a notorious lack in the basic education in this discipline. Based on this statement, this study starts from the hypothesis that mathematics contributes significantly to the feeling of dissatisfaction of the poor university students engaged in majors that predominantly involve applied mathematics. Factors influencing perceived academic performance were also explored using two groups of higher education students attending majors with similar educational technologies base of training, but differences in the quantity of mathematics of respective curricula syllabus. This between-groups comparison will allow appreciating if mathematics makes a difference, both on satisfaction with perceived performance (SPP) and factors influencing perceived academic performance (FIPAP).

METHODOLOGY

Participants were selected from an initial convenience sample ($N = 251$) of the ongoing doctoral research entitled "Psychosocial Implications of Poverty in the Permanence of Students of Public Universities in Ceará". They were predominantly from the first and second years, the most with family income up to two Brazilian minimum wages. The data were collected through an online questionnaire which contains the following questions: "How is your academic performance?" and "What is the main factor influencing your academic performance?" whose responses were used to identify the variables SPP ("satisfaction" vs. "dissatisfaction"); and FIPAP ("intrapersonal" vs. "interpersonal"), respectively. Data analyses was made with the *IBM SPSS Statistics for Windows (version 24.0)* and the *G*Power 3.1* open-source software. The subsample for the present study consists of 60 undergraduate university students (age-range = 18-39 years, *Mdn* = 21) purposively selected from the full sample. Students were chosen under the criterion of belonging to majors in Technology and Agricultural Sciences (TAS; $n = 30$) and to majors in Education, Culture and Art (ECA; $n = 30$). These majors were chosen because of their similar educational technologies base of training and were differentiated into

two groups, based on the criterion of whether or not they have syllabus related to mathematics as the basis of the curriculum. The majority of the participants were women (55%), and had a family income of up to Brazilian minimum wages (n = 54). We performed chi-square tests of association to examine the independence between the two groups in the two variables of interest. The minimum sample size for test the χ^2 of association with one degree of freedom, calculated through *G*Power*, given an *a priori* moderate effect size (w = .30), a type I error of .044, and a statistical power of .80, should be equal to 91 participants. This result mean that our sample size is lower than the desirable to avoid type II error.

FINDINGS

The chi-square test of association revealed a significant difference between the student groups regarding "satisfaction with performance", with a moderate effect size (w) and, considering the *a priori* power analysis result, a good observed power [$\chi^2(1, N = 60) = 6.79$, $p = .009$, $w = .34$, $P_{obs} = .73$]: the majority of TAS students ($n = 18$, 60%) were dissatisfied with their performance while the minority of ECA students ($n = 8$, 30.8%) were dissatisfied. The same test revealed a non-significant difference between the student groups, with a small to moderate effect size and a very low observed power, regarding FIPAP [$\chi^2(1, N = 60) = 2.42$, $p = .121$, $w = .20$, $P_{obs} = .32$]: the majority of TAS students ($n = 17$, 56,7%) affirmed that intrapersonal factors are the most influential for academic performance while the majority of ECA students ($n = 19$, 63,3%) affirmed that interpersonal factors are the most influential. Taking into account the obtained effect size, and the *a priori* power analysis result, we can say, but prudently, that with a sample size of 91 participants (or higher) there is a chance that the variables group and "factors that influence performance" may be associated.

CONCLUSIONS

The results show that there is a greater dissatisfaction with the students' performance in TAS majors, compared to the ones in ECA majors. Since most of the students are poor, coming from public schools, we can infer, like Silva (2016), that the Brazilian educational reality lack in basic education, namely in mathematics, can be an important challenge to academic success, specifically in TAS majors. They need to acquire greater educational capital to triumph in performance, which is the largest marker of academic success (Cavalcante, 2014). Results also revealed a difference in FIPAP between the two groups. Intrapersonal factors are more relevant to the TAS students, which can also be related to the importance of prior knowledge of disciplines such as mathematics to achieve academic success. This latter result contributes to the understanding of the problems raised, however it needs to be replicated in studies with a larger sample, according to the indication of the *a priori* power analysis.

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