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# Undergraduate Researchers: Scientific Initiation in the Context of affirmative action policies in Higher Education

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#### Abstract

This paper aims to analyze the profile of the fellows from The Institutional Program of Scholarships to Scientific Researchers (PIBIC) at Pedagogy undergraduate Curse from the Federal University of Ceara (UFC). It intends to describe possible patterns to highlight investigative tracks on barriers to accessing the undergraduate scientific training programs for those who accessed higher education after the federal quota's law implementation. The methodology consists of a descriptive analysis from 3 databases: 1) research realized by the Scholl of Education at the Federal University of Ceara; 2) Lattes platform; 3) *Encontros Universitarios'* annual meeting at UFC. We analyzed 61 students' profiles. They all started at the undergraduate level between the 2017.1 and 2020.1 semesters. The theoretical framework was based on the general principles of Bourdieu's praxeology. The results show an underrepresentation of workers, night shift students; quota' fellows; transferred from other courses; and those from lower socioeconomic stratifications. **Keywords:** Higher Education.

#### Pesquisadores na graduação: Iniciação Científica no contexto das políticas de ação afirmativa no Ensino Superior

#### Resumo

O presente artigo objetiva analisar o perfil de bolsistas do Programa Institucional de Bolsas de Iniciação Científica do curso de Pedagogia da Universidade Federal do Ceará (UFC), observando os padrões que possam indicar caminhos investigativos futuros sobre potenciais dificuldades que o público ingressante após a lei de cotas pode enfrentar para a inserção e permanência na carreira científica. A metodologia empregada consiste em uma análise descritiva dos dados oriundos de três fontes: 1) pesquisa de perfil realizada pela Faculdade de Educação da UFC; 2) currículo lattes dos bolsistas; 3) e dados dos Encontros Universitários da UFC. Ao todo foram estudados 61 bolsistas, dentro do recorte temporal de ingresso na graduação entre 2017.1 a 2020.1. Adota-se como referencial teórico a praxiologia

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de Pierre Bourdieu. Os resultados apontam um perfil com menor representação de: estudantes trabalhadores; estudantes do curso noturno; ingressantes por cota e transferência; e discentes das menores faixas de renda. **Palavras-chave:** Educação Superior. Formação Científica. Equidade em Educação. Democratização do Ensino.

#### **1** Introduction

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The Institutional Scientific Initiation Scholarship Program (Pibic) represents, for undergraduate students, especially those in undergraduate teacher training courses (licenciatura), a possibility of distinction among peers and prolonging their academic trajectories. Its primary objectives are the commitment to research-oriented training and the preparation for entry into graduate programs (CNPg, 2006). The distinction consists, in general, of the fact that these scholarships offer their beneficiaries the apprehension of knowledge ranging from a deeper study of research methodologies to greater sociability in academic spaces. It makes it possible for the fellowship owners to access the rules and values of the specific field, and it can be used to promote them to succeed in the graduatelevel selective process. In this way, the bibliography on the Pibic shows a clear difference between former fellowship owners and non-fellowship students concerning the length of access to the graduate level. It also shows that, in comparison to non-fellowships students, the former fellowship owner tends to be more representative, spends less time to conclude the graduate course, and has a more effective conclusion rate on graduate courses, reaffirming that former fellowships owners are more successful in all these rates than the others (CENTRO DE GESTÃO E ESTUDOS ESTRATÉGICOS, 2017; MASSI; QUEIROZ, 2015; OLIVEIRA; 2015).

We are interested in discussing the program with a focus on its user profile, especially linking them to studies on educational inequality. Based on the specific literature, we delighted two axes to direct the study of the profile of Pibic fellows. We did it to understand the paths that initial training establishes concerning educational inequalities. The first concerns the process of democratization of the Federal Public Higher Education

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System, whose landmark is the quota law (No. 12.711/2012), an affirmative action policy that ensured the access of black, brown, and indigenous students (PPI), those from public school, low-income people and, subsequently, of people with disabilities to the higher education system on the undergraduate-level. The second, concerning graduate studies, points to a slow diversification of the level, reproducing, especially at the Stricto Sensu training courses, and low participation of PPI faculties and students (VENTURINI, 2019). Although democratizing higher education at the Brazilian undergraduate level has advanced significantly with the quota law, the specific training field to the Stricto Sensu graduate level does not seem to have followed the same path. Therefore, it is essential to highlight the profile of the students with access to scientific education through scientific initiation and what difficulties are posed at the undergraduate level so that the groups currently accessing the university remain marginalized from the graduate spaces.

The present paper aims to describe the socioeconomic profile of the PIBIC fellows of the Pedagogy undergraduate course at the Federal University of Ceará (UFC), highlighting, in the light of the specific literature, the patterns to future investigative paths about potential difficulties that the quota law students may face on the insertion and permanence in the scientific career. To this end, we conducted a descriptive analysis of data from students on the pedagogy course at the UFC between 2017.1 and 2020.1.

### 2 Methodology

The population studied includes students enrolled in the Pedagogy courses (daytime and nighttime courses) between 2017.1 and 2020.1 and who have participated as fellowship owners in the Pibic program until June 2020, the time of data collection for this research. A total of 611 Students were observed. The time frame chosen is justified

<sup>&</sup>lt;sup>1</sup> One of those students only presents data on the turn (daytime or nighttime courses) and quota classification. To tall other variables, the sample size is 60. The data follows the Yasmin da Silva Barros monography for the conclusion of the undergraduate course.

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because, considering that the duration of the Pedagogy course in the UFC is eight semesters, the 2017 students would be seniors in June 2020, and the 2020.1 students would be freshmen at that moment. Moreover, this cutout also includes the most recent beneficiaries of the Quotas Law, thus allowing an examination from the perspective of an already consolidated policy.

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The data construction process consisted of four stages: (1) a list of the students enrolled in the course collected on the Integrated System for Academic Activity Management (SIGAA); (2) Research students' historical and scientific profiles on Plataforma Lattes and from the annals of the University Meetings (Encontros Universitario's) (Scientific Initiation Meeting); (3) socioeconomic profile data collected by the School of Education of the UFC; (4) compilation of the data in a matrix and standardization.

For the socioeconomic profiles of the students enrolled in the course, we requested, with the coordination of the courses2, the name of the students and the enrollment number of all entrants between 2017 and 2020, including in the data matrix only students with "active" or "completed" enrollment status. Also, with this data, the type of entrance was observed: SISU, transfer, or change of course. For those who entered via SISU, which corresponds to most students, we also collected, via SIGAA, whether they entered through broad competition (AC) or a quota. In the institution, there are eight nomenclatures of quotas corresponding, according to the SISU site in the UFC, to the following criteria:

#### Table 1: Quota Criteria

Quota	Criterion
Quota L1	High school education in public schools with per capita household income equal to or less than 1.5 minimum wages
Quota L2	High school education in public schools, with per capita household income equal to or less than 1.5 minimum wages, self-declared black, brown, or indigenous
Quota L5	High school education in public schools, regardless of per capita household income

<sup>2</sup> Data requested via SEI (Electronic Information System) /UFC, process no. 23067.038820/2021-38

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Quota L6	High school education in public schools, regardless of per capita household income, self- declared black, brown, or indigenous	
Quota L9	High school education in public schools, with disabilities who have a per capita household income equal to or less than 1.5 minimum wage	
	High school education in public schools, with disabilities, self-declared black, brown, or	
Quota L10	indigenous people, and with a per capita household income equal to or less than 1.5 minimum wages	
Quota L13	High school education in public schools, with disabilities, regardless of per capita household income	
Quota L14	High school education in public schools, with disabilities, self-declared black, brown, or indigenous people, regardless of per capita household income	
Source: FEDERAL UNIVERSITY OF CEARÁ (2021).		

UNIVERSITY OF CEARA (2021).

For students who did not enter via SISU and, therefore, do not have information on entry by quota or broad competition, we established no response for this variable-these are nine students.

For the identification steps of the scholarship students, we conducted a nominal search on the Lattes platform of all 566 students enrolled, verifying: (1) the existence of a registered curriculum; (2) Pibic declaration; (3) Monitoria [teacher assistant] declaration; (4) declaration of other types of scholarships, (5) existence of publications and (6) name of advisor. Concomitant to this process, since not all students add to the curriculum the information of participating or not in a scholarship, the analysis of the editions between 2017 and 2021 of the Scientific Initiation Meeting of the UFC (ENCONTROS UNIVERSITARIOS, 2017; 2018; 2019; 2020; 2021) was carried out. Participation is mandatory in the event for scholarship recipients, so with this is possible to find the students who were fellowship owners during the meeting.

The penultimate step was merging the data already described here with the data3 gathered by Scholl of Education at the Federal University of Ceara (FACED) in the course of planning emergency activities during the Covid-19 pandemic (UFC, 2020b). The research was conducted by the "Comissão Organizadora do seminário de Avaliação e planejamento" (Organizing Committee of the Evaluation and Planning Seminar), which was a component of the "Plano Participar e Incluir" (Participate and Include Plan) of the same

<sup>&</sup>lt;sup>3</sup> Data requested via SEI (Electronic Information System) /UFC, process no. 23067.038835/2021-04

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unit, in the year 2020. Before the definitive access, the advisor anonymized the data, avoiding that the first author - also a pedagogy course student at that moment - could identify colleagues in non-anonymized data. In this step, data on (1) marital status; (2) gender; (3) age; (4) locality; (5) income; (6) professional occupation information; (7) number of children and whether or not they are of school age; (8) number of people with whom they live; and (9) information on scholarships or university aid were incorporated into the matrix. Not all students enrolled between the time frame of 2017 and 2020 responded to the FACED survey, given that: some students had already completed the course; students in the 2020.2 semester had not yet entered at the time of the survey; and others chose not to respond, or they could not do so.

In general, as a criterion for analysis, we adopted the comparison between PIBIC scholarship students and students enrolled in Faced as a whole. It is, therefore, a paper focused on the cross-sectional descriptive analysis of data, almost entirely categorical. The programs used for statistical observation and constructing the data matrix were Microsoft Excel e Statistical Package for the Social Sciences (SPSS).

#### 3 Results and Discussion

Among the Human Sciences courses of the UFC, Pedagogy represents the highest percentage of PIBIC's scholarship recipients, with 25% of the total. Compared with other courses from the same area, this means twice as many scholarships as Philosophy and History courses (FERREIRA, 2015). However, despite these rates, the percentage of students contemplated with these scholarships (counting voluntary and remunerated) throughout the studied period is only 11% of the entire Pedagogy student population. That makes us reaffirm that such a scholarship position is distinct and uncommon among the trajectories. Compared with data from Minas Gerais Federal University (UFMG) (CANAAN, 2012), whose numbers vary between 25% and 40%, this percentage represents a much lower number and, consequently, a significant dispute for a fellowship.

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3.1 Profile of the students observed,

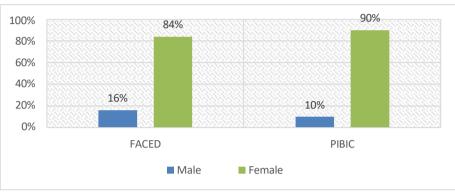


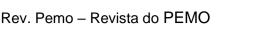
Figure 1 - Distribution of students by gender

Source: survey data.

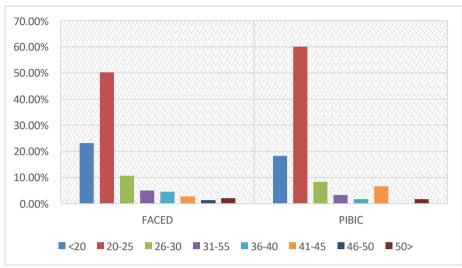
Figure 1 shows that, as the majority in the course profile (84%), women are also in the majority among the scholarship recipients (90%). In turn, the male population has an under-representation of 6 percentage points between the general population and the population of fellows. However, the data above is compatible with the overall UFC data, where the number of female PIBIC egresses from the Humanities represented 93.3% of the total group (FERREIRA, 2015). When comparing the same results with the national panorama, one has that the female participation rate is much higher than the average, in this case falling to 60.30% (CGEE, 2017).

Regarding the age configuration of the students observed, the two groups are predominantly young. The pedagogy course has 74% of its students aged up to 25 years, while the rate for PIBIC is 78.33%.

Figure 2 - Distribution of students by age.







Source: survey data.

There is a variation between shifts, with the evening course showing a higher number of students over 30 years old, whose rate is 23.57%. The figure for the daytime course is only 10.23%.

Historically, the profile of PIBIC fellows follows this picture, since until 2001, there was an age restriction: the admission limit was up to 24 years old (Normative Resolution 019/2001). Even though there is no longer such a restriction, the average age of PIBIC fellows at FACED is 24.3 years old.

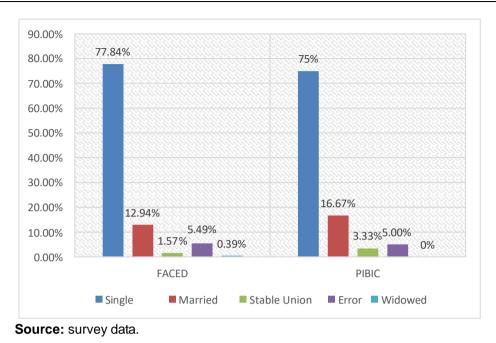
Regarding marital status<sup>4</sup>, the population of fellows has rates very close to those of the general population of the course, whose vast majority (75%) is in the category "Single".

Figure 3 - Distribution of students by marital status.

<sup>&</sup>lt;sup>4</sup> Data transformation: "separated" was changed to divorced; "living together" and "amasiado" was changed to stable union; "dating" was changed to single. We also have attributed the answer error for those who wrote Ceara or Ce to this question.



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Generally, the configuration where singles are the majority among the scholarship recipients is repeated for other courses. In the case of the IC scholarships of the History, Electrical Engineering, and Biological Sciences courses that Canaan (2012) studied, all students belonged to this category. Moreover, in addition to the fact that the profiles are primarily young, individuals who are in a stable union or married may have more difficulties entering the scholarships due to their different responsibilities (greater participation in the family income, longer working hours, and more domestic activities; this last item may be even more significant with the gender cut-off).

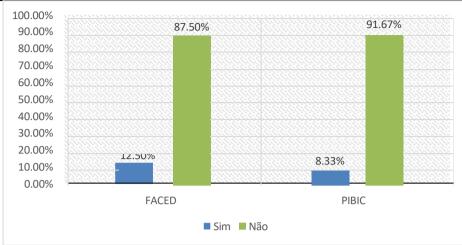
Figure 4 - number of students with children.

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#### Source: survey data.

For the variable "Children," although the course profile is composed of many students without kids, this number becomes even higher when we analyze the scholarship recipients. There is a drop in the representation of students with children, with a decrease of 4.17 percentage points. It is also worth noting that most students in this category are women in the evening course (61.97%) and that the entire population of scholars with children is also female.

Analyzing the non-proportional representation of this group in the PIBIC is part of the discussion of maternity and science. The selection criteria for these fellows, once taking into account aspects of exclusive dedication (CNPq, 2006) for a scholarship that, when paid, is equivalent to R\$400 and with a weekly workload of 16 hours (4 hours more than the other university scholarships), become major obstacles for these students. Santoro et al. (2021, p.74) state that: "new mothers are more likely than new fathers to leave their science careers, switch to a part-time job, or become unemployed. Notoriously, parenting does not affect fathers to the same extent as mothers" (free translation).

The representation of employed students declines by 10.50 percentage points when looking at the population of PIBICs. Even considering its decrease, such a rate is quite peculiar because it considers that the expected rate would be 0% once it requires exclusive dedication from its students.

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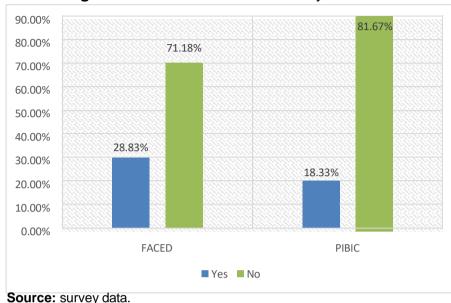


Figure 5 - Distribution of students by work activities.

However, it can reflect that this number expresses the need for these students to obtain another source of income because, considering that the Pedagogy course has a profile of primarily low-income students and that the value of the scholarship is insufficient to be taken as the only source of income, it would be challenging to meet the requirement of being only a scholarship holder.

The graph analysis also reiterates that even if they create means to obtain a source of income outside of the PIBIC, students who work tend not to join these scholarships. Data from the Federal University of Minas Gerais (CANAAN, 2012, p. 86) show that "A student who had worked at some point in his life is 13% less likely to become a CI fellow in Biological Sciences, and 58%, in History" (free translation).

Finally, for the general profile of the course and for fellows, more than 60% of students who work are from the evening course.

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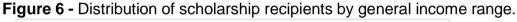
Regarding income<sup>5</sup>, we adopted as a criterion of comparability the division of the Pedagogy students (on scholarship and not on scholarship) by income ranges. Four groups of students were established by minimum wage per capita, as defined in Table 2. Finally,

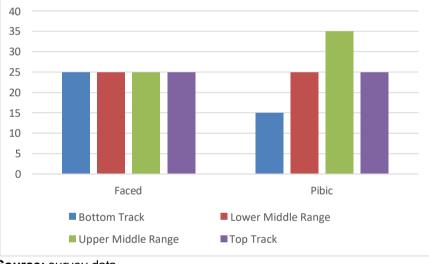
### Table 2: General income ranges established

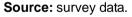
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Track	Track Description
Bottom Track	income in minimum wages per capita between 0 and 0.25 (1st quartile);
Lower Middle Range	income in minimum wages per capita above 0.25 (1st quartile) and below 0.375 (median);
Upper Middle Range	income in minimum wages per capita above 0.375 (median) and below 0.75 (3rd quartile)
Top Track	income in minimum wages per capita above 0.75 (3rd quartile)

Source: elaborated by the author







The expected result, following the general estimate, was an equal distribution of 25% by income bracket. However, there is a shift in the percentage of recipients in the lower income bracket to those in the upper middle bracket. Among the scholarship recipients,

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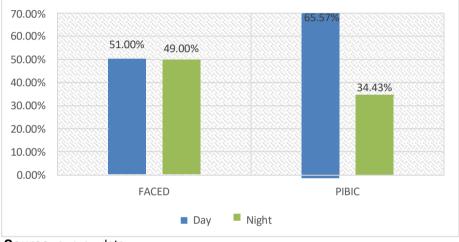
<sup>&</sup>lt;sup>5</sup> For the income variable, we established the mean of the family income as an income value. The exception is the "more than 14 minimum salaries," in which we adopted 14 as the value. The family's income was divided by the number of people living in the same house as the student. In the end, we find the per capita income.

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there is lower participation of the poorest in the course and higher participation of the second most affluent group. In any case, the income brackets comprise the poorest students. Only 4.5% of students enrolled in the Pedagogy course would have an income to overcome the quota law's economic barrier, and 87.6% earning less than one minimum wage per capita, for example.







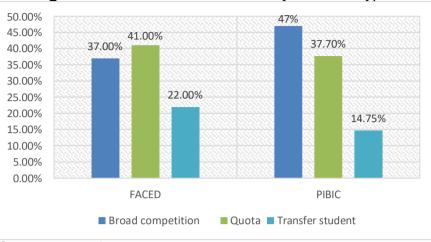
Source: survey data.

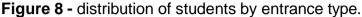
There is an apparent disparity in the distribution of fellows between shifts. While there is only a 2% difference between shifts in the course, the difference increases to 31.14% among PIBIC fellows. In other words, the percentage of day-shift fellows is almost double that of night-shift students. The low representation of the evening course can be understood mainly by the aspect of work obligations since 69.39% of students who work are enrolled in the evening shift. Another aspect already mentioned that may influence this rate is the greater presence of mothers on the evening shift.

Finally, there is the pedagogical organization of FACED itself, which primarily concentrates its activities on the day shift, considering extra-class activities and the operation of physical spaces (ARAÚJO, 2019). It implies that, for nighttime students who only have the availability in their enrollment shift, their access to activities that are not curricular components becomes out of their reach.

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For the variable "Type of admission," there is an inversion in the predominance. Those who accessed via a quota were the majority of the students on the course, while those of broad competition were the majority among PIBIC scholars. For the broad competition, there is a variation of 10% between students in general and PIBIC fellows. It is the only rate that increases and reaches almost 50% of the fellows. Quota students become the second largest number of students with scholarships, decreasing by 3.3%. Finally, some students entered via transfer, whose representation rate dropped 7.25%.

Following the UFMG teacher training undergraduate course (CANAAN, 2012), the tendency is that most scholarship recipients come from private schools. This "advantage" would be due to cultural origin, which would influence both the choices of academic paths, especially in the selection processes.

### 4 Final considerations

It is observable that the profile of the students who, in their majority, access the training place for research in the Pedagogy course is composed of: women; close to 24 years old age group; single, without kids; without employment or exercise of work activity;

Source: survey data.

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students of the day course; entrants by broad competition and with per capita income above the median for pedagogy students at Faced.

Among the variables studied, the aspects of most significant discrepancy occur in the representation regarding shift, labor situation, income, and type of entry. It indicates that students from the evening course, students with some work activity, students from lower income brackets, and students entering by quota or transfer would probably be more distant from the IC scholarships than the others.

The present scenario allows the analysis that (1) the requirement of exclusive dedication combined with the low value of the PIBIC scholarship is potentially one of the main barriers to access since the majority of students at Faced have incomes of up to 1 minimum wage per capita, and that Pibic is a less attractive location when compared to higher paid internships and scholarships that do not have this requirement. (2) The type of high school represents an essential factor in the acquisition of scholarships, indicating the importance of studies focused on these selection processes, investigating their criteria and demand by entry category. In summary, based on the profile data of the scholarship recipients, we observe that students entering through affirmative action policies still encounter obstacles to full participation in the existing spaces in Higher Education (materialized here with the analysis of Scientific Initiation), thus demonstrating the maintenance of inequalities.

Therefore, we hope this research will broaden the discussions about evaluating scientific initiation policies and instigates the necessary discussion about actions aimed at the students who accessed Higher Education through affirmative action policies. It is vital to ensure, in addition to access, their permanence and effective participation in the various academic spaces.

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