

ACADEMIC PERFORMANCE STUDENTS OF HIGH-SCHOOL- INTEGRATED TECHNICAL COURSE IN CHEMISTRY BY IFMA - MONTE CASTELO CAMPUS

Dr. Rogério de Mesquita Teles¹ & Patrícia Nogueira Moraes²

¹*Professor, Chemistry Academic Department, IFMA – Monte Castelo Campus,
Sao Luis, Maranhao, Brazil,
E-mail: rogerioteles@ifma.edu.br*

²*Estudent, , IFMA – Monte Castelo Campus, Sao Luis, Maranhao,
Brazil, E-mail: pathynm@hotmail.com*

ABSTRACT

Federal Law No. 12.411/2012 establishes the quota system for public school students access to federal universities and institutes in Brazil. The Federal Institute of Education, Science and Technology of Maranhao (IFMA) reserves 50% of its spots for students coming from public schools. Academic performance was analyzed for students of IFMA's technical course in chemistry. Students were divided in 6 groups: 4 related to quotas for students from public schools (based on family income and self-declaration as black/brown/indigenous student), 1 for wide competition and 1 for people with disabilities. Overall semester grades for the classes of 2013 (CM-13) and 2014 (CM-14) over the six semesters of the course were taken, for the whole class and also organized in quota groups. Students coming from public schools presented higher averages in four of the six semesters in CM-13. But in CM-14, non-quota students presented better results. The overall average for quota students is lower than non-quota students' by 3.33% in class CM-13 and 4.99% in class CM-14. Thus, for the course studied, the Quota Law promotes the intended corrections, without prejudice to the academic standard.

Keywords: Quota System; Technical Professional Education at High Schools; Affirmative Action Policies.

INTRODUCTION

1.1 Affirmative Actions and Quota Policy

Racial, economic and social discrimination are deeply rooted in Brazilian history, fact that has increasingly mobilized creation of public policies in order to compensate inequalities generated over time, as well as to affirm historical and cultural value of all people. These policies are known as affirmative actions [1].

These actions, according to Oliveira and Carvalho [2], appear as measures aiming to increase representativeness of historically discriminated groups in social spaces. In Brazil, racial quotas are an old demand from social movements, especially black ones [3]. Quotas can be considered as an instrument seeking to redress this inequality of opportunities, since entire generations have been harmed "because of past mistakes never reviewed by our society, but, instead, reinforced by more than a hundred years of denying existence of racism in Brazil" [4].

Since the 90s, these policies began to be discussed in an academic perspective [5]. From this moment forward, there have been both favorable and contrary opinions towards their implementation, "but there haven't been yet any theoretical discussions or confrontations about the concept of affirmative action between authors on both sides" [6]. The first quotas in Brazilian public higher education appeared in the year 2000 [7]. After that, more than half of public universities in Brazil began to adopt some kind of racial or social quota to easy access to their courses, even without existence of a federal law, which would only be created in 2012 [8]. The Law No. 12.711/2012[9], also known as Quota Law, establishes reservation of half the spots in universities and federal institutes for racial and social quotas, and can be considered as a milestone in the struggle against racial and social exclusion in Brazilian educational system [10,11].

Since Selection Process for admission in classes of 2013, IFMA adopts the Quota System in accordance with what it is provided by Law No. 12.711/2012. Therefore, 50% of the spots are allocated to students who have studied in a public school, 50% of which are reserved to candidates with a gross household income equal to or less than 1.5 minimum wage, guaranteeing the percentage of 77% [12] of these spots to self-declared blacks, brown and

indigenous students. Besides, 50% of spots for public school graduates are reserved for candidates with a gross household income above 1.5 minimum wage, guaranteeing, again, percentage of 77% [12] of these vacancies to self-declared blacks, browns and indigenous students. IFMA also ensures that 5% of the spots, per course and shift, are allocated to candidates with disabilities [13].

1.2 Monte Castelo Campus in Sao Luis – Maranhao Federal Institute

The starting point for federal network of professional education was the creation, in September 1909, of "Schools of Artificers Apprentices" in all the 19 Brazilian state capitals, and among them was the School of Artificers of Maranhao, which became the Industrial School of Sao Luis in the 1930s. In the following decade, it then became the Federal Technical School of Sao Luis, and in 1965, Federal Technical School of Maranhao. This then turned into Federal Center of Technological Education of Maranhao - CEFET-MA, in 1989, having its attributions expanded for graduation and postgraduate studies. With Law 11892 [14] sanction on December 29, 2008, it finally became the Federal Institute of Education, Science and Technology of Maranhao - IFMA [15].

IFMA has being through a large expansion ever since, reaching 30 campuses throughout the state of Maranhao, with Monte Castelo Campus in Sao Luis being the oldest and largest.

The main goal of this research is to analyze academic performance of quota and non-quota students from high-school-integrated technical course in chemistry in IFMA Monte Castelo Campus, Sao Luis, who were admitted the first two years after the sanction of Law No. 12.711/2012.

METHODOLOGY

Technical courses in IFMA Monte Castelo Campus are organized on a semester basis, and they are integrated with High School, being developed in six semesters.

For the classes chosen for this study, 40 spots are offered annually, being 18 of them for open competition and 02 for people with disabilities. The remaining 20 spots are for students from public schools, with 10 of them being for those with a per capita income of up to a minimum and a half wage and the other 10 for students with a per capita income above a minimum and a half wage. In each of these two groups, 8 spots are for self-declared black, brown or indigenous students and 2 for non-self-declaring students.

Of the 40 spots offered for the class of 2013 (CM-13), only 39 students enrolled. Of these, one left still in the first semester, so the number of students whose grades were analyzed in this work was 38. For the class of 2014 (CM-14), there were a total of 37 students enrolled.

The overall semester grades for each of these students were searched in the Academic System of each institution, for each subject and semester studied. Then, the average of these grades was calculated for each student, per group and per class. For this, each class was divided into six groups, according to the quotas in which the students were classified during selection process. Table 1 shows the distribution of students in groups and classes.

Table 1. Students distribution and quota description

GROUPS	DESCRIPTION	NUMBER OF STUDENTS	
		CLASS CM-13	CLASS CM-14
G1	Open competition	19	17
G2	Individuals with disabilities	1*	-
G3	Self-declared BBI, $\leq 1,5$ MW ^(a)	8	8
G4	Self-declared BBI, $> 1,5$ MW ^(b)	8	9
G5	Non-Self-declared BBI, $\leq 1,5$ MW ^(c)	1	2
G6	Self-declared BBI, $> 1,5$ MW ^(d)	2	1

(a) Self-declared black, brown or indigenous students with income up to 1.5 minimum wage.

(b) Self-declared black, brown or indigenous students with income above 1.5 minimum wage

(c) Non-Self-declared black, brown or indigenous students with income up to 1.5 minimum wage

(d) Non-Self-declared black, brown or indigenous students with income above 1.5 minimum wage

RESULTS

Half-yearly averages of each semester for students of class CM-13 students, as a whole and per group, are showed in Table 2.

Table 2. Half-yearly average for CM-13, as a whole and per group

GROUPS	2013-1	2013-2	2014-1	2014-2	2015-1	2015-2	MEDIUM
G1	9,13	8,59	8,68	8,43	8,84	8,57	8,71
G2	8,40	7,60	-	-	-	-	8,00
G3	9,05	8,46	8,70	8,34	8,80	8,55	8,65
G4	8,93	8,18	8,46	8,06	8,86	8,39	8,48
G5	9,30	8,50	8,80	8,80	8,73	8,50	8,77
G6	8,60	6,90	7,80	7,25	8,56	7,65	7,79
CLASS	9,03	8,36	8,59	8,28	8,82	8,48	8,60

From these data, it was observed that G1 obtained a higher score than quota students in two of the six semesters studied, G4 scored the highest in one of the six semesters, and for the course's other three semesters, the highest scored came from G5. Thus, it is evident that quota students obtained higher averages than non-quota ones in four of the six semesters of the course, which was also confirmed in a study by Pinheiro [16], in a similar study for undergraduate courses, in which "for the 15 courses analyzed, cumulative academic overall average in 9 of them was higher for non-quota students against 5 of which the average was higher for quota students. The one course left presented equal average for both quota and non-quota students."

Table 3. Half-yearly average for CM-14, as a whole and per group

	2014-1	2014-2	2015-1	2015-2	2016-1	2016-2	MEDIUM
G1	8,59	8,89	8,66	8,71	8,48	8,32	8,61
G2	-	-	-	-	-	-	-
G3	8,31	8,23	7,82	8,00	8,22	8,14	8,12
G4	8,30	8,45	7,86	8,04	8,15	7,55	8,45
G5	8,08	8,63	7,80	8,25	8,24	8,08	8,18
G6	8,46	8,46	8,68	8,04	7,93	8,05	8,22
CLASS	8,43	8,61	8,25	8,36	8,32	8,09	8,34

Data extracted for class CM-14 originated Table 3, from which it can be observed that non-quota students obtained higher averages than quota ones in all semesters. Also in the literature there are discussions that have detected situations such as this one, as the work of Peixoto et al. [17], which "indicates superior performance of non-quota students". A similar observation, in Fraga's study [18], have come to the conclusion that "quota students have inferior performance among university students".

Observing the overall averages profile for each of the two classes investigated during the course's six semesters, it was noted that there were not big differences between averages of quota students and non-quota ones.

It was also noted that the highest overall average (considering the whole course) of class CM-13 was 8.77 and the lowest 7.79. The difference was only 0.98 point, that is, less than one point (on a scale of zero to ten points). For class CM-14, the highest average was 8.61 and the lowest 8.18, with a difference of only 0.43 point, that is, 4.99%.

Campos, Feres Junior and Daflon [19] observed in a research evaluating the scores of high school graduates, that "the difference between the score of quota and non-quota students tends to be very low, if not insignificant", and this corroborates the results of the research.

Normally, studies in this area investigate higher education students, as was Velloso's study case [20], which concluded, when studying UnB students, that "there was no systematic superiority of non-quota students".

In another study, Oliveira and Carvalho [2], when studying performance of students from Federal University of Sergipe, realized that "although non-quota students generally have higher averages than quota students, the difference between them is really small."

Figure 1 shows overall averages of students over the six semesters of the course (from 2013-1 to 2015-2, for CM-13, and from 2014-1 to 2016-2, for CM-14), by group and per class. From these results, it was observed that the performance of CM-13 pupils coming from a public school declared black, brown or indigenous ones had a final average of 8.48 (G4 - with income above 1.5 minimum wage) and 8.65 (G3 - with income of up to 1.5 minimum wage), which are, respectively, 2.64% and 0.69% lower than the average of non-quota students. For CM-14, the G4 average was 8.45 and G3 was 8.12, which is equivalent to 1.85% and 5.69% lower than the average of non-quota students.

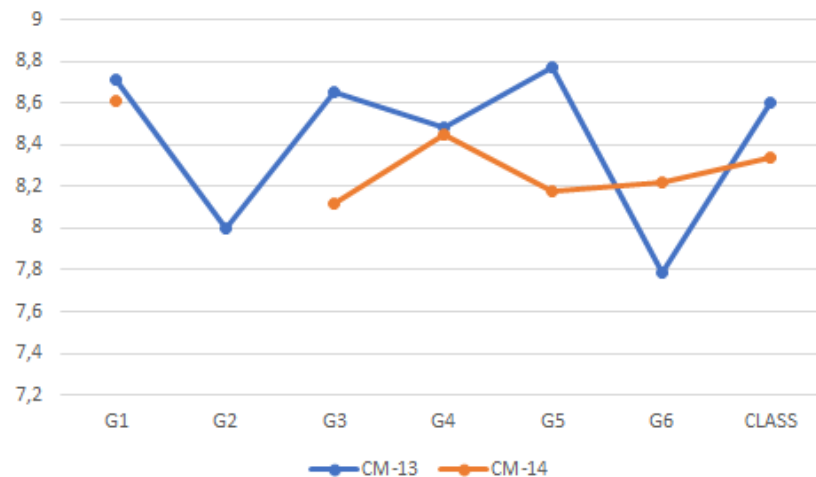


Figure 1. Average grades for all six semesters, per class and by group

This shows an inexpressive difference between averages of quota and non-quota students, except for CM-14 G3, for a study by Velloso [20] considers “as significant all differences between averages that are equal to or greater than 5%, favoring both quota and non-quota students, and as inexpressive differences that are smaller than this percentage”. The difference of 1.6% between the highest average of all, CM-13 G5, in relation to non-quota students, is also considered to be inexpressive. On the other hand, for CM-13, the difference between non-quota students and G6, which presented the lowest average among all groups, was considered expressive according to Velloso [20], since it was 10.56%.

Group oscillations in results from one class to another, whether it’s a quota student group or not, is in agreement with Pierone’s studies [21], who also obtained similar results in his researches on quota and non-quota students’ academic performance analysis in professional education.

In light of this analysis, it is relevant to highlight that this comparison takes into account six groups of students, due to quotas division given by 2012 law, and not only two – quota and non-quota students. When a weighted average is calculated from the overall averages of the four groups that constitute the total spots which must be reserved in accordance with the 2012 Quota Law (G3, G4, G5 and G6), that is, the average for students coming from public schools, values of 8.42 (for CM-13), and 8.28 (for CM-14) were obtained. Comparing these values with the overall averages of non-quota students (8.71 for CM-13 and 8.61 for CM-14), it can be seen that quota students are only 3.33% and 4.76%, respectively, lower compared to non-quota students, which shows that the difference between averages for quota and non-quota students has a non-expressive value - less than 5%.

CONCLUSIONS

Results show the differences found in academic performance at the end of each semester for each one of the two classes studied. For the first class (CM-13) quota students’ grades were higher in four of the six semesters, while for the second class (CM-14), non-quota students were those with the highest averages. In both classes, the difference between grades’ average for quota and non-quota students is not significant.

Organizing the two classes into two large groups, quota and non-quota students, overall average for quota students obtained were 8.42 (CM-13) and 8.28 (CM-14) and for non-quota students they were 8.71 (CM-13) and 8.61 (CM-14), showing the first group obtained an average performance, respectively, of only 3.33% and 4.76% inferior to the overall average for non-quota students.

Thus, there was not a systematic superiority of non-quota students in relation to those who got admitted through quotas. Moreover, we can consider this difference to be inexpressive.

Therefore, considering the results discussed here, everything indicates the Quota Law is successful, without any prejudice to the academic standard of the technical course investigated in this research.

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