



Use of Generative AI by Brazilian Economics students: satisfaction and confidence, in the context of learning statistics



1 Introduction

The use of Generative Artificial Intelligence (AIGen) has been growing rapidly in several sectors. In education, it allows for real-time explanations of content covered in the classroom, as well as assistance in solving school problems. With this, AIGen can transform the learning of Statistics, a subject often considered challenging by most students. In this context, in Brazil, the Economics course is one of the ones with the largest number of subjects related to Statistics. This reality raises some questions: 1) What is the profile of use of AIGen by Economics undergraduates? 2) What are their perceptions of General Satisfaction and Academic Confidence with AIGen in the circumstance of their statistical learning?

2 Objective

This study aims to analyze the profile of use of generative technologies by Brazilian undergraduate Economics students and their perceptions of General Satisfaction and Academic Confidence with the use of AIGen, within the scope of statistical learning.

3 Data

• **Questionnaire:** 10 questions prepared via Microsoft Forms, during the Statistics course, offered in the first semester of 2024. The application took place from 07/06/2024 to 22/06/2024, through a link made available in the class's virtual classroom. Perceptions of Satisfaction and Confidence were measured on a 5-point Likert scale.

• **Subjects:** 45 students, aged between 19 and 35 years old, in the 4th period of the Economics course at a university located in the State of Pernambuco, Brazil.



4 Method

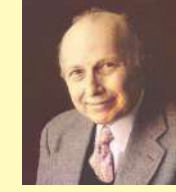
• Descriptive Statistical Analysis and Non-Parametric Inference were used, employing the Wilcoxon Rank Test and the Kruskal-Wallis Test, with post hoc analyses by way of Bootstrap, ensuring more robust Confidence Intervals for medians.

Frank Wilcoxon



(1892-1965)

William Kruskal and Wilson Wallis



(1919-2005)



(1912-1998)

Bradley Jefron*



(1938-Atual)

• All analyses were performed in R

(*) Creator of the Bootstrap method.

5 Results



91%

All students surveyed reported using AIGen. Of these, 91% use ChatGPT.



87% found out about AIGen through social media or direct recommendations from friends.

5.1 Characterization of use



General Satisfaction level



70% has ever been harmed academically by any erroneous or incomplete information provided by AIGen.



Academic Confidence Level in the use of statistical learning



95% used it to learn Statistics.

5.2 Insights

Using the Wilcoxon Rank Test to investigate possible significant differences between students' levels of General Satisfaction and Academic Confidence

The Test was significant at 1% and the effect size (r) was high, close to +1.00 ($r = 0.908$), suggesting that Satisfaction levels are higher than Confidence levels for most students.

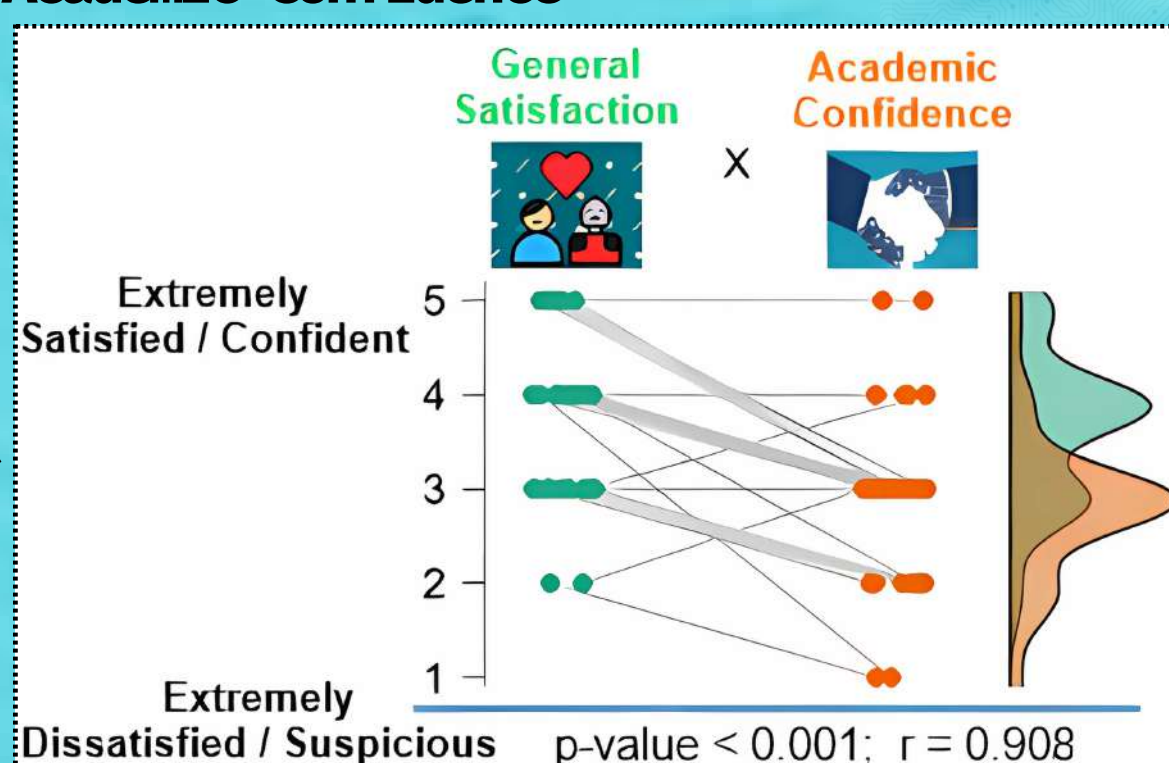


Figure 1 - Dotplot chart with the density curves of students' General Satisfaction and Academic Confidence levels and statistical evidence from the Wilcoxon Rank Test

Application of the Kruskal-Wallis Test to analyze how demographic factors (Gender, Age Range and Income Range) affect students' levels of General Satisfaction and Academic Confidence

Just the Income presented a significant effect, both on General Satisfaction ($p\text{-value} = 0.009$), and on the level of Academic Confidence ($p\text{-value} = 0.007$). The effect size was high in both cases ($\eta^2 > 0.140$).

Demographic Factor	General Satisfaction		Academic Confidence	
	p-value	Effect (η^2)	p-value	Effect (η^2)
Gender	0.800	0.000	0.255	0.007
Age Range	0.794	0.000	0.508	0.000
Income Range	0.009	0.235	0.007	0.251

Table 1 - Statistical evidence from the Kruskal-Wallis Test on the impact of demographic factors on students' levels of General Satisfaction and Academic Confidence



Post hoc analysis, via Bootstrap⁽¹⁾, to examine which income range present a significant median difference in General Satisfaction and Academic Confidence levels



General Satisfaction

There was a significant difference⁽²⁾ in the level of General Satisfaction between students with income range of up to 1 and those with income of 8 to 10 Brazilian minimum wages⁽³⁾.

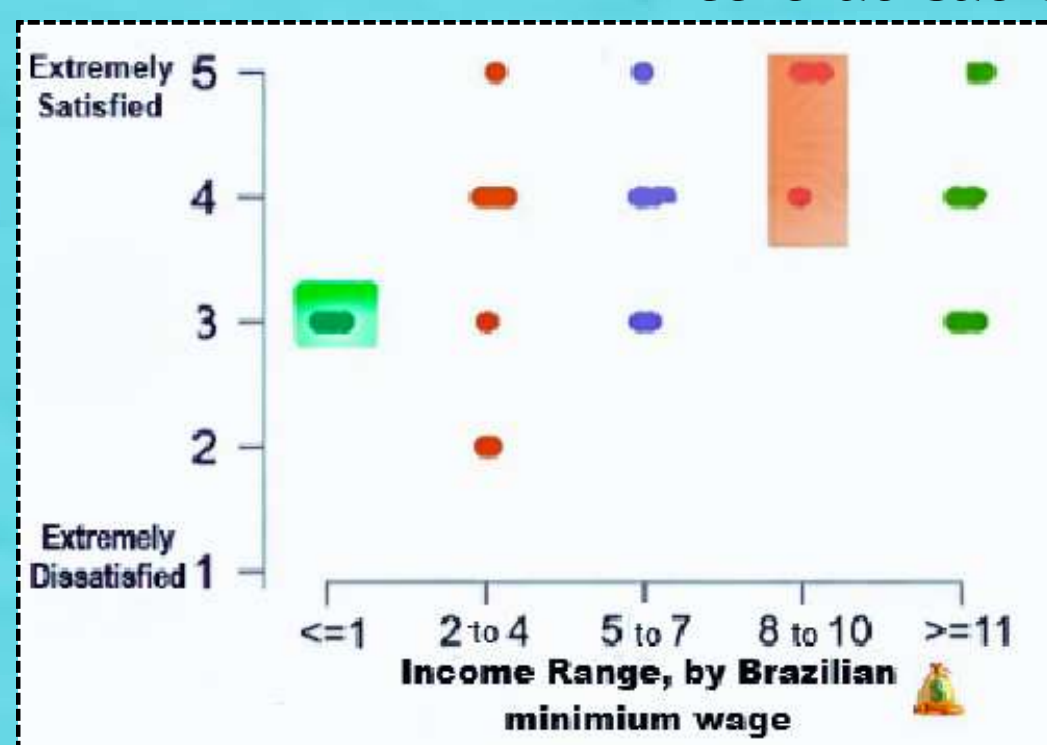


Figure 2 - Dotplot chart of the level of General Satisfaction, by income range⁽⁴⁾



Academic Confidence

There was a significant difference⁽²⁾ in the level of Academic Confidence between students with income range of up to 1 and those with income greater than or equal to 11 Brazilian minimum wages⁽³⁾.

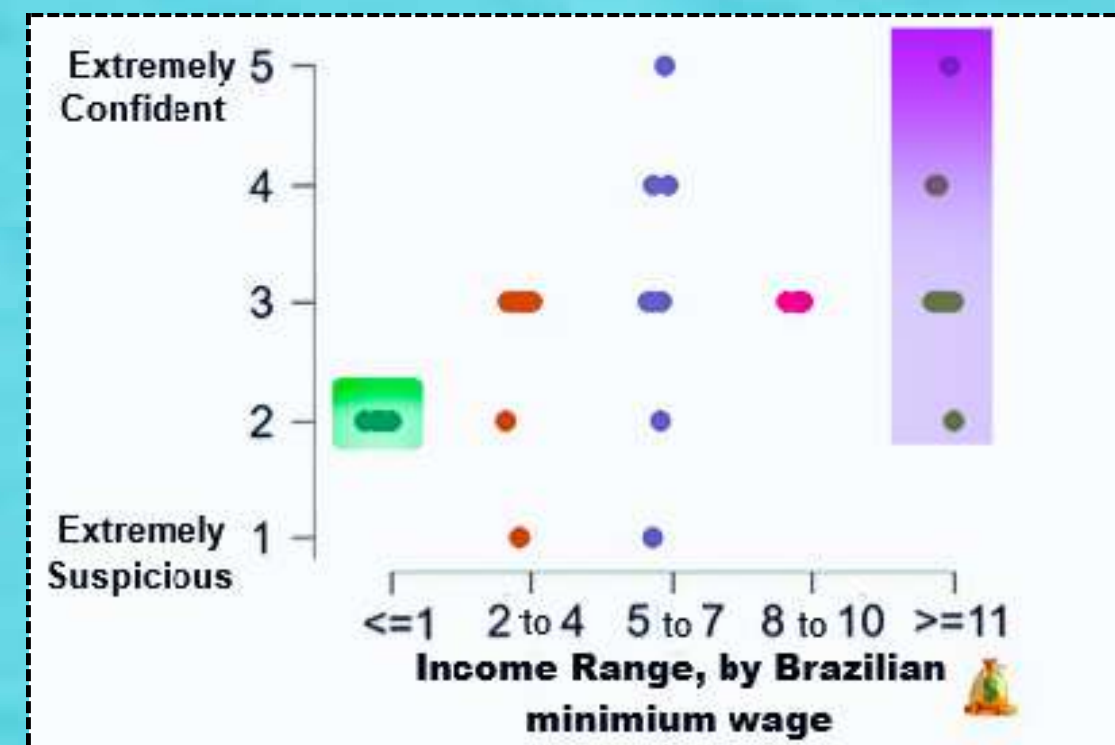


Figure 3 - Dotplot chart of Academic Confidence level, by income range⁽⁴⁾

(1): 1000 Bootstrap replicates; (2): p-value < 0.001 corrected by Tukey; (3): Brazilian minimum wage is equivalent, in Apr 2025, to 240.39 USD; (4): Income ranges with significant median difference are shaded.

6 Final comments

It was found that AIGen is a consolidated reality for the Economics students surveyed, both in daily use and for statistical learning, confirming the growing acceptance of platforms such as ChatGPT. It was observed that students are satisfied with the technology. However, they demonstrated distrust in its use for statistical learning. This contrast suggests that there is a certain skepticism regarding the effectiveness of AIGen in certain educational contexts. It was also shown that students with lower family incomes exhibited significantly lower levels of satisfaction and confidence, compared to their higher-income peers. This difference accentuates the inequalities that are so evident in Brazil, and indicates that socioeconomic factors can influence students' perception and experience of new generative technologies.