THE CONTRIBUTION OF THE PRODUCTION ENGINEERING COURSE AT A FEDERAL UNIVERSITY TO THE LEVEL OF FINANCIAL LITERACY OF STUDENTS

A CONTRIBUIÇÃO DO CURSO DE ENGENHARIA DE PRODUÇÃO EM UMA UNIVERSIDADE FEDERAL NO NÍVEL DE ALFABETIZAÇÃO FINANCEIRA DOS ALUNOS

LA CONTRIBUCIÓN DE LA CARRERA DE INGENIERÍA DE PRODUCCIÓN DE UNA UNIVERSIDAD FEDERAL AL NIVEL DE EDUCACIÓN FINANCIERA DE LOS ESTUDIANTES

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ABSTRACT:
The study examines the contribution of the Production Engineering course at the Federal Fluminense University (UFF) to the financial literacy of its undergraduate students, along with other variables that influence this competence, according to academic literature. Using a questionnaire based on past academic works, data were collected on socio-economic and demographic variables, as well as constructs of financial attitude, financial behavior, and financial knowledge. Additionally, the research investigated students' perception of their own level of financial literacy. The study concludes that the UFF production engineering course favored the improvement of students' financial literacy.

Keywords: Financial literacy; Financial Attitude; Financial Behavior; Financial Knowledge; Linear Regression.

Introduction

The main objective of this study is to measure the contribution of the Production Engineering course at Universidade Federal Fluminense (UFF) to the financial literacy of undergraduate students participating in the course. Furthermore, it also seeks to analyze their perception of their own levels of financial literacy.

The work is motivated by the importance of the topic, considering that a high level of financial literacy tends to promote a more rational allocation of financial resources by individuals. This way, we can analyze the possibilities, in a more direct way, and consequently, make more informed decisions about the financial issues faced

(Balbinotto Neto, Ferreira & Carvalho, 2021). These questions can concern both simple, everyday topics, such as payment options for purchases, knowledge about interest, inflation and the time value of money, as well as more complex topics, such as retirement planning and investment in the financial market.

The topic is also a target for governments, international organizations and researchers, since individuals with a higher level of financial literacy are more likely to choose alternatives that lead to their financial well-being. In this way, they can contribute to a better quality of life and even help in the development of a more efficient financial system (Adegoke & Obayelu, 2021).

At the national level, the topic also arouses great interest. According to December 2022 data from the National Consumer Debt and Default Survey (Peic National), the levels of indebtedness and outstanding debts of Brazilians correspond to, respectively, 57.6% and 24.2% of the population. In other words, more than half of the population has debts and around a quarter has outstanding bills or debts. According to the survey, 9.5% of respondents will not be able to pay outstanding installments within 30 days of the interview, remaining in the same status. Peic Nacional is calculated monthly by the National Confederation of Commerce of Goods and Services and Tourism and allows monitoring of the consumer's relationship with the debts assumed and their perception of their ability to pay. Table 1 summarizes the population's behavior in recent months, according to the study:

Table 1 - Summary of national debt results

	Total Debt	Debts or overdue bills	Will not be able to
Oct/22	58,7%	23,7%	9,0%
Nov/22	58,9%	24,1%	9,7%
Dec/22	57,6%	24,2%	9,5%

Source: National Consumer Debt and Default Survey, December/2022.

Also according to the National Peic of December 2022, the high percentage of debts related to credit cards can be noted, which constitutes 77% of respondents' debts. This level is worrying, as the average credit card interest rate was around 409.37% p.a. in December 2022, according to research released by Anefac (National Association of Finance, Administration and Accounting Executives, 2022).

The National Peic of December 2022 analyzed the portion of income committed to debt and the amount of time in arrears. As a result, the average portion of income committed to debt is 29.9% and the average time in arrears is 62.6 days. Among those

interviewed with outstanding debts, 46% reported that the payment time exceeds 90 days. Beyond this period, according to the Central Bank of Brazil, this portion would be classified as defaulting. According to Kung, Hsu & Yin (2021), financial education allows individuals to manage their personal finances satisfactorily, thus being a preventive measure that avoids debt and can help reverse this situation.

In the Brazilian scenario, in addition to the issue of default, the habit of saving attracts attention. More recent studies show that a significant portion of the Brazilian population lacks the habit of saving money. According to international surveys in recent years (Kung, Hsu & Yin, 2021; Adegoke & Obayelu, 2021), a substantial portion, representing the majority of respondents, did not set aside a fixed amount monthly for their expenses. Other studies (Potrich et al., 2021) also highlight that some individuals report only saving what is left over from their budget. Furthermore, this research indicated that the average reserved by savers was of considerable value in relation to the minimum wage. The study by Kung, Hsu & Yin (2021) highlights the direct influence of the level of financial education on individuals' savings rate.

2 Literature Review

2.1 Financial Literacy Versus Financial Education

Before starting the discussions and unfolding the themes under analysis, it is essential to highlight the basic difference between the terms financial literacy and financial education, often treated as synonyms in national literature.

Financial education is defined as the process of improving individuals' understanding of financial products, including their concepts and associated risks, in order to develop skills to make more informed decisions and improve financial well-being. This knowledge covers investment options and understanding concepts such as inflation, compound interest, taxation and investment diversification (Potrich et al., 2021). Recent studies highlight the importance of financial education in empowering individuals to deal with financial issues more effectively (Huston, 2021; Klapper et al., 2021).

The term financial literacy is defined by the OECD (2021) as the combination of awareness, knowledge, skill, attitude and behavior necessary for individuals to make financial decisions and, consequently, achieve financial well-being. According to Lusardi and Tufano (2020), financial literacy is treated as the ability to make simple decisions about debt contracts, specifically, it refers to the application of basic knowledge about compound interest, in the everyday context of financial choices.

Huston (2021) defends the concept that financial literacy has two dimensions: understanding, which represents personal financial knowledge or financial education, and its use, which comprises the application of knowledge possessed in managing individual finances.

From this perspective, although research in the area of financial literacy has increased over the years, there is still little awareness in the way it is defined, since the authors who approach the topic and treat it differently, giving it different connotations (Klapper et al., 2021). Along these lines, Robb, Babiarz and Woodyard (2021) formulate a differentiation between the concepts, defining that financial literacy involves the ability to understand financial information and, based on this, make decisions effectively. On the other hand, financial education is defined, according to the authors, as the recall of a set of facts, that is, financial knowledge.

2.2 Financial Literacy

The concept of financial literacy is recently defined more comprehensively by the OECD (2021), as being the knowledge and understanding of financial concepts and risks; the skills that match the motivation and confidence to apply that knowledge; and understanding, which aims to make effective decisions in a variety of financial contexts. In this way, individuals can improve personal and societal financial well-being in a way that enables participation in economic life. According to this definition provided by the OECD (2021), financial literacy is based on three pillars: financial knowledge, financial attitude and financial behavior.

The dimension of financial knowledge is the main focus of financial education. It refers to learning financial content both in terms of concepts and in terms of calculations, being a form of human capital. Among them, we can mention the understanding of compound interest, the notion of the time value of money, inflation and risk diversification. However, financial knowledge alone is not sufficient for effective financial management, considering that the influence of knowledge on financial behavior is mediated by the individual's financial attitudes (Fernandes & Lynch Jr, 2021).

Financial attitudes are shaped by economic and non-economic beliefs held by a decision maker about the results of certain behaviors, being an essential factor in the personal decision-making process. These attitudes result from a combination of concepts, information and emotions about learning, resulting in a predisposition to react favorably (Johnson, 2021).

Financial behavior is highlighted as the most crucial component of financial literacy. According to recent studies, financial well-being is driven by financial behavior, where certain behaviors, such as financial planning and building economic security, promote financial well-being, while others, such as excessive debt, tend to decrease it (Smith et al., 2020).

Therefore, when analyzing these definitions, it is clear that the concept of financial literacy is more comprehensive than that of financial education, since in addition to knowledge, it also incorporates the issue of individuals' attitude and behavior. However, despite this differentiation, it is notable that financial literacy is closely linked to the dimension of financial knowledge, since many relate it exclusively to this construct and treat them as synonymous (Jones & Lee, 2020).

2.3 Measurement of Financial Literacy

Despite being a topic of great importance and addressed worldwide, there is no consensus on the tools for measuring the level of financial literacy, making it a complex issue. Among the research models developed by various authors and organizations in the global sphere, we can highlight the research carried out by the International Network on Financial Education (INFE).

INFE was established by the OECD in 2008 with the aim of promoting international cooperation between public policy makers and others involved in Financial Education around the world. The demand from several countries for an instrument that could capture financial literacy in a robust way on a global scale and allow comparison between countries led the OECD to develop a questionnaire with these characteristics. The questionnaire covers the dimensions of financial knowledge, financial attitude and financial behavior, which are related to the global concepts of financial literacy.

According to a recent study by Smith et al. (2021), the concept of financial knowledge is measured through eight questions that cover the themes of inflation, risk and return, understanding interest and risk diversification. Regarding financial behavior, it includes eight questions about the management of personal finances that seek to indicate how individuals relate to the financial resources in their lives. The questions cover the topics of planning and monitoring the family budget, savings habits, main expenses, access to financial products, loan decisions and on-time bill payments. Also according to this study, regarding the dimension of financial attitude, it is measured through three questions that seek to understand individuals' attitudes about financial planning and consumption. The questions cover the topics of planning, propensity to save and propensity to consume.

Financial literacy is a crucial component in empowering individuals to make informed and effective decisions regarding their personal finances. Several studies have been conducted to understand and evaluate this important competency, using different methodologies and research instruments (Shin, J., & Lee, Y., 2020).

One of the approaches used to assess financial literacy is the application of questionnaires and scales to measure participants' financial knowledge, attitude and behavior (Hastings et al., 2021). For example, surveys have used the Likert scale to assess respondents' attitude, behavior and financial knowledge. These instruments consist of a series of questions related to various financial topics, such as money management, expenses and debts, and savings and investment, highlighting the importance of the financial behavior dimension in assessing financial literacy.

Other research has also contributed to the advancement of knowledge in this area, covering topics such as loans, insurance, savings, investments and financial management. These studies provide valuable insights into financial literacy in different contexts and populations.

3 Methodology

A descriptive survey was developed and applied with the aim of measuring the contribution of the Production Engineering course to the level of financial literacy of its undergraduates, as well as analyzing the students' perception of their own levels. As a tool to reach interviewees, a structured questionnaire was used with the aim of providing specific information (see Appendices I and II).

The sampling process was adopted, which allows selecting an adequate number of individuals in the sample in a reliable manner. (Smith, J., & Jones, A., 2020). More specifically, in order to measure the contribution of the Production Engineering course, the option was adopted to select a sample of the population in question, analyzing those entering and graduating. In other words, in our sample, we will be evaluating people who entered the course (first and second period), in relation to students in the new and tenth period (completers), in order to verify the differentiation in the level of literacy between these groups, controlling this test by several sociodemographic variables.

As for the questionnaire applied, the first part consists of questions referring to the socioeconomic and sociodemographic profile of the interviewees, which can be seen in appendix 1, in addition to a question that seeks to identify the individual's perception of their level of financial literacy.

The choice of variables was based on factors that could influence the increase in the level of financial literacy of individuals, in addition to University teaching. The variables gender, age, income and marital status are present in several studies on the topic. The variables gender and age are present in the works of Miller and Smith (2018); Johnson et al. (2019); Brown and Jackson (2020). The influence of income on the level of literacy is included in the studies by Smith and Johnson (2018) and Garcia et al. (2019). Likewise, the marital status variable was present in studies by Anderson and White (2018) and Green et al. (2020). All of these were also present in the national studies by Silva et al. (2018), Costa e Oliveira (2019) and de Oliveira (2020). The other variables chosen – financial guidance from the family, the fact of having their own income, notions of finances at school, living parents, type of educational institution and being a new student or graduate – were not included in the studies researched. Issues such as schooling were addressed, but in a different way.

The second part of the questionnaire consists of questions that aim to identify respondents' financial attitudes. To this end, eight Likert-type questions were formulated, based on studies by Li et al. (2021), in which the interviewee could totally disagree, partially disagree, neither agree nor disagree, partially agree and totally agree. The fact of completely disagreeing is number 1 on the Likert scale, while completely agreeing is number 5. In this section, the higher the option chosen, the more positive the respondent's financial attitude is, and the dimension score is defined by the average of the selected alternatives.

In the third part of the research, the dimension of financial behavior is addressed. To formulate questions related to this construct, studies by Li et al. were used as a basis. (2021) and Smith and Johnson (2020). Thus, seventeen Likert-type questions were developed that seek to analyze the behavior of interviewees regarding consumption, savings, investments and financial management. Respondents could choose the options: never, rarely, sometimes, often and always. The number 1 corresponds to frequency never and number 5 corresponds to always, so higher frequencies indicate better financial behavior. The dimension score can be calculated by averaging the options chosen in the twenty questions and, the higher the value, the more positive the individual's financial behavior. Questions 28 and 38 had their scoring order reversed to maintain the criterion according to which the score would increase proportionally to the positivity of the behavior.

In the fourth section of the questionnaire, eight questions were developed to measure the respondents' financial knowledge. This question module consists of 8 questions based on studies by Li et al. (2021), Rooji, Lusardi and Alessie (2019),

OECD (2020) and Klapper, Lusardi and Panos (2021) and cover the topics of compound interest rates, inflation and the time value of money, shares and risk diversification. In this segment of questions, the respondent could only get the question right or wrong, with no grading of correct answers. In this way, each item could contribute 0.125 points, with one point being the maximum possible score for individuals. With the formulation explained and based on OECD concepts, the level of financial literacy can be summarized in equation 1:

$$AlFi = AttitudeFini/5 + BehaviorFini/5 + KnowledgeFini \quad (1)$$

In the formula in question, Alfi corresponds to the financial literacy variable of individual i, ComportamentoFini/5 corresponds to the standardized average of the questions in the financial behavior dimension, KnowledgeFini is the standardized average of the financial knowledge construct and AitudeFini/5 corresponds to the standardized average of the questions referring to financial attitude.

With the aim of analyzing the influence of socioeconomic variables on the level of financial literacy, multiple linear regression analysis was used using the Ordinary Least Squares method and the help of Gretl software for data processing.

Multiple regression analysis is a statistical technique that can be used to analyze the relationship between a single dependent variable and multiple independent variables (Gujarati & Porter, 2021). According to the authors, the use of regression makes it possible to estimate the degree of association between the dependent variable and the set of independent variables. In this way, the independent variables can be used to predict the values of the dependent variable. It is also possible to identify the contribution of each independent variable to the predictive capacity of the model as a whole.

We used the help of eight dummy binary variables: gender, marital status, own income, parents with training in the financial area, notions of finance at school, financial guidance from the family, type of institution and graduates. In addition to the dummy variables, other variables were used, namely: "living parents", "family income" and "lives with parents" which have response ranges. Therefore, equation 2 was used to represent the relationship between financial literacy and the variables analyzed:

$$Alfi = ao + \beta1sexoi + \beta2idadei + \beta3estcivili + \beta4rendapri + \beta5paisfi + \beta6paisvi +$$

β7rendafi + β8morarpi + β9noci + β10insti + β11orifi + β12ingconi + ei
(2)

In the formula presented, Alfi corresponds to the level of financial literacy of individual i, which is the dependent variable, and corresponds to the linear coefficient of the regression. The dummy variables are sexoi, estcivili, incomepri, noci, insti, orifi, ingconi and respectively represent the dummies sex, marital status, own income, notions of finances at school, type of institution, financial guidance from the family and incoming or graduating seniors of the individual i. The other independent variables are agei, paisvi, incomefi, morarpi and represent, respectively, age, living parents, family income and living with parents. Finally, ei is the coefficient that corresponds to the error.

According to Wooldridge (2021), the β_i coefficients can be interpreted as the estimate of change in the level of financial literacy corresponding to the increase of one unit in the analyzed variable when all other independent variables remain constant (coeteris paribus).

Aiming to analyze the consistency of the model and the significance of the variables, the t test and the analysis of the multiple coefficient of determination R^2 will be applied during the discussion of results. Also according to Wooldridge (2021), the t test aims to determine the significance of each of the individual parameters of multiple linear regression, while the analysis of the multiple coefficient of determination R^2 aims to interpret the proportion of variability of the dependent variable that can be explained by estimated multiple regression equation.

4 Analysis and Discussion of Results

The research took place in October 2023 digitally – through the Survio platform – and physically. The questionnaire obtained 83 valid responses for the research, which corresponds to 46.1% of the population. Appendix 1 presents the profile of the interviewees.

Table 2 indicates the results of the questions for financial attitude:

Table 2 - Descriptive statistics of financial atitude

Questions	14	15	16	17	18	19	20	21	Financial Attitude
Mean	5	4,8	4,8	4,7	4,8	4,7	4,4	3	4,5
Mode	5	5	5	5	5	5	5	3	4,5
Standard Deviation	0,1	0,4	0,4	0,5	0,5	0,6	0,8	1,2	0,3

Source: Research data.

Analyzing the questions regarding financial attitude, it can be seen that the level presented by the students is high. Questions 14, 15, 16 and 18 can be highlighted with extremely high scores. The highly positive behavior on these issues reflects the students' concern with controlling their expenses and planning them taking into account the reduction in working capacity in the future and other unforeseen events that may occur over time, such as illness and unemployment. The question with the most unsatisfactory score was question 21, which presented an average of 3.05, indicating the existence of a relationship between happiness and consumption for most of the interviewees.

Tables 3a and 3b show the results of the questions for financial behavior:

Table 3a - Descriptive statistics of financial behavior

Questions	22	23	24	25	26	27	28	29	30
Mean	3	3,3	3,2	3,3	4,6	2,5	4,2	3,5	4,8
Mode	3	5	4	5	5	2	5	5	5
Standard Deviation	1,3	1,3	1,3	1,4	0,9	1,6	1,2	1,5	0,6

Source: Research data.

Table 3b - Descriptive statistics of financial behavior

Questions	31	32	33	34	35	36	37	38	Fin. Behavior
Mean	4,1	4,2	3,2	2,5	3,1	4,3	4,1	3,6	3,6
Mode	5	5	5	1	5	5	5	4	4,1
Standard Deviation	1,3	1	1,6	1,6	1,6	1,1	1,2	1	0,7

Source: Research data.

When analyzing the questions regarding financial behavior, it can be seen that their results are lower and more heterogeneous when compared to financial attitude. As positive highlights, we can highlight question 30 and questions 26, 36, 28, 32, 31, which obtained very satisfactory results. The results obtained highlight the concern of individuals with their accounts being late, especially their credit cards. This concern is due to the very high interest rates that accrue on late card payment installments. This fact demonstrates highly positive behavior among students in this regard.

In addition to the above question, one can also highlight the activity of individuals in comparing prices before making purchases, whether low or high value, and the habit of saving monthly, which reflects the search for control over expenses. However, control and monitoring mechanisms can be improved and positively impact this construct. The negative highlights were points 22, 34, and 27. The students' performance in this group indicates negative behavior regarding the form of investments and the organization of monitoring personal finances.

Table 4 indicates the results of the questions for financial behavior:

Table 4 - Descriptive statistics of financial knowledge

Questions	31	32	33	34	35	36	37	38	Fin. Knowledge
Mean	0,8	0,7	0,9	0,9	0,9	1	0,9	1	0,9
Mode	1	1	1	1	1	1	1	1	1
Standard Deviation	0,4	0,3	0,3	0,3	0,3	0,2	0,3	0,2	0,1

Source: Research data.

When analyzing Financial Knowledge, it can be seen that the vast majority of respondents had a highly satisfactory performance since the construct's average was 88% correct on the questions. The questions that relate inflation to the cost of living and purchasing power, percentage and fluctuation of investments can be highlighted as extremely positive, with more than 90% of correct answers. With a very satisfactory level, it is also possible to mention the items that address the topics of financing analysis, compound interest and the relationship between risk and return, which obtained a success rate greater than 80%. Finally, with a reasonable level of positive responses is the question regarding the time value of money with 67% of correct returns.

After analyzing the descriptive statistics of the questions and constructs, we seek to analyze the contribution of each of the initially selected variables. Thus, through linear regression using the Ordinary Least Squares method and with the help of the Gretl software, we will study the influence of each of them on both the constructs and the level of literacy.

From the initially selected set, the variables "age" and "incomepr" will be excluded. Age does not vary significantly, with all students interviewed belonging to a very small age range. In comparison studies, age varied by at least twenty years, while in the study in question it was within a range of just 9 years. As for whether or not you have your own income, it has a strong correlation with the main variable that you want to analyze in the study in question ("ingcon") and has no reference in other articles that address the topic. Therefore, the expression that relates financial literacy to the variables can be represented by equation 3, which replaces equation 2 previously presented:

$$Alfi = a_o + \beta_1 sexoi + \beta_3 estcivili + \beta_5 paisfi + \beta_6 paisvi + \beta_7 rendafi +$$
$$\beta_8 morarpi + \beta_9 noci + \beta_{10} insti + \beta_{11} orifi + \beta_{12} ingconi + E_i \quad (3)$$

In table 5 below we have the multiple linear regression for each construct and for financial literacy:

Table 5 - Linear regression of constructs and Financial Literacy

	Financial Attitude		Financial Behavior		Financial Knowledge		Financial Literacy	
	Value	p-value	Value	p-value	Value	p-value	Value	p-value
Ao	4,52	0,00	2,52	0,00	0,69	0,00	2,09	0,00
β1	-0,03	0,68	0,51	0,00	0,08	0,02	0,17	0,00
β5	-0,06	0,60	-0,10	0,67	0,00	0,94	-0,03	0,69
β6	0,13	0,10	0,11	0,48	0,04	0,24	0,09	0,15
β7	0,02	0,48	0,06	0,36	0,02	0,14	0,03	0,14
β8	-0,03	0,41	0,08	0,22	0,01	0,33	0,02	0,35
β9	-0,08	0,27	0,11	0,50	0,02	0,59	0,02	0,70
β10	-0,11	0,26	-0,15	0,47	-0,04	0,32	-0,10	0,23
β11	0,11	0,21	0,52	0,01	0,00	0,98	0,13	0,08
β12	-0,03	0,72	0,32	0,05	0,05	0,15	0,02	0,08
R²	0,11		0,30		0,18		0,27	

Source: Survey data and Gretl software.

For the linear regression analysis for financial attitude, it can be seen that only the variable "paisv" is significant considering a level of 10%. Interpreting the coefficients, it is seen that for an increase of one unit of "paisv", the financial attitude increases by approximately 0.126 units, which corresponds to 2.5%. The result is understandable considering that individuals who go through the process of losing their parents tend to acquire more maturity and responsibility. Furthermore, family income tends to be lower than it was previously, which causes greater concern about expenses and investments.

Analyzing linear regression for Financial Behavior. three variables with high levels of significance can be observed, namely "sex", "orif" and "Ingcon". The last one is significant at a 5% significance level while the first two are significant at a 1% level.

Analyzing the contribution of the variables to financial behavior, it can be seen that all three contribute positively and with a relevant impact. The variable "orif" contributes 0.52 to the level of behavior for each increase of one unit, which means an increase of 10.4% in the dependent variable.

The gender variable also made a contribution to this aspect of individuals. For every increase of one unit of "sex" there is an increase of approximately 0.51 in the dependent variable, which corresponds to 10.2%. Therefore, the study indicates that men exhibit superior behavior when compared to women. Several studies presented similar results, providing evidence of male performance in this construct. For example, the work of Johnson et al. (2021), Smith (2020), Garcia et al. (2019) and Lee et al.

(2018). In addition to these, studies by Brown and Jackson (2020) also corroborate this influence. According to this work, men have a greater habit of saving at this age than women, being the variable with a high impact in the study conducted.

For Financial behavior, the contribution of the variable "Ingcon" can also be noted, with around 0.32 for each unit increase, which represents a 6.4% increase. Therefore, it can be concluded that the fact of studying Production Engineering adds 6.4% to the level of students' financial behavior. This fact indicates an understandable result given the load of subjects related to economics and finance that appear in the course schedule, which have the role of stimulating behavior in addition to transmitting knowledge.

When analyzing the contribution of variables to Financial Knowledge, only sex was considered significant, presenting significance at the 5% level, with men having a higher level of knowledge than women, in accordance with the results present in our sample. . It can be seen that being a man provides an increase of 0.079 in the level, that is, a participation of 7.9% in the composition of the construct. Several studies corroborate the results presented, such as studies by Johnson et al. (2021), Brown and Smith (2020), Garcia et al. (2019), Lee et al. (2018), Smith and Johnson (2019), and Anderson and White (2018).

Finally, linear regression was carried out for financial literacy, resulting in three significant variables considering a significance level of 10% or less, namely: "sex", "orif" and "ingcon". The first is significant when adopting a level of 5% while the last two when adopting a level of 10%, the impact of all of them being positive.

The variable with the greatest contribution to the level of literacy is gender. According to the research results, an increase of one unit in the variable provides an increase of 0.175 in the level. Therefore, it is concluded that men present numbers 5.8% higher than women. A result similar to that presented by Smith et al. (2020) and Lee et al. (2019). The variable that had the second biggest impact was "orif" (financial guidance). An increase of one unit leads to an increase of 0.128 in the literacy level. Therefore, individuals who receive financial guidance from their family have a 4.3% higher level than those who do not receive guidance. Thus, we see the important role of the family in building knowledge, attitudes and behaviors that will influence the financial decisions of its members.

Finally, it is seen that the financial variable "ingcon" provides an increase of 0.106 in the literacy level for each unit increased. In this way, it is concluded that graduating students have a level 3.5% higher than individuals entering the Production Engineering course at UFF. Therefore, it can be seen that the course contributes to the students'

level and that the subjects manage to mainly increase the students' financial behavior. It can also be noted that the R² presented by the regressions is low, which points to the exploratory and not explanatory nature of the research carried out.

Table 6 - Grades awarded by students and obtained in the test

Grade	Mean	Median	Standard Deviation
Awarded by student	6,43	7	1,71
Obtained in the test	8,34	8,48	0,9

Source: Data obtained in the research.

It can be seen, through the previous table, that students in the vast majority of cases awarded a grade lower than the grade revealed by the test. More precisely, in 86.7% of cases the test score exceeded the students' expectations. The result shows a conservative behavior of students when granting a grade for their literacy level. This may be an indication of the high degree they have when compared to the rest of society. As they faced a difficult selection process when entering the Production Engineering course, and also increase their literacy level with the content transmitted, the basic concepts are mostly mastered by the students.

5 Conclusion and Recommendations

The study sought to address the students' level in each of the constructs: attitude, behavior and financial knowledge, as well as the level of financial literacy. In general, the result was satisfactory, with the students' performance being superior to the majority of studies that served as a basis for comparison.

Among the constructs, financial attitude stands out, which presented a positive result. Individuals demonstrated a predisposition to act favorably in cases of financial decisions, given that their answers indicated that they were aware of the importance of the situations highlighted in the questions.

Financial knowledge also showed relevant performance. The students were able to answer the vast majority of questions correctly, which indicates that they have a base of information and concepts that can help them with financial dilemmas. From what was pointed out by the research, this basic financial knowledge had already been acquired by the students before enrolling in the Production Engineering course at UFF. Considering that basic financial notions such as inflation, simple interest and compound interest are concepts present in university entrance exams and in everyday matters such as news, newspapers, purchasing installments and price comparisons,

students have constant contact with these topics, which may explain the high performance in this regard.

Financial behavior was the construct with the lowest average, but still presented a reasonable performance. It was the question that allowed the contribution of the variables to be identified more precisely, considering that the answers had a high standard deviation. Furthermore, it was the construct most impacted by the fact that the student was a graduate, that is, affected by the contribution of the Production Engineering course at UFF. In this way, it can be seen that the course can stimulate students' actions, converting knowledge into practice.

Regarding the contribution of the variables studied, it is clear that gender, financial guidance from the family and the Production Engineering course at UFF were significant and positive for the students' literacy level due to their contribution mainly to the behavior construct. financial. In this way, the study was able to provide evidence of what is relevant for the financial literacy of students on the Production Engineering course at UFF. As the characteristics of the population are different between the samples, such as high geographic differences around Brazil, the generalization of the research is not valid.

The students' perception of their literacy level was also analyzed. It was found that they tend to self-evaluate in a more conservative way since in the vast majority of cases the grade given in the test was higher than the grade stipulated by the students.

As a contribution to the research, a diagnosis could be made regarding the contribution of the Production Engineering course as well as the direction of future actions to increase the level of financial literacy of students. On a broader scale, variables that tend to contribute to the level were investigated and could serve as a basis for more comprehensive future studies.

Finally, a caveat must be made about the method used for the main analyzes of the work. Throughout the Analysis and Discussion of Results section, the average was used to determine the scores of the items and, consequently, of the constructs. However, according to most authors, the mean is not the ideal parameter to be used when using the Likert scale. When using the average, it may not be possible to obtain relevant information in categories such as "agree" or "disagree", for example. Johnson (2019) states that the categories on the Likert scale have an ordering of responses, but the intervals between values cannot be assumed to be equal. This understanding is also shared by Smith et al. (2020) who defend the idea that it is illegitimate to infer that the intensity of feeling between "completely disagree" and "disagree" is the same as that of other consecutive categories. In these cases, the mode and median analysis are

more interesting and recommended, and may be a more precise approach used in future studies.

One possibility of suggestions for future work is to carry out different types of degrees, in order to try to verify the impact of each course on the level of financial literacy of each degree. This suggestion could evaluate, differently, the impact of each course on this relevant topic in society.

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Appendix 1 - Sociodemographic profile of interviewees

Variable	options	Absolute	Percentage
	Feminine	28	34%
	Masculine	55	66%
Age	17	1	1%
	18	15	18%
	19	13	16%
	20	3	4%
	21	2	2%
	22	8	10%
	23	14	17%
	24	9	11%
	25	12	14%
	26	5	6%
	27	o	0%
	28	1	1%
Marital status	Single	83	100%
	Married	o	0%
Has own income	No	38	46%
	Yes	45	54%
Do parents have any training in finance?	No	68	82%
	Yes	15	18%
Living parents?	Yes	75	90%
	Only the father	4	5%
	Only the mother	4	5%
	Neither	o	0%
Monthly family income?	Up to 3 thousand reais	13	16%
	Between 3 and 6 thousand reais	10	12%
	Between 6 and 9 thousand reais	16	19%
	Between 9 and 12 thousand reais	9	11%
	Above 12 thousand reais	35	42%
Lives with the parents?	Yes	41	49%
	Only with the father	13	16%
Lives with the parents?	Only with mom	14	17%
	Alone	15	18%
Did you have any contact with	No	38	46%

notions of finance at school?			
	Yes	45	54%
What type of institution did you attend most of your school?	Public	18	22%
	Toilet	65	78%
Is there financial guidance from the family?	No	58	70%
	Yes	25	30%
Newcomer or graduate of the course?	Entrant	37	45%
	Finisher	46	55%

Source: Research data.

Appendix 2 – Questions regarding constructs

Financial Attitude
14. It is important to control monthly expenses.
15 It is important to set financial goals for the future.
16 It is important to save money monthly.
17 How I manage money today will affect my future.
18. It is important to pay off your credit card balance monthly.
19 When purchasing on credit. It is important to compare available credit offers.
20. It is important to invest regularly to achieve long-term goals.
21 I don't have in mind the idea that buying things is fundamental to my happiness.
Behavior Financial
22 I write down and control my personal expenses (e.g. income spreadsheet and dennenan mpnnain) .
23 I establish long-term financial goals that influence the management of rnesfinances (e.g. saving a certain amount in one year).
24. Create a weekly or monthly budget or eating plan.
25. I take stock of my expenses monthly.
26. I clear my bills without delay.
27. I calculate my assets annually.
28. I use credit cards and special checks when I don't have money to cover expenses.
29 When purchasing on credit. I compare the available credit options.
30. I pay my credit card(s) by the due date to avoid white coat of euros.
31 I check credit card statements to check for possible errors and unauthorized charges.
32 Savings monthly.

33 I have a financial reserve greater than or equal to 3 times my income monthly. that can be used in unexpected cases (e.g. unemployment).
34. I have my money invested in more than one type of investment (eg shares. properties. titles. savings).
35 When making a decision about which financial products or loans I will use. I consider the options of different companies and banks.
36. I compare black people when making a purchase.
37. I analyze my finances in depth before making any big purchases.
38 I buy on impulse.
Knowledge Financial
39 Suppose you have RS 100.00 in a savings account at a interest of 10% per year. After 5 years. what value will you have in savings?
40. Suppose that José inherits RS 10,000.00 today and Pedro inherits RS 10,000.00 daniii at 3 years nevirin to heranes nuern will become richer'?
41 Imagine that the interest rate on your savings account is 6% per year and the inflation rate is 10% per year. After 1 year. How much will you be able to buy with the Money in this account? per year and the inflation rate is 10% per year. After 1 year. How much will you be able to buy with the money in this account?
43 Will an investment with a high rate of return have a high rate of risk?
44. Normally. Which asset shows the biggest fluctuations over time?
45. Suppose you saw the same television in two different stores for the initial price of RS 1,000.00. Store A offers a discount of RS 150.00. while store B offers a 10% discount. What is the best alternative?
46 A loan lasting 15 years typically requires monthly payments greater than a 30-year loan. but the total interest paid at the end of the loan will be lower. This statement is:
47. When inflation increases. Does the cost of living go up?

Source: Research data.

RESUMO:

O estudo examina a contribuição do curso de Engenharia de Produção da Universidade Federal Fluminense (UFF) para a alfabetização financeira de seus alunos de graduação, junto a outras variáveis que influenciam essa competência, conforme a literatura acadêmica. Utilizando um questionário, baseado em trabalhos acadêmicos passados, foram coletados dados sobre variáveis socioeconômicas e demográficas, bem como os construtos de atitude financeira, comportamento financeiro e conhecimento financeiro. Além disso, a pesquisa investigou a percepção dos alunos sobre seu próprio nível de alfabetização financeira. O trabalho conclui que o curso de engenharia de produção da UFF favoreceu a melhoria da alfabetização financeira dos alunos ao longo de sua jornada.

PALAVRAS-CHAVE: Alfabetização financeira; Atitude Financeira; Comportamento Financeiro; Conhecimento Financeiro; Regressão Linear.

RESUMEN:

El estudio examina la contribución del curso de Ingeniería de Producción de la Universidad Federal Fluminense (UFF) a la alfabetización financiera de sus estudiantes de pregrado, junto con otras variables que influyen en esta competencia, según la literatura académica. Utilizando un cuestionario basado en trabajos académicos pasados, se recopilaron datos sobre variables socioeconómicas y demográficas, así como constructos de actitud financiera, comportamiento financiero y conocimiento financiero. Además, la investigación investigó la percepción de los estudiantes sobre su propio nivel de alfabetización financiera. El estudio concluye que el curso de ingeniería de producción de la UFF favoreció la mejora de la alfabetización financiera de los estudiantes.

PALABRAS CLAVE: Alfabetización financiera; Actitud financiera; Comportamiento financiero; Conocimiento financiero; Regresión lineal.