

ECONOMIC LITERACY: A LONGITUDINAL STUDY IN PORTUGUESE UNDERGRADUATE STUDENTS

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Abstract

Economic literacy can be defined as the ability to use related knowledge and skills to manage financial sources effectively. Economic literacy is about knowing and applying the main economic theories in making rational economic decisions. Higher literacy levels on economy will lead to an increase in society's and individuals' economic efficiency and well-being.

The objectives of this study were to evaluate the impact of the General Principles of Economics (GPE) course on students' economic literacy and to identify subjects in which students show greater difficulty.

To collect the data, a questionnaire that included socioeconomic variables and the Economic Literacy Test (ELT) developed by the National Council of Economic Education (NCEE) was applied. The ELT includes twenty questions of multiple choice. There were four choices: a correct answer, two incorrect ones and a fourth choice for the students that did not know the answer. Basically, the ELT is about basic economic concepts and allows to evaluate the literacy of students and adults in four topics, namely consumer economics; production economics; financial economics; government's economic role and international trade. The ELT was applied to all students that were enrolled in GPE, who were present in the first class, in September 2017. At the end of the semester (January 2018), the same questionnaire was applied. GPE is a course of the Languages for International Relations degree from a public higher education institution, located in the northern of Portugal. Of the 95 students enrolled in GPE, 70 completed the questionnaire at the beginning of the semester. Of these, only 45 answered the questionnaire at the end of the semester that corresponds to a response rate of 47.4%.

Data analysis was carried out using IBM SPSS (Statistical Package for Social Sciences) 25.0. Descriptive statistics was used to characterize the sample. In order to compare the students' knowledge level on economics, pre and post-course, the Wilcoxon test was applied. For each question (correct and incorrect answer), the McNemar test was used to compare pre and post-course samples, considering each question, in order to verify if the course was responsible for the changes that occurred between the two moments. For both statistical tests, a significance level of 5% was used.

Students were, mainly, female (60%), with a mean age of 19.4 years old (SD = 1.63). Only 20.0% had previous training in economics during high school and 8.9% have already attended the GPE course in previous years without success. Most students came from rural areas (53.0%) and their parents were employed (father: 86.7%; mother: 73.3%), and the monthly income level was up to 1000 euros (59.1%). Most mothers had an educational level between 3rd cycle (33.3%) and high school (31.1%) while the fathers' educational level ranged between 2nd and 3rd cycles with 24.4% and 33.3%, respectively. The knowledge level pre and post-course was, on average, 12.0 (SD = 2.55) and 12.9 (SD = 3.24) out of 20, respectively. There were no statistically significant differences in students' level of knowledge pre and post-course (p-value = 0.091).

Students proved to have a fair level of knowledge pre and post-course. At the end of the course, most students showed improvements in the literacy level on economy. However, the improvement was not statistically significant. So, in the future, in order to improve the economic literacy level, some topics must be emphasized by the teacher, namely, financial, consumer and producer economics.

Keywords: Economic Literacy Test, Knowledge level, Students, Higher Education, General Principles of Economics

1 INTRODUCTION

Economic literacy can be defined as the ability to: identify economic problems, alternatives, compare costs and benefits; analyze incentives at work in economic situations; examine the consequences of

changing economic and public policy conditions; collect and organize economic evidence; and, ponder costs against benefits [1]. Economic literacy can, simply, be defined as the ability to use related knowledge and skills to manage financial sources effectively [2]. As stated and accepted in the literature, economic literacy facilitates rational decision making and allows making more accurate economic decisions [3,4]. Thus, improving economic literacy will increase economic efficiency and the well-being of individuals and society [3]. Well-informed economic agents make economic decisions that improve the resources allocation and increase economic efficiency [5]. Preferences and economic decisions affect the citizens as consumers, producers, investors, savers and voters [4,5]. In this sense, every member of the society must have a certain level of knowledge, skill and understanding of the economy [3]. Due to the lack of financial and economy knowledge, individuals make very poor retirement planning and, as such, benefit less from financial opportunities [6]. Consequently, individuals with low economic literacy levels often experience economic difficulties at older ages. In this context, the objectives of this study were to evaluate the impact of the GPE course on students' economic literacy level and to identify subjects in which students show greater difficulty that will deserve special attention by the teacher.

2 METHODOLOGY

To achieve these objectives, a longitudinal, observational, quantitative and analytical study was carried out. This study assumes a longitudinal nature because the data were collected in two different moments, namely pre-course (September 2017) and post-course (January 2018). Thus, a longitudinal study provides a dynamic vision of the relevant variables. Once this study fits the social sciences field and aims to evaluate the impact of the GPE course on students' economic literacy, it can, also, be classified as observational. On the other hand, the study can be classified as quantitative as it allows the representation of the acquired knowledge in the form of tables, graphs and calculations. Finally, this study is analytical as it involves, besides the calculation of descriptive statistics, the use of statistical tests [6,7].

To collect the data, a questionnaire was applied that included socioeconomic variables and the Economic Literacy Test (ELT) developed by the National Council of Economic Education (NCEE) [8]. This test includes twenty questions of multiple choice. There were four choices: a correct answer, two incorrect ones and a fourth choice for the students that did not know the answer (Appendix A). Basically, the ELT is about basic economic concepts and allows the evaluation of the literacy of students and adults in four issues, namely consumer economics; production economics; financial economics, government's economic role and international trade. The ELT was applied to all students enrolled in the GPE course who were present in the first class, in the second half of September 2017. At the end of the course, in January 2018 (nineteen weeks later), the same questionnaire was applied. GPE is a course of the Languages for International Relations degree, from a public higher education institution, located in the north-east Portugal. Of the 95 students enrolled in GPE, 70 completed the questionnaire at the beginning of the course. Of these, only 45 correctly and completely answered the questionnaire at the end of the course, which corresponds to a response rate of 47.4%.

Data analysis was carried out using IBM SPSS (Statistical Package for Social Sciences) 25.0. Initially, a descriptive study was carried out involving the calculation of descriptive statistics, namely, absolute and relative frequencies for nominal variables, and measures of central tendency and dispersion for ordinal and superior variables [9,10].

In order to compare the students' knowledge level on economics, pre and post-course, the Wilcoxon test was applied once the test application condition was verified (symmetry of the differences' distribution) [9,10]. In fact, the asymmetry coefficient was contained between -2 and 2 [11]. The Wilcoxon test allows testing the null hypothesis: the medians of the variable age are equal, against the alternative hypothesis: the medians are different, that is, $H_0: \eta_{Pre-course} = \eta_{Post-course}$ versus $H_1: \eta_{Pre-course} \neq \eta_{Post-course}$, where η is the median [9,10].

The McNemar test was used to compare pre and post-course samples, considering each question, in order to verify if the course was responsible for the changes that occurred between the two moments [9]. That is, $H_0: \text{The changes occurred randomly } (H_0: P_{12} = P_{21})$ versus $H_1: \text{The changes occurred due to the course } (H_1: P_{12} \neq P_{21})$, where P is the probability and 1 is the incorrect answer and 2 is the correct answer [9].

For the execution of the analytical study, it was used a confidence level ($1 - \alpha$) of 95%, corresponding to a level of significance (α) of 5%. The decision rule is to reject the null hypothesis (H_0) when the p-value is less than or equal to the significance level, that is, when $p\text{-value} \leq \alpha$ [9]. The probability of significance or p-value is the lowest level of α for which it is possible to reject H_0 [9].

3 RESULTS

Most students were female (60%). Only 20.0% had previous training in economics during high school and 8.9% have already attended the GEP course in previous years without success.

Table 1. Sociodemographic and academic characterization (n = 45)

Variables	Categories	Frequencies	
		Absolute (n)	Relative (%)
Gender	Male	18	40.0
	Female	27	60.0
Father's professional situation	Employed	39	86.7
	Unemployed	2	4.4
	Retired or invalid	4	8.9
Mother's professional situation	Employed	33	73.3
	Unemployed	7	15.6
	Retired or invalid	1	2.2
	Domestic	4	8.9
Father's education level	1st cycle	7	15.6
	2nd cycle	11	24.4
	3rd cycle	15	33.3
	High school	7	15.6
	Higher education	5	11.1
Mother's education level	1st cycle	3	6.7
	2nd cycle	8	17.8
	3rd cycle	15	33.3
	High school	14	31.1
	Higher education	5	11.1
Monthly income level	Less than 500 Euros	4	8.9
	501 to 1000 euros	22	48.9
	1001 to 1500 Euros	12	26.7
	1501 to 2000 Euros	4	8.9
	More than 2000 Euros	2	4.4
	Missing	1	2.2
Previous training on economics during high school	No	36	80.0
	Yes	9	20.0
Previous training on General Principles of Economics	No	41	91.1
	Yes	4	8.9

Most students came from rural areas (53.0%) and their parents were employed (father: 86.7%; mother: 73.3%) and had, at their disposal, a monthly income up to 1000 euros (59.1%). Most mothers had an educational level between the 3rd cycle (33.3%) and high school (31.1%) while the fathers' educational level ranged between 2nd and 3rd cycles with 24.4% and 33.3%, respectively (Table 1). The mean age was 19.4 years old (SD = 1.63).

It was verified that Q3, Q4, Q10, Q12, Q13, Q14, Q18 and Q20 questions had worse results after the course since the variation is negative. However, only Q12 question registered statistically significant differences between pre and post-course correct answers (Table 2 and Appendix A). These questions definitely point out the need for the teacher to emphasize topics like: the impact of the change on interest rates charged by the banks, the relationship between consumers and companies, the origin of individuals' net income, the trade relations between countries, the limited resource use options in the production of goods and services, the functioning of the stock market, the benefits of goods and services, and currency functions and consequences of inflation. All the remaining questions showed improvements, especially, Q11 and Q15 questions about the demand and supply of products and services and the need to weigh costs and benefits (Table 2 and Appendix A).

Table 2. Comparison of correct answers proportions pre and post-course

Question	Correct answer (%)		Δ Correct answer (%)	McNemar test (p-value)
	Pre-course	Post-course		
Q1	33.3	51.1	53.5	0.057
Q2	88.9	95.6	7.5	0.250
Q3	64.4	57.8	-10.2	0.648
Q4	91.1	88.9	-2.4	0.980
Q5	31.1	48.9	57.2	0.115
Q6	88.9	95.6	7.5	0.453
Q7	84.4	91.1	7.9	0.508
Q8	55.6	57.8	4.0	0.980
Q9	64.0	73.3	14.5	0.454
Q10	66.7	60.0	-10.0	0.581
Q11	60.0	84.4	40.7	0.013*
Q12	73.3	51.1	-30.3	0.031*
Q13	62.2	60.0	-3.5	0.957
Q14	71.1	62.2	-12.5	0.388
Q15	62.2	80.0	28.6	0.039*
Q16	33.3	46.7	40.2	0.210
Q17	62.2	71.1	14.3	0.454
Q18	11.1	4.4	-60.4	0.375
Q19	75.6	80.0	5.8	0.727
Q20	22.2	20.0	-9.9	0.996

* There is a statistically significant difference at a significance level of 5%.

Students had a fair level of knowledge pre and post-course. In fact, the knowledge level pre and post-course was, on average, 12.0 (SD = 2.55) and 12.9 (SD = 3.24) out of 20, respectively. The Wilcoxon test showed no statistically significant differences between students' pre and post-course level of knowledge (p -value = 0.091 > 0.05). However, at the end of the course, most students showed improvements in economic literacy level.

As shown in Figure 1, although the proportion of students with a fair knowledge level had decreased from 55.6% to 43.2% (-22.3%), the proportion of students with a good knowledge level increased almost twice as much (86.5%). As can be seen in Figure 1, the proportion of students with a good level increased from 24.4% to 45.5%. In addition, the proportion of students with very poor or poor knowledge has decrease 41.3% (Figure 1).

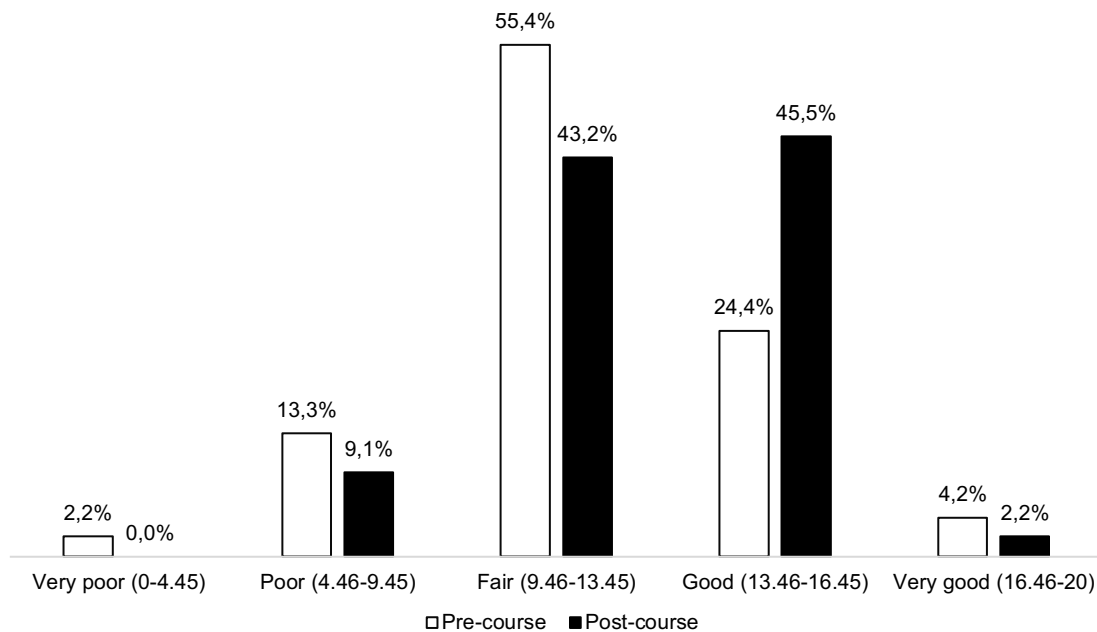


Fig.1. Distribution of students by economic literacy level

Regarding the population of students, a study developed in the US which involved 154 students of higher education, founded economic literacy levels of 70% (pre-course) and 86% (post-course) [13]. Regarding the population of adult, the literature presents a range of economic literacy results ranging from 39.0% to 75.6% [14,15]. In this study, pre and post-course economy literacy levels were, on average, 60.0% and 64.5%, respectively. However, the percentage of students with positive, pre and post-course, economic literacy levels were 84.5% and 90.9%, respectively.

4 CONCLUSIONS

The objectives of this study were to evaluate the impact of the GPE course on students' economic literacy and to identify subjects in which students show greater difficulty and may deserve special attention. The ELT developed and published by the NCEE in 1999 was used to collect the data. This tool was design to try to measure adult and student familiarity with basic economic principles, knowledge about the economy, and the understanding of some basic economic terms. The ELT was administered directly by the teacher of GPE. Of the 95 students enrolled in GPE, only 45 students correctly and completely answered the questionnaire at the beginning and at de end of the course.

Students proved to have a fair, pre and post-course, level of knowledge. At the end of the course, most students showed improvements in economic literacy level. However, the improvement was not statistically significant.

Furthermore, in the future, some topics must be emphasized by the teacher, namely, the impact of the change on interest rates charged by the banks, the relationship between consumers and companies, the origin of individuals' net income, the trade relations between countries, the limited resource use options in the production of goods and services, the functioning of the stock market, the benefits of goods and services, and the currency functions and consequences of the inflation.

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APPENDIX A

The Standards in Economics Survey (Answer each of the 20 questions to the best of your ability):

#	Question and option of answer (The correct answer for each question is underlined)
Q1	If there is a greater number of fast-food restaurants in a locality, it is more likely that: A. <u>Lower prices and higher quality.</u> B. Lower prices and lower quality. C. Higher prices and higher quality. D. Don't know.
Q2	A person who creates an enterprise to produce a new product for the market is known as: A. A manager. B. A bureaucrat. C. <u>An entrepreneur.</u> D. Don't know.
Q3	An increase from 5 to 8% in the interest rates charged by banks would probably encourage: A. Companies to invest. B. People buying houses C. <u>People saving money.</u> D. Don't know.

Q4	For most people, the largest portion of their personal income comes from: A. <u>Wages and salaries from their jobs.</u> B. Interest from stocks and bonds they own. C. Rent paid to them from property they own. D. Don't know.
Q5	If Portugal's real gross domestic product increased, but the production of goods remained the same, then the production of services: A. <u>Increased.</u> B. Decreased. C. Remained the same. D. Don't know.
Q6	If the price of beef doubled and the price of poultry remained the same, people are likely to buy: A. <u>More poultry and less beef.</u> B. Less poultry and more beef. C. The same amount of poultry and beef. D. Don't know.
Q7	If Portugal stopped importing cars from country X, who would benefit the most? A. Automobile manufacturers in Country X B. Consumers in Portugal C. <u>Portuguese automobile manufacturers</u> D. Don't know.
Q8	If the Portuguese government defined a maximum amount for real estate rents, what would be the most likely result? A. There will be more apartments available than people want to rent. B. <u>There will be fewer apartments available than people want to rent.</u> C. The number of apartments available will be equal to the number of people that want to rent. D. Don't know.
Q9	In Portugal, who determines which goods and services to produce are: A. Producers and government. B. Consumers and government. C. <u>Producers, consumers, and government.</u> D. Don't know.
Q10	Portugal produces fruits and vegetables and Spain produces beef. If Portugal voluntarily sells fruits and vegetables in exchange for Spanish beef A. <u>Both Portugal and Spain benefit from the trade.</u> B. Both Portugal and Spain lose from the trade. C. Portugal has benefits but Spain loses from the trade. D. Don't know.
Q11	XYZ winter clothing manufacturers have their factories running 24 hours a day, but they cannot produce enough sportswear to meet the demand. If XYZ manufacturers cannot increase production and demand continues to increase, the price of winter clothing XYZ A. <u>Increase.</u> B. Decrease. C. Stay the same. D. Don't know.
Q12	The resources used in the production of goods and services are limited, so the enterprise must: A. <u>Make choices about how to use resources.</u> B. Try to obtain additional resources. C. Reduce their use of resources. D. Don't know

Q13	<p>The stock market is an example of an institution within our economy that exists to help people achieve their economic goals. The existence of this institution:</p> <p>A. Results in an increase in the price of stocks.</p> <p>B. <u>Brings people who want to buy stocks together with those who want to sell stocks.</u></p> <p>C. Helps to predict stock earnings.</p> <p>D. Don't know.</p>
Q14	<p>When a person rents an apartment, who benefits from the transaction?</p> <p>A. Only the person renting the apartment.</p> <p>B. Only the landlord.</p> <p>C. <u>Both the person renting the apartment and the landlord.</u></p> <p>D. Don't know.</p>
Q15	<p>When deciding which of two goods to buy, one should always:</p> <p>A. Choose the good that costs less.</p> <p>B. Choose the good with the greatest benefits.</p> <p>C. <u>Choose a good after comparing the costs and benefits of both goods.</u></p> <p>D. Don't know.</p>
Q16	<p>When governments provide products and services, these products and services generally benefit</p> <p>A. <u>More than one person at a time whether they have paid for it or not.</u></p> <p>B. Only the people who pay for these products and services.</p> <p>C. Business at the expense of consumers.</p> <p>D. Don't know.</p>
Q17	<p>When State expenditures in a given year are greater than the revenues of that year, the difference is known as:</p> <p>A. A balanced budget.</p> <p>B. <u>A budget deficit.</u></p> <p>C. A budget surplus.</p> <p>D. Don't know.</p>
Q18	<p>Who will be helped by inflation?</p> <p>A. People living on a fixed income.</p> <p>B. Banks that loaned money at a fixed rate of interest.</p> <p>C. <u>People who borrowed money at a fixed rate of interest.</u></p> <p>D. Don't know.</p>
Q19	<p>What would be most likely to accelerate innovation in the computer industry:</p> <p>A. Placing a tax on all new inventions in the computer industry.</p> <p>B. Increasing government regulation of the computer industry.</p> <p>C. <u>Investing in more research and development in the computer industry.</u></p> <p>D. Don't know.</p>
Q20	<p>Which of the following statements about the money function is wrong?</p> <p>A. Money makes it easier to save.</p> <p>B. Money makes trading goods and services easier.</p> <p>C. <u>Money holds its value well in times of inflation.</u></p> <p>D. Don't know</p>