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Assessing the effectiveness of economic and financial education for decision-making on graduate studies: Experimental evidence

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Objectives and hypotheses

- The purpose of our research was **to test causal relationships** between delivery methods of economic and financial education (IV), and economic and financial knowledge, and downstream financial behaviors (DV).
- **H1.** We wanted **to test whether economic and financial education** for graduate education decision-making, delivered in the experiment through two educational formats (video and chatbot), **improved both the objective economic** knowledge of students to calculate the profitability of a master's degree (NPV) **and their financial knowledge** when deciding to finance the degree through a student loan.
- **H2.** We also wanted **to test whether the chatbot treatment was more effective than the video treatment.**
- **H3.** Our research also aimed **to test whether the educational intervention had an impact on financial behavior.** In particular, if it fostered the intention of college students to take out a student loan to pursue a graduate degree by changing (improving) their attitudes towards debt-financed graduate studies.

The experiment

- Experiment run by the FUNCAS project team at the beginning of the **2019/2020 academic year**.
- **525 college seniors** enrolled at the UGR Business School.
- All participants had to perform **two incentivized activities**.
- The first activity was structured in three parts for the treatment groups, and in two parts for the control group.
 - In Part I, **experimental subjects** received **online economic and financial training** for graduate education decision-making.
 - In Part II (in fact, Part I for the control group), all participants were given **a case study** and they had to answer several questions related to the case study.
 - In Part III (in fact, Part II for the control group), all participants were asked to report some **sociodemographic characteristics**.
- The second activity was carried out by all participants in an online behavioral economics lab in the last 15 minutes of the experiment.

Design of the FUNCAS randomized controlled experiment

**Experimental Factor, EF
(Independent Variable, IV)**

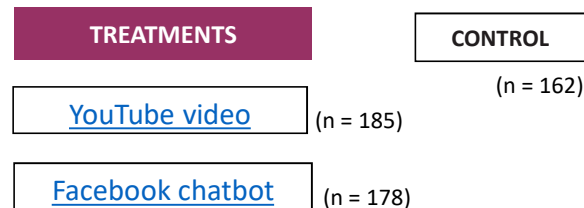
Economic and financial education **delivery method** for decision-making on graduate studies



**Outcome Measure
(Dependent Variable, DV)**

Objective economic and financial knowledge*, and behavior changes**


Subjects were randomly assigned to 2 treatment groups and one control group



I. Economic education	II. Financial education
CBA to assess the economic viability of a master's degree.	How to finance a master's degree with a student loan.

How was the intervention administered?



 *the objective economic and financial knowledge was tested in the experiment using six multiple-choice questions

** 7-point Likert scale items on variables that precede the intention to apply for a student loan.



TREATMENTS

Economic and financial education for graduate education decision-making

In both educational formats was explained the same content (an online short course with two modules).



[YouTube video](#)



[Facebook chatbot](#)



MODULE 1 ECONOMIC EDUCATION

Module objectives

- Why good decision making begins with accurately understanding costs and benefits.
- The decision to invest in a master's degree.

Module outline

- Direct and opportunity costs to estimate the total cost of a graduate degree.
- Estimating the economic benefits of a master's degree.
- The time value of money.
- Calculation of the net present value of the investment.



MODULE 2 FINANCIAL EDUCATION

Module objectives

- To assist the student in developing better control over his/her finances.
- Given the potential salary, figure out how much money should be going toward a student loan.
- How much prospective student-loan payments will be and how much interest an individual will pay.

Module outline

- Borrowing capacity calculation. The 40 percent rule.
- Student-loan payment amount estimation.
- Personal financial scheduling.

The post-intervention questionnaire

Case study shown in the experiment to all participants

- Master's degree taught by a recognized business school.
- A 12-month graduate program, from January to December 2020.
- Direct costs of €12,000 (tuition and teaching materials) to be paid on Jan. 1, 2020.
- Regardless master's degree is pursued, the annual cost of living is €18,000 to be paid at the end of each year.
- Labor market information (assume wages are earned at the end of each year)

		Without a master's degree (since 2020)	With a master's degree (since 2021)
Income	Job placement rate	88%	95%
	Average annual net salary	€25,000	€36,000
Working life	Years in the labor market	42	41

Source: FUNCAS project and author's elaboration

Conditions for financing the master's degree

- Maximum amount: 100% of the total cost of pursuing the master's degree (direct costs and living costs while studying).
- No provision of guarantees or endorsement is required.
- Annual interest rate: 5%.
- Repayment: 10 constant annual payments at the end of each year (December 31), from 2021 to 2030, which include repayment of principal and interest.*

$$* \text{Annual payment} = \frac{\text{Borrowed amount}}{a_{10|0.05}}$$

$$\text{Where } a_{10|0.05} = 7.7217$$

Source: FUNCAS project and author's elaboration

Three questions of economic knowledge

Calculation of direct and opportunity costs of pursuing the master's degree.

Calculation of the expected income differential as a graduate.

Calculation of NPV of the investment in the master's degree.

Three questions of financial knowledge

The total amount of interest on a student loan according to the repayment term.

Student loan installment based on borrowing capacity.

Calculation of cash surplus.

The post-intervention questionnaire

Attitude (A)

Getting into debt with the student loan to pursue the master's degree would be for me:

1. Stressful 1 - 2 - 3 - 4 - 5 - 6 - 7 Relaxing
2. Uncomfortable 1 - 2 - 3 - 4 - 5 - 6 - 7 Comfortable
3. Worrying 1 - 2 - 3 - 4 - 5 - 6 - 7 Rewarding

Subjective Norm (SN)

Rate from 1 (totally disagree) to 7 (totally agree) the following statements:

1. Most of the people who are important to me would consider that I should apply for the student loan to pursue the master's degree
2. Most of the people whose opinion I value would approve of me asking for the student loan to pursue the master's degree
3. Most of the people who are important to me would encourage me to apply for the student loan to pursue the master's degree

Perceived Behavioral Control (PBC)

1. My level of financial knowledge regarding the decision to apply for the student loan to pursue the master's degree is:

Very low 1 - 2 - 3 - 4 - 5 - 6 - 7 Very high

2. For me, making the decision about requesting the student loan to pursue the master's degree is:

Extremely difficult 1 - 2 - 3 - 4 - 5 - 6 - 7 Extremely easy

3. Rate from 1 (totally disagree) to 7 (totally agree) the following statement:

I am confident that I can make the best decision about whether to apply for the student loan to pursue the master's degree

Behavioral Intention (BI)

1. My intention would be to apply for the student loan to pursue the master's degree:

Strongly disagree 1 - 2 - 3 - 4 - 5 - 6 - 7 Strongly agree

2. For me to apply for the student loan to pursue the master's degree would be:

Extremely unlikely 1 - 2 - 3 - 4 - 5 - 6 - 7 Extremely likely

3. I would try to get the student loan to pursue the master's degree:

Strongly disagree 1 - 2 - 3 - 4 - 5 - 6 - 7 Strongly agree

OUTCOMES

Economic knowledge		
Number of right answers		% of participants
0	166	31.6
1	224	42.7
2	99	18.9
3	36	6.9
Total	525	100.0

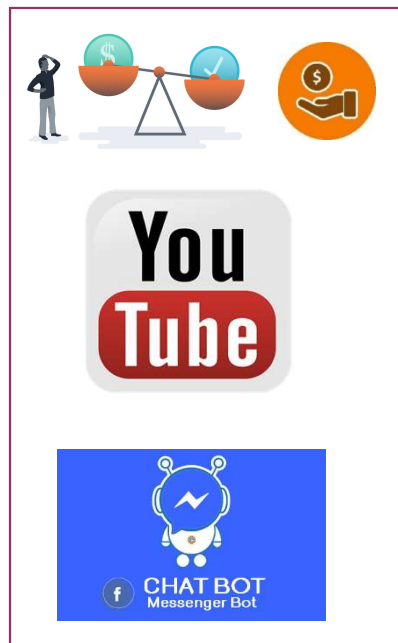
Financial knowledge		
Number of right answers		% of participants
0	49	9.3
1	163	31.1
2	203	38.7
3	110	21.0
Total	525	100.0

Economic and financial education to the decision-making of university students: Evaluation of the effectiveness of two delivery methods

Experimental Factor	Model I (economic education)			Model II (financial education)		
	Coef.		Robust Std. Err.	Coef.		Robust Std. Err.
Control group	Ref. cat.			Ref. cat.		
Treatment group 1 (video)	0.355	**	0.091	0.208	**	0.098
Treatment group 2 (chatbot)	0.542	**	0.091	0.329	**	0.094
Gender (= 1 female)	-0.113		0.076	-0.134		0.083
Intuitive thinker	-0.060	**	0.024			
Analytical thinker				0.127	**	0.022
Academic ability	0.164	**	0.055	0.101	**	0.050
Constant	-0.171		0.388	0.631	*	0.345
F(5, 505)	12.34			13.69		
Prob. > F	p < 0.001			p < 0.001		
Testing the equality of two coefficients						
H ₀ : beta1 and beta2 are not statistically different						
F (1, 505) = 3.98			F (1, 505) = 1.78			
Prob. > F = 0.047			Prob. > F = 0.183			
0.355 and 0.542 are statistically different			0.208 and 0.329 are not statistically different			
* p < 0.10 ** p < 0.05						

OUTCOMES

INTERVENTION (EF)



Attitude



Subjective Norm



Perceived Behavioral Control

perceived financial self-efficacy

Theory of Planned Behavior (TPB)

Behavioral Intention



intention to take out a graduate loan

$BI = f(A, SN, PBC)$	Eq. 1
$A = f(EF, \text{controls})$	Eq. 2
$SN = f(EF, \text{controls})$	Eq. 3
$PBC = f(EF, \text{controls})$	Eq. 4

Economic and financial education and financial behavior changes: Three-stage least-squares regression

	Eq. 2. Dependent variable: attitude to borrowing		Eq. 3. Dependent variable: subjective norm		Eq. 4. Dependent variable: perceived control (financial self-efficacy)		Eq. 1. Dependent variable: intention to request a graduate loan	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Control group	Ref. cat.		Ref. cat.		Ref. cat.			
Treatment group 1 (video)	0.444 **	0.131	-0.243	0.160	0.300 **	0.117		
Treatment group 2 (chatbot)	0.383 **	0.133	-0.100	0.161	0.381 **	0.119		
Controls: Gender (= 1 female), Experience with a student loan, Analytical thinker, Order of questions, Academic ability, Formal education attained by the father								
Constant	3.075 **	0.519	5.438 **	0.632	4.461 **	0.464		
Explanatory variables of intention to request a graduate loan								
Attitude							0.682 **	0.305
Subjective norm							0.727 **	0.183
Perceived behavioral control							-0.370	0.264
Constant							-0.187	0.773
Obs.	507		507		507		507	
chi2	50.11		34.68		84.06		28.22	
p-value	p < 0.001		p < 0.001		p < 0.001		p < 0.001	
* p < 0.10 ** p < 0.05								

Conclusion

- Empowering college students to make optimal financial decisions associated with financing graduate education should also be a priority for institutions of higher education. FUNCAS project was born with that goal.
 - It developed web-based training resources aimed at undergraduates to guide them on the advisability of pursuing a master's degree and help them make informed decisions about incurring student loan debt for graduate education.
- We verified experimentally that economic and financial education can be effective by increasing the level of objective knowledge of its recipients and also promoting changes in financial behavior.
 - Compared to the control group, the experimental subjects were more likely to correctly answer economic and financial knowledge questions immediately after the intervention; in particular, the assessment of the economic viability of a master's degree and its financing through a student loan.
 - The effectiveness of the chatbot-based learning was greater than that of the video format for providing economic education.
 - For providing financial education, both delivery methods were effective without finding statistically significant differences between them.
- We also found positive treatment effects on individuals' attitudes towards financing a graduate degree with a student loan which in turn influenced borrowing intention.



Many thanks!