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Active Learning Methods to Enhance Higher Education in Business

Ana María Vallina-Hernández[1], Hanns de la Fuente-Mella[2], José Barrera[1], and Hugo Mansilla[1]

[1]Escuela de Negocios y Economía, Pontificia Universidad Católica de Valparaíso, Viña del Mar, Chile
[2]Escuela de Comercio, Pontificia Universidad Católica de Valparaíso, Valparaiso, Chile

ABSTRACT

This research aims to explore measuring success in obtaining a degree and compare effectiveness between simulation-role playing techniques versus more traditional methods such as lectures, using the case of the Business Administration Program at the Pontificia Universidad Católica de Valparaíso -PUCV. The current program includes, since 2009, the course *Entrepreneurship Simulation*, designed under the learning-by-doing philosophy, which includes the above-mentioned active teaching methods. This analysis contributes to deepening knowledge about the measurement of education quality and effectiveness of different methods.

Keywords: Higher education in business, Active learning, Role-playing, Simulation

INTRODUCTION

Business education has always faced the challenge of getting students to understand business dynamics and having the notions of decision making. Current environment stresses these requirements even more. Therefore, active learning methods have been used for a long time, especially the case-study method, however developing new and mixed approaches, such as role playing and simulation software for business development improve students' experiences related to decision making.

The research aims to explore the effectiveness of active learning methods, of simulation-role playing techniques versus more traditional methods such as lectures, using the course *Entrepreneurship Simulation*. This subject is a 500 course that uses active-cooperative learning methods through simulation and role-playing techniques. The students form teams (Management Teams) that correspond to a firm in the industry. Each one has an executive occupation. The team has to present "yearly results" and face the company board (the professors). Thus, role-playing, simulation, and ICTs are essential parts of the lecture. This paper explores indicators and relationships that allow the comparison of graduate performance in both curriculums, one which focused more on traditional methods called the Control Group (CG – generations from 2001–2008), and the other identified as the Experimental Group (EG – generations 2009–2016). Hence, it will provide a

methodology that may be replicated in other Business Schools or other college degrees to evaluate the performance of active courses, using quantitative analysis.

ACTIVE LEARNING AS A FRAMEWORK FOR IMPROVING HIGHER EDUCATION IN BUSINESS

The environment of a knowledge society is dynamic, active, and oriented towards innovation. Therefore, the development of skills for the 21st century, such as those that are fundamental to the content and graduate profile of the Business Program, is becoming more critical. Furthermore, active-cooperative methodologies take more prominence in the development of an undergraduate program in business and economics (Obi, Eze & Chibuzo, 2021, The Journal of Education for Business), which will have an even greater importance due to the uncertainty and social and environmental changes caused by the pandemic.

There are various teaching methods, from lectures, lectures plus discussion, negotiation and role playing, case studies, facilitation methods and coaching methods (Downey, 2008; Kademia, 2013; Kozlovskyi, 2018; Krychtanovych, 2019; Yavorska, 2005). The approach of negotiation and role playing is an active method, which could be mixed with other techniques to enrich the students' experience and increase learning opportunities.

Active-cooperative learning is increasingly being adopted, as it is a way of improving the quality of learning due to the possibility of developing critical and creative thinking, better understanding the market development, and the strategies, operations and vicissitudes of companies (Clark & White, 2010; Habib *et al*, 2021).

The role-play methodology allows greater commitment by the students to the study objective and the carrying out of the activities of the specialty (Bowen, 2005), which in the case of business, relates to organizations, decision-making, the relationship among the people that form the company at different hierarchical levels, the customers, and in general, the stakeholders of the organization. In this regard, a role-play methodology, that includes the application of the knowledge and attitudes obtained during the program implies that the student-directive has to "check their learning process involving active learning" (Bowen, 2007), with aims to be able to deliver proper arguments that support their decisions as executives. Additionally, the complexities of the social context are incorporated into the development of the course, which according to Bowen (2007), considers incorporating an ethical component.

Also, it is highlighted that the competency assessment has to be, according to Alsina (2011 p. 23): "a dynamic evaluation, an evaluation that places the action in the context, and includes the knowledge, know-how, being and knowing how to be" (2011). Consequently, the development of courses that involves an integral view develops creativity, organization and the ability to make decisions in semi-defined activities, where the students' initiative and collaborative teamwork are determining factors in reaching expected results in tasks presented in written form, orally and when interacting with software,

contributing positively to the development of transversal and professional skills in higher education (Gonzalez Gonzalez, 2015).

ANALYSIS AND EVALUATION OF THE APPLICATION OF ROLE-PLAYING TO HIGHER EDUCATION IN BUSINESS

The course of Entrepreneurship Simulation mixes role-playing with the students that form the entrepreneurship team with the use of ICTs when using the software Tempomatic (Michelson, 2009) for decision making. It is complemented with coaching sessions for the management teams to support them in the analysis of feedback from the Board (professors) with the objective of improving their performance in the next meeting. The course often has four meetings throughout the semester, which correspond to an annual meeting in the simulation.

The objective of this study is to determine whether there is a difference in the effectiveness of the learning process using this active methodology, with the hypothesis that the performance of generations of students who entered the Business Program at PUCV after its implementation would be higher than the previous generations.

Method

The research is quantitative. Descriptive statistics and a multivariate econometric model were used, contrasted with a decision tree model. The model design includes demographic variables, income condition, average performance per key subject areas and the time it took to finish the degree. The parameters that were included in the model are: gender (Gen), type of school [(TC): municipal, subsidized or private school], age at degree entry (Age), region of origin (Reg), type of entry [(Tin): regular via standardized test or special, such as a sports scholarship], score of standardized admission test (Ptje) and high school grades (NEM), these are the socio-economic and entry condition variables. With regards to the degree path, the average grades of the following subjects are considered: Management (Adm), Economics (Eco), Finance (Fin), English (Ing), Math and Statistics (MatE), Human Resources (Pers), Marketing (Mark), Operations (Ope), Average of graduation grades (PME) and Graduation Time (TEgr), as well as the *dummy* that indicates if they attended the Entrepreneurship Simulation Course (dumSE). The dependent variable chosen to measure "success" or performance is the grade obtained in the comprehensive exam, as it is the most integrative evaluation, where the skills and knowledge acquired during the program have to be applied (ExTit).

First of all, a univariate analysis is performed comparing the value of the means, at the significant figure level, of the control group and the experimental group for the quantitative variables. The control group are those students who entered the Business Administration program between 2001 and 2008, when the educational program did not consider a course based on a 100% active methodology such as role-playing and simulation. The experimental group are those students who entered the new program in 2009, until the generation that entered in 2016; there are 8 generations per academic

Table 1. Significant and explanatory parameters in the comprehensive exam grade. (Prepared by the authors).

Parameter	Intercept	dum*SE*	Eco	Ptje	Mktg
Coefficient	2.167	−0.097	0.174	0.001	0.085
p-value	$7.27*10^{-9}$	0.000305	$7.27*10^{-7}$	0.001104	0.23119
Confidence Level	99%	99%	99%	99%	95%

program, with 419 students belonging to the control group and 390 in the experimental group. Those who received their degree with the preparation of a report or who followed special degree programs are not considered.

Afterwards, in order to determine if there are differences in the effectiveness of the teaching methods, a multivariate econometric model will be used, that will be applied to both groups that will be differentiated by a dummy variable that states if they attended the Entrepreneurship Simulation course or not. The variable to measure the performance will be the grade obtained in the Comprehensive Exam, considering the fact that it is a comprehensive evaluation that represents reaching the skill to act as a Business Major. The equation that illustrates the econometric model is presented in the following equation:

$$\begin{aligned} \text{ExTit} = {} & \beta_0+\beta_1\text{Gen}+\beta_2\text{TC}+\beta_3\text{Age}+\beta_4\text{Reg}+\beta_5\text{TIn}+\beta_6\text{Ptje} \\ & +\beta_7\text{NEM}+\beta_8\text{Adm}+\beta_9\text{Eco}+\beta_{10}\text{Fin}+\beta_{11}\text{Ing}+\beta_{12}\text{MatE} \\ & +\beta_{13}\text{Pers}+\beta_{14}\text{Mark}+\beta_{15}\text{Ope}+\beta_{16}\text{PME}+\beta_{17}\text{TEgr} \\ & +\beta_{18}\text{dumSE}+\mu \end{aligned}$$

This analysis is going to be complemented with a decision tree model, an algorithm is used to find the independent variables that best separate the data into groups, according to the dependent or target variable. One of the main advantages of this model is its interpretability, as the reason that a student gets certain grade in the final degree exam can be explained directly (following the branches). On the other hand, one of the main problems is the tendency to over adjust the training data.

Results

In the results of the analysis for the independent qualitative parameters of the means control and experimental groups, at a level of relevant digits, it is observed that they are equal, except for math and statistics, human resources, English, operations and the GPA, in the last two cases with a difference of only 0.1. Operations is in the only category where the average of the control group is higher. In terms of the relationship between the explanatory parameters, there is a positive correlation between the subjects of economics, finance and operations. Meanwhile, there is a negative correlation between the graduation time and the subjects of management, economics and finance.

In terms of the equation, the following (Table 1) indicators are highlighted as relevant and significant.

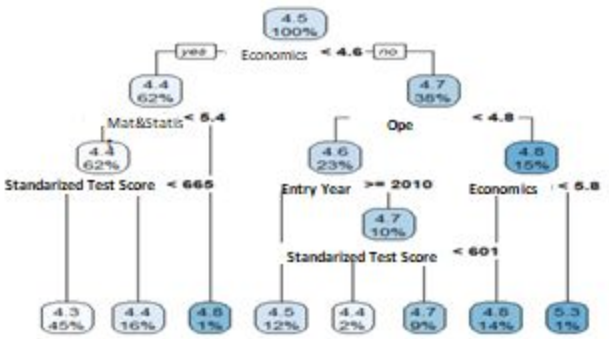

Figure 1: Decision tree for comprehensive exam grade (Prepared by the authors).

Consequently, there is a minimum that the students manage to answer that would be equivalent to 2.2 points of the grade, having attended the Entrepreneurship Simulation course does not ensure a better grade, but would decrease it; having a good result in economics would ensure a better result with 99% confidence and in marketing with 95% confidence. The only socio-economic variable or start condition variable that would affect it would be the score in the university admission standardized test, but the coefficient is practically irrelevant since the grade is given with only one decimal place. Thus, the analysis shows that over the course of the program, any gaps that may exist due to socio-economic issues or starting conditions are overcome and these variables do not affect the result obtained in the comprehensive exam grade, including the fact that there is no gender bias.

When developing the decision tree, the following (Fig. 1) result is obtained:

In this case there is certain consistency with the result of the logistic regression, in relation to the grade obtained in economics and the standardized university entrance test score, but also relevant are the grades obtained in mathematics and statistics and operations subjects, as well as studying in your city of origin.

CONCLUSION

For both groups, the Comprehensive Exam grade depends directly on their performance in Economics and Marketing and negatively on whether they attended Entrepreneurship Simulation, considering at least 95% confidence interval. The additional variables that are relevant to the decision tree analysis reiterate a lower grade in this exam if the students attended the Entrepreneurship Simulation, which is the opposite of the expected result of this research.

The reasons for this finding might be that the dependent variable is not a good indicator for detecting the effectiveness of different teaching methodologies. Due to its structure, it might be more suitable for an education program based mainly on lectures, as this program was until 2008. Also, completing

the comprehensive exam does not capture the honing of soft skills and attitudes which might be where there is a significant difference between both programs. There may also be greater specialization than in the other program in which students take management subjects. Finally, the demands of the Entrepreneurship Simulation are relatively high, so the new generations may consider it more like a procedure to obtain the degree rather than the way of demonstrating the skills they obtained throughout their studies.

In the future, this research should continue, incorporating other dependent variables that could measure the preparation that an active methodology course provides, complementing the quantitative analysis with the qualitative to develop a mixed research method. Perhaps, even deepening the performance analysis of the students throughout the program and not only focusing on those who were successful in overcoming all the obstacles present in the completion of a university program.

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