Journal of Management and Business Education

JMBE

STUDENT MOTIVATION IN A REAL INVESTMENT DECISION- MAKING CASE STUDY

LA MOTIVACIÓN DEL ESTUDIANTE CON UN CASO REAL DE DECISIONES DE INVERSIÓN

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2020
Vol.3 Num. 3
250-265

Language: English
Received: 27 July 2020 / Accepted: 17 October 2020

ABSTRACT

One of the main concerns of the university is the ability to respond to the training needs of future workers. The disconnection between the theory and the practise causes demotivation because sometimes knowledge learned in the classroom has no direct application at work. The purpose of this study is to evaluate student motivation through investment decision-making real case using gamification techniques and an incentive system. The results showed a positive impact since students improved their learning and appreciated its usefulness. The main conclusion is the necessity to include real examples in the classroom.

Plaza Casado, P.; Escamilla Solano, S.; Orden-Cruz, C. (2020). Student motivation in a real investment decision making case study. *Journal of Management and Business Education*, 3(3), 250-265. https://doi.org/10.35564/jmbe.2020.0016
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http://www.nitoku.com/@journal.mbe/issues ISSN: 2605-1044
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KEYWORDS
Incentives, learning motivation, learning activities, gamification, real case study.

RESUMEN

Una de las principales preocupaciones de la universidad es la capacidad de dar respuesta a las necesidades de formación de los futuros trabajadores. La desconexión entre la teoría y la práctica provoca desmotivación porque, en ocasiones, los conocimientos aprendidos en el aula no tienen aplicación directa en el trabajo. El propósito de este estudio es evaluar la motivación de los estudiantes en la toma de decisiones de inversión con un caso real mediante técnicas de gamificación y un sistema de incentivos. Los resultados mostraron un impacto positivo ya que los estudiantes mejoraron su aprendizaje y apreciaron su utilidad. La principal conclusión es la necesidad de incluir ejemplos reales en el aula.

PALABRAS CLAVE
Incentivos, motivación por el aprendizaje, actividades de aprendizaje, gamificación, caso real

INTRODUCTION

We live in a changing world, which moves very fast. The transmission of knowledge and education should not be left behind, hence the necessity for continuous improvement and updating. Universities are socially responsible to ensure the transmission of contextualized and updated knowledge (García-Ramírez, 2011, Bozu and Canto, 2009). A university environment is a place that cannot be kept away from the social and economic reality, and what´s more, they should teach students to develop skills that will allow them to face the world of work.

The adaptation of Spanish universities to the European Higher Education Area (EHEA) has been a challenge for the teachers to improve teaching and adapt it to the new times and a changing reality, looking for that the consequence is the improvement of the quality in the university teaching (Berne et al, 2011). It is necessary to achieve the objectives to renew in a profoundly way the traditional methodology. The model followed until now in the university education has been base on masterclasses with a public that did not participate in any way in them; it became an increasingly inefficient passive element. (Castilla Cebrián and López-Terradas, 2013; Larsen, 2006).

One of the main objectives of the EHEA is a methodological change in teaching, making learning the axis of education, where the student has a more active role (Blanco, 2010). Although, it must be borne in mind that, to make these changes, there are two important problems: the lack of motivation of the students (García and Álvarez, 2007) and the teachers (Chain Navarro, Martínez Solís and Sánchez Baena, 2008). Learning motivation is one of the major factors associated with academic performance (Vargas, 2007), and is essential to achieve the change (Romero et al, 2009). Motivation is understood as "the set of

reasons why people behave in the ways they do" (Ajello, 2003). Thus, in education, motivation should be considered as "the positive disposition to learn and continue to do it autonomously" (Pereira, 2009), with dynamics that manage to capture the interest and participation of students, motivating them to achieve a creative and innovative thinking, thus facilitating the knowledge of transversal and professional competences (González, 2014). The faculty becomes a dynamic element, traditionally accused of a lack of motivation (Tejedor et al, 2007).

The teaching innovation projects ensure a renewed and interdisciplinary teaching, which together with the Information and Communication Technologies (hereinafter, ICT) and social networks enable the dissemination of knowledge (Molina, 2012; Salinas, 2004). ICT, virtual personal learning environments and the use of teaching tools help with the design of activities, which improves teaching innovation and the factors that motivate, and interest and reinforce student learning (Díaz-Marín, Vázquez Martínez and McMullin, 2014; Espuny, González, Leixa and Gisbert, 2011).

Many academic papers establish a relationship between active methodologies, motivation, and new technologies. These studies show a positive impact of active teaching that is reflected in the motivation and, in the end, results in lasting learning. The positions of the different authors regarding motivation and learning are summarized in Table 1.

Table 1: Motivation and learning

Relation between motivation and learning	**Authors**
Students have greater motivation when they learn with an active method	Ochsendorf, Boehncke, Sommerlad & Kaufmann (2006)
Problem-based learning	Nalesnik, Heaton, Olsen, Haffner & Zahn (2004)
Improvement in student satisfaction when there is motivation	Cheng, Rhee, Baik & Os (2009)
Intrinsic motivation is a predictive factor of academic success	Deci & Ryan (1985)

One of the methodologies that is intimately linked with motivation is gamification, a new concept that has not a single definition (see Table 2).

Table 2. Meaning of "gamification"

Definition	Author
"The use of game elements and game design techniques in non-game contexts"	Werbach & Hunter (2010)
The gamification is different from what is known as serious game or game-based learning, which is based on the use of games as such for learning	Contreras (2016).
The use of game design elements in non-game contexts	Deterding et al. (2011)
Gamification is about using the techniques of the game, its aesthetics and its strategies to involve people, motivate action, promote learning and solve problems	Kapp (2012)
Gamification is intended to promote or modify desired behavior	Houtari & Hamari (2012), Lee & Hamer (2011)

According to Herberth Alexander (2016) gamification activities when are used for educational purposes seek to attract the attention of students and improve their academic performance. Various studies show that gamification increases the motivation to learn (Bergin and Reilly, 2005, Kapp, 2012, among others) and improves the learning experience (Meister, 2013). Besides, it increases academic performance (Perrota, Featherstone, Aston and Houghton, 2013) and develops strategic thinking, group decision and negotiation skills (Kirriemuir and McFarlane, 2007). The use of this technique to increase the interest of students has been explored in Education in several fields such as role plays (Pelegrín-Borondo et al., 2020), computer programming (Becker, 2001), operating systems (Hill et al., 2003), languages (Martínez and Terrón, 2016), advertising and public relations (Estanyol, Montaña and Lalueza; 2013) and in other areas (see literature review by Fui-Hoon, Zeng, Rajasekhar and Padmanabhuni, 2014). In recent years they have been used in a very important way in the so-called educational platforms (Benítez Porres, 2015; Contreras-Castillo et al., 2015; Herberth, 2016; Quintaral Pérez, 2016; Molina Álvarez et al., 2017; Rodríguez Fernández, 2017; Corchuelo Rodriguez, 2018; Pérez Quiñones, 2018).

In finance, the area of knowledge in which this work is focused, there are studies based on financial markets, some on portfolio management games (Dressler, Rachfall, Kapanen and Foerster-Trallo, 2016; Gómez-Martínez, Prado-Roman and Escamilla-Solano, 2016). In banking, gamification impact on the acceptance of mobile banking services has been researched (Baptista and Oliveira, 2017). Other studies carried out by professionals, outside the educational sector (Petridis, et al. 2016). This scarce literature existing on gamification activities in Finance taching shows the need to explore the possibilities of this tool in this area of knowledge.

Another methodology for motivation used in education has been an external incentive. From the early 1970s, psychologists have examined the role of external incentive and token economies on students' outcomes (e.g. Kazdin, 1975; Lepper, Greene and Nisbett 1973; Cameron and Pierce, 2002). The literature is not conclusive because the efficacy depends on the context, the intrinsic motivation of the student, type of behaviour being incentivized and the type of

reward, between others. The incentives researched has been cash payment, food, visits to museums, other forms of entertainment and extra credit. This last factor, which is focused on this research, has been used to increase student attendance (Thorne, 2000), motivate students to read journal articles (Carkenord, 1994) and promote participation in the classroom (Boniecki and Moore, 2003). Up to our knowledge, there is no research about the impact on learning motivation giving incentive thorough extra points in the final grade.

Then, this work pretends to research on Corporate Finance courses, in which gamification and incentive have not yet been tested in university degree courses. For this, a gamification activity with incentives was carried out based on a real case on deciding on a real investment project in a company to evaluate the motivation of the students in the learning of the subject through these tools. The methodology has been based on a questionnaire and the realization of a regression model.

After this introduction, the following headings are the methodology and data, how was the development of the innovation, the results of the same, ending with some conclusions.

METHODOLOGY

Objective and methodology

The main objective of this work involves a double contribution to the analysis of student motivation. On one hand, using a real investment decision-making case of a company with gamification techniques and, on the other, with the establishment of an incentive in the qualification of the final grade for its realization.

For this, the evaluation is conduct in two parts. In the first one, the motivation of the students is analyzed by the accomplishment of the activity as a game through a questionnaire where the intermediate objectives to be evaluated were: the perception about acquisition of knowledge, the improvement of knowledge, the case study linked to motivation and motivation as a whole (see table 3). In addition, in the second part, it is try to quantify specifically by means of a simple regression, the degree of sensitivity between the motivation and the incentive given in the activity. The regression model proposed was collect in equation 1.

$$y = \alpha + \beta x + \varepsilon \quad \text{(equation 1)}$$

Being:
y: the degree of motivation of the game
x: how the incentive given in the activity note is valued

Data collection

The experience of the research was carry out in the Rey Juan Carlos University, specifically in the Accounting and Finance degree and its double degree with Human

Resources and Labor Relations, in the subject of Investment and Financing Decisions.

In order to carry out the investigation, a survey was conduct where the technical characteristics shown in table 3.

Table 3. technical data sheet of the research

Universe of the population	Students of 2 º course, Degree of Accounting, Finance, and double degree with Human Resources and Labor Relations. Rey Juan Carlos University
Sample Size	187
Answered and valid surveys	147
Geographical area	Madrid
Information collection	Socrative
Type of study	Poll
Data colection period	December 2017

The research was based on making a game in class in groups providing the students with a real business case where they had to calculate free cash flows and, later, to decide an investment decision-making or not, using the most appropriate decision method that students had studied during the course. The activity was carried out in a class with gamification techniques, but with traditional means (case delivery on paper, pen, calculator and document delivery with the solution and decision). The duration was two hours. Additionally, for those students who did it, an incentive was establish in the grade of the evaluation of the subject. They could obtain a maximum of 0.25 points that would be add to the final grade of the subject. The incentive register obtained was variable depending on the overcoming of different sections raised in the practical exercise.

The survey was composed of 15 questions. The first 4 made reference to information on socio-economic aspects such as gender, employment status, type of degree they attend and campus where they received teaching. In relation to the second block of questions, as shown in Table 4, they were the object of study and the objectives were purse. Questions were measured with a Likert scale from 0 to 10.

Table 4. Key issues in the analysis of the impact on student motivation

Issues under study	**Objectives pursued**
Before the activity, to what degree did you have clear concepts?	Perception of knowledge acquisition
After the activity, to what degree did you have clear concepts?	
To what degree has the activity been useful for putting your knowledge into practice?	Improvement of knowledge
What degree of reality have you appreciated in this activity?	Case study
To what extent has it been useful to improve your knowledge?	
In what degree has the activity motivated you?	Motivation
How do you value the incentive in the note to perform this activity?	
To what extent do you find it interesting to implement new learning techniques?	

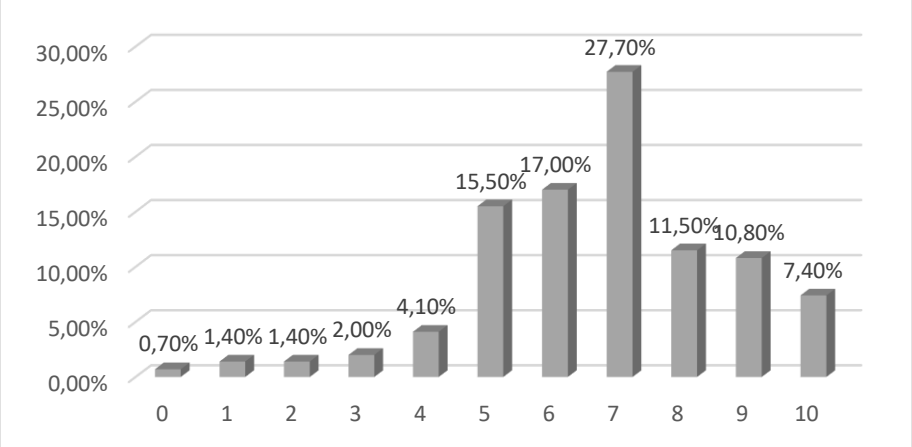
The data collection process was carry out at the end of the activity in the classroom. The students had to take their mobile and, through the Socrative application, answer the survey provided by the teacher. When they accessed, they had to identify themselves with the student number and the workgroup they belonged to in order to preserve their identity. As the students were answering, the registration was make in the application in real time. Subsequently, the database was save in a spreadsheet for processing.

RESULTS

The results of this study regarding the first questions of the survey about the socioeconomic data of the students are list below. Beginning with gender, the data shows that of the total number of students surveyed, female predominates over male, with 55.78% and 44.90% respectively. In the study, there is another two significant variables, necessary to take into account to understand student behaviour such as gender and employment situation. The research shows that there is a predominance of a profile, both male and female, that students are only studying in university, being 58.46% for men and 54.88% for women. Likewise, the number of women studying and working is slightly higher (45.12%) with respect to men (41.54%). Another consideration was the type of degree since within the degrees offered by the Rey Juan Carlos University; there is the possibility of having students from different degrees in the same classroom. The poll shows that only 17.01% of the students in this subject study a double degree.

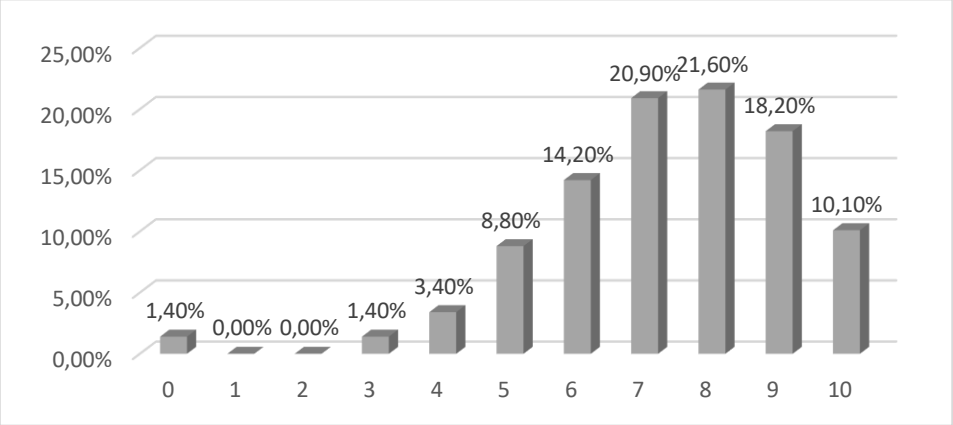
Once analysed the data resulting from the socioeconomic part, we proceed to present the data corresponding to the experience carried out in the classroom with the students.

Graph 1. Before the activity, in what degree did you have clear concepts? (0: nothing clear - 10: very clear)



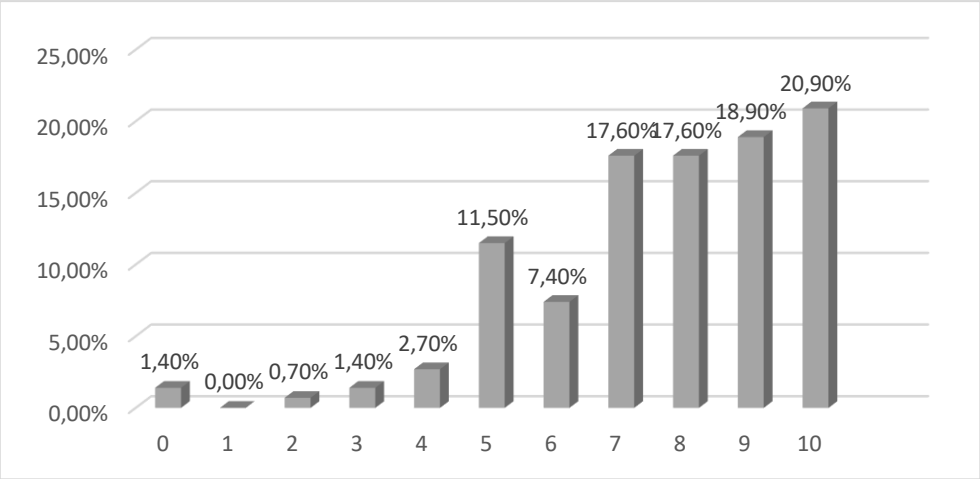
The clarity level of subject concepts before the activity was high. More than 50% of the students considered to have clear concepts.

Graph 2. After the activity, to what degree did you have clear concepts?
(0: nothing clear - 10: very clear)



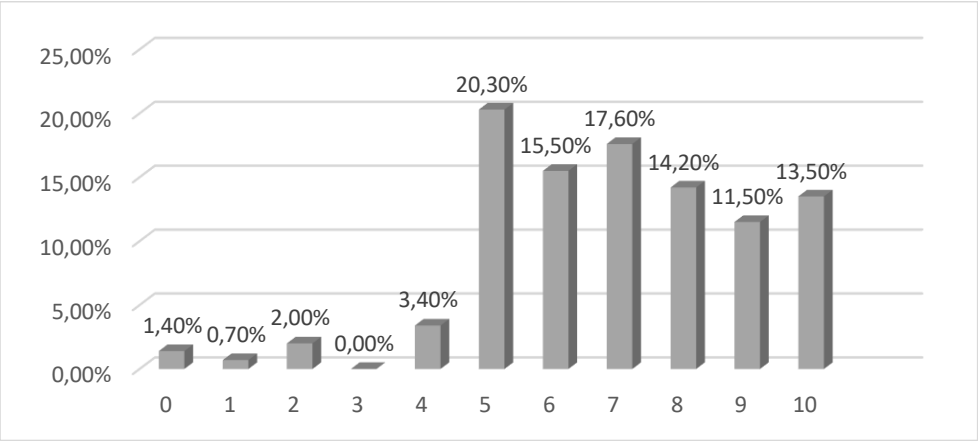
Once the experience in the classroom was realize, it is observe that 85.00% of the students have increased the degree of clarification of the contents, increasing in this case the scores of 8.9 and 10 with respect to the graph 2.

Graph 3. To what degree has the activity been useful for putting your knowledge into practice?
(0: nothing useful - 10: very useful)



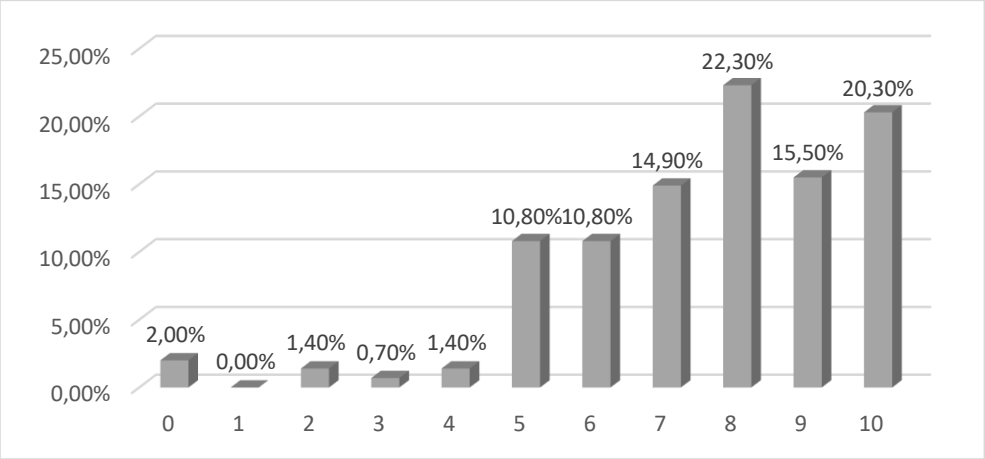
To the question of “To what degree has the activity been useful for putting your knowledge into practice?”, more than 80% shows that the activity has been useful for them. This result is quite relevant for the research given that to do activity in the classroom is valued. This allows them to approach business reality in decision-making.

Graph 4. What degree of reality have you appreciated in this game? (0: nothing real - 10: very real)



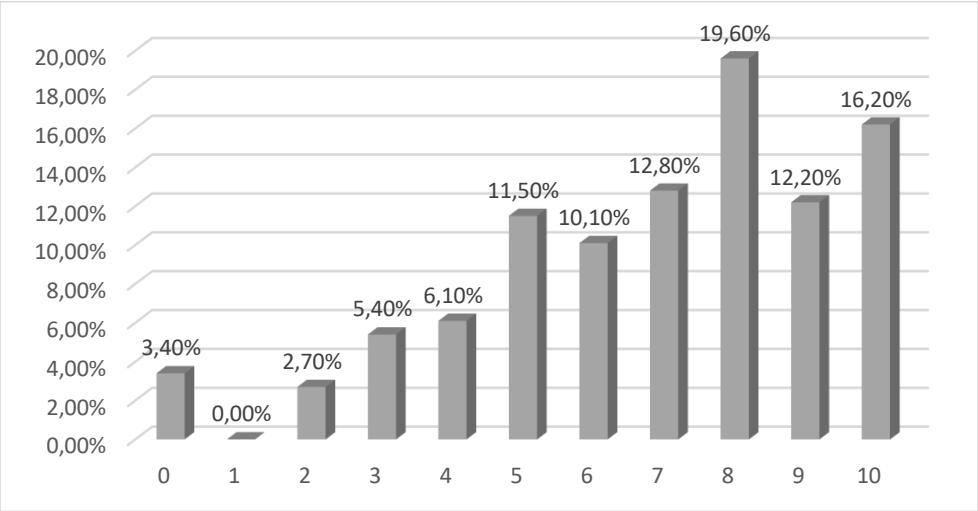
The degree of reality of the activity presents a bit of controversy. The activity presented is a real business case that was carry out in the classroom, but the results of the research point to a low appreciation of reality by the students. The majority (72.30%) presents values within the Likert scale between 6 and 10, but the highest data of the survey is 20.30%. This result indicates that the average value of appreciation of the reality of the case is 5.

Graph 5. To what extent has it been useful to improve your knowledge? (0: nothing useful - 10: very useful)



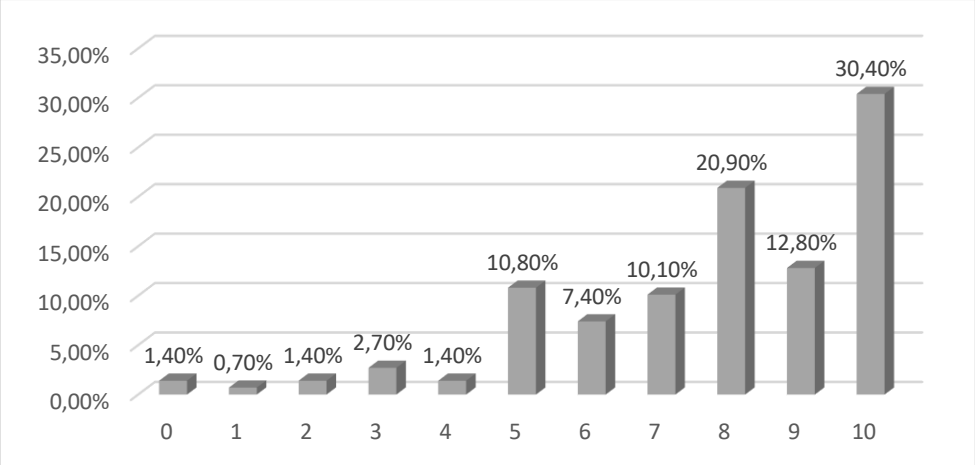
In whatever case, the usefulness of the activity had gotten a good mark. A majority, more than 83%, considers that the activity has served to improve their knowledge, obtaining 58.10% in the values 8, 9, 10. These data show that the provision of this activity goes further beyond the traditional exercises of investment decision taking made in class, which corroborates that the activity helps the student to understand the subject.

Graph 6. In what degree has the game motivated you?
(0: minimum - 10: maximum)



Another aspect to highlight is the result shown in graph 6 since it reveals that 70.90% consider that the activity increased their motivation. In addition, this value concentrates 48% in the values 8, 9 and 10.

Graph 7. How do you value the incentive in the note to perform this activity?
(0: nothing incentive - 10: very incentive)



The question valued in graph 7 shows how the type of incentive in the activity mark is considered positive by the students since 64.10% gives high values to the question, where half of the answers gave maximum of 10.

In addition, it was considered relevant to analyze in particular if the degree of motivation of the student was depending on the incentive offered with the activity. Analyzing it. in general terms, we obtain the following data collected in table 5.

Table 5. Pearson correlation to relate motivation and incentive

	In what degree has the game motivated you?	How do you value the incentive in the note to perform this activity?
In what degree has the game motivated you?	1,000	,320
How do you value the incentive in the note to perform this activity?	,320	1,000

Table 5 shows the result of the Pearson correlation analysis between the motivation and the incentive of the activity, confirming the existence of a positive correlation between the two.

Table 6. Summary regression model

Model	R	R squared		R squared tight	Standard error of the estimate
1	,320[a]	,102		,096	2,416

a. Predictors: (Constant), How do you value the incentive in the note to perform this activity

b. Dependent variable: In what degree has the game motivated you?

As can be seen in table 6, the motivation is explained only in 10.2% by the incentive in the note. Then, it is show probably that the incentive was not enough.

Table 7. Summary coefficients regression model

Model		Non-standardized coefficients		Standardized coefficients	T	Sig.
		B	Standard error	Beta		
1	(Constant)	4,080	,701		5,819	,000
	How do you value the incentive in the note to perform this activity?	,355	,087	,320	4,082	,000

a. Dependent variable: In what degree has the game motivated you?

In this way, once the regression of our analysis has done, the values of the coefficients were obtained (table 7), leaving equation 2 and stating that the variables are significant.

$motivation$ = 4,08 + 0.355 $*$ $incentive$ + ε (equation 2)

Likewise, it has been considered relevant to study if there is a relationship between the campus where the students are studying and their motivation.

Table 8. Motivation according to the campus (ANOVA[a])

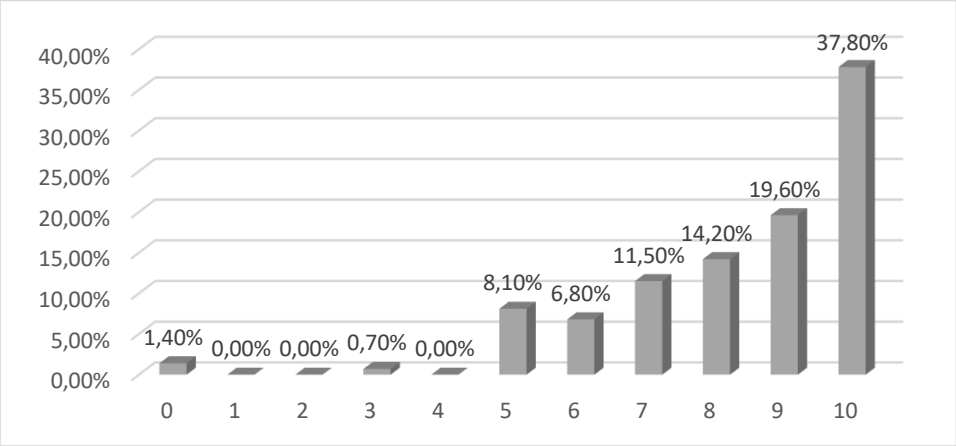
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	2,448	2	1,224	5,158	,007[b]
Residual	34,165	144	,237		
Total	36,612	146			

a. Dependent Variable: Campus

b. Predictors: (Constant), after the game ¿in what grade do you had the clear concepts? 0: nothing clear – 10: very clear

As can be seen in table 8 through the study of the ANOVA, the data that it throws on how it affects the motivation according to the campus where they study are significant.

Graph 8. Degree of interest in implementing new learning techniques (0: none - 10: maximum)



Finally, regarding the question about the degree of interest in the implementation of new learning techniques, students show a clear acceptance. More than 50% of the students shows great importance in their implementation in order to acquire competencies.

CONCLUSIONS

Improving student motivation is still not resolved at all educational levels. In the case we are dealing with, university, the need is even greater since it is the previous step to the world of work. In this research, we have tried to make a proposal to approach the motivation of the student from a holistic approach using new tools such as gamification, the use of a real investment decision-making case and the establishment of quantitative incentives in the qualification of the subject.

The results confirm that the accomplishment of an activity framed outside the theoretical master class is accepted with great interest of the students, in order

to be able to put in practice the knowledge acquired in the classroom. Likewise, the innovative activity improves motivation in a group of students almost equal in gender (women predominate slightly) and work situation (in this case, there are slightly more men working).

According to the objectives pursued in the research, the students confirmed an improvement in learning after the completion of the activity. It allowed them to clarify concepts and improvement of quantified knowledge in a ten-point improvement; significant given that the previous assessment of the activity was already high (around 75% the students already showed a high degree of learning of the subject). In addition, the high utility of the activity carried out that students indicated with values of more than 80%, supports the realization of this type of activity in the classroom, although they showed a low appreciation of reality. This result raises some limitations as the need to perform the activity outside the usual environment and with other less traditional means despite having applied gamification techniques. All this has reverted to a positive result since more than 70% revealed that the activity had increased their motivation, where 16% responded to the maximum increase in motivation. It is important to know that this result has happened despite the fact that the introduction of the incentive in the note has not been an important influence, as shown by the regression analysis. In this aspect, perhaps the incentive suffered from being scarce for the student's perception.

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DECLARATION OF CONFLICTING INTERESTS

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

FUNDING

The author received no financial support for the research, authorship, and/or publication of this article.

Cita recomendada

Plaza Casado, P.; Escamilla Solano, S.; Orden-Cruz, C. (2020). Student motivation in a real investment decision making case study. *Journal of Management and Business Education*, 3(3), 250-265. https://doi.org/10.35564/jmbe.2020.0016