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LEARNING CREATIVITY AND STUDENT'S PERFORMANCE: AN EMPIRICAL STUDY FROM PORTUGAL

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ABSTRACT: This research aims to recognize the influence that creativity units/modules/seminars has on academic performance of students who attend. Consequently, the purpose of this study is to understand the impact that learning creativity has on Porto Accounting and Business School (ISCAP) students'.

Therefore, a quantitative methodology was developed through a questionnaire with 240 answers from ISCAP's students. The data was studied through reliability and explanatory factorial analysis in order to find the relation between the physical environment, learning climate and learner engagement on the performance of students.

The results show that the physical environment and learning climate have a positive influence on students' performance but the same does not happen with the motivation of students. These findings focus on the necessity to improve the students' engagement.

It is recommended that ISCAP will take into account the factors that lead to the referred results so as to reform and develop new ways in which to improve students' performance through students' motivation.

KEYWORDS: creativity, learning, education, performance, HEI.

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1. Introduction

Some scholars believe that often, school education instead of providing the learning of creativity they are killing it (Kim & VanTassel-Baska, 2010; Robison, 2007) so if we potentialize a creative environment. that will have a positive influence on the process of creative learning (Garcês , Pocinho, & Jesus, 2016). Haydon (2016) refers that usually, creative thinkers do not have a good performance at school because the institution sees their attitudes (e.g., intrinsic motivation, risk taking, physical environment, etc.) as a learning disability which means that often the performance of students depends on their attitudes and motivations towards the subjects and being bad at mathematics, sciences, etc. does not necessarily mean that they are bad at the rest. Yoga and Irnin (2018) mentions that students need to learn creativity to be able to learn science by implementing a well-planned process of skills which will help students to discover their own knowledge and motivation for the development of curiosity.

Thereby, the present objective of this study is to understand the relation between the influence that learning creativity has on Porto Accounting and Business School (ISCAP) students' performance through a quantitative methodology that will provide answers to the following research question:

Why are the attitudes of students to whom creativity is taught questioned by higher education institutions (HEI) regarding their performance?

In depth study of this research problem can demystify why so the education system is so often accused of being guilty for killing creativity and the reason for the failure of their students by trying to teach different students with different attitudes, different cognitive styles, different levels of learning the same subjects, in the same way and by not worrying about which learning technique would better fit each student. So, the learning of creativity can be the answer to developing the performance of all students providing new ways of thinking and problem solving to reach solutions (Smith & Smith, 2012; Kaplan, 2019).

To conclude, Oakley (2014) emphasizes that creativity and learning are connected. He believes that if we recognize how our brain works when we are trying to study a new concept or new things, it is possible to achieve better awareness of how we

learnt and how we can flex our learning style when facing problems which will require creativity.

2. Literature review and hypotheses

During the years many researchers pointed out to the positive correlation between motivation and students' academic performance (Eccles & Wigfield, 2002; Law & Breznik, 2017; Law & Geng, 2018; Law, Li, & Geng, 2019; Hong, Peng, & Onell, 2016; Weiner, 1990) defining the positive consequence in students achievement and by focusing on learning motivation. In fact, Law, Li and Geng (2019) showed that learning motivation can be developed through intrinsic and extrinsic factors which can influence students positively by being part of activities and tasks. The same authors argue that it is important to design the degree by always taking into consideration the learning motivation "from the initial enrolment to the course setting facilitation" (p. 8). Amabile (1996) and Winner (1996) besides proving the influence that motivation has on the academic performance it also influences creative performance. Moreover, Hong and Milgram (2008) concluded that motivation through challenges and difficult work do not let and help people to think outside of the box. Therefore, the findings from this study did not support the previous assertions.

On the other hand, Zhu, Gardner and Chen (2016) found that extrinsic motivation was not directly related with creativity which does not mean that is not related, in fact, they emphasize the necessity to study both, extrinsic and intrinsic motivation. Therefore, their results showed that creativity increases when extrinsic motivation is high, and intrinsic motivation is low. So, in the present study, we do not differentiate the two types of motivation that can be the reason for the result once both motivations can develop different effects on creativity (Gilson, Lim, D'Innocenzo, & Moye, 2012).

Another study demonstrated that when the university supports the students it will not only have a direct impact on their academic performance but an indirect influence on their motivation to learn too, which will lead to a positive increase in academic performance of students (Shanti, Janssens, & Setiadi, 2016).

Thus, we intend to test the following hypothesis:

H1: Motivation positively enhances student's performance.

The positive influence that the physical environment (building, resources, furniture) has on the performance of students has been proved by different studies emphasizing its importance for the learning process, grades achievement, creative performance and motivation (George, 2008; Shalley, Gilson, & Blum, 2000; Shalley & Gilson , 2004; Shalley, Zhou, & Oldham, 2004; Yekanialibeiglou & Demirkan, 2018; Licite & Janmere, 2018).

Moreover, some scholars observed that a low quality of the physical environment could create a negative impact on academic performance, vandalism, absence, behaviours and attitude from students and would not only affect them but also the educators performance (Schneider, 2002; Dawson & Parker , 1998; Ruszala, 2008) which means that in an inadequate learning environment the learning process is not taken seriously (Uline & Tschannen-Moran, 2008).

On the other hand, Beckers, Van der Voordt and Dewulf (2016) showed that the students do not value the physical dimension because the most important thing for them is the effectiveness consequently from the physical environment, therefore, student satisfaction is related to learning outcomes and performance. As a result. satisfied students are better learners (Temple, 2007). In controversy, the study driven by Sonmez and Akpinar demonstrated that there is no relationship between the physical environment and academic performance (Sonmez & Akpinar , 2017).

Many scholars have been studying the influence of the learning climate regarding academic performance coming to the same result that is presented in this present study consequently having a supportive learning climate helps the student to have control over their learning process (Akram, Sultan, & Ijaz, 2014; Kaplan & Assor, 2012; Lombarts, Heineman, Scherpbier, & Arah, 2014; Khan, Sadia, Hayat, & Tahir, 2019; Wali, Abulfathi, & Mustapha, 2019).

As a result, Lin and Wu (2016) defend that creative environments can be an asset for motivation, students thinking and behaviour and for that reason influences the learning outcomes. A more recent study showed that a huge improvement in students grades were associated with their learning climate (Yeager, Hanselman, Crosnoe, & Muller, 2019). Concluding, this positive influence is possible due to the ability of students learning based on their own interests and tastes (Boonchan, Pupat, & Seesan, 2017).

Therefore, the following hypothesis is tested:

H2: Physical environment and learning climate positively enhances student's performance.

3. Methodology

This is an empirical study that aims to understand how learning creativity can influence the performance of students in HIE. To developed it, the quantitative methodology was adopted that according to Bryman and Cramer the research is manipulated by any variable and all data related to select the variables will be collected at the same time (Bryman & Cramer, 2012). This is a suitable method (Sousa et al., 2008) once there is the need to question a large number of people and a representative problem exists (Campenhoudt & Quivy, 2008).

This methodology has many advantages like 1) the possibility to collect a large quantity of data and since it is standardized, their comparison is easier; 2) the generalization of the sample results for the population. On the other hand, this method is not free from inconvenience such as a) weight and cost; b) superficiality of the answers due to the standardization of the questions; c) individualization leads to loss of social relationships among respondents and d) difficulty in controlling the response time or who often admits delays in the investigation process (Campenhoudt & Quivy, 2008).

The collection of data was done through a questionnaire (Appendix 1) developed on google forms that was made available to Portuguese students from Porto Accounting and Business School between 22nd of March and 6th of May on different social media platforms. Therefore, the questionnaire was divided into three main parts: the sample (question 1 to 5), the performance evaluation (question 6) and the learning scale developed by Richardson and Mishra in 2018 (question 7).

The academic performance is evaluated many times by GPA which shows the learning outcomes from students in a determined subject or degree (Morsy & Karypis, 2019). As a result, to evaluate the performance, it was considered if the students failed or passed the subjects so students answered about the number of subjects which approached creativity as a theme and how it impacted their performance on the subjects.

To create the questions for the survey to interconnect learning and creativity a scale that "offers educators a practical tool to aid in the design of learning environments that support student creativity" was used (Richardson & Mishra, 2018, p. 45). Therefore, the instrument (Table 1) has nineteen items that emphasize learning tasks, classrooms practices, interactions between students and teachers, the environments around students

and the availability of resources. These items are divided into 3 categories such as Physical Environment; Learning Climate; Learner Engagement.

Table 1: SCALE Components

Physical Environment	Learning Climate	Learner Engagement
1. A variety of resources are available to students.	1. Messiness and noise are tolerated.	1. Students are involved in tasks that are open-ended and/or involve choice.
2. Examples of student work appear in space.	2. Students are involved in active discussions among themselves and with the teacher.	2. Students are involved in real/authentic tasks that may include inquiry, project/problem-based learning, and interdisciplinary tasks.
3. A variety of work areas are available to students.	3. Students are members of the learning community that is caring and respectful.	3. Students are encouraged to use multiple perspectives/viewpoints or alternative modes of investigation/problem-solving.
4. The furniture is comfortable and flexible allowing for multiple arrangements and configurations.	4. The teacher is a co-learner, explore and resource person supporting students	4. Mistakes and risk-taking are encouraged.
	5. The atmosphere is collaborative and friendly.	5. Students are intrinsically motivated.
	6. Differences are valued.	6. Students are given time for the development of ideas and creative thinking.
		7. Multiple ways of knowing and learning are encouraged.
		8. Students are reflexive about their learning.
		9. Students work at their own pace. Time is used flexibly.

Source: "Learning environments that support students creativity: Developing the SCALE" Article

The Physical Environment is linked to the learning environment emphasizing the flexibility of the furniture, the open spaces, the size of groups, the variety of resources and material available to students. (Warner & Myers, 2009; Peterson & Harrison, 2005). In Learning Climate a bigger relation between student and teacher exists and describes the atmosphere of the classroom approaching the way of communication and if it is possible to debate ideas freely and accept them, trust each other and take risks but the most important aspect is the relationships that are possible to be created (Peterson & Harrison, 2005; Richardson & Mishra, 2018). Lastly, Learner Engagement is related with the tasks that the students need to develop and engage while having active learning and exploration where all academic staff is seen as "co-learners and co-teachers" so the process is more important than the goal (Richardson & Mishra, 2018, p. 51).

The best step to measure the satisfaction of each item the Likert scale with 7 points was used, where 1 means totally disagree and the 7 totally agrees. In this way it is possible to conclude about satisfaction and level of agreement among students (Matos, Ramos, H, & Rodrigues, J, 2018).

4. Results

After processing and analyzing the data from the questionnaires the sample consisted of 239 students, of which 66,1% are female and 33,9% are masculine (Table 2).

Table 2: Gender

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	1	158	66,1	66,1	66,1
	2	81	33,9	33,9	100,0
	Total	239	100,0	100,0	

Source: Own elaboration.

We can notice a higher student's concentration in the age groups from 17 to 20 years (56,1%) and between 21 and 30 years (41,0%) corresponding to 97,1% (Table 3).

Table 3: Age

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	1	134	56,1	56,1	56,1
	2	98	41,0	41,0	97,1
	3	2	,8	,8	97,9
	4	5	2,1	2,1	100,0
	Total	239	100,0	100,0	

Source: Own elaboration.

Table 4 highlights undergraduate students from Accounting and Management (27,2%), Creativity and Business Innovation (22,6%), Business Communication (11.3%), Marketing (7.5%) and Management and Administrative Assistance and Translation (5,9%) as those with greater adherence to the present study.

Table 4**:** Courses

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	1	2	,8	,8	,8
	3	1	,4	,4	1,3
	4	1	,4	,4	1,7
	5	6	2,5	2,5	4,2
	7	2	,8	,8	5,0
	8	3	1,3	1,3	6,3
	9	14	5,9	5,9	12,1
	10	4	1,7	1,7	13,8
	11	15	6,3	6,3	20,1
	12	27	11,3	11,3	31,4
	13	65	27,2	27,2	58,6

	14	54	22,6	22,6	81,2
	15	18	7,5	7,5	88,7
	16	6	2,5	2,5	91,2
	17	1	,4	,4	91,6
	18	2	,8	,8	92,5
	20	6	2,5	2,5	95,0
	22	1	,4	,4	95,4
	23	6	2,5	2,5	97,9
	24	2	,8	,8	98,7
	31	3	1,3	1,3	100,0
	Total	239	100,0	100,0	

Source: Own Elaboration

Regarding the number of units/modules/seminars related to creativity that students attended in their course, 49,9% was between 2 and 4 units, 34,2% related with one unit and 15,9% correspond to more than 5 units (Table 5).

Table 5: Units/modules/seminars related to Creativity

		Frequency	**Percentage**	**Valid percentage**	**Cumulative percentage**
Valid	1	82	34,2	34,2	34,2
	2	119	49,9	49,9	84,1
	3	38	15,9	15,9	100,0
	4	0	0,0	0,0	100,0
	Total	239	100,0	100,0	

Source: Own elaboration.

4.2. Reliability analysis

The experimental models required testing to verify their reliability. For this purpose, the analysis of Cronbach's Alpha was used which aims to ensure the internal consistency of the scale. The α coefficient measures uniformly, varying on a scale from 0 to 1, the correlation between items in a survey by analyzing the profile of the responses obtained (Hora, Torres, & Arica, 2010). It is interesting to notice that the value obtained is related to the variability of the respondents' answers, as they have different opinions on the subject (Pestana & Gageiro, 2008). The scale used to measure the alpha is from the authors Pestana and Gageiro (2008).

The samples' reliability is very good, with a Cronbach's Alpha value of 0.921, for all variables.

4.3. Explanatory factorial analysis

Exploratory factor analysis consists of statistical techniques that assist in the analysis and clarification of quantitative data to explore information without predetermination (Damásio, 2012). One of the functions of factor analysis is to reduce the number of observed variables which are correlated with each other. In brief, when establishing covariance relationships generating underlying factors not observed (King, 1985). In the present work, the technique used to extract the interrelationships of the variables and explain them through the proposed dimensions was the Principal Component Analysis (PCA). The objective was to synthesize the original variables into main components with the minimum loss of information using Varimax rotation which aims to minimize the number of variables for each fact and makes it possible to obtain more understandable and theoretically more significant factors (Filho & Júnior , 2010; Pestana & Gageiro, 2008).

For the studied constructs, they were tested by Kaiser-Meyer-Olkin test (KMO) and by Bartlett's sphericity test to prove the adequacy of the variables and consistency of the data collected for application of factor analysis (Marôco, 2011). According to Pestana and Gageiro (2008) the KMO test makes it possible to measure the sample adequacy of all variables and the sample adequacy of each factor with scales between 0 and 1. On the other hand, Bartlett's Sphericity test assesses the hypothesis that the correlation matrix is equal to the identity matrix, that is, the hypothesis that the proposed variables do not correlate them.

Regarding the factor analysis of this construct, it was not necessary to eliminate items "PE2 – There are examples of our work distributed by the facilities" and "LC1 – We are involved in active debates between students and with the teacher" (communalities <0,5). Therefore, 2 factors were obtained which explain 70,00% of the total variance being 61,17% of the variance explained by student's motivation (1st factor) and 8,83% by the physical environment and learning climate (2nd factor) as observed in Table 6.

Table 6: Total variance explained

Component	Initial Eigenvalues			Extraction Sums of Square Loadings			Rotation Sums of Square Loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	10,399	61,171	61,171	10,399	61,171	61,171	6,482	38,131	38,131
2	1,501	8,831	70,002	1,501	8,831	70,002	5,418	31,871	70,002
3	0,729	4,291	74,293						
4	0,606	3,563	77,856						
5	0,550	3,237	81,094						
6	0,420	2,472	83,566						
7	0,391	2,302	85,868						
8	0,362	2,129	87,997						
9	0,308	1,809	89,806						
10	0,293	1,722	91,528						
11	0,273	1,605	93,133						
12	0,252	1,485	94,618						
13	0,233	1,372	95,990						
14	0,221	1,303	97,293						
15	0,176	1,035	98,328						
16	0,157	0,923	99,251						
17	0,127	0,749	100,000						

Extraction Method: Principal Component Analysis.

Source: Own elaboration.

In the respective factor structure, the variables present loadings that vary according: 1st factor: between 0,820 and 0,685; 2nd factor: between 0,820 and 0,525 (Table 7).

Table 7: Rotating component matrix

Variable	Component	
	1	2
PE3		,820
LC3		,805
LC6		,762
PE1		,741
LC5		,740
PE4		,722
LC4		,691
LC2		,525
SM6	,820	
SM4	,818	
SM9	,800	
SM8	,787	
SM7	,772	
SM1	,761	
SM2	,738	
SM3	,737	
SM5	,685	

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser normalization
a. Converged rotation in 3 interactions.

Source: Own elaboration.

The KMO test indicates that there is a very good correlation between the variables (0,950). The Bartlett's sphericity registered the value $\chi^2(171, n=239) = 3515{,}002$, $p<0{,}05$, so it was recorded immediately referring to the distribution table of χ^2 it is possible to verify that $\chi^2>\chi_{0,95}^2$, therefore, the null hypothesis is rejected which means that the variables are correlated (Table 8).

Table 8: KMO and Bartlett

Kaiser-Meyer-Olkin measure of sampling adequacy		,950
Bartlett's sphericity test	Aprox. Chi-square	3515,002
	Gl	136
	Sig.	,000

Source: Own elaboration.

4.4. Research hypotheses

A binary logistic regression was performed to verify if the student's motivation and the physical environment and learning climate are predictors of the approval of students who take creativity units/modules/ seminars. This technique is recommended for situations in which the dependent variable is of a dichotomous nature (Pestana & Gageiro, 2008). In the present case, this corresponds to the student's performance variable (1 – Passed; 2 – Failed). Therefore, the Chi-square test is significant (Table 12). The significative model is considered that $\chi^2(1) = 212{,}713$ ($p<0{,}05$) and R^2 Nagelkerke = 0,044 (Tables 9 and 10).

Table 9: Omnibus test of model coefficients

		Chi-square	df	Sig.
Step 1	Step	6,370	2	,041
	Block	6,370	2	,041
	Modelo	6,370	2	,041

Source: Own elaboration.

Table 10: Model summary

Step	-2 Log likelihood	Cox & Snell R square	Nagelkerke R square
1	212,713[a]	,026	,044

a. Estimation terminated at iteration number 5 because parameter estimates changes by less than,001

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Source: Own elaboration.

Student's motivation is not a significant predictor (OR = 1,394, p>0,05). On the other hand, the physical environment and learning climate is a significant predictor (OR = 4,712, p<0,05) as observed in Table 14.

Table 6: Variables in the equation

		B	E.P.	Wald	Gl	Sig.	Exp(B)
Step 1[a]	SM	-,215	,182	1,394	1	,238	,806
	PE_LC	,397	,183	4,712	1	,030	1,487
	Constant	-1,638	,181	81,971	1	,000	,194

a. Variable(s) enter on step 1: SM (Student's motivation), PE_LC (Physical environment and learning climate).

Source: Own elaboration.

Resulting from the results of the logistic regression H1 - Motivation positively enhances student's performance is not supported (Sig. ,238; p>0,05) and H2 - Physical environment and learning climate positively enhances student's performance, on the other hand, is supported (Sig. ,030; p<0,05).

5. Conclusions

This research aimed to identify the contribution the performance of students who attend creativity units/modules/seminars associating it to three factors: physical environment, learning climate and student motivation. According to the quantitative analysis the results gave evidence that physical environment and learning climate positively enhances the performance of students and on the other hand, it was proved that student motivation did not have a positive influence on their performance.

The theoretical overview provided knowledge about the relation between creativity, the advantage and disadvantage of the factors surrounding us and the performance of student, therefore, it was possible to relate each point and understand the influence on the academic achievement.

While physical environment and learning climate showed positive results conversely, students motivation provide a new insight to Porto Business and Accounting School which I suggest finding and understanding the factors responsible for the lack of student motivation and to take action to improving it and consequently improvinh their academic performance.

For this reason, ISCAP does not harm students' performance but when related with motivation it is the reason for the students not to feel motivated to pursue the learning process. Therefore, the biggest influence on students' motivation should be the organization than the physical environment and learning climate that can be demonstrated by the lack of literature that describes motivation as a bad influence on performance and the existing studies that affirms that the other 2 factors are not predominant for students' performance.

Consequently, one of the limitations of this work is the non-probable sample of convenience due to it not being a random sample but rather specific to the students from ISCAP, the sample size as it was not answered by the majority of the students, this research cannot be generalized for all Higher Education Systems, the individualization that leads to a loss of relationship among respondents and the difficulty to control the response time.

For future research, I recommend to extend the study to all the students at ISCAP or even across all Higher Education Universities in Porto and see if there are any changes in the results. Therefore, I believe it is important not only to study motivation as a general topic but the influence of each motivation (intrinsic and extrinsic) on the performance of students.

It is important to emphasize that motivated and satisfied students are better learners. Good student performance is not only an advantage for them and the higher education institutes but for future organizations too, because they are the future employees and future leaders of the world.

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