

LEARNING STYLES AND STYLES OF COPING WITH STRESS IN UNIVERSITY ENGINEERING STUDENTS

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Abstract: The present research has been developed in the university environment. The objective was to determine the relationship between Learning styles and styles of coping with stress in university chemical engineering students of the National University of Callao. Regarding the methodology, it can be pointed out that the type of research is applicative, with a quantitative approach and descriptive correlational level, regarding the sample, the study was represented by 273 engineering students of a public university of Peru - Callao. For this purpose, the Carver's Stress Coping Modes Questionnaire and the Honey and Alonso's Learning Styles Questionnaire were administered. Then, the data were systematized and the inferential statistical analysis was carried out for hypothesis testing, using Pearson's Correlation statistic and the homogeneity of variances test. In addition, the validation of the instruments was established through Cronbach's Alpha, having a reliability index of 0.70. In this regard, the results indicate a significant relationship between all learning styles and styles of coping with stress in the university students evaluated. That is, between the active learning style and emotion-focused and additional styles of coping with stress; between the reflective learning style and problem-focused styles of coping with stress; between the theoretical learning style and problem-focused and emotion-focused style of coping with stress; and between the pragmatic learning style and emotion-focused style of coping with stress.

Keywords: Learning styles, coping, stress, university engineering students

Introduction

In recent years, research work in Peru on stress and learning in university students has been developing more and more and with greater emphasis. It is evident that university life constitutes a particular context, with highly stressful situations such as: the number of subjects to study, papers to present, exhibitions, exams to take, etc. Piergiovanni and Depaula (2018), refer that "the beginning of a university career is presented as a stage in which subjects will begin to differentiate themselves from the rest, mainly taking into account their own and others' ways and abilities to appropriate the new information presented to them". These aspects previously mentioned have been evidenced in different educational and psychological research, stressful academic experiences have consequences at physiological and psychological level (cognitive, affective and volitional), occurring mainly in the first cycles and in the period prior to exams, which is why several studies have argued the greater effectiveness of strategies focused on the problem (coping), which have been associated with a certain learning style (Cornejo and Lucero. 2006, p. 146).

Somerfield and McCrae (2000) have pointed out the difficulty of determining the greater or lesser effectiveness of one type of coping or another, since the suitability of a strategy depends to a large extent on the specific context in which it is applied, and what is suitable in one situation does not necessarily make it suitable for another.

The world in which we live today is fast-paced and highly competitive, demanding continuous and new learning. However, the first thing that is needed is to know how to effectively assimilate the vast amount of information present in the wide range of publications, especially in the university academic setting. The present research is important because the information it provides is fundamental to understand the dynamics of both variables, explain the interconnectivity and their intrinsic relationship since the objectives are oriented to determine the relationship between learning styles and coping styles of stress in students of Chemical Engineering at the National University of Callao.

It is necessary to point out the particular recognition of the diverse learning styles; as well as, to take into account the situations of coping, product of the diverse activities to develop; the student is in the need to make use of mechanisms of coping with stress, In this sense, the methodological modifications to include, are fundamental in the teaching-learning processes (planning, activities, tasks, interaction, evaluation, etc.). Consequently, students are required to adapt in order to achieve the objectives set, as a result of their new pace of life. Martín (2007). He states that the way in which they will perform and adapt to the new environment will be influenced by external variables belonging to the learning context.

Bandura (1986) argues that people have an internal system to control their thoughts, feelings, motivations and behaviors, which provides them with references that will influence their behaviors; that is, the way in which they are perceived, regulated and evaluated during the course of action. From this, students' behaviors are linked to academic achievement, for this reason this research is developed in Chemical Engineering students of the National University of Callao.

Regarding the learning styles, it can be pointed out that the active, is the involvement that should be had with the various activities, which generates new experiences; theoretical, is oriented to observations and logical foundations, leading to a complexity of thought through analysis and synthesis; reflective, it is based on the position of analyzing the experiences made from different points of view, from the collection of detailed data, allowing later to reach correct and adequate conclusions; pragmatic, it is characterized because it seeks to test ideas, theories, techniques, etc., that work in a practical and adequate way that work in a practical and immediate way, this style is oriented to the solution of concrete problems.

Regarding the scope of the present study, it can be referred that it is oriented to students of chemical engineering, of a public university and of the different study cycles, this research has a maximum time of two academic semesters, which is one year.

This study is importance because it allows the identification of student behaviors and how these are linked to the achievement of academic objectives. It is necessary that university teachers are trained and can manage practical strategies related to stress through relaxation techniques, from this the teacher will transfer the knowledge to the students, and they will put into practice the different strategies learned and thus can adequately manage the stress that increases more in the midterm and final exams. It can be observed in the present study that there is a significant relationship between

learning styles and stress coping, it should be noted that there is a higher score of the reflective style which shows that engineering students are oriented to a position of analysis from different points of view from the detailed collection of information.

Method

The type of research is descriptive and correlational, since it tries to respond to a theoretical problem and is oriented to describe reality. The study was developed under the non-experimental quantitative design, because it allows the measurement of the variables Learning Styles and Styles of coping with stress, raised in the research problem, through the methodology that seeks to quantify the data obtained in the field work, by means of statistical analysis to establish behavioral patterns.

Sample

The population is made up of 943 students of the Faculty of Chemical Engineering of the National University of Callao; however, the sample size of 273 students was obtained from the sampling formula, which is applied for finite populations, as is the case of the present investigation.

Technique and instruments

In the present research, the psychometric technique was used. This is represented through the Honey-Alonso Learning Styles and Carver's Stress Coping Modes questionnaires, these instruments are made up, respectively, by the protocol of questions and the answer sheets. The respective instructions for each instrument were given to the students, who were evaluated as a group in four sessions in the university classroom and the evaluation was carried out by the responsible researcher.

Regarding the instruments used in this research, we can point out the Honey and Alonso Learning Styles Questionnaire (CHAEA), which allows collecting information on the four learning styles, through the 80 items, which are distributed in each 20 items. This instrument presents validity and reliability. I used Cronbach's Alpha, obtaining a score of 0.70, which represents a moderate level of reliability of the 80 items it contains.

Likewise, the Coping with Stress Questionnaire (COPE), is designed to collect information on the reactions or responses faced in difficult or stressful situations, it consists of 52 items, evaluates the response to stress, the things that the subject does or feels more frequently when in such a situation, it tries to determine which are the alternatives that the person uses most. The instrument presents validation and reliability, using the item-test method and the criteria of judges, for internal consistency the Cronbach coefficient was used, obtaining high values and homogeneity, the Pearson statistical test was used, showing that the items are statistically very significant, which demonstrates the construct validity. (Casareto and Perez, 2016). The questionnaire has been widely used in different populations and in various contexts within Peru, both in its 52-item and 53-item versions (Cassaretto, 2011; Cassaretto, Chau, Oblitas, & Valdez, 2003; Cassaretto & Paredes, 2006; Chau 1999, 2004; Chau, Morales, & Wetzell, 2002; Gastelumendi & Ore, 2013; Levano, 2003; Rojas, 1997; Solano, 2013), cited in (Casareto and Perez, 2016).

Results and Discussion

Descriptive results

Table 1: Learning Styles

LEVELS	FREQUENCY	PERCENTAGE
Active	8571	23.45
Reflective	9477	25.93
Theoretical	9299	25.44
Pragmatic	9206	25.19
TOTAL	36553	100,00

The results obtained from the descriptive analysis show four learning style profiles, which are clearly defined and differentiated. Reflective learning predominates with 25.93%, being the first style with the highest score, and active learning with 23.45%, being the one with the lowest score. As for the other styles, 25.44% corresponds to theoretical learning and 25.19% to pragmatic learning. The results of the present research show that the students evaluated have a greater tendency towards reflective learning, being its score the most significant.

Table 2: Levels of Learning Styles

LEVELS	FREQUENCY	PERCENTAGE
Very Low	0	0,00
Low	0	0,00
Moderate	0	0,00
High	39	14,29
Very High	234	85,71
TOTAL	273	100,0

The levels of learning styles of the 273 students evaluated establish clearly significant differences, which are determined by two levels with 85.71% (234), very high score, 14.29% (39), the lowest score, evidencing in the results, the existence of a clear development of learning style.

Table 3: Modes of Coping with Stress

MODES	FREQUENCY	PERCENTAGE
Very seldom uses this form	0	0,00
Depends on circumstances	29	10,62
Frequent way of coping with stress	244	89,38

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Very seldom uses this form	0	0,00
Depends on circumstances	29	10,62
Frequent way of coping with stress	244	89,38
TOTAL	273	100,0

From the descriptive analysis, clearly differentiated results can be established, showing two ways of coping with stress. 89.38% (244); predominates as "frequent way of facing stress" and 10.62% (29), as "depends on the circumstances", showing that students have a greater tendency to face stress frequently.

Inferential results

At the inferential level, the Pearson correlation coefficient "r" was used for hypothesis testing, since the study aims to determine the relationship between learning style and ways of coping with stress. Likewise, we worked with a significance level of 5%.

The SPSS 24 statistical software was used to process the data. It is necessary to specify that it is the statistical software in question for the statistical technique.

a. General hypothesis testing

General hypothesis: There is a significant relationship between learning styles and stress coping styles in Chemical Engineering students of the National University of Callao.

Null Hypothesis: There is no significant relationship between learning styles and styles of coping with stress in Chemical Engineering students of the National University of Callao.

Table 4: Relationship between learning styles and modes of coping with stress

		LEARNING STYLES
STRESS MANAGEMENT MODES	Pearson Correlation	,353
	Sig. (2-tailed)	,000
	N	273

The results obtained are the product of the use of the statistical program SPSS 25 for Windows, which establishes the correlation of Pearson's coefficient, finding a Sig.= 0.000, a value that indicates that there is a significant relationship between learning styles and styles of coping with stress in Chemical Engineering students of the National University of Callao. Therefore, the null hypothesis is rejected and the general hypothesis is accepted.

b. Testing of specific hypotheses

Research hypothesis (H1): There is a significant relationship between active learning style and styles of coping with stress: problem-focused, emotion and additional styles of coping in Chemical Engineering students of the National University of Callao.

Null Hypothesis (Ho): There is no significant relationship between active learning style and styles of coping with stress: problem-focused, emotion and additional styles of coping in Chemical Engineering students of the National University of Callao.

Table 5: Relationship between active learning styles and styles of coping with stress: problem-focused, emotion and additional.

		ACTIVE LEARNING STYLE
Problem-focused	Pearson Correlation	,111
	Sig. (2-tailed)	,068
	N	273
Emotion-focused	Pearson Correlation	,178
	Sig. (2-tailed)	,003
	N	273
Other additional	Pearson Correlation	,202
	Sig. (2-tailed)	,001
	N	273

The results were obtained from the use of the statistical program SPSS 25 for Windows, establishing correlation of Pearson's coefficient, partially finding values lower than Sig.= 0.05, indicating that there is a significant relationship between the active learning style and the styles of coping with stress focused on emotion and other additional ones in the students of Chemical Engineering of the National University of Callao. Therefore, the null hypothesis is rejected and the specific hypothesis is accepted. Finally, we can observe that there is no relationship between active learning style and problem-focused styles of coping with stress:

Research hypothesis (H2): There is a significant relationship between the reflective learning style and styles of coping with stress problem-focused, emotion and additional in Chemical Engineering students of the National University of Callao.

Null Hypothesis (Ho): There is no significant relationship between reflective learning style and problem-focused, emotion and additional styles of coping with stress in Chemical Engineering students of the National University of Callao.

Table 6: Relationship between reflective learning styles and problem-focused, emotion, and additional styles of coping with stress

		REFLECTIVE LEARNING STYLE
Problem-focused	Pearson Correlation	,351
	Sig. (2-tailed)	,000
	N	273
Emotion-focused	Pearson Correlation	,094
	Sig. (2-tailed)	,120
	N	273
Other additional	Pearson Correlation	-,001
	Sig. (2-tailed)	,989
	N	273

The statistical analysis of Pearson's correlation between the reflective learning styles and the coping styles of stress focused on the problem, emotion and additional others, using the statistical software IBM SPSS 25 Statistics for Windows, evidenced, partially, a value Sig.= 0.000, which indicates that there is a significant relationship between the reflective learning style and the coping style of stress: focused on the problem in the students of Chemical Engineering of the National University of Callao. Therefore, the null hypothesis is rejected and the specific hypothesis is accepted. Finally, it is observed that there is no relationship between the reflective learning style and the styles of coping with stress focused on emotion and other additional styles.

Research hypothesis (H3): There is a significant relationship between the theoretical learning style and styles of coping with stress: problem-focused, emotion and additional coping styles in Chemical Engineering students of the National University of Callao.

Null Hypothesis (Ho): There is no significant relationship between theoretical learning style and problem-focused, emotion and additional styles of coping with stress in Chemical Engineering students of the National University of Callao.

Table 7: Relationship between theoretical learning styles and problem-focused, emotion and additional stress coping styles

		THEORETICAL LEARNING STYLE
Problem-focused	Pearson Correlation	,346
	Sig. (2-tailed)	,000
	N	273
Emotion-focused	Pearson Correlation	,139
	Sig. (2-tailed)	,022
	N	273
Other additional	Pearson Correlation	-,002
	Sig. (2-tailed)	,969
	N	273

As for the results of the correlation of Pearson's coefficient, a partial score was obtained with lower values Sig.= 0.05, indicating that there is a significant relationship between the theoretical learning style and the stress coping style: focused on the problem and on the emotion in the students of Chemical Engineering of the National University of Callao. Therefore, the null hypothesis is rejected and the specific hypothesis is accepted. Finally, it is observed that there is no significant relationship between the theoretical learning style and the stress coping styles and other additional styles.

Research hypothesis (H4): There is a significant relationship between pragmatic learning style and problem-focused, emotion and additional styles of coping with stress in Chemical Engineering students at National University of Callao.

Null Hypothesis (Ho): There is no significant relationship between pragmatic learning style and problem-focused, emotion and additional styles of coping with stress in Chemical Engineering students of the National University of Callao.

Table 8: Relationship between pragmatic learning styles of coping with stress: problem-focused, emotion and additional ones

		PRAGMATIC LEARNING STYLE
Problem-focused	Pearson Correlation	,232
	Sig. (2-tailed)	,000
	N	273
Emotion-focused	Pearson Correlation	,068
	Sig. (2-tailed)	,263
	N	273
Other additional	Pearson Correlation	,108
	Sig. (2-tailed)	,075
	N	273

The results of the present investigation show the correlation of Pearson's coefficient obtaining a partial score with a Sig.value = 0.000, indicating the existence of a significant relationship between the pragmatic learning style and the style of coping with stress focused on emotion in the students of Chemical Engineering of the National University of Callao. Therefore, the null hypothesis is rejected and the specific hypothesis is accepted. Finally, it is observed that there is no relationship between the pragmatic learning style and the problem-focused and additional styles of coping with stress.

Conclusion

The present research demonstrates the existence of a significant relationship between learning styles and stress coping styles in Chemical Engineering students of the National University of Callao, which indicates that there is a degree of relationship or association between the variables mentioned.

It is shown that there is a significant relationship between the active learning style and the styles of coping with stress focused on emotion (search for emotional support, positive reinterpretation and personal development, acceptance, turning to religion and analysis of emotions) and other additional coping styles (denial, inadequate behaviors and distraction) in the students of Chemical Engineering of the National University of Callao. However, there is no relationship between the active learning

style and the coping style of stress focused on the problem, evidencing through the score the non-existence of an associative relationship between the variables mentioned.

The result shows that there is a significant correlation (degree of relationship or association between the variables) between the reflective learning style and problem-focused styles of coping with stress (active coping, planning, suspension of other activities, postponement of coping and seeking social support) in Chemical Engineering students of the National University of Callao. Finally, it is shown that there is no correlation between the reflective learning style and the coping styles of emotion-focused stress and other additional coping styles. Since the scores demonstrate the non-existence of a relationship of association between the variables.

On the other hand, it was demonstrated the existence of a significant relationship between the theoretical learning style and the stress coping style focused on the problem (active coping, planning, suspension of other activities, postponement of coping and search for social support) and on the emotion (search for emotional support, positive reinterpretation and personal development, acceptance, turning to religion and analysis of emotions), in the students of Chemical Engineering of the National University of Callao. Finally, there is no relationship between the theoretical learning style and other additional coping styles, due to the score obtained.

The results demonstrated through the scoring the existence of a significant relationship between the pragmatic learning style and the emotion-focused stress coping style (search for emotional support, positive reinterpretation and personal development, acceptance, turning to religion and analysis of emotions) in the Chemical Engineering students of the National University of Callao (Universidad Nacional del Callao).

However, there is no relationship between the pragmatic learning style and the problem-focused and additional coping styles of coping with stress.

The limitations that can be highlighted and considered in the present study refer to the fact that it would have been constructive to have counted with the participation of a more diversified sample of university students.

This research has put as a debate in the university academic environment the importance of learning styles and coping with stress oriented to university engineering students, since there are no studies in the National University of Callao with these variables and in this type of sample.

Acknowledgements

To Mg. Psic. José Mariano Gabriel Eusebio, friend and colleague for his support and suggestions in the preparation of this article.

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