

# Disposition Towards Critical Thinking In University Students Considering The Professional Areas And The Sex Of The Participants\*

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## Abstract

The disposition towards critical thinking in students from various professional areas, men and women from state and private universities of Metropolitan Lima, was compared. The participants were 1439 university students obtained through a non-probabilistic sampling procedure by quotas. Once the institutions to be included in the study were selected, the proportion of students by professional area and sex was established, maintaining the proportion of the population and subsequently the participants were chosen. The instrument used was the Scale of Disposition towards Critical Thinking and it was applied according to the Helsinki declaration. A comparative 2x5 factorial analysis of variance design was used. In the results it is observed that there are only statistically significant differences in maturity to formulate judgments between students of state and private universities of Metropolitan Lima considering the various professional areas. No significant differences were found in the disposition towards critical thinking between students of state and private universities considering the sex of the participants.

**Keywords:** Critical thinking, students, universities, professional areas, sex.

## INTRODUCTION

The interest in critical thinking, according to Siegel (1990), has as its main motive the need to generate higher-order thinking skills among students and enable the ability to think critically when society demands it and thus be able to participate fully in public life.

According to Ennis (1986), the main function of critical thinking is to review ideas, evaluate them, review what is understood, process and communicate, through other types of thinking, such as logical, mathematical, verbal. In short, it is

characterized by handling and mastering ideas.

Critical thinking, according to Çubukcu (2006), is an effective, organized and functional cognitive process that allows us to understand thoughts, understand the opinions of other people and improve the dispositions to express themselves. Critical thinking also includes provisions about how to decide, what to do, or logically believe.

Several authors such as Ennis (1986) point out that critical thinking has a cognitive and a motivational component. The cognitive component defined by Ennis (1986, 2011) is rational, reflective thinking. The disposition towards critical thinking constitutes the motivational component, it is the set of characterological attributes of a person to value and employ critical thinking (Facione et al., 1997, 2000). For Nieto and Valenzuela (2012) they constitute the intervention of motivation to participate in thinking skills.

Reyes et al. (2013) indicate that it is worrying that students are only interested in the results in their grades ignoring that this may imply a deficient contribution to the construction of knowledge. In this regard, Merchán (2012) points out that evaluations in university classrooms show that students correctly answer questions that basically require the use of memory but fail in those in which it is necessary to make some deduction or relationship.

In turn, Gotoh (2016) proposes critical thinking as the set of skills and dispositions that allow solving problems logically and reflecting autonomously through the metacognitive regulation of problem-solving processes. In this regard, he points out that it is important that students use the rubric and manage to evaluate themselves, so the emphasis should be on metacognitive regulation to help self-evaluation, since metacognitive regulation has two aspects: The rubric of critical thinking and the evidence of the problem-solving process. The respective integration would allow to

achieve the ability referred to critical thinking in the students.

Murawski (2014) highlights the idea that critical thinking is a term frequently used in the educational field based on what is called the art of thinking about thinking in order to improve the ability to think, which really generates a series of challenges, one of them being to provide the appropriate learning environment in the sense of promoting the development of the disposition of critical thinking, that will help both in the classroom and in everyday activities linked to work and social synergy in general.

For Escurra & Delgado (2008) the disposition to critical thinking is a consistent internal motivation to face problems and make decisions, making use of thought. According to Facione et al. (1997, 2000); Velásquez & Figueroa (2010) the dimensions of the disposition towards critical thinking are described below.

**Truth-seeking:** It constitutes the willingness to inquire for the truth, to formulate questions, being honest and objective about the answers that are obtained, however contradictory they may be.

**Open-minded or mental amplitude:** Concerns the willingness and tolerant of other points of view or divergent opinions.

**Analytical capacity:** Refers to the willingness to be alert to potentially problematic situations, expecting possible results or consequences, and appreciating the use of reason and the use of evidence, even in the face of a complex or difficult problem.

**Systematicity (Thinking systematically):** It raises the disposition for organization, concentration, to focus in an orderly manner on a question, so that no specific form of organization is privileged.

**Self confidence in reasoning:** Refers to the willingness to be self-confident to trust the abilities of someone who reasons and expresses his views as a good thinker.

**Inquisitiveness or curiosity:** Refers to the willingness to be curious or impatient to acquire knowledge and learn new explanations.

**Maturity of judgment:** It refers to the willingness to make reflective judgments, preferring those who approach to answer problems, ask questions and make decisions. León (2014) highlights that the dispositions of critical thinking are measurable and influence performance as a critical thinker. García, Graterol & Triviño (2014) highlight its importance, pointing out that it is important to combine the development of skills as well as the dispositions of thought. A UNESCO document (1998) states the need to train professionals with critical capacity to seek solutions and assume responsibilities. Likewise, López (2012) highlights the importance of acquiring intellectual autonomy on the part of students, which can be achieved by privileging the disposition that is contributed to a task of thought.

From the above, the following question arises: Does the disposition towards critical thinking differ between students of various professional areas, men and women, of state and private universities of the city of Lima, Peru?

The objectives of this study have been to know the disposition towards critical thinking among students of state and private universities of Lima considering the professional areas and sex of the participants.

As for research on the disposition towards critical thinking, the work of Torres (2011), Bejarano et al. (2014) are described in the following lines.

Torres (2011) investigated the influence of dispositions on the development of critical thinking and the learning of Natural Sciences, in 30 high school students, aged 15 and 16 years. He used the Consciousness Scale and an interview to obtain spontaneous answers about the concept of disposition, its importance in the formation process and its

relationship with learning. He concluded, pointing out that the arrangements contribute to the general development of thinking, evidenced by students in the development of their classroom practices and contextual practices, making it clear that educators must provide spaces and activities that allow them to develop positive dispositions in the learning process. Most participants considered positive arrangements important but did not develop activities that reflected their usefulness.

Bejarano et al. (2014) studied critical thinking and motivation towards critical thinking in 65 psychology students from a higher education institution. The PENCRISAL and the Motivation Scale towards Critical Thinking (EMPC) were applied. They found that both men and women had deficiencies in thinking critically. In relation to motivation, participants recognized that critical thinking was useful and important, but noted a lower willingness to use this way of thinking and assume the respective demands.

In Peru, Escurra & Delgado (2008) constructed the Disposition Scale towards Critical Thinking using the Samejima Model in university students in the city of Lima. The participants were 830 students from state and private universities. It was concluded that each of the areas that constitute the disposition towards critical thinking fits the Samejima graduated response model. Likewise, the instrument presented construct validity and reliability by the internal consistency method.

Pérez (2015) investigated the relationship between motivation to critical thinking and cognitive ability, according to the perception of 172 university students. He used as instruments the Motivational Scale of Critical Thinking – EMPC of Valenzuela, Nieto & Saiz, translated and adapted for Colombia and the Questionnaire for the Measurement of Cognitive Capacity – CCC, developed specifically for this research. He

concluded that there is a significant relationship between motivation to think critically and cognitive ability according to the perception of the participants.

Perea (2017) studied the relationship between the disposition towards critical thinking and academic performance in 263 university students of the research methodology course. He concluded that there is no significant relationship between the total score of the Scale of Readiness towards Critical Thinking and academic performance, nor did he find a significant relationship between the areas of the scale and academic performance, except in the area of inquisitiveness or curiosity.

## RESEARCH METHOD

### Participants

The population was constituted by male and female students of the various professional areas of state and private universities of the city of Lima. The sample size was determined taking into account the characteristics of the population. To obtain the sample, a non-probabilistic sampling procedure was applied by quotas, and once the institutions to be included in the study were selected, the proportion of students by professional area and sex was established, maintaining the proportion of the population and subsequently the participants who were evaluated were chosen.

### Instrument

The instrument used was the Scale of Disposition towards Critical Thinking by Ecurra & Delgado (2008), made up of the following areas: Search for truth, mental

amplitude, analytical capability, systematicity (thinking systematically), confidence in reasoning, inquisitiveness, and maturity to formulate judgments.

### Procedure

The data was collected according to the Helsinki declaration. The participants took the test on a voluntary basis, it was assured that the results were private and have been informed about the procedure adding that they may ask any questions and leave whenever they feel so.

### Data analysis

To process the data, a 2x5 factorial analysis of variance (ANOVA) was used to compare the total score and scores of the areas of readiness towards critical thinking among students of state universities and individuals of the various professional areas. In the same way it was compare the scores of readiness towards critical thinking among male and female students from state and private universities.

## RESULTS

Table 1 presents the values of the arithmetic mean (M) and the standard deviation (D.E.) of the scores of the areas and the total score of the Scale of Disposition towards Critical Thinking of male and female students of state and private universities of the city of Lima, observing that the highest arithmetic mean is in the systematicity area, followed by the area of confidence in reasoning. The lowest arithmetic mean is in the inquisitiveness or curiosity area.

**Table 1** Arithmetic mean and standard deviation of the scores of the areas and the total score of the Scale of Disposition towards Critical Thinking of the male and female students of state and private universities of Metropolitan Lima

Areas	M	D.E.
Search for truth	52.53	6.371
Mental amplitude	51.90	7.008
Analytical capability	52.15	7.153

Systematicity	53.81	7.271
Confidence in reasoning	53.80	7.223
Inquisitiveness or curiosity	48.53	5.914
Maturity to make judgments	53.00	6.432
Total	365.70	40.073

n = 1439

Table 2 presents the results of the general hypothesis  $H_1$  that raises the existence of a statistically significant difference in the disposition towards critical thinking between students of state and private universities of Lima considering the various professional areas, noting that there is no statistically significant difference between students of state and private universities ( $F =$

.037), nor is a statistically significant difference observed when comparing university students from the various professional areas ( $F = .767$ ). Finally, considering the disposition towards critical thinking there is a non-significant interaction between the two variables ( $F = 2.215$ ), which indicates that the general hypothesis  $H_1$  is not validated.

**Table 2** 2x5 ANOVA of the disposition towards critical thinking among students of state and private universities considering the various professional areas

Factors	df	Quadratic mean	F	p
Universities	1	59.785	.037	.847
Areas	4	1229.164	.767	.547
Universities*Areas	4	3549.733	2.215	.065

Regarding the specific hypothesis  $H_{1.1}$  that indicates that there is a statistically significant difference in the area of truth search of the disposition towards critical thinking among students of state and private universities of Lima considering the various professional areas, the results (Table 3) show that there is no significant difference in the

area of truth search between students of state and private universities ( $F = .143$ ), it is also evident that there is no significant difference between the participants considering the various professional areas ( $F = 1.277$ ). It is observed that the specific hypothesis  $H_{1.1}$  is not validated because an  $F$  of 1.831 is obtained that is not statistically significant.

**Table 3** 2x5 ANOVA of the area search for the truth of the disposition towards critical thinking among students of state and private universities considering the various professional areas

Factors	df	Quadratic mean	F	p
Universities	1	5.782	.143	.706
Areas	4	51.699	1.277	.277
Universities*Areas	4	74.149	1.831	.120

Regarding the comparison in mental amplitude of the disposition towards critical thinking between the participants of state and private universities considering the various professional areas, the results in table 4 show that there is no significant difference ( $F = .056$ ) between students of state and private universities, it is also observed that there is no significant

difference between the participants of the various areas ( $F = 1.308$ ). Finally, there is a non-significant interaction in mental amplitude of the disposition towards critical thinking between students of state and private universities considering the various professional areas ( $F = 1.707$ ), which indicates that the specific hypothesis  $H_{1,2}$  is not validated.

**Table 4** 2x5 ANOVA of the mental amplitude area of the disposition towards critical thinking among students of state and private universities considering the various professional areas

Factors	df	Quadratic mean	F	p
Universities	1	2.721	.056	.813
Areas	4	63.753	1.308	.265
Universities*Areas	4	83.225	1.707	.146

Regarding the specific hypothesis  $H_{1,3}$  that indicates the existence of a statistically significant difference in the area of analysis capacity of the disposition towards critical thinking among students of state and private universities of Metropolitan Lima considering the various professional areas, the results (Table 5) allow us to observe that there is no significant difference in the area of analysis capacity between students of state and private universities of Metropolitan

Lima ( $F = .014$ ), there is also no significant difference when comparing university students from the various professional areas ( $F = 1.460$ ). The specific hypothesis  $H_{1,3}$  is not validated because no significant interaction is found in analysis capacity of the disposition towards critical thinking among students of state and private universities of Metropolitan Lima ( $F = 1.231$ ).

**Table 5** 2x5 ANOVA of the area capacity of analysis of the disposition towards critical thinking among students of state and private universities considering the various professional areas

Factors	df	Quadratic mean	F	p
Universities	1	.727	.014	.905
Areas	4	74.524	1.460	.212
Universities*Areas	4	62.864	1.231	.296

Table 6 presents the results of the comparison in the systematicity area of the disposition towards critical thinking between the participants of state and private universities of Metropolitan Lima considering the various professional areas. The results (Table 5) show that there is no significant difference in the systematicity

area between students of state and private universities ( $F = .055$ ), also that there is no significant difference between the participants considering the professional areas ( $F = .945$ ). It is observed that the specific hypothesis  $H_{1.4}$  is not validated because an  $F$  of 1.439 is obtained that is not statistically significant.

**Table 6** 2x5 ANOVA of the systematicity area of the disposition towards critical thinking among students of state and private universities considering the various professional areas

Factors	df	Quadratic mean	F	p
Universities	1	2.906	.055	.815
Areas	4	50.026	.945	.437
Universities*Areas	4	76.120	1.439	.219

Regarding the comparison in confidence in the reasoning of the disposition towards critical thinking between the participants of state and private universities considering the various professional areas, the results in table 7 show that there is no significant difference ( $F = .568$ ) between students of state and private universities, it is also

observed that there is no significant difference between the participants of the various areas ( $F = 1.406$ ). Also, there is a non-significant interaction around trust in the reasoning of the disposition towards critical thinking ( $F = 2.318$ ), which indicates that the specific hypothesis  $H_{1.5}$  is not validated.

**Table 7** 2x5 ANOVA of the area confidence in the reasoning of the disposition towards critical thinking among students of state and private universities considering the various professional areas

Factors	df	Quadratic mean	F	p
Universities	1	29.543	.568	.451
Areas	4	73.166	1.406	.230
Universities*Areas	4	120.658	2.318	.055

Regarding the specific hypothesis  $H_{1.6}$  that indicates the existence of a statistically significant difference in the disposition towards critical thinking among students of state and private universities considering the

various professional areas, the results (Table 8) allow us to observe that there is no significant difference ( $F = 2.055$ ). However, there is a significant difference in inquisitiveness when comparing students

from the various professional areas ( $F = 2.950$ ). The groups that differ are students from the area of Health Sciences and those from the area of Engineering, as well as participants from the area of Health Sciences

and those from the Economic and Business area. The specific hypothesis  $H_{1.6}$  is not validated because no significant interaction is found ( $F = 1.651$ ).

**Table 8** 2x5 ANOVA of the inquisitiveness area of the disposition towards critical thinking among students of state and private universities considering the various professional areas

Factors	df	Quadratic mean	F	p
Universities	1	71.346	2.055	.152
Areas	4	102.412	2.950	.019
Universities*Areas	4	57.312	1.651	.159

Table 9 presents the results of the comparison around maturity to formulate judgments of the disposition towards critical thinking among the participants considering the various professional areas. The results show that there is no significant difference in the area maturity to formulate judgments between students of state and private universities ( $F = .048$ ), also there is no significant difference between the participants considering the various professional areas ( $F = .541$ ). However, the specific hypothesis  $H_{1.7}$  is validated

because an F value of 3.463 is obtained which is statistically significant. Participants from private universities in the professional area of Humanities obtained a higher average (54.73) compared to students from state universities in Humanities (51.96) and the area of Health Sciences (52.87). Likewise, students at state universities in the professional area of Engineering obtained a higher average (53.75) compared to students of private universities of similar professional area (51.26).

**Table 9** 2x5 ANOVA of the maturity area to formulate judgments of the disposition towards critical thinking among students of state and private universities considering the various professional areas

Factors	df	Quadratic mean	F	p
Universities	1	1.983	.048	.826
Areas	4	22.269	.541	.706
Universities*Areas	4	142.559	3.463	.008

Regarding the comparison considering the sex of the students, it can be seen in table 10 the results corresponding to the general hypothesis  $H_2$  that raises the existence of statistically significant differences in the

disposition towards critical thinking among the students at the state and private universities considering the sex, noting that there is no statistically significant difference between students ( $F = 1.73$ ). Nor is there a



statistically significant difference when comparing male and female students ( $F = 1.80$ ). Finally, in the disposition towards critical thinking, the interaction between the

two variables is not significant ( $F = 1.687$ ), which indicates that the general hypothesis  $H_2$  is not validated.

**Table 10** 2x5 ANOVA of the disposition towards critical thinking among students of state and private universities considering the sex of the participants

Factors	df	Quadratic mean	F	p
Universities	1	277.310	.173	.678
Sex	1	288.981	.180	.671
Universities*sex	1	2708.633	1.687	.194

As for the specific hypothesis  $H_{2.1}$  that indicates that there is a statistically significant difference in truth-seeking disposition towards critical thinking between male and female students, the results (Table 11) show that there is no significant difference between students of

state and private universities ( $F = .382$ ), there is also no significant difference between male and female participants ( $F = .004$ ). It is observed that the specific hypothesis  $H_{2.1}$  is not validated because an F value of 1.136 is obtained that is not statistically significant.

**Table 11** 2x5 ANOVA of the truth-seeking area of the disposition towards critical thinking among male and female students of state and private universities

Factors	df	Quadratic mean	F	p
Universities	1	15.518	.382	.537
Sex	1	.178	.004	.947
Universities*sex	1	46.138	1.136	.287

Regarding the comparison in mental amplitude of the disposition towards critical thinking between male and female students of state and private universities, the results in table 12 show that there is no significant difference ( $F = .096$ ) between students of state and private universities. However, there is a significant difference between male and female students ( $F = 5.316$ ), with

women achieving a higher average (52.31) than their male peers (51.32). Finally, it is evident that there is not a significative interaction in mental amplitude of the disposition towards critical thinking between male and female students of state and private universities ( $F = 3.553$ ), which indicates that the specific hypothesis  $H_{2.2}$  is not validated.

**Table 12** 2x5 ANOVA of the mental amplitude area of the disposition towards critical thinking among male and female students of state and private universities

Factors	df	Quadratic mean	F	p
Universities	1	4.723	.096	.756
Sex	1	260.528	5.316	.021
Universities*sex	1	174.142	3.553	.060

Regarding the specific hypothesis  $H_{2,3}$  that indicates the existence of a statistically significant difference in analysis capacity of the disposition towards critical thinking between male and female students of state and private universities, the results (Table 13) allow us to observe that there is no significant difference in the area analytical skills among students of state and private

universities ( $F = .040$ ). However, there is a significant difference in analysis capacity between male and female university students ( $F = 4.216$ ), with men reaching a higher average (52.61) than their female counterparts (51.71). The specific hypothesis  $H_{2,3}$  is not validated because the interaction between the two variables is not significant ( $F = 1.378$ ).

**Table 13** 2x5 ANOVA of the area capacity to analyze the disposition towards critical thinking among male and female students of state and private universities

Factors	df	Quadratic mean	F	p
Universities	1	2.026	.040	.842
Sex	1	214.527	4.216	.040
Universities*sex	1	70.144	1.378	.241

Table 14 presents the results of the comparison in the systematicity area of disposition towards critical thinking between male and female participants from state and private universities, which show that there is no significant difference in the systematicity area between students from

state and private universities ( $F = .397$ ), also there is no significant difference between male and female participants ( $F = 1.399$ ). It is observed that the specific hypothesis  $H_{2,4}$  is not validated because an F value of 1.595 is obtained which is not statistically significant.

**Table 14** 2x5 ANOVA of the systematicity area of readiness towards critical thinking among male and female students of state and private universities

Factors	df	Quadratic mean	F	p
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Universities	1	21.026	.397	.528
Sex	1	74.029	1.399	.237
Universities*sex	1	84.384	1.595	.207

Regarding the comparison in confidence in the reasoning of the disposition towards critical thinking between male and female students of state and private universities, the results in table 15 show that there is no significant difference ( $F = .364$ ) between these students. However, it is observed that there is a significant difference in confidence

in reasoning between male and female students ( $F = 4.665$ ), with male students achieving a higher average (54.34) than their female peers (53.39). Finally, there is no significant interaction in trust in the reasoning of the disposition towards critical thinking ( $F = .541$ ), indicating that the specific hypothesis  $H_{2.5}$  is not validated.

**Table 15** 2x5 ANOVA of the area confidence in reasoning of the disposition towards critical thinking among male and female students of state and private universities

Factors	df	Quadratic mean	F	p
Universities	1	18.896	.364	.547
Sex	1	242.341	4.665	.031
Universities*sex	1	28.114	.541	.462

Regarding the specific hypothesis  $H_{2.6}$  that indicates the existence of a statistically significant difference in the inquisitiveness area of the disposition towards critical thinking between male and female students of state and private universities, the results (Table 16) allow us to observe that there is no significant difference ( $F = 3.277$ ).

Likewise, there is no significant difference in the inquisitiveness area when comparing male and female university students ( $F = .471$ ). The specific hypothesis  $H_{2.6}$  is not validated because the interaction between the two variables is not significant ( $F = .050$ ).

**Table 16** 2x5 ANOVA of the inquisitiveness area of the disposition towards critical thinking among male and female students of state and private universities

Factors	df	Quadratic mean	F	p
Universities	1	114.486	3.277	.070
Sex	1	16.461	.471	.493
Universities*sex	1	1.740	.050	.823

Table 17 presents the results of the comparison in maturity to formulate judgments of the disposition towards critical thinking among male and female students of state and private universities. The results show that there is no significant difference in the area of maturity to formulate judgments between students of state and private

universities ( $F = .025$ ), it is also evident that there is no significant difference between male and female participants ( $F = 1.204$ ). Finally, the specific hypothesis  $H_{2.7}$  is not validated because an  $F$  value of 1.501 is obtained which is not statistically significant.

**Table 17** 2x5 ANOVA of the maturity area to formulate judgments of the disposition towards critical thinking among male and female students of state and private universities

Factors	df	Quadratic mean	F	p
Universities	1	1.051	.025	.873
Sex	1	49.722	1.204	.273
Universities*sex	1	61.984	1.501	.221

## DISCUSSION

In the hierarchical analysis of the results obtained from the different areas of the disposition towards critical thinking, it is observed that those that achieve higher scores are the systematicity area ( $M = 53.81$ ) and the area of confidence in reasoning ( $M = 53.80$ ), while those that obtain lower scores are the area of inquisitiveness ( $M = 48.53$ ) and the area of mental amplitude ( $M = 51.90$ ) (Table 1). These results agree with what was found by Escurra & Delgado (2008), who find that the areas with the highest scores are systematic and confident in reasoning, although they disagree because they point out as an area with higher scores also the area of mental amplitude, they also agree with the results of this study in that they point out curiosity as the least valued area. Likewise, the results disagree with what was reported by Perea (2017) in the sense that the areas of disposition towards critical thinking with higher results were those referred to the area of mental amplitude and the area of inquisitiveness.

The result of comparing the disposition towards critical thinking in the students of state and private universities of Metropolitan Lima considering the various professional areas makes it possible to point out that there are no significant differences between the groups studied (Table 2), which coincides with the theoretical approaches formulated by Facione et al. (1997, 2000) and Escurra & Delgado (2008) that the disposition towards critical thinking concerns the internal motivation both to use critical thinking skills to face problems and to make decisions. In the same way, it affects what was pointed out by Siegel (1990) who states that the fundamental thing about critical thinking is the need to generate higher-order thinking skills and at the same time enable critical thinking to interact in an integral way. However, this result does not agree with what was found by Escurra & Delgado (2008) in university students in Lima and Callao, because significant differences were found in the disposition towards critical thinking according to the management of the university, sex and the professional area. Likewise, it is indicated that the indexes

corresponding to the students of Health Sciences, Basic Sciences (Biology, Physics, Mathematics) and Humanities were higher with respect to those obtained by the students of the Engineering and Business Sciences. It is proposed that these differences could be explained because in the Health Sciences, Basic Sciences and Humanities scientific research is motivated and encouraged to a greater degree, while in the areas of Engineering and Business Sciences the search for applied knowledge of a technical nature is emphasized.

Regarding the comparison in the area of truth search of the disposition towards critical thinking considering the different professional areas (Table 3) it was found that there was no statistically significant difference, agreeing with Facione et al. (2000) in the sense that the disposition towards critical thinking refers to how to decide, what to do or how to believe logically.

Taking into account the comparison referred to the area mental amplitude of the disposition towards critical thinking in function of the various professional areas it was found that there is no statistically significant difference (Table 4), coinciding with the approach of Çubukcu (2006), in the sense that critical thinking constitutes an organized, functional and effective cognitive construct that makes it possible to understand the approaches of others.

Taking into account the comparison corresponding to the ability to analyze the disposition towards critical thinking among students of state and private universities of Metropolitan Lima according to the professional areas and as seen in table 5 there is no statistically significant difference. Ennis (1986, 2011) and López (2012) agree with this result in the sense that critical thinking is characterized in what to do or what to believe, emphasizing the predominance of reason. Indeed, this area refers to the willingness to be alert in matters that generate problems, privileging the use

of reason in different situations, regardless of their complexity or difficulty.

Regarding the results of the systematicity area of the disposition towards critical thinking among the students of state and private universities considering the various professional areas it was found that there is no significant difference (Table 6), this result coincide with the indicated by León (2014) who confirms the existence of certain provisions of critical thinking as traits that characterize those who are a critical thinker, which is considered an indispensable condition of the university student. Likewise, García et al. (2014) propose that the expression of the systematicity area is presented in the practice of good thinking, which is a present and important condition in a future professional, for this reason the non-existence of differences between the professional areas is justified, since the systematicity area is a characteristic that refers to the disposition for the organization, for the concentration and to point out in an orderly way a question.

If the area of confidence in the reasoning of the disposition towards critical thinking among students from various professional areas is considered, as presented in table 7, no significant difference was found, so the hypothesis was not validated, and corroborates considering the disposition to critical thinking as a motivation to face problematic situations using thinking in decision making, which is expected in every university student and therefore would explain the non-existence of significant differences. This aspect is important as highlighted by Boisvert (2004) when proposing three conditions of critical thinking: The demand of society, the guarantee of socioeconomic development, and a rational production without manipulation, which is inherently presented in the college student, a condition that would justify the non-existence of significant differences between professional areas. The above implies confidence in reasoning and

the security to raise opinions and points of view appropriately.

Regarding the comparison in inquisitiveness of the disposition towards critical thinking among students, the results show that there is no statistically significant difference between the different professional areas (Table 8). This result, as stated by Escurra & Delgado (2008) does not coincide with reports of significant differences between students in different professional areas, with the participants of Health Sciences reaching the highest rates while the students of Business Sciences presented the lowest scores in the area of inquisitiveness of the disposition towards critical thinking.

Considering the comparison in the area of maturity to formulate judgments of the disposition towards critical thinking among the participants of state universities and individuals of various professional areas, in table 9 it is observed that there is a statistically significant difference, which validates the hypothesis. It is observed that participants from private universities around Humanities obtain higher rates than their peers from state universities in the area of Humanities and the area of Health Sciences. Similarly, students at state universities in the area of Engineering achieve a higher average than students at private universities in the same professional area. This result coincides with what was found by Escurra & Delgado (2008) who report statistically significant differences, with students around Health Sciences who achieve the highest score while those in the area of Business Sciences are those who obtain the lowest score in the area of maturity to formulate judgments of the disposition towards critical thinking.

Taking into account the comparison referred to the disposition towards critical thinking in the students of state and private universities of Metropolitan Lima considering the sex of the participants, the results show that the interaction between the variables is not significant (Table 10), so the hypothesis is not validated, which is justified considering

what Facione et al. (2000) point out in the sense that the disposition towards critical thinking refers to the characteristics of a person to face problems and make decisions using thought.

Regarding the comparison in the area of truth-seeking of the disposition towards critical thinking between male and female students of state and private universities, the results in table 11 show that there is no significant difference, which coincides with what was pointed out by Escurra & Delgado (2008) to the extent that this area of the disposition towards critical thinking has to do with the motivation of the person to seek the truth, to make question, being honest and objective with the answers that are obtained even when they may be contradictory, which is to be expected in every university student. Likewise, it agrees with what was reported in university students from Lima and Callao that point out that there is not a significant difference in the area of search for truth of the disposition towards critical thinking.

Regarding the area of mental amplitude of the disposition towards critical thinking among the male and female participants of state and private universities, it was found that there is no significant difference (Table 12), which corroborates what was proposed by Çubukcu (2006), among others, in the sense that critical thinking allows understanding the opinions expressed by others, and that the mental amplitude area has to do with the willingness to have an open mind and tolerant of other points of view or opinions. The results of the present research also agree with what was reported by Escurra & Delgado (2008) in university students in Lima and Callao who point out that no significant difference was found in the open-minded area.

Regarding the comparison in the area of capacity for analysis of the disposition towards critical thinking between male and female students of state and private universities of Metropolitan Lima, the results in table 13 show that there is no

statistically significant difference. This result agrees with what was proposed by Escurra & Delgado (2008) because the capacity for analysis refers to the willingness to be alert to problematic situations, expecting possible results or consequences, and to assess the use of reason and the use of evidence, even in the face of complex problems, characteristics that are expected in every university student.

Regarding the comparison in the systematicity area of the disposition towards critical thinking between male and female participants from state and private universities, the results show that the interaction between the variables is not significant (Table 14), so the hypothesis is not validated, which would be explained considering what was proposed by García et al. (2014) who point out that the practice of good thinking is essential as an expression of the systematicity area. This area has to do with the disposition for organization, for concentration and to point out in an orderly way a question, without choosing a certain form of organization.

Regarding the comparison in the area of confidence in the reasoning of the disposition towards critical thinking between male and female students of state and private universities, it is observed that the hypothesis is not validated because the interaction between the variables is not statistically significant (Table 15). Regarding the comparison in inquisitiveness of the disposition towards critical thinking between male and female students of state and private universities of Metropolitan Lima, the results show that the hypothesis is not validated (Table 16), which coincides with what was found by Escurra & Delgado (2008) in university students, because they found no significant differences between men and women in the area of inquisitiveness.

Finally, when comparing male and female participants from state and private universities in the area of maturity to

formulate judgments of the disposition towards critical thinking, the results in table 17 show that there is no significant difference, with which the specific hypothesis raised is not accepted, this would be explained taking into account that the area of maturity to formulate judgments refers to the willingness to make reflective judgments when responding to problems, to the ability to ask questions and make decisions, which is a characteristic that every university student must have. This result differs from what was found by Escurra & Delgado (2008) who report statistically significant differences in university students with men achieving higher scores in the area of maturity to formulate judgments.

## Conclusions

- Only statistically significant differences are found in the area of maturity to formulate judgments of the disposition towards critical thinking among students of state and private universities of Metropolitan Lima considering the various professional areas.
- Participants from private universities in the Humanities area score higher in the maturity area to make judgments than their peers from state universities in the area of Humanities and the area of Health Sciences. Similarly, students of state universities in the area of Engineering achieve higher rates than students of private universities in the same professional area.
- No statistically significant difference is found in the disposition towards critical thinking between students of state and private universities of Metropolitan Lima considering the various professional areas.

- There are no statistically significant differences in the areas of truth search, mental amplitude, analytical capacity, systematicity, confidence in reasoning, inquisitiveness among students of state and private universities of Metropolitan Lima considering the various professional areas.
- There is no statistically significant difference in the disposition towards critical thinking between male and female students of state and private universities of Metropolitan Lima.
- There are no statistically significant differences in the areas of truth-seeking, mental amplitude, analytical ability, systematicity, confidence in reasoning, inquisitiveness, maturity to formulate judgments between male and female students of state and private universities of Metropolitan Lima.

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#### References

- [1] Bejarano, M. Galván, F. & López, B. (2014). Pensamiento crítico y motivación hacia el pensamiento crítico en estudiantes de Psicología. *Aletheia*, 6, (2), 202-223. <http://aletheia.cinde.org.co/index.php/ALETHEIA/article/view/218>
- [2] Boisvert, J. (2004). La formación del pensamiento crítico. Fondo de Cultura Económica.
- [3] Çubukcu, Z. (2006). Critical thinking dispositions of the Turkish teacher candidates. *The Turkish Online Journal of Educational Technology*, 5(4), 22-36. <https://files.eric.ed.gov/fulltext/ED501351.pdf>
- [4] Ennis, R. H. (1986). A taxonomy of critical thinking dispositions and abilities. In J. B. Baron y R. J. Sternberg (Eds.). *Teaching thinking skills*. Freeman.
- [5] Ennis, R. H. (2011). The nature of critical thinking: An outline of critical thinking dispositions and abilities. [http://faculty.education.illinois.edu/rhenis/documents/TheNatureofCriticalThinking\\_51711\\_000.pdf](http://faculty.education.illinois.edu/rhenis/documents/TheNatureofCriticalThinking_51711_000.pdf)
- [6] Escurra, M. & Delgado, A. (2008). Relación entre disposición hacia el pensamiento crítico y estilos de pensamiento en alumnos universitarios de Lima metropolitana. *Persona*, (11), 143-175. <https://revistas.ulima.edu.pe/index.php/Persona/article/view/929/878>
- [7] Facione, P. A., Facione N. C. & Giancarlo C. A. (1997). Professional judgement and the disposition toward critical thinking. California Academic Press.
- [8] Facione, P. A., Facione, N. C., Giancarlo, C. A. & Gainen, J. (2000). The disposition toward Critical Thinking: Its Character, Measurement, and Relationship to Critical Skill. *Informal Logic*, 20(1), 61-84. DOI: 10.22329/il.v20i1.2254
- [9] García, I., Graterol, V. & Triviño, A. (2014). Potencialización del pensamiento “ser estratégico” por medio del juego. [Trabajo de licenciatura, Universidad de la Sabana]. <http://intellectum.unisabana.edu.co/handle/10818/11199>
- [10] Gotoh, Y. (2016). Development of critical thinking with metacognitive regulation. 13th International Conference on Cognition and Exploratory Learning in Digital Age (CELEDA 2016). <https://files.eric.ed.gov/fulltext/ED571408.pdf>
- [11] León, F. (2014). Sobre el pensamiento reflexivo, también llamado pensamiento crítico. *Propósitos y Representaciones*, 2(1), 161-214.



- <http://dx.doi.org/10.20511/pyr2014.v2n1.56>
- [12] López, G. (2012). Pensamiento crítico en el aula. *Docencia e Investigación*, (22), 41-60. <https://ruidera.uclm.es/xmlui/bitstream/handle/10578/9053/Pensamiento%20cr%20c3%adtico%20en%20el%20aula.pdf?sequence=1&isAllowed=y>
- [13] Merchán, M. (2012). Cómo desarrollar los procesos del pensamiento crítico mediante la pedagogía de la pregunta. *Actualidades pedagógicas*, 59(1), 119-146. <https://revistas.lasalle.edu.co/index.php/ap/article/view/54/10>
- [14] Murawski, L. M. (2014). Critical Thinking in the Classroom...and Beyond. *Journal of Learning in Higher Education*, 10(1), 25-30. <https://files.eric.ed.gov/fulltext/EJ1143316.pdf>
- [15] Nieto, A. & Valenzuela, J. (2012). A Study of the Internal Structure of Critical Thinking Dispositions. *Inquiry: Critical Thinking Across the Disciplines*, 27(1), 31-38. [https://www.researchgate.net/publication/232252543\\_A\\_Study\\_of\\_the\\_Internal\\_Structure\\_of\\_Critical\\_Thinking\\_Dispositions](https://www.researchgate.net/publication/232252543_A_Study_of_the_Internal_Structure_of_Critical_Thinking_Dispositions)
- [16] Perea, L. (2017). Disposición hacia el Pensamiento Crítico y su relación con el Rendimiento Académico en Estudiantes del curso de Metodología de la Investigación de una Universidad Privada de Lima Metropolitana. [Tesis de maestría, Universidad Peruana Cayetano Heredia]. [http://repositorio.upch.edu.pe/bitstream/handle/upch/945/Disposicion\\_Perea%20Romero%20Lizette.pdf?sequence=3&isAllowed=y](http://repositorio.upch.edu.pe/bitstream/handle/upch/945/Disposicion_Perea%20Romero%20Lizette.pdf?sequence=3&isAllowed=y)
- [17] Pérez, G. (2015). La motivación al pensamiento crítico y la capacidad cognitiva, según la percepción de los estudiantes de la Corporación Universitaria Adventista-UNAC, Medellín: Colombia, 2014. [Tesis de maestría, Universidad Peruana Unión]. <http://repositorio.upeu.edu.pe/handle/UP EU/351>
- [18] Reyes, J., Mellizo, N. & Ortega, A. (2013). Pensamiento crítico y rendimiento académico en contextos educativos rural y urbano. Universidad de Manizales. Facultad de Ciencias Sociales y Humanas. <http://ridum.umanizales.edu.co:8080/xmlui/handle/6789/768>
- [19] Siegel, H. (1990). *Critical Thinking as an Educational Ideal*. Routledge.
- [20] Torres, N. (2011). Influencia de las disposiciones en el desarrollo del pensamiento crítico y el aprendizaje de las Ciencias Naturales. *Educación en Revista*, Curitiba, Brasil [on line], 41, 247-259. [www.scielo.br/pdf/er/n41/16.pdf](http://www.scielo.br/pdf/er/n41/16.pdf)
- [21] UNESCO (1988). Declaración Mundial sobre la Educación Superior en el Siglo XXI: visión y acción. [http://www.unesco.org/education/educpr og/wche/declaration\\_spa.htm](http://www.unesco.org/education/educpr og/wche/declaration_spa.htm)
- [22] Velásquez, M. & Figueroa, H. (2010). Desarrollo del pensamiento crítico en estudiantes de las carreras universitarias de mayor demanda de El Salvador. *Panorama* 6(10), 7-20. <https://dialnet.unirioja.es/descarga/articulo/4780115.pdf>