# Revista Innova Educación

**ORIGINAL ARTICLE**

# Cognitive strategies and level of understanding of academic texts in university entering students - Perú

*Estrategias cognitivas y nivel de comprensión de textos académicos en estudiantes ingresantes en la universidad – Perú*

Estratégias cognitivas e nível de compreensão de textos acadêmicos em estudantes universitários ingressantes - Peru

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**ABSTRACT.** The purpose of contemporary university education is to strengthen the capacities of understanding academic texts of future professionals as autonomous agents who manage their learning. Within this framework, the article aimed to determine the degree of relationship between cognitive strategies and the compression of academic texts in Peruvian university students, in order to have a cognitive profile of those entering the university. The study population consisted of 172 first cycle students. The methodology used was descriptive - correlational cross-sectional. It was concluded, due to the correlation coefficient of Spearman's Rho equal to 0.7929 and the estimated P-value of 0.001 lower than the significance level (0.05), that there is a high positive correlation

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between cognitive strategies and comprehension of the students' academic texts, although this relationship is not decisive.

**PALABRAS CLAVE**

Comprensión de textos, estrategias cognitivas, estrategias didácticas, estudiantes universitarios, textos académicos

**RESUMEN.** Es finalidad de la enseñanza universitaria contemporánea fortalecer las capacidades de comprensión de textos académicos de los futuros profesionales como agentes autónomos que gestionen su aprendizaje. En ese marco, el artículo tuvo por objetivo determinar el grado de relación entre las estrategias cognitivas y la compresión de textos académicos en estudiantes universitarios de Perú, con el propósito de contar con un perfil cognitivo de los ingresantes a la universidad. La población de estudio estuvo conformada por 172 estudiantes del primer ciclo. La metodología empleada fue del tipo descriptivo - correlacional de corte transversal. Se concluyó, en razón del coeficiente de correlación de Rho de Spearman igual a 0.7929 y el P-valor estimado de 0.001 menor al nivel de significancia (0.05), que existe correlación positiva alta entre estrategias cognitivas y compresión de textos académicos de los estudiantes, aunque dicha relación no es decisiva.

**PALAVRAS-CHAVE**

Compreensão de textos, estratégias cognitivas, estratégias de ensino, estudantes universitários, textos académicos

**RESUMO.** O objetivo da formação universitária contemporânea é fortalecer as capacidades de compreensão dos textos acadêmicos dos futuros profissionais como agentes autônomos que gerenciam sua aprendizagem. Nesse contexto, o artigo teve como objetivo determinar o grau de relação entre as estratégias cognitivas e a compressão de textos acadêmicos em estudantes universitários peruanos, a fim de traçar um perfil cognitivo daqueles que ingressam na universidade. A população do estudo foi constituída por 172 alunos do primeiro ciclo. A metodologia utilizada foi descritiva - transversal correlacional. Concluiu-se, devido ao coeficiente de correlação do Rho de Spearman igual a 0,7929 e ao valor P estimado de 0,001 menor que o nível de significância (0,05), que existe uma alta correlação positiva entre as estratégias cognitivas e a compreensão dos textos acadêmicos dos alunos, embora essa relação não seja decisiva.

## 1. INTRODUCTION

Mechanical and automatic learning is no longer functional in knowledge societies, in which Peru seeks a place. "The current scientific and technical development demands highly trained professionals for reading comprehension of texts related to their specialty" (Muñoz et al, 2013, p. 774) so that they can process information. On the other hand, mastery of reading skills and knowledge of theoretical elements for understanding scientific texts is a necessity in the training of all professionals (Muñoz et al, 2013). Understanding academic texts is crucial to solving problems in society in general. In a world in which knowledge is increasing day by day, the independence of university students is necessary for relation to the use of strategies to learn (Klimenko, 2009) and it is imperative to develop self-training capacities, which requires learning strategies that facilitate critical and autonomous learning (Roque et al, 2018).

The knowledge and the process of understanding texts, of the academic type, in university education, are inseparable. Cognitive strategies such as taking notes, underlining, summarizing, drawing outlines and graphs, using concept maps, or using analogy (Sánchez, Pulgar y Ramírez, 2015), are fundamental in university life; however, what is its status of appropriation in those entering the university? Studies like that of Fumero (2009) in Venezuela, visualize that university students present problems of understanding texts, including in discursive and communicative competencies, and specific cognitive processes (Roa, 2014).

According to the report of the Ministerio de Educación (2018), Peru ranked 64th out of 77 countries in the PISA - 2018 results, being below other Latin American countries. At the national level, the Measurement Unit (UMC) of the Ministerio of Educación (2016), reported that only 29.80% of students in the second grade of secondary education reached level 2 (Expected achievement), while the rest either understand the simplest readings

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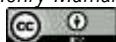
(47.10%) or do not even understand them (23, 10%). At the National University of the Altiplano Puno, students entering the different Secondary Education programs present deficiencies in understanding written texts, according to the report of the Office of Technology and Information Technology - OTI (2019). In Verbal Reasoning, more than 50% did not reach the required average (14). This problem may be directly related to the management of cognitive strategies. In this framework, the study aimed to determine the degree of relationship between cognitive strategies and the compression of written texts in students of the 1st Semester of the Professional School of Secondary Education of the National University of the Altiplano of Puno - Peru.

There are various studies on the problem in Latin America. Maturano, Soliveres y Macías (2002), in their research on university students of the Geography Degree, professors in Physics, Chemistry and Engineering in Argentina, indicate that when students use only some cognitive and metacognitive strategies, they present strategic deficiencies in reading and comprehension and limited comprehension of the text. Sánchez, Pulgar y Ramírez (2015, p. 122), found that new students of Civil Engineering at the Universidad del Bío-Bío - Chile, "have characteristics of machine learning and concrete reasoning, strategic learning, and pre-formal reasoning, and therefore they have a high probability of not achieving academic success ".  Zaragoza (2018), in his study of 70 students of the first cycle of the Faculty of Law of the Inca Garcilaso de la Vega University, concluded that the inclusion or exclusion of learning strategies in the classroom influences the assimilation and understanding of comprehensive reading expository texts.

Regarding the relationship between the variables studied, Riffo y Contreras (2018) found that in political science university students, the higher the level of academic training, the higher the performance in the specialized texts tests, being lower in the first semester students. In the same line, Guerra y Forero (2015), in their experimental study in undergraduate students of Mathematics in Colombia, found that 76% and 86% of the students modified their behavior as a reader of academic texts before, during, and after reading, thanks to the application of cognitive strategies. Fumero (2009) demonstrated in his study in university students of Teaching of the Mother Language of Venezuela, that the applied didactic strategies allowed the consolidation of the levels of inference, evaluation, and appreciation of the text". The understanding of scientific texts involves processes related to the management of cognition and metacognition strategies, as indicated by the studies reviewed by Yana et al (2019): a good percentage of authors of articles and theses reviewed conclude that the good use of cognitive strategies develops reading comprehension skills.

On the other hand, there are studies carried out in Peru that reveal the importance of teaching intervention to develop cognitive strategies that allow them to raise their levels of text comprehension. Descriptive studies of Villegas (2010; 2017) were carried out in 158 business administration students and 167 law students, as well as the experimental studies of  Reyes (2017) in 150 students of basic mathematics and Perez (2017) in 20 Medicine students - Peru, they concluded that the teaching Strategies used appropriately significantly influence the Academic performance. Descriptive studies of Chaiña (2018), carried out in architecture students UNA Puno - Peru, such as the one carried out by Domínguez (2015) in 348 secondary education students (Peru), indicate that the various didactic strategies used by the teacher have a differentiated relationship with the achievement of learning, although teacher motivation is important for this, as demonstrated Espitia (2014) when conducting a study in first-year students of Health and Humanities of the Universidad del Bio-Bio - Chile.

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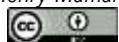
## Cognitive strategies and understanding of academic texts

Didactic strategies, that is, psychic processes or mental activities, become relevant in learning processes. They help the acquisition, retention, understanding, elaboration, transfer, and applicability of the different content and information (Barca-Lozano et al, 2013). Strategies are not mere observable actions, but a sequence of mental operations that allow the reader to organize, decode and encode, integrate, retrieve, elaborate information. They are classified into teaching strategies, instructional strategies, learning strategies, and assessment strategies (Feo, 2015). Those of teaching are those proposed by the teacher to facilitate the processing of certain linguistic forms (Van Dijk, 1992). Learning strategies are mental and cognitive operations (Ferreiro, 2007), that the student uses to process information and learn it meaningfully, following a systematic process (Altamirano, 2006; Yana et al, 2019). These intra / psychological strategies or mechanisms can be classified, in turn, into cognitive strategies, metacognitive strategies, and resource management strategies (Sánchez, Pulgar & Ramírez, 2015).

Cognitive strategies are a set of planned activities or cognitive, affective, motor, or mental mechanisms (Muria, 1994; citado por Klimenko, 2009). They are used for a specific purpose, the comprehension of texts or assimilation of information. They are "a set of procedures that make up action plans that the subject draws up" (Roque et al, 2018, p. 298). These cognitive learning strategies accompanied by a positive general and academic self-concept influence the achievement of good academic performance (Barca-Lozano et al, 2013). " ognitive and metacognitive strategies prepare for a reading, facilitate understanding and reaffirm the knowledge acquired" (Guerra & Forero, 2015, p. 25). They facilitate the transfer of information and the identification of spaces and situations, the synthesis of what is read in graphic organizers as a way of representing and relating knowledge, allows ordering, planning actions, storing, and retrieving information.

In that sense, Klimenko (2009) indicates that the teaching of cognitive strategies, and even metacognitive (Tapia, 2021), is a possibility to improve the processes of learning and comprehension of texts. The most frequently used strategies in the literature are self-planning, self-monitoring, and self-assessment (Castro & Oseda, 2017). These strategies are metacognitive mechanisms or processes that allow the reader to develop activities before, during, and after the session (Berrocal & Ramírez, 2019; Castro & Oseda, 2017). In that line, Solé (1998) indicates that "three cognitive sub-processes called pre-reading, reading and post-reading intervene in the reading process. These cognitive strategies are related to reading or text comprehension processes, according to Solé (1998), They are classified into three phases (Table 1).
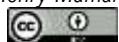
Table 1

*Cognitive reading strategies*

| Phase | Cognitive strategies |
|---|---|
| Before reading | Set reading goals |
| | Activate prior knowledge |
| | Make predictions about the text |
| | Ask questions about the text |
| During the lecture | Shared reading |
| | Independent reading |
| | Determine the meaning of words according to the context |
| | Distinguish relevant information |
| | Deduce and make inferences from explicit information |
| | Make new predictions. |
| After reading | Underline or highlight facts and ideas. |
| | Make annotations in the margin |
| | Identification of the main idea. |
| | Writing of abstracts |
| | Development of information organizers |
| | Formulation of questions and answers to them. |

Source: Solé (1998). Reading Strategy

**Strategies before reading.** The purpose of cognitive processes before reading is to communicate to students what they will discover in the reading process, mobilizing their previous knowledge, asking questions, analyzing the title, etc. (see Table 1), using questions such as what am I going to read for? (Reading objective), what do I know about this text? (prior knowledge) (Solé, 1998), what is this text about? What about its structure? (Trujillo, 2018).

**Strategies during reading.** It is time for individual recognition reading to become familiar with the content of the text (Trujillo, 2018). Reading can also be in pairs or small groups, to then exchange opinions and knowledge, formulate hypotheses, make predictions about the text, clarify doubts, summarize, reread, consult the dictionary and, of course, apply logical thinking to ensure understanding of the text. Solé (1998) indicates that it is time to systematize, work on transversal approaches, values, norms, and decision-making.

**Strategies after reading.** In this part, metacognition aimed at improving reading skills is promoted. It is an opportunity for students to transfer or use what they have learned in new situations, for example, performing tasks, solving summaries, drawing diagrams. The work is intrapsychological, that is, reflective, critical, generalizing, metacognitive, metalinguistic.

A good reader has a repertoire of cognitive strategies and can use them flexibly (Palincsar & Brown, 1997; Maturano, Soliveres & Macías, 2002). These cognitive operations include the recognition of letters and their integration into syllables, the coding of words, syntax, propositions, and thematic integration to build a coherent and integrated model of the text ( De Vega, 1993; Maturano, Soliveres & Macías, 2002).

Understanding is a process of reconstructing meanings by performing mental operations. It is a dynamic process, in which the person who reads establishes coherent connections between the previous knowledge they have in their cognitive structures and the new ones provided by the text, and involves penetrating, conceiving, reaching, discerning, deciphering, decoding; unravel meanings and rebuild them (Muñoz et al, 2013). Reading is an interactive process between the reader and the text, the purpose of which is to apprehend the meaning or message of what is read, capturing relevant ideas and secondary ideas that can support the former, based on the knowledge that is already possessed.

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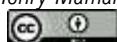
Reading comprehension, being a psychological tool (Gutierrez-Braojos & Salmerón, 2012), it is a process of decoding the linguistic signal and processing it at various levels of the structure of the linguistic code (phonologic, lexical, syntactic, textual) (Riffo & Contreras, 2018). The process of understanding academic texts implies understanding of speeches made with formal, objective, and precise vocabulary; being generally descriptive and argumentative, with a high degree of abstraction and semantic generalization, in which the information is presented in an orderly, hierarchical way and using the intertext (Roa, 2014).

Competence in text comprehension involves three levels (Cerrillo & Yubero, 2003 y Johnson, 1989; quoted by García, 2003). These levels are the degrees of depth and breadth in the assimilation of a written text (Niño, 2003). The process of reading comprehension is developed by levels: literal, inferential, and critical comprehension (Pinzás, 2001).

**Literal understanding.** Called basic understanding, it consists of the recovery of the information explicitly stated in the text (Ministerio de Educación, 2009). The reader decodes the written signs, collects forms and explicit contents of the text, does not deduce any details from the text. It is the first step to access the full understanding of the text; If the student achieves this level, it will be easy for him to develop the next level of understanding: inferential and evaluative or critical (Pinzás, 2001; Tapia, 2005). The questions must be linked to characters, places, time, plot, outcome, as long as it is a narrative text (Pinzás, 2001). The cognitive skills to recover the literal meaning of the text, reading comprehension implies the ability to identify and understand irony, metaphor, and humor, reflect on them, analyze, evaluate, criticize and expand the statements made (Reymer, 2005).

**Inferential understanding.** Also called logical-deductive, it requires more developed cognitive processes, such as the systematization of information and the degree of abstraction. The reader relates his previous experiences and knowledge to the information in the text and infers the implicit information suggested (Cerrillo, Cañamares & Sánchez, 2006). It is a higher level that comprises three hierarchical levels: propositional interpretation, propositional restructuring, and propositional involvement (Rojas, 2017). With this level, the student should approach a global understanding of the meaning of the text (Niño, 2003), unraveling the underlying meanings of the explicitly exposed information, managing to make inferences, and identify main ideas, thanks to the use of cognitive and metacognitive strategies (Rojas, 2017; Mayora, 2013). The reader converts the information into meta-reading (Sacristán, 2005).

**Critical understanding.** For Tapia (2005) critical-evaluative understanding is the highest level of conceptualization, since it supposes having surpassed the previous levels, reaching a degree of mastery of the reader characterized by making personal judgments about the text, assessing the relevance and irrelevance of the same. The evaluative reading is a disposition, an inclination of the person to try to reach the deep meaning of the text, the underlying ideas, the foundations and reasoning, and the implicit ideology, to emit alternative explanations (Zambrano, 2007).

## 2. METHOD AND MATERIALS

### Place of study

The research was carried out at the Professional School of Secondary Education of the Faculty of Education Sciences of the National University of the Altiplano de Puno, located in the Puno region - Peru.

### Data collection type, design, technique, and instrument

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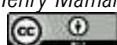
The research corresponds to a quantitative, descriptive approach. The design used was the correlational (Hernández, Fernàndez & Baptista, 2014) cross-sectional, to know the relationship or degree of association that exists between the two variables, after the events and in a single moment. The cognitive strategies variable was measured with the Opinion Survey, an instrument that contains three dimensions: Before reading (6 items), During reading (7 items), and After reading (7 items) with a triple alternative, "Never, Sometimes and Always". For the variable Comprehension of academic texts, the Academic Text Comprehension Test was designed, consisting of twenty (20) questions on the levels of text comprehension (literal, inferential, and critical). The instruments were elaborated from the operationalization of variables by Fredy M. Vilca N. and William W. Mamani A. The validation process, by expert judgment, yielded an average score of 80% for both instruments, placing them in the category Good, with an Alpha Cronbach reliability of 0.76 and 0.72 (Good), respectively.

## Study population

A total of 172 students from the I semester of the four Study Programs of the Professional School of Secondary Education of the National University of the Altiplano participated in the research, enrolled in the academic year 2019 II. According to the methodological scope of (Hernández, Fernàndez y Baptista, 2014), we worked with the entire population (Table 2). The instruments were applied in the classroom during December 2019, with a duration of 60 minutes each.

Table 2
*Study population, students of the I Semester of Education, 2019 - II*

| Study Programs | N ° Students | | |
|---|---|---|---|
| | Males | Females | Sub Total |
| Language, Literature, Psychology and Philosophy | 19 | 29 | 48 |
| Mathematics, Computing and Laboratory | 23 | 15 | 38 |
| Social Sciences | 29 | 21 | 50 |
| Science, technology and environment | 15 | 21 | 36 |
| Total | | | 172 |

Source: Office of Information Technology (OTI) and Academic Coordination

## Data analysis

For the processing and analysis of the data, descriptive statistics were taken into account, considering the scores obtained in the CEPCT (Questionnaire for Survey and Text Comprehension Test). The treatment has followed a schematic view: data collection; creation of a database with the statistical program Excel and SPSS 2, for statistical processing; preparation of percentage distribution tables and graphs; analysis, interpretation, and discussion of the results. For the hypothesis contrast, considering that the Cognitive Strategies variable is qualitative, Spearman's Rho correlation was used, opting for a significance level of 5%. Given a qualitative variable, the normality test was dispensed with.

## 3. RESULTS

### 3.1 Results of the use of cognitive strategies before, during, and after reading

Table 3
*Level of use of cognitive strategies before, during, and after reading*

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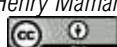
| Use of cognitive strategies Frequency | Before the Read (%) | During the lecture (%) | After reading (%) |
|---|---|---|---|
| Always | 38.00 | 43.20 | 40.80 |
| Sometimes | 51.20 | 48.60 | 50.00 |
| Never | 10.90 | 8.10 | 9.20 |
| Total | 100.00 | 100.00 | 100.00 |

Source: Own elaboration based on data from the opinion survey

Regarding the use of cognitive strategies before reading (establishing objectives, formulating questions, activating previous knowledge, establishing predictions, and formulating hypotheses), according to table 3, only 38.00% of students indicate that they always use them; while the highest percentage is found in *Sometimes* (51.20%) and *Never* (10.90%). Regarding the use of cognitive strategies during reading (actively participate in reading, perform an independent reading, determine the meaning of words, identify relevant information, make inferences), 43.20% of students admit to using them *Always*; while 48.60% indicate *Sometimes*, and 8.10%, *Never*. And on the use of the same strategies after reading (underlining the most outstanding data and ideas, making annotations, identifying the main idea, writing summaries, preparing information organizers, judging the content of a text), 40.80% of students admit to using them *Always*; while 50.00%, *Sometimes* and 9.20%, *Never*.

## 3.2 Comprehension results of academic texts at the literal, inferential, and critical level

Table 4

*Nivel de comprensión de textos académicos por niveles: literal, inferencial y crítico*

| | Scales | Interval | Frequency (n) | Percentage (%) |
|---|---|---|---|---|
| LITERAL LEVEL | In start | [0 - 10] | 6 | 3.50 |
| | In process | [11 - 13] | 82 | 47.70 |
| | Expected accomplishment | [14 - 17] | 80 | 46.50 |
| | Outstanding Achievement | [18 -20] | 4 | 2.30 |
| | Total | | 172 | 100 |
| INFERENTIAL LEVEL | In start | [0 - 10] | 22 | 12.80 |
| | In process | [11 - 13] | 81 | 47.10 |
| | Expected accomplishment | [14 - 17] | 62 | 36.10 |
| | Outstanding Achievement | [18 -20] | 7 | 4.10 |
| | Total | | 172 | 100 |
| CRITICAL LEVEL | In start | [0 - 10] | 4 | 2.33 |
| | In process | [11 - 13] | 97 | 56.40 |
| | Expected accomplishment | [14 - 17] | 65 | 37.79 |
| | Outstanding Achievement | [18 -20] | 6 | 3.49 |
| | Total | | 172 | 100.00 |

Source: Own elaboration based on data from the written test

Regarding literal comprehension, the ability to identify the information that the text explicitly presents (Tapia, 2005), According to Table 4, only 2.30% of students are located on the Outstanding Achievement scale (between 18 and 20 points) followed by 46.50% in Expected Achievement (between 14 and 17 points); while 3.50% of students are on the In Beginning scale (between 0 and 10 points) and 47.70% in In Process (between 11 and 13 points). These results indicate that university students have difficulty capturing elementary data from an academic text, although 38.00% of students indicated that they always use cognitive strategies before reading, and 43.20% and 40.80%, During and After reading, respectively. These data reinforce the research that indicates

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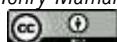
comprehension difficulties at the literal level, and with the public results of the PISA, ENLACE, and CENEVAL tests (Salas, 2012), that place students at a basic level.

Regarding inferential understanding, according to table 4, within the highest scores, only 4.10% of students obtained grades between 18 and 20 points (scale *Outstanding Achievement*) and 36.10%, between 14 and 17 points (scale *Expected accomplishment*); most students obtained grades between 0 and 10 points (scale *in the start*, 12.80%) and marks between 11 and 13 points (scale *in the process*, 47.10%). Regarding the Critical Level, according to Table 4, 2.33% of students obtained a grade between 0 and 10 points, ranking on the scale, ranking on the scale *in start*; 3.49%, between 18 and 20 points (scale *Outstanding Achievement*); 56.40%, between 11 and 13 points (scale *in process*); and 37.79%, between 14 and 17 points (scale *Expected accomplishment*). Studies warn that there are several causes of this situation. According Rodríguez (2018), would be the shortcomings and ignorance of the strategies aimed at promoting reading comprehension.

### 3.3 Degree of association between cognitive strategies and comprehension of academic texts

Table 5
*Level of comprehension of academic texts in university students*

| Scales | Interval | Frequency | Percentage |
|---|---|---|---|
| In start | [0 - 10] | 5 | 2.91 |
| In process | [11 - 13] | 99 | 57.56 |
| Expected accomplishment | [14 - 17] | 66 | 38.37 |
| Outstanding Achievement | [18 -20] | 2 | 1.16 |
| Total | | 172 | 100 |

**Source:** Own elaboration with data from the written text comprehension test

Table 5 presents the level of compression of academic texts of the students of the 1st Semester of the Professional School of Secondary Education of the Faculty of Education Sciences UNA Puno - 2019. As can be seen, taking the highest scores, that only 1.16% obtained grades between 18 and 20 points (*Outstanding Achievement*) and 38.37% grades between 14 and 17, *Expected accomplishment*. The majority of students, 2.91% (marks between 0 and 10 points) and 57.50% (marks between 11 and 13 points), are located on the scales *in start and process*.

Table 6
*Results of Spearman's Rho correlation between cognitive strategies and academic text comprehension*

| | | Cognitive strategies | Academic text compression |
|---|---|---|---|
| Cognitive strategies | Correlación Rho de Spearman | 1 | 0.7929 |
| | Sig. (bilateral) | | 0.001 |
| | N | 172 | 172 |
| Academic text compression | Correlación Rho de Spearman | 0.7929 | 1 |
| | Sig. (bilateral) | 0.001 | |
| | N | 172 | 172 |

**Source:** Results obtained with Stata software

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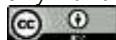
According to Table 6, the estimated Spearman Rho correlation coefficient value is 0.7929. This value corresponds to the high positive correlation, which means that there is a high relationship between cognitive strategies and understanding of academic texts. On the other hand, the P-value (0.001) was lower than the level of significance (0.05), then the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted; Therefore, it is concluded that when students apply cognitive strategies, the level of comprehension of academic texts increases, to a level of 95% confidence.

## 4. DISCUSSIONS

The results on the use of cognitive strategies before, during, and after reading indicate that their use is limited. Although 38.00% of university students 'Before reading', 43.20% 'During reading' and 40.80% 'After reading' reported using cognitive strategies, only 1.16% of the total students reached the level of *Outstanding Achievement* in understanding academic texts. This result may be due, as stated by Yana et al (2019) because students are not aware of the importance of cognitive strategies to develop reading comprehension skills. It follows that having strategies does not always mean efficiency, much less obtaining results according to the planned objectives (Jiménez, 2000), rather, there are other factors that must be analyzed. This first result indicates that this problem is not typical of Peru, but of other countries and areas of university education such as Education in Argentina  (Maturano, Soliveres & Macías, 2002), Civil Engineering in Chile (Sánchez, Pulgar & Ramírez, 2015), Health and Humanities in Chile (Espitia, 2014), Law in Peru (Zaragoza, 2018) and Architecture in Peru (Chaiña, 2018).

Regarding the results of comprehension of academic texts at the literal, inferential, and critical level, the study found that only 2.30% of students reached the scale of *Outstanding Achievement* in understanding academic texts at the literal level; 4.10% in inferential understanding, and 3.49% in critical understanding. These results are similar to those reported internationally by Fumero (2009) in Venezuela, Rodríguez (2018), and De la Puente (2015), in the sense that students do not understand what they read, either due to lack of reading habit or because the reader does not have prior knowledge in relation to the text that is broad and structured enough to produce comprehension (Johnston, 1989). Furthermore, these results confirm the data from PISA, ENLACE and CENEVAL reported by Salas (2012), that students are at a basic level around reading comprehension, that is, they only respond to simple questions and inferences. This reality can improve in later cycles, as they warn Riffo y Contreras (2018) as they advance in their academic training; however, this warrants carrying out studies to understand what factors influence or are related to the low levels of text comprehension from the student's first years of schooling.

This second result allows us to postulate that several factors can make it difficult to understand academic texts and must be addressed by other studies. To the lack of habit and the little previous knowledge, the lack of reading at home can be added (Vilca & Mamani, 2017), decoding deficiencies, poor vocabulary, memory problems, ignorance of comprehension strategies, poor comprehension control (metacognitive strategies), low self-esteem (Espitia, 2014), mastery of language and memory, lack of motivation (Naranjo, 2009; Ramos, 1998), the characteristics of the text (syntax, structure, and organization), the global conception of the world, and social, cultural, and natural life  (Mamani, Huayanca & Yana, 2019; Mamani, 2016), the teaching factor and its

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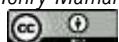
methodology, desire, will, among others. Also consider economic conditions, affective denial, the moral and cultural situation of the country, self-esteem, poor vocabulary, memory problems, teaching mastery of reading strategies.

Regarding the relationship between cognitive strategies and understanding of academic texts, although the normal thing is that, as indicated by Zaragoza (2018) and Fumero (2009), The strategies influence the assimilation and comprehension of texts, the results of this study allow us to infer that cognitive reading strategies do not have a decisive and determining relationship in the comprehension of academic texts in students of the 1st Semester of the Professional School of Secondary Education from the National University of the Altiplano because the value of the estimated Spearman Rho correlation coefficient is 0.7929 = high positive correlation. This result expresses those students use cognitive strategies in reading relatively, such as demanding and academic formalism, since it has been identified that only 38.00%, 43.20%, and 40.80% use these strategies before, during, and after the reading, respectively. These data are similar to those found by Maturano, Soliveres, and Macías (2002), in Argentine students of Chemistry teachers and engineers, who, when using only some cognitive strategies, present limited comprehension of texts. Given this way, the application of strategies does not always guarantee expected results. As he warned Jiménez (2000), you can have a good intellectual capacity and yet not be obtaining an adequate performance, not denying the thesis of Guerra y Forero (2015), those cognitive strategies can improve reading behavior.

The results found a lead to affirm that the exclusive use of cognitive strategies does not guarantee the achievement of the comprehension skills of academic texts. This leads to infer that the development of academic reading comprehension skills is also related to other factors that go beyond the cognitive or methodological or technical, which deserve to be studied. As they indicate Naranjo y Velázquez (2012), Understanding a text not only requires a psychological, linguistic, or cognitive process, there are various factors associated with success in understanding texts. It is possible to quote, the habit, the constancy, and the volitional attitude towards reading. The accompaniment of parents, healthy and nutritious food, early stimulation, mastery of two languages, rest, and good sleep are the factors highlighted by Vilca and Mamani (2017), the habit of reading, reading with the family, and accompanying (Vilca & Mamani, 2020), the role of the family in school life is highlighted by several researchers. In such a way that, a good reader is not necessarily one who has a repertoire of strategies as they claim Maturano, Soliveres y Macías (2002), or that reading comprehension is only a basic process of linguistic decoding to say of Riffo and Contreras (2018), it is much more complex.

 Authors such as Van Dijk (1992) highlight the importance of the connection between the context and the psyche, the relationship between the text and the context, and the life of a man with reality, linguistics with cultures. Van Dijk (1992), Mamani (2016), Mamani, Huayanca, and Yana (2019) they agree that contextual aspects influence text comprehension, although some privilege mental processes more than affective and behavioral components. Understanding implies seeing facts and ideas in a logical sequence to interpret the ideas in the text, but not as phenomena and thoughts isolated from reality  (Naranjo & Velázquez, 2012). It is the appropriate political decisions, the economic conditions, the moral and cultural situation of the country, apart from purely didactic matters, which necessarily influence the achievement of competencies. It is also necessary to consider that the conception of the world, that is, philosophy, thought and logic, allows the reader to take a position concerning the text he reads (Mamani, Huayanca & Yana, 2019). Then, what is stated by Mariátegui (1970; 1928): The
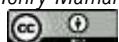
problem of Indian illiteracy turns out to be a problem that goes beyond the restricted framework of a purely pedagogical plan. To understand a text is to create a representation of the situation or world that the text evokes.

## 5. CONCLUSIONS

According to the results obtained, there is a high positive correlation between the cognitive strategies and the comprehension of academic texts of the students of the 1st Semester of the Professional School of Secondary Education of the Faculty of Education Sciences UNA Puno, in 2019. However, students use cognitive strategies before, during, and after reading in a relative way, such as demanding and academic formalism, so they do not have a decisive relationship with the comprehension of academic texts, since very few students manage to achieve the level of outstanding Achievement in Comprehension of academic texts, requiring training in the management of strategies.

The results also allow us to conclude that the exclusive use of cognitive strategies is not enough to achieve high levels of understanding of academic texts. It is not true, as several authors affirm, that success as a reader depends exclusively on a repertoire of cognitive strategies or that reading comprehension is only a basic process of linguistic decoding, this process is more complex. The method, the didactics, and the cognitive are important, as several authors postulate, but not enough; Therefore, it is suggested to carefully study the various social, personal, family, and cultural factors that may be associated with the comprehension of texts. The habit of reading, perseverance, volitional attitude, family action, nutrition, early stimulation, rest and good sleep, the relationship between text and context, thought and logic, philosophy, and the reader's worldview, including politics and economics, can be directly related to the comprehension of texts, considering that understanding is capturing facts and ideas in a logical and contextualized sequence and not as phenomena and thoughts isolated from reality.

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**Rol de los autores / Authors Roles:**
William Mamani: conceptualización, curación de datos, análisis formal, adquisición de fondos, investigación, metodología, administración del proyecto, recursos, software, supervisión, validación, visualización, escritura - preparación del borrador original, escritura - revisar & amp; edición.

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Darssy Carpio: conceptualización, investigación, metodología, administración del proyecto, recursos, software, supervisión, validación, visualización, escritura - preparación del borrador original, escritura - revisar & amp; edición.

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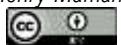
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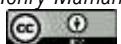
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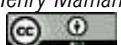
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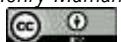
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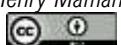
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