




## Assessment of reading comprehension, use of strategies and their relationship with academic and sociodemographic variables in university students

*Evaluación de comprensión lectora, uso de estrategias y su relación con variables académicas y sociodemográficas en estudiantes universitarios*

*Avaliação da compreensão leitora, uso de estratégias e sua relação com variáveis acadêmicas e sociodemográficas em estudantes universitários*


**Jorge Guerra-García<sup>1</sup>**

Universidad Nacional Autónoma de México, Coyoacán - Ciudad de México, México

 <https://orcid.org/0000-0003-1273-5752>  
guerra@unam.mx (correspondencia)


**Abigail Saldívar-Llanos**

Universidad Nacional Autónoma de México, Coyoacán - Ciudad de México, México

 <https://orcid.org/0000-0001-5466-6914>  
saldivar1@unam.mx

**Sarabhi Sandria-López**

Universidad Nacional Autónoma de México, Coyoacán - Ciudad de México, México

 <https://orcid.org/0000-0002-7533-3278>  
sandrial@unam.mx

DOI (Genérico) : <https://doi.org/10.35622/j.rie.2021.02.005>  
DOI (Documento en español) : <https://doi.org/10.35622/j.rie.2021.02.005.es>  
DOI (Document in English) : <https://doi.org/10.35622/j.rie.2021.02.005.en>

Received 18/12/2020/ Accepted 12/03/2021 Published 01/04/2021

### ORIGINAL ARTICLE

### KEYWORDS

Comprensión lectora,  
estrategias lectoras,  
estudiantes  
universitarios,  
evaluación, variables

**ABSTRACT.** This research aimed to identify the levels of reading comprehension, the use of strategies, and the motivation towards reading, and to relate them to different sociodemographic and academic variables, in students of the Biology career of the National Autonomous University of Mexico (UNAM), Campus Iztacala. Fifty-four students participated and were remotely applied the Instrument for Assessing Reading Comprehension in University Students, the Inventory of Metacognitive Strategies and Reading Motivation, and a self-report to measure various academic and socio-demographic variables. The results showed a low level of reading comprehension, given that only 45% of the test was answered correctly; they reported high use of strategies, -those related to reading analysis, identification of information, and motivation towards reading general texts- and only statistically significant relationships were found in reading comprehension and parent's

<sup>1</sup> Psychology Professor at Universidad Nacional Autónoma from Mexico.

académicas, variables sociodemográficas.

schooling ( $F(2-51)= 3,303, p= .045$ ) and also with having to access to text markers [ $t(52)= -2,155, p= .036$ ] and Post it® [ $t(52)= -2,466, p= .17$ ]. It is concluded that these results, although they should be taken with caution, are evidence of comprehension and reading strategies in Biology students.

#### PALABRAS CLAVE

Reading comprehension, reading strategies, university students, evaluation, academic variable, socio-demographic variable.

**RESUMEN.** El objetivo de la presente investigación fue identificar los niveles de comprensión lectora, el uso de estrategias y la motivación hacia la lectura, y relacionarlos con diferentes variables sociodemográficas y académicas, en estudiantes de la carrera de Biología, de la Universidad Nacional Autónoma de México (Campus Iztacala). Participaron 54 alumnos a quienes se les aplicó, por vía remota, el Instrumento para evaluar la comprensión lectora en alumnos universitarios, el Inventario de estrategias metacognitivas y motivación hacia la lectura y un autorreporte para medir diversas variables académicas y sociodemográficas. Los resultados mostraron un bajo nivel de comprensión lectora, dado que respondieron de forma correcta sólo un 45% de la prueba; reportaron un uso alto de estrategias, –las relacionadas con análisis de la lectura, identificación de la información y motivación hacia la lectura de textos generales–, y solo se encontraron relaciones estadísticamente significativas en comprensión lectora y escolaridad del padre ( $F(2-51)= 3.303, p= .045$ ) y, también, con tener acceso a marcatextos [ $t(52)= -2.155, p=.036$ ] y notas adhesivas [ $t(52)= -2.466, p=0.17$ ]. Se concluye que estos resultados, aunque deben ser tomados con prudencia, son evidencia de la comprensión y estrategias lectoras en estudiantes de Biología.

#### PALAVRAS-CHAVE

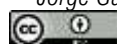
Compreensão em leitura, estratégias de leitura, estudantes universitários, avaliação, variáveis acadêmicas, variáveis sociodemográficas.

**RESUMO.** O objetivo desta pesquisa foi identificar os níveis de compreensão leitora, o uso de estratégias e a motivação para a leitura, e relacioná-los a diferentes variáveis sociodemográficas e acadêmicas, em alunos da carreira de Biologia, da Universidade Nacional Autónoma do México (Iztacala Campus). Os participantes foram 54 alunos que aplicaram remotamente o Instrumento para avaliação da compreensão leitora em universitários, o Inventario de estratégias metacognitivas e motivação para a leitura e um autorrelato para mensurar diversas variáveis acadêmicas e sociodemográficas. Os resultados mostraram baixo nível de compreensão leitora, visto que apenas 45% dos testes acertaram; relataram alto uso de estratégias –aquelas relacionadas à análise de leitura, identificação de informações e motivação para a leitura de textos gerais–, e apenas relações estatisticamente significativas foram encontradas na compreensão de leitura e escolaridade do pai ( $F(2-51) = 3,303, p = 0,045$ ) e, também, com acesso a marcações [ $t(52) = -2,155, p = 0,036$ ] e notas adesivas [ $t(52) = -2,466, p = 0,17$ ]. Conclui-se que esses resultados, embora devam ser vistos com cautela, evidenciam a compreensão e as estratégias de leitura em estudantes de Biologia.

## 1. INTRODUCTION

In the field of reading in general, it has been evidenced that reading has several positive effects on readers; for example, improves writing and critical thinking, maintains psychological health in times of war, provides survival advantages, among others (Avni & Becca, 2016; Flores, 2016; Omat, 2018).

In the last decades, many universities (Facultad de Estudios Superiores Iztacala, Psychology and Biology; Universidad de la Laguna, Medicine; Universidad de Guadalajara, Biology) include in the entrance profiles of their students' aspects related to reading and reading comprehension; for example, skills related to analysis, synthesis, identification of relevant information, abstraction of concepts, etcetera. Which requires that the student enters the university with skills to carry out an active and constructive process of interpreting the meaning of a text, generating the expansion of knowledge that facilitates interaction in different scenarios, giving rise to the implementation of a meaning of words, phrases, paragraphs, and ideas that can be contrasted with previous



knowledge (Cortes, Daza & Castañeda, 2019; López, 2009; Ramos, 2006; Regueyra & Arguello, 2018; Sánchez, 2012).

In literature there are various ways of defining what reading comprehension is, emphasizing different aspects. For example, for the PLANEA test design committee, reading comprehension is understood as “the ability of an individual to analyze, understand, interpret, reflect, evaluate and use written texts ..., in order to develop competence communicative and build new knowledge...” (PLANEA MS, 2016, p. 19). Here the purpose of understanding is weighed. Instead, Pérez (2005) emphasizes the role of the reader in the process of reading comprehension, since for him, involves an interaction of the text with the reader using different strategies. In this way, highlights two situations: the impact of the text on the reader, and the use of different ways of approaching the text, known as reading comprehension strategies. In addition, for this author the understanding is shown in five levels. The literal is identified when the reader can recognize and remember the main ideas of the text read; the reorganization of information when it is able to rearrange the author's ideas through processes of classification or synthesis; the inferential when it adds elements or ideas that are not in the text but can be deduced from it; the critic when assessing the content of the text and can communicate its interpretation based on previous knowledge of the subject and, finally, the appreciative when it can express comments on the text and its content, or directly on the author in relation to his or her style, language, etcetera.

In contrast to the definitions of reading comprehension that emphasize a different aspect, those of reading comprehension strategies have many similarities to each other. For example, Peña (2000) defines them as the set of actions that the reader uses and that regulate their reading, allowing him to select, evaluate or abandon such actions, depending on whether to achieve understanding. Similarly, Latorre and Seco (2013) understand them as a "finite set of not strictly sequenced actions that involve a certain degree of freedom and whose execution does not guarantee the achievement of an optimal result" (p. 15). That is to say, they are those activities that people carry out according to the requirements of a certain objective, although sometimes they do not achieve it; in this case, the comprehension of the text.

The study of reading comprehension and the strategies used in reading have been documented in the university context. As is well known, students entering higher education begin to have greater contact with scientific texts, characterised by their technical language, length, thematic specificity, intertextuality, and conceptual density; examples of these are theses, book chapters and technical reports. These documents require a high level of abstraction on the part of the reader, where they must reason, describe and explain the information through logical and coherent arguments, allowing them to develop skills and strategies to acquire, infer, encode, store, retrieve and represent the information read (Gallardo & López, 2019; Vidal-MoscOSO & Manríquez-López, 2016).

Various studies show that students at this level of education have some deficiencies in these skills and, therefore, in the comprehension of academic texts. Guerra and Guevara (2017), in their evaluation of reading comprehension in psychology students, based on a test designed by them, found that they had a low performance; they described it this way, because they answered correctly only 66% of the items of the test applied. Particularly low levels of comprehension were at the literal, inferential and critical levels. Also, Portilla, Ramírez and González (2018) evaluated reading comprehension in new students entering higher education in the subject of basic chemistry. They used a CLOZE test, which categorized students into three levels of

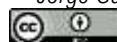
performance in understanding: independent, dependent, or instructional, and deficit or also called frustration. The authors report that about 20% of the sample were placed in the latter level, describing that learners exhibit "serious difficulties" (p. 8) in understanding a text and therefore require pedagogical support; while about 80% were placed in the dependent level, which implied that "there may be a rough overall understanding, but details are missed that are either not understood or easily forgotten" (p. 8).

In relation to reading comprehension strategies in university students, there is evidence that students use them frequently and differently depending on the degree course they are studying, except for those associated with reading analysis, which seem to be used very frequently by the majority of students, regardless of the degree course they are studying. Guerra, Guevara, Rugerio and Hermosillo (2018) evaluated the use of strategies through the Inventory of Metacognitive Strategies and Motivation towards Reading (IEMML) in students of various careers in the Health area. They found that the only strategies, catalogued at a high level of frequency, that most of the students mentioned using in all the studied careers were those related to the analysis of reading, the others were located at a medium level of use. The strategies of identifying information or ideas obtained a medium level in the distance learning courses of Dentistry, Optometry and Psychology; the same medium level was identified in the strategies related to consulting additional sources in Optometry and face-to-face Psychology. The strategies linked to motivation towards reading texts in general also obtained an average level among students in the careers of Dentistry, Optometry and Nursing, as well as motivation towards reading academic texts in Dentistry and Optometry. The students of Medicine were those who reported to make more searches in additional sources, those of Psychology expressed more motivation towards the reading of texts in general and those of Biology evidenced higher levels of reading analysis strategies. In summary, the five types of strategies assessed by the IEMML are distributed differently among students according to the degree course they are studying.

On the other hand, research has also been carried out to relate reading comprehension and the strategies used by university students to various academic and socio-demographic variables. The evidence shows that there are significant differences between a high assessment in reading comprehension and those students who (a) are only engaged in their professional studies; (b) have scholarship; and (c) have a high academic average (9 or 10 on a scale of 0 to 10). It has also been found that the strategies are used more among (a) the higher the student's GPA (9 or 10); (b) males more than females; (c) the greater the time spent reading, measured by the hours per week the student spends reading academic texts; and (d) those students whose mothers attended university (Guerra & Guevara, 2017; Guerra, Guevara & Rugerio, 2019; Guerra et al. 2018).

Based on the results of the different research studies on the subject, the following hypotheses were proposed:

- H1: The overall reading comprehension test score will fluctuate between 60% and 70% correct answers, in the sample studied.
- H2: The strategies related to reading analysis will be those that the students of the sample report as the most frequently used.
- H3: There will be differences in reading comprehension test scores and in some socio-demographic and academic variables.



H4: There will be differences in reading comprehension strategies test scores and in some socio-demographic and academic variables.

The objective of this study is to identify the levels of reading comprehension, the use of reading strategies and reading motivation, and to compare them with different sociodemographic and academic variables in Biology students at a public university.

## 2. METHOD

### 2.1 Participants

The study was a descriptive-transversal-not experimental quantitative study, the study involved 54 second semester students of Biology from a public university, they were contacted through their professors of theoretical subjects; from the morning and afternoon shifts. Their ages ranged between 18 and 25 years; 59.30% were women and the remaining 40.70% were men.

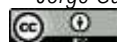
### 2.2 Variables and Instruments

2.2.1. Reading comprehension. It was measured through the Instrument to Assess Reading Comprehension in University Students (ICLAU), developed and validated by Guerra and Guevara (2013). This instrument is made up of: 1) a text called *La evolución y su historia*, taken from Cela and Ayala (2001), which is a narrative of 965 words containing an average of seven central concepts; 2) a test of seven items aimed at investigating the comprehension levels shown by the students, two evaluate the level of literal comprehension, one the level of reorganization of information, two the level of inference, one the critical level and another the level of appreciation. Most of the items are evaluated by means of rubrics.

2.2.2. Reading comprehension strategies. They were measured by means of the Inventory of Metacognitive Strategies and Motivation towards Reading (IEMML), designed and validated by Guerra, Guevara and Robles (2014) to evaluate, by means of a five-point Likert-type scale, the reading comprehension strategies that the student carries out when reading. It consists of 27 items grouped into five factors: 1) reading analysis strategies, 2) strategies for identifying information or ideas, 3) strategies for consulting additional or external sources, 4) intrinsic motivation for reading in general, and 5) intrinsic motivation for reading academic texts.

2.2.3. Sociodemographic and academic data. A self-report form was used to identify students' gender, age, marital status, whether they had a paid job, number of hours worked per month, shift in which they studied (morning or afternoon), time invested weekly in reading academic texts, academic average, having taken extraordinary exams, having or not having an academic scholarship, having access to bookmarks, sticky notes and body position during reading.

### 2.3. Context of test application



Due to the impossibility of applying the instruments in person because of the COVID-19 pandemic, the students had access to an electronic address, during a period of 20 days, to answer the different instruments, in a Google form.

#### *2.4. Procedure*

The application of the instruments was divided into two phases:

Phase 1. Contact and sending of the form.

The students were contacted through the teachers in charge of some theoretical subjects corresponding to the second semester. They were sent by e-mail a brief explanation of the project, a letter requesting support and an informed consent form to be answered by their students. This activity was carried out over a period of one week.

Phase 2. Application of the instruments.

Once they agreed to participate, they were sent the link to the Google form with the respective instructions and were told that they had twenty days to answer it. This application was done individually and lasted approximately 45 minutes.

#### *2.5. Data analysis*

The data obtained were automatically stored by the Google Forms program. The various instruments were rated by the researchers who considered the criteria defined for each instrument and, based on this, reached an agreement on the ratings recorded. A database was created in the Excel statistical program and subsequently exported to the SPSS program (version 22.0). The Kolmogorov-Smirnov normality test (for samples larger than 50 participants), Student's t test (for dichotomous variables), one-factor ANOVA (for polynomial variables) and post hoc tests were applied.

### **3. RESULTS**

The results are presented in three sections. First, the scores obtained from the ICLAU are shown; second, from the IEMML; and third, comparisons between the scores of the previous tests and the sociodemographic and academic variables.

#### *3.1. ICLAU scores*

Application of the Kolmogorov-Smirnov test indicated that the variable is normally distributed in the sample (113,  $gI = 54$ ,  $p = .085$ ). In relation to identifying reading comprehension levels in the sample, Figure 1 shows the results obtained.

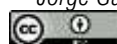
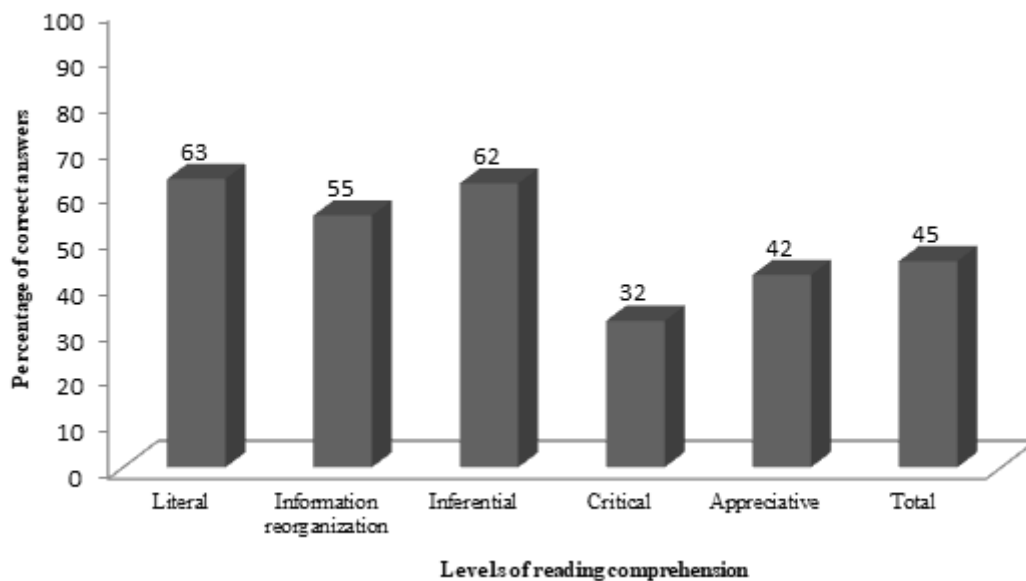


Figure 1. Shows the percentages of correct answers in the different levels of comprehension.



As can be seen, considering all the items to evaluate the five levels of comprehension, the total score of the test yielded 45% correct answers. The highest levels did not exceed 63% and the lowest levels ranged from 32% to 62% correct answers.

It should be noted that the maximum ICLAU score is 25 points and that the mean obtained by the sample of students was 11.20 points.

### 3.2. IEMML scores

Application of the Kolmogorov-Smirnov test indicated that the variable is normally distributed in the sample (.071,  $g= 54$ ,  $p= .200$ ).

With respect to the identification of the comprehension and reading motivation strategies mentioned by the students, Figure 2 shows the results.

As can be noted, the overall percentage of IEMML was 71% of strategies they reported using, which fluctuated in a very narrow range from 68% to 72%; the highest were those related to motivation toward reading texts in general, identifying information, and analyzing reading.

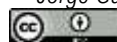
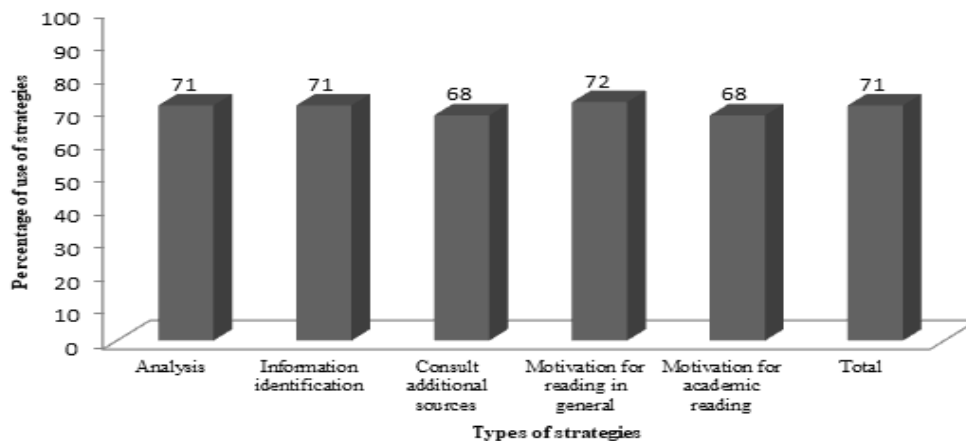


Figure 2. Shows the percentages in the use of the different types of strategies, and globally.



It is important to note that the maximum IEMML score is 135 points, and that the mean obtained by the sample of students was 96.04 points.

### 3.3. Relationship between ICLAU scores, IEMML and sociodemographic-academic variables

To relate the total scores of ICLAU, IEMML and the different sociodemographic and academic variables, different statistical analyses were performed.

With respect to the ICLAU, through a one-factor ANOVA, statistically significant differences were found ( $F(2-51)=3.303$ ,  $p=.045$ ) with the variable father's schooling (See Table 1). In order to know in favor of which category of studies, post hoc comparisons were made, obtaining that students who reported that their parents had studied at university had a higher mean ( $M=14.71$ ) than those who had only completed high school ( $M=10.71$ ).

Table 1. ANOVA results for ICLAU and father's schooling variable.

	F	gl 1	gl 2	post hoc	Comparisons	p
Schooling	3.303	2	51	Bonferroni	Bachelor's Degree	$M=14.71$ $DE=3.72$
					High School	$M=10.71$ $DE=3.95$

Note: \*  $p < 0.05$

Source: Own elaboration

Considering the total ICLAU score, differences were also found in a second and third variable using a t-test for independent samples.



Statistically significant differences ( $t(52) = -2.155, p = .036$ ) were found in the ICLAU total scores of those students who reported having easy access to text markers when reading ( $M = 12.23$ ), in contrast to those who reported not having access ( $M = 9.92$ ). Significant differences ( $t(52) = -2.466, p = 0.017$ ) were also found with students who reported having access to Post it® or sticky notes ( $M = 12.77$ ) compared to those who did not have access ( $M = 10.13$ ) (See Table 2).

The respective statistical analyses were also performed on the IEMML total score and the various sociodemographic and academic variables, but no statistically significant differences were found in any of them.

Table 2. Results of the t Student test on the variables of access to text markers and Post it®.

Variable	<i>t</i>	<i>gl</i>	<i>M</i>	<i>p</i>
Access to text markers	-2.155	52	12.23	.036*
No access to text markers			9.92	
Access to Post it® or sticky notes	-2.466	52	12.77	0.017*
No access to a Post it® or sticky notes			10.13	

Note: \*  $p < 0.05$   
Source: Own elaboration

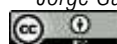
#### 4. DISCUSSION

This research found, in the sample studied, a low level of reading comprehension, a medium use of reading strategies, and significant relationships between the student's comprehension level and the variables having access to text markers and sticky notes, and the father's schooling.

It was assumed that the overall reading comprehension test score would fluctuate between 60% and 70% of correct answers; however, the score found was 45%, which indicates a major problem in the students related to the acquisition of knowledge of their future profession.

Different studies that have measured reading comprehension in different ways in university populations show heterogeneous results; while some indicate higher percentages of performance than those found in other studies (Esquivel, Martínez, Córdova & Gutiérrez, 2016; Fajardo, Hernández & González, 2012; Guerra, 2014; Guevara, Guerra, Delgado & Flores, 2014; Portilla et al., 2018), otros muestran lo contrario (Calderón-Ibáñez & Quijano-Peñuela, 2010; Durango, 2017; Gordillo & Flórez, 2009; Neira, Reyes & Rifo, 2014).

Among the main reasons for the above, it can be inferred that the instruments used for the evaluation are of a different nature; while some authors use the CLOZE test, others develop their own, adapted to their sample, with



specific items at different levels of comprehension, and evaluated based on multiple-choice answers or rubrics. It is also possible that the area of knowledge, the course of study and the degree of academic progress of the students evaluated may have an influence. Another possibility would be a combination of the above factors: type of instrument used, area of knowledge, career of study and degree of advancement of the student.

The hypothesis indicating that strategies related to reading analysis would be the most frequently used by the sample studied was confirmed; however, so were those related to motivation towards reading texts in general along with those of information identification. These results are congruent with those found by Guerra et al. (2018) in the study in which they evaluated comprehension strategies in different careers. Biology students had a mean score for the strategies very similar to that found in this research; also, a high level in the others.

The hypothesis of differences in reading comprehension test scores and in some sociodemographic and academic variables was confirmed in relation to only three variables: father's schooling, access to textbook markers and sticky notes for making comments.

There is precedent that advanced parental schooling has been significantly related to pre-reading skills (Andrés, Urquijo, Navarro & García-Sedeño, 2010), reading comprehension (Rodríguez, 2017), academic achievement (Bazán, Castellanos & Fajardo, 2020; Casassus, Cusato, Froemel & Palafox, 2000) and intellectual aptitudes (Bazán, Castellanos & Fajardo, 2020), in research with preschool and elementary school students. In this research, the fact that the relationship between reading comprehension and the father's schooling was significant could be conceived as a lasting effect over time and, in addition, as a variable associated with the performance of various behaviors, mediated by cultural and contextual factors, in the family environment that have contributed to comprehension, such as having access at home to books, computer, Internet service (understood as a learning opportunity), or consolidated reading habits (Jiménez-Pérez, Martínez-León & Cuadros-Muñoz, 2020), among others.

On the other hand, access to bookmarks during reading can be recognized as a tool for underlining or highlighting words and, in this way, making sure to identify the main ideas or finding the information required to achieve some objective during reading, which are types of strategies in the category of information identification, which resulted in a high percentage of use.

Likewise, the sticky notes can be conceived as another useful material available to the student to carry out some reading analysis strategies -which also had a high percentage of use- such as writing, in their own words, the central ideas, their own conclusions or some reflections of the text read.

Finally, there was no confirmation of the hypothesis that mentioned differences in the scores obtained in the reading comprehension strategies test and in some sociodemographic and academic variables. The same occurred in the study by Guerra et al. (2018) where they found no significant differences, with the exception of the mother's schooling variable in favor of those who had university studies, in contrast to those who had attended secondary or high school. In this research we are reporting, we did not perform the respective statistical analyses on this variable, because there were not enough cases to make comparisons between the different groups (primary, secondary, etc.).

It can be said that the results reported in this research, in general, are similar to others in terms of the evaluation of the strategies and their relationship with academic and sociodemographic variables, and different with respect to the percentages of correct answers in reading comprehension.

It is necessary to point out some limitations of the present study. It should be emphasized that the results obtained are valid only for the sample studied, because it was obtained intentionally, therefore, they cannot be generalized.

In the case of this research, one factor that may have contributed to the low level of reading comprehension was the fact that second semester students may have been under academic stress. The application of the various instruments was in the first two weeks of April 2020, just after the beginning of the COVID-19 pandemic. Students were going through a period of uncertainty in relation to (a) their studies; (b) the frequent information about the course of the pandemic and the new rules implemented -social distancing, use of masks, etc.- and (c) the new family practices -meticulous storage of supplies and consumer goods, forced confinement at home, etc.- resulting in generalized stress (Gonzalez, 2020). Specifically, in their studies, they were not sure how the classes would continue to be taught, whether face-to-face, blended or distance learning. This insecurity makes students more vulnerable to academic stress, especially those who are beginning their university studies, due to their initial process of adaptation to the institution, its regulations, classmates, professors, and teaching-learning processes (Pulido et al. 2011).

Therefore, it would be valuable to replicate this study in different contextual conditions, and with a broad and random sample of the population to maximize external validity.

In spite of the evidence found and compared with previous studies, more research is needed to describe comprehension levels, reading strategies and the possible relationship with academic and social variables in different populations -careers- of university students, in order to find similarities or differences.

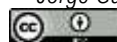
In the design of future studies, in addition to considering the limitations described above, the possibility of expanding the investigation of the tools that students use when reading, and that help them to effectively carry out the different comprehension strategies, should be considered.

## 5. CONCLUSIONS

Some conclusions derived from this study can be pointed out.

Regarding the objective of evaluating reading comprehension in Biology students, we found a low level of 45%, although the evidence reported by several investigations shows an average percentage between 60% and 70% in university students, in general. This result, together with the fact that the critical and appreciative levels were the lowest, may suggest that it is important to consider the area of knowledge, the course of study and the student's degree of advancement as factors that could mediate the evaluated variable.

In relation to the objective of comparing reading comprehension and some sociodemographic variables, it should be noted that the educational background of parents confirms their impact on the cognitive skills and abilities of



their children. This fact, along with some others, is an indicator for teachers at any educational level to predict with a certain degree of confidence their students' achievement in reading comprehension. They can also encourage the use of text marks to underline the main ideas of a text, as well as the habit of making notes in the text or in a notebook to help them clarify their reading.

Finally, this study contributes to the description of the variables reading comprehension and uses of reading strategies in a university population, particularly with students of Biology, for which there is little or no evidence, as well as the role that various academic and sociodemographic elements have on these variables.

## REFERENCES

### **Agradecimientos / Acknowledgments:**

Expresamos el agradecimiento a los docentes de la Facultad de Psicología de la Unidad de Ciencias Biológicas, Químicas y de la Salud de la Universidad Nacional Autónoma de México.

### **Conflicto de intereses / Competing interests:**

Los autores declaran que no incurrir en conflictos de intereses.

### **Rol de los autores / Authors Roles:**

Jorge Guerra: 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 & edición.

Abigail Saldivar: conceptualización, análisis formal, investigación, metodología, administración del proyecto, recursos, software, supervisión, validación, visualización, escritura - preparación del borrador original, escritura - revisar & edición.

Sarabhi Sandría: conceptualización, investigación, metodología, administración del proyecto, recursos, software, supervisión, validación, visualización, escritura - preparación del borrador original, escritura - revisar & edición.

### **Fuentes de financiamiento / Funding:**

Los autores declaran que no recibieron un fondo específico para esta investigación.

### **Aspectos éticos / legales; Ethics / legals:**

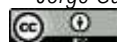
Los autores declaran no haber incurrido en aspectos antiéticos, ni haber omitido aspectos legales en la realización de la investigación.

Andrés, M. L., Urquijo, S., Navarro, J. I., & García-Sedeño, M. (2010). Contexto alfabetizador familiar: relaciones con la adquisición de habilidades prelectoras y desempeño lector. *European Journal of Education and Psychology*, 3(1), 129. <https://doi.org/10.30552/ejep.v3i1.38>

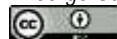
Bavishi, A., Slade, M. D., & Levy, B. R. (2016). A chapter a day: Association of book reading with longevity. *Social Science and Medicine*, 164, 44–48. <https://doi.org/10.1016/j.socscimed.2016.07.014>

Bazán, A., Castellanos, D., & Fajardo, V. (2020). Family variables, intellectual aptitudes, and Mexican students' reading achievement. *Electronical Journal of Research in Educational Psychology*, 18(3), 375–398. (PDF) Family variables, intellectual aptitudes, and Mexican students' reading achievement (researchgate.net)

Cassasus, J., Cusato, S., Froemel, J., & Palafox, J. (2000). Primer estudio internacional comparativo sobre lenguaje, matemáticas y factores asociados, para alumnos del tercer y cuarto grado de la educación básica. Segundo informe. Santiago de Chile: Laboratorio Latinoamericano de Evaluación de la Calidad de la Educación.



- Cela, C., & Ayala, F. (2001). Senderos de la evolución humana. Madrid: Alianza.
- Centro Nacional de Evaluación para la Educación Superior, A.C. (2016). Manual para usuarios. Plan nacional para las evaluaciones de los aprendizajes en el nivel medio superior.
- Cortes, J., Daza, J., & Castañeda, J. (2019). Relación del entorno socioeconómico con el desempeño de la comprensión lectora en universitarios. *Revista de la Facultad de Ciencias Económicas y Sociales*, 25(4), 119-133. <https://doi.org/10.31876/rcs.v25i4.30521>
- Durango, Z. (2017). Niveles de comprensión lectora en los estudiantes de la Corporación Universitaria Rafael Núñez (Cartagena de Indias). *Revista Virtual Universidad Católica del Norte*, 51, 156-174.
- Esquivel, I., Martínez, W., Córdoba, R., & Reyes, C. (2016). Working memory and reading comprehension: Measurement through reading span test and cloze type test for high school and university levels. *Apertura*, 8(2), 38-53. <https://doi.org/10.32870/Ap.v8n2.919>
- Fajardo, A., Hernández, J., & González, Á. (2012). Acceso léxico y comprensión lectora: un estudio con jóvenes universitarios. *Revista Electrónica de Investigación Educativa*, 14(2), 25-33.
- Flores, D. (2016). The importance and impact of reading, writing and critical thinking in higher education. *Zona Próxima*, 24, 128-135. <https://doi.org/10.14482/zp.24.8727>
- Gallardo, V., & López, E. (2019). Conocimiento y uso de estrategias de comprensión lectora en estudiantes de psicología. *Revista Electrónica de Psicología Iztacala*, 22(2), 2066-2086.
- González, L. (2020). Estrés académico en estudiantes universitarios asociado a la pandemia por COVID-19. *Espacio I+D, Innovación más Desarrollo*, 9(25), 158-179. <https://doi.org/10.31644/IMASD.25.2020.a10>
- Gordillo, A., & Flores, M. del P. (2009). Los niveles de comprensión lectora: hacia una enunciación investigativa y reflexiva para mejorar la comprensión lectora en estudiantes universitarios. *Actualidades Pedagógicas*, 53, 95-107. <https://ciencia.lasalle.edu.co/ap/vol1/iss53/8/>
- Guerra, E., & Forero, C. (2015). Strategies for the development of academic text comprehension. *Zona Próxima*, 22, 33-55. <https://doi.org/10.14482/zp.22.6151>
- Guerra, J. (2014). Competencias genéricas en estudiantes de educación superior: el caso de la comprensión lectora. Tesis inédita de doctorado en Psicología. México: Universidad Nacional Autónoma de México.
- Guerra, J., & Guevara, Y. (2013). Validación de un instrumento para medir comprensión lectora en alumnos universitarios mexicanos. *Enseñanza e Investigación en Psicología*, 18(2), 277-291. <http://www.redalyc.org/articulo.oa?id=29228336005>
- Guerra, J., & Guevara, Y. (2017). Variables académicas, comprensión lectora, estrategias y motivación en estudiantes Universitarios. *Revista Electrónica de Investigación Educativa*, 19(2), 78. <https://doi.org/10.24320/redie.2017.19.2.1125>
- Guerra, J., Guevara, Y., & Robles, S. (2014). Validation of inventory of metacognitive strategies and motivation for reading (IEMML) in college students of psychology. *Psicogente*, 17(31), 17-32. <https://doi.org/10.17081/psico.17.31.419>
- Guerra, J., Guevara, Y., & Rugerio, J. P. (2019). Aportaciones a la descripción del estudiantado de la Facultad de Estudios Superiores Iztacala. *Revista Electrónica de Psicología Iztacala*, 22(3), 2574-2600.



- Guerra, J., Guevara, Y., Rugerio, J. P., & Hermsillo, Á. (2018). Estrategias lectoras y motivación hacia la lectura en universitarios. *Revista Mexicana de Investigación en Psicología*, 10(1), 17–29. <http://revistamexicanadeinvestigacionenpsicologia.com/index.php/RMIP/article/view/318/189>
- Guerra, J., Guevara, Y., López, A., & Rugerio, J. P. (2014). Identificación de las estrategias y motivación hacia la lectura, en estudiantes universitarios mexicanos. CPU-e, *Revista de Investigación Educativa*, 19, 254-277. <https://doi.org/10.25009/cpue.v0i19.972>
- Guevara, Y., Guerra, J., Delgado, U., & Flores, C. (2014). Evaluación de distintos niveles de comprensión lectora en estudiantes mexicanos de psicología. *Acta Colombiana de Psicología*, 113-121. <https://doi.org/10.14718/ACP.2014.17.2.12>
- Jiménez-Pérez, E., Martínez-León, N., & Cuadros-Muñoz, R. (2020). La influencia materna en la inteligencia emocional y la competencia lectora de sus hijos. *Ocnos. Revista de Estudios sobre lectura*, 19(1), 80-89. [https://doi.org/10.18239/ocnos\\_2020.19.1.2187](https://doi.org/10.18239/ocnos_2020.19.1.2187)
- Latorre, M., & Seco, C. J. (2013). Introducción: definición de conceptos. En *Estrategias y técnicas metodológicas*. Universidad Marcelino Champagnat.
- López, J. A. (2009). Evolución histórica del concepto de comprensión lectora. Innovación y experiencias educativas. 16, 1-20. Microsoft Word - JOSE ANTONIO\_LOPEZ\_2.doc (csif.es)
- Neira, A., Reyes, F., & Riffo, B. (2014). Experiencia académica y estrategias de comprensión lectora en estudiantes universitarios de primer año. *Literatura y Lingüística*, 31, 221 – 244.
- Ornat, N. (2018). Reading for you life: The impact of reading and writing during the siege of Sarajevo. *Open Information Science*, 2(1), 44-58. <https://doi.org/10.1515/opis-2018-0004>
- Peña, G. (2000). Las estrategias de lectura: su utilización en el aula. *Educere*, 4(11), 159-163.
- Pérez, M. (2005). Evaluación de la comprensión lectora: Dificultades y limitaciones. *Revista de Educación, Número Extraordinario*, 121-138.
- Portilla, M., Ramírez, J., & González, M. (2018). Evaluación de la comprensión lectora en química, de los estudiantes universitarios de nuevo ingreso. *ANFEI Digital*, 8, 1-11.
- Pulido, M. A., Serrano, M. L., Valdés, E., Chávez, M. T., Hidalgo, P., & Vera, F. (2011). Estrés académico en estudiantes universitarios. *Psicología y Salud*, 21(1), 31-37.
- Ramos, C. (2006). Elaboración de un instrumento para medir comprensión lectora en niños de octavo año básico. *Onomázein - Revista de Lingüística, Filología y Traducción*, 2(14), 197–210.
- Regueyra, M. G., & Arguello, S. (2018). Superando mitos sobre la comprensión lectora en la población estudiantil universitaria. *Káñina*, 42(1), 33-49. <https://doi.org/10.15517/rk.v42i1.32941>
- Rodríguez, R. (2017). El nivel de comprensión lectora y de representación mental en estudiantes de sexto grado. *Scientific International Journal*, 14(1), 5-20.
- Sánchez, E. L. (2012). La comprensión lectora en el currículo universitario. *Diá-Logos*, 9, 21–36. <http://rd.udb.edu.sv:8080/jspui/handle/11715/444>
- Vidal-Moscoso, D., & Manríquez-López, L. (2016). El docente como mediador de la comprensión lectora en universitarios. *Revista de la Educación Superior*, 45(1), 95-118.

