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Artículos Científicos

Brecha digital, idioma inglés y su vínculo con la comprensión lectora en español

Digital Divide, English Language and Their Link with Spanish Reading Comprehension

Divisão digital, idioma inglês e seu vínculo com a compreensão de leitura em espanhol

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Resumen

Para toda universidad es de gran importancia la detección oportuna de factores de éxito académico con la finalidad de generar estrategias adecuadas de tutoría que contribuyan con la finalización de estudios en tiempo y forma. El objetivo de esta investigación fue profundizar en el entendimiento de la primera brecha digital, el dominio del idioma inglés y la relación de ambos con la comprensión lectora en español de los alumnos de nuevo ingreso en la Universidad Politécnica de Victoria (UPV). Se utilizó un diseño de investigación cuantitativo, relacional y retrospectivo, en donde se analizaron los resultados del Examen Ceneval Exani-II que se aplicó a los alumnos de nuevo ingreso de dicha institución, ubicada en Tamaulipas, México, en los años 2015, 2016 y 2017.



Se realizó un análisis unifactorial con cuatro grupos de estudio creados a partir de los datos. Esto permitió identificar una tendencia de aumento de la comprensión lectora ante la presencia del acceso a internet en casa y de un dictamen favorable del idioma inglés. En una segunda fase, se procedió con un análisis con dos factores con el que se pudo observar cada variable de manera independiente y la interacción de ambas. A través de las pruebas se pudo demostrar estadísticamente en todos los años que el dominio del idioma inglés incide positivamente en la comprensión lectora en español (pruebas Scheirer-Ray-Hare, $p = 0.0$). También se observó una tendencia favorable en la comprensión lectora en español en los alumnos que tienen internet en casa (año 2017, prueba Scheirer-Ray-Hare, $p = 0.0$). De esta manera, los alumnos que tienen internet en casa y que obtuvieron un dictamen satisfactorio en el idioma inglés obtuvieron las puntuaciones más altas, mientras que los alumnos sin este servicio en casa y con un dictamen insatisfactorio en inglés tuvieron las puntuaciones más bajas (pruebas Kruskal-Wallis, $p = 0.0$). Estos resultados muestran que existen estudiantes de nuevo ingreso en la UPV que inician sus estudios universitarios en desigualdad de condiciones con los demás. Es preocupante que aún hoy en día existan estudiantes sin acceso a internet en casa y sin un dominio satisfactorio la lengua inglesa, pues son condiciones que reducen sus probabilidades de éxito académico. Es necesario reflexionar sobre la desigualdad que afecta a estos alumnos y las maneras en que se puede mejorar esta situación desde el interior de la misma universidad.

Palabras clave: brecha digital, comprensión, educación superior, idioma inglés, lectura.

Abstract

It is important that every university timely detect academic success factors that contribute students to finish their studies in a timely manner so a correct tutoring strategy can be applied. The objective of this research was to deepen the knowledge of digital gap, English language and the relationship of both with the reading comprehension of new students entering the Polytechnic University of Victoria (UPV). A quantitative, relational and retrospective research design was used to analyze the results of the Ceneval Exani-II Exam that was applied to new students of said institution, located in Tamaulipas, Mexico, for years 2015, 2016 and 2017.



First, a one-factor analysis was made with four study groups created in the data; this allowed identifying a tendency to increase reading comprehension in the presence of Internet access at home and a favorable grade in English language. In a second phase, we proceeded with a two-factor analysis with which we could observe each variable independently and the interaction of both. By means of the tests it was possible to statistically demonstrate in all the years that English language proficiency has a positive effect on the reading comprehension in Spanish (Scheirer-Ray-Hare tests, $p=0.0$). A favorable trend in Spanish reading comprehension was observed in students who have Internet at home (year 2017, Scheirer-Ray-Hare tests, $p=0.0$). Thus, students who have Internet at home and who obtained a satisfactory grade in English language obtained the highest scores, while students without Internet at home and with an unsatisfactory grade in English had the lowest scores (Kruskal-Wallis tests, $p=0.0$). These results indicate that there are new students at the UPV who begin their university studies in unequal conditions with others. It is worrisome that even today there are students without internet access at home and without a satisfactory proficiency in English language, as these are conditions that reduce their chances of academic success. It is necessary to reflect on the inequality affecting these students and the ways in which this situation can be improved from within the university.

Keywords: digital divide, comprehension, higher education, English language, reading.

Resumo

Para cada universidade, a detecção oportuna de fatores de sucesso acadêmico é de grande importância, a fim de gerar estratégias de tutoria adequadas que contribuam para a conclusão dos estudos em tempo hábil. O objetivo desta pesquisa foi aprofundar a compreensão do primeiro fosso digital, a proficiência na língua inglesa e a relação de ambos com a compreensão de leitura em espanhol de novos alunos da Universidade Politécnica de Victoria (UPV). Utilizou-se um projeto de pesquisa quantitativa, relacional e retrospectiva, que analisou os resultados do Exame Ceneval Exani-II aplicado aos novos alunos da referida instituição, localizada em Tamaulipas, México, nos anos de 2015, 2016 e 2017.

Uma análise unifatorial foi realizada com quatro grupos de estudo criados a partir dos dados. Isso nos permitiu identificar uma tendência a aumentar a compreensão de leitura na presença

de acesso à Internet em casa e uma opinião favorável do idioma inglês. Numa segunda fase, procedeu-se a uma análise com dois fatores com os quais cada variável pôde ser observada independentemente e a interação de ambos. Através dos testes, foi possível demonstrar estatisticamente em todos os anos que a proficiência em inglês tem um impacto positivo na compreensão da leitura em espanhol (testes de Scheirer-Ray-Hare, $p = 0,0$). Também foi observada uma tendência favorável à compreensão da leitura em espanhol em estudantes que possuem internet em casa (2017, teste Scheirer-Ray-Hare, $p = 0,0$). Dessa forma, os alunos que possuem internet em casa e obtiveram uma opinião satisfatória no idioma inglês obtiveram as pontuações mais altas, enquanto os estudantes sem esse serviço em casa e com uma opinião insatisfatória em inglês obtiveram as pontuações mais baixas (testes Kruskal-Wallis, $p = 0,0$). Esses resultados mostram que há novos alunos na UPV que iniciam seus estudos universitários em condições desiguais com os outros. É preocupante que ainda hoje existam estudantes sem acesso à Internet em casa e sem proficiência em inglês satisfatória, pois são condições que reduzem suas chances de sucesso acadêmico. É necessário refletir sobre a desigualdade que afeta esses alunos e as maneiras pelas quais essa situação pode ser melhorada dentro da mesma universidade.

Palavras-chave: divisão digital, compreensão, ensino superior, língua inglesa, leitura.

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Introduction

It is important to detect the academic success factors of new students in the university in order to generate intervention proposals that help improve their chances of completing their studies in a timely manner. And in that area, reading comprehension is one of the most influential factors (Gallardo and López, 2019). Although today students can access more texts than 25 years ago thanks to the Internet, there are still students who at home suffer the first digital divide; Even in developed countries there is evidence of households that can be classified as highly connected and unconnected households (Robinson and Schulz, 2013). However, there are also students who have internet access at home, but they have reading deficiencies in English and Spanish. Therefore, it can be mentioned that even when a student

has overcome the first digital divide, he faces a second, which are cognitive skills: one of them is reading comprehension (Büchi, Just and Latzer, 2016).

Access to the wide variety of texts on the Internet could present a difficulty for reading since reading on that platform could be more difficult than reading a book, since all texts are flat, have a similar shape and are on the same screen ; In addition, the texts that a student can face on the Internet can be complex, which were not explicitly intended for their reading level. Thus, it is important to mention that there is a difference between reading in traditional format versus reading in hypertext format, since the cognitive overload that represents a non-linear text, such as hypertext, makes reading comprehension difficult. people (Srivastava and Gray, 2012). It is worth emphasizing that this is a basic and transversal skill in modern society: every citizen who wishes to participate in it must have a good reading comprehension. At this point, it should also be mentioned that reading comprehension should not be confused with basic communication skills, since that is only part of the set that makes up the latter. In this regard, Binkley (cited in Organization for Economic Cooperation and Development [OECD], 2019) mentions:

Whether a technician or a professional person, the success lies in being able to communicate, share and use information to solve complex problems, to be able to adapt and innovate in response to new demands and changing circumstances, to be able to gather and expand the power of technology to create new knowledge and expand human capacity and productivity (p. 22).

There is currently a greater emphasis on the integration of information technologies in reading, although the basic skills of understanding, interpretation and reflection in individual texts are maintained (Spiro, DeSchryver, Hagerman, Morsink and Thompson, 2015). On the other hand, the difference between reading and digital reading has to do with the context of the process in which it is carried out (Singer and Alexander, 2017). Elleman and Compton (2017) mention that reading comprehension is based on an interaction between the reader, the text and the task, which is immersed in a sociocultural context. Bawden (cited in Burin, Coccimiglio, González and Bulla, 2016) comments that digital literacy is made up of several skills, such as prior knowledge of information, reading comprehension of digital information and learning independently.

For its part, the English language, which currently predominates in Internet content (Correa, Reséndiz, Capello and Recio, 2015), has been identified as a clear limitation between peoples and societies, but also as an essential factor in the academic context of university students (Gómez, Insa and Sanjosé, 2015). In that tonic, Chavez, Saltos and Saltos (2017) argue that English is of vital importance so that university students can have good opportunities in a globalized world. In addition, they add that most of the fundamental bibliography and sources of information on the Internet for university subjects are in that language. They also cite Sprachcaffé (2017), who states that learning a language other than the native language produces brain stimuli that affect the improvement of other areas such as reasoning, problem solving and mental ability.

In this paper we study the digital divide and competencies in English in relation to reading comprehension, which acquires special relevance in university academic life. The research hypothesis is that both a narrow digital divide and a satisfactory performance of the English language are related to positive effects on reading comprehension in Spanish in students of the Polytechnic University of Victoria (UPV), located in Tamaulipas, Mexico, specifically in those newly admitted in 2015, 2016 and 2017. To show the linguistic differences between groups of students that emerged in this study, a Kruskal-Wallis test was used with a subsequent analysis by Mann-Whitney, following Sánchez's study and Hernández (2018), who use these tests to demonstrate linguistic differences between groups of students and evaluate their ability to recognize and manipulate morphemes, since this ability is strongly linked to the development of the student's reading comprehension.

However, unlike Sánchez and Hernández (2018), in this research the study groups were formed with the purpose of visualizing differences between them regarding the understanding of reading in Spanish, the level of the English language and the home connected to the Internet . This article presents the results of this research, with the aim of deepening the knowledge of reading comprehension, for which the results of the National Examination of Entrance to Higher Education (Exani-II), designed by the National Center for the Evaluation of Higher Education (Ceneval), presented by the students of the mentioned population. The work is organized in this way: first, the contextual background and previous work are presented. The following section explains the details of the methodology that was

followed. Then the results of the analyzes are presented, which are discussed in the immediate subsequent section. Finally the conclusions are addressed.

Digital divide

Today we are in the era of globalization. The Internet has spread throughout the world since 1998, following an exponential curve. According to Internet Advisor (2019), the number of web users around the world has increased from 16 million people in 1993 to 350 million in 2000; 2267 million people in 2010 to 4208 million people as of June 30, 2018. In addition, it is presumed to continue expanding. According to the United Nations Educational, Scientific and Cultural Organization [Unesco] (2005), the effect of globalization at the end of the 20th century and the beginning of the 21st century has interconnected the world in a way never seen before. the history of humanity, which has created new and varied links between social, scientific, technological and cultural groups, which are constantly evolving. However, despite the great technological advance, there are still social inequalities; for example, the so-called first digital divide (Ma, Vachon and Cheng, 2019), which refers to the socioeconomic difference between people who have access to digital technology and those who do not. Ma et al. (2019) highlight that the study of the first digital divide is relevant from different perspectives. For example, it has been found that people who have access to the Internet have greater purchasing power than those who do not.

Reading comprehension skills

Reading comprehension skills are decisive for the academic advancement of university students. It is a complex process developed through frequent student reading and perfected through written language. Reading comprehension can be classified as a cognitive ability; that is, the person must be able to convert the information into knowledge (Correa et al., 2015). Therefore, the higher the level of reading comprehension a user has, the more benefit he can obtain from the information on the Internet. However, according to the OECD expert committee (2006), reading competence is understood as the following: “The ability to understand, use and analyze written texts to achieve the personal goals of the reader, develop their knowledge and possibilities and participate in society ”(p. 13). In addition, in Mexico,



the Ministry of Public Education (SEP) issued Agreement Number 444 (Official Gazette of the Federation [DOF], 2008), which mentions the competences that constitute the common curricular framework of the National Baccalaureate System. And in this agreement reading comprehension is defined as follows:

The ability of students to communicate effectively in Spanish and essentially in a second language in different contexts, through the use of different means and instruments. (...)

Students who have developed these competencies will be able to read critically and communicate and argue ideas effectively and clearly, orally and in writing. In addition, they will use information and communication technologies critically for various communicative purposes. (DOF, 2008, cap. III, art. 7).

The previous agreement establishes the bases for the framework of communication competences in higher secondary education in Mexico. In summary, the agreement includes: reading critically, communicating through a second language and using information technologies. Therefore, the agreement states that the student must master a second language, in this case the English language.

It is logical that this agreement encourages communication through a second language, since the largest number of nodes and domains on the Internet belong to the United States and other English-speaking countries (Correa et al., 2015). It is also consistent that it includes the student's domain of information and communication technologies (ICT), in this case the use of the Internet, since this allows the use of advanced office automation, online data repositories consultation, instructional tutorials in video, as well as the online accessibility of different literary and scientific writings. In addition, internet access produces a positive change in the life of the university student (Castaño, Duart and Sancho, 2014). Salmerón, García and Vidal (2018), for example, mention that parents and teachers should be aware of the importance of recommending frequent Internet readings at home as a way to improve skills based on reading comprehension in that space. Supporting other uses, such as social interactions, would not have a positive impact on students' abilities.

The UPV and the Ceneval Exani-II exam

On October 11, 2006, the governor of the state of Tamaulipas, through the Secretary of State Education, signed the agreement that began the UPV project. This university is a decentralized public body of the Government of the state of Tamaulipas with its own legal personality and heritage. To fulfill the UPV mission of training competitive professionals in their area of expertise, nationally and internationally, it is necessary for new students to meet the basic disciplinary communication skills. And to ensure that the student possesses such disciplinary competencies, the Ceneval Exani-II admission exam (2019) is applied, which demands the following for reading comprehension: “Understand explicit and implicit information in informative, argumentative and narrative texts of medium complexity, as well as its purpose, characteristics and language”(p. 12). Reading comprehension in this exam is assessed on a scale of 700 to 1300 points. For the English language, it is ruled only if it is satisfactory or unsatisfactory. To inquire if the student has access to the internet from home, he is asked a question that can be answered with “Yes” or “No”.

Related studies

Hoar (2014) He mentions that most of the admission criteria in post-primary education studies require good skills in reading, writing and math comprehension, which are mentioned by Shearer and Karanian (2017) as part of the theory of multiple intelligences. Gomez et al. (2015), meanwhile, indicate that the acquisition of the English language is essential in the academic context of current university students. On the other hand, Singer and Alexander (2017) conducted a review of the literature of empirical studies that differentiate reading comprehension in digital media compared to reading comprehension in print media. Weber and Becker (2017) studied school-related social inequality in the use of the Internet in adolescents. It is also worth mentioning the work of Van-Deursen and Van-Dijk (2019), which indicates that the first digital divide remains a problem in one of the most wealthy and technologically developed countries in the world, such as the Netherlands. Luna (2015) mentions that in Mexico there may be citizens excluded from the information society. Along the same lines, Ma et al. (2019) talk about the first digital divide, the access gap, which is the difference between people who have access to the internet and those who do not; In

addition, the existence of the second digital divide introduced by Attewell (2001) is mentioned, which is the difference in the use and skills of people with respect to ICT.

Villegas (2017) mentions that the Ceneval Exani-II (2019) can be used as an instrument of social exclusion. And Martínez and Herrera (2013) measure the impact of ICT through the section of the scale of self-efficacy in the use of the Exani-II computer, where the student's self-perception is explored to navigate and search for information on the Internet, the use of a word processor, spreadsheet and software to make presentations. Martínez and Herrera's study (2013) can be related to the self-perception of the second digital divide. Another similar effort is that of Cortés and Palomar (2008), who analyze the results of the students who presented the Exani-II in order to predict the student's academic success through their general high school average and a social problems questionnaire . A further study within this area is the one carried out by Chain, Cruz, Martínez and Jacome (2003), where the student's school career is analyzed by grouping categories into the Exani-II admission criteria, which are linked to academic success of student. Some of the previous studies aim to predict the student's academic success by analyzing the results of the Ceneval Exani-II. However, they do not focus on the first digital divide and its association with basic disciplinary communication skills. (DOF, 2008).

Methodology

Research design

A quantitative, retrospective and relational design was used.

Participants

The participants were the total number of students who presented the Exani-II of the Ceneval of admission to the UPV in the years 2015 (n = 300), 2016 (n = 281) and 2017 (n = 524).

Analysis of data

The analysis of the data of the new students in each year, 2015, 2016 and 2017, was carried out in the statistical packages SPSS version 24 and Jamovi version 1.0.4.0, and was conducted in two phases: in the first, it was carried out a statistical analysis with a factor for which four groups were created, as indicated in table 1.

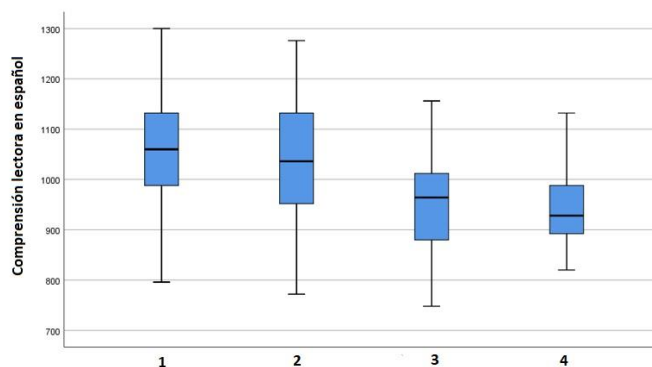
Tabla 1. Clasificación de alumnos de acuerdo con las posibles combinaciones de valores en el dominio del idioma inglés y en su conexión a internet en casa

| Grupo | Internet en casa | Dictamen de inglés |
|-------|------------------|--------------------|
| 1 | Sí | Satisfactorio |
| 2 | No | Satisfactorio |
| 3 | Sí | Insatisfactorio |
| 4 | No | Insatisfactorio |

Fuente: Elaboración propia

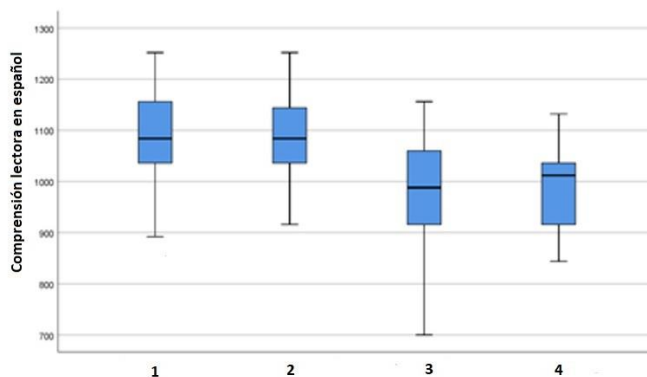
In addition, distributions of the results of the reading comprehension assessment in Spanish were plotted according to the years of admission. A first visual inspection of the distributions was made. First, similarities were observed between groups 1 and 2, and the common factor was identified, which is English language proficiency. Later similarities were observed between groups 3 and 4, whose common factor was the lack of mastery of the English language (see figure 1, 2 and 3).

Figura 1. Comprensión lectora en español clasificada de acuerdo con los grupos de la tabla 1 para el año 2015



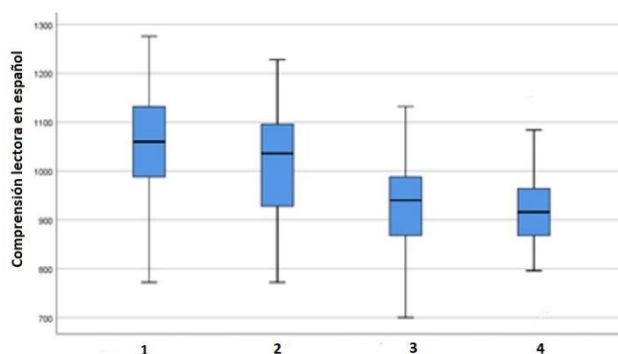
Fuente: Elaboración propia

Figura 2. Comprensión lectora en español clasificada de acuerdo con los grupos de la tabla 1 para el año 2016



Fuente: Elaboración propia

Figura 3. Comprensión lectora en español clasificada de acuerdo con los grupos de la tabla 1 para el año 2017



Fuente: Elaboración propia

The following research hypothesis was proposed for each year 2015, 2016 and 2017:

- Ha1: There are differences in the reading comprehension of new students of the UPV between the study groups defined in Table 1.

Non-parametric Kruskal-Wallis tests and subsequent Dwass-Steel-Critchlow-Fligner comparisons were performed to analyze differences in the reading comprehension score between the four previously created groups.

In the analysis of the first phase, in accordance with what is presented in Figures 1, 2 and 3, reasons were found to think that having the internet service at home was not as relevant for reading comprehension as the result of the opinion of English. For this reason we proceeded to a second phase. There, an analysis was carried out with two factors to observe the independent effect of each variable, as well as the interaction between them on reading comprehension. Then non-parametric Scheirer-Ray-Hare tests were performed for each year, where the following research hypotheses were raised:

- Ha2: There is a difference in reading comprehension between students who have internet and those who do not.
- Ha3: There is a difference in reading comprehension between students with satisfactory and unsatisfactory opinion in the English language.
- Ha4: There is an interaction effect between the digital divide and the English language opinion, which affects reading comprehension.

Process

First, the data was collected, which was provided by the UPV school services department. Three files were obtained in CSV format (separated by commas) with the data of the results of the Exani-II exam presented by new students in 2015, 2016 and 2017. The files were imported to SPSS, where it was made an exploration and cleaning of the data. Irrelevant columns were removed for the purpose of the analysis and the conditions of normality (with Kolmogorov-Smirnov and Shapiro-Wilk tests), homocedasticity (with Levene tests) and shape of the distributions (through visual inspection) were reviewed. It was determined that not all groups complied with normal distribution and equality of variances, so it was decided to perform non-parametric tests. In this way, the data was imported into the Jamovi software, where the unifactorial analysis of the result of the reading comprehension for the four study groups was made in order to observe if there was a difference in the central tendency of the qualification observed for each group. This analysis was carried out for each year of study. Descriptive statistics of mean, standard deviation, median and interquartile range were also calculated. For the analysis with a factor, Kruskal-Wallis tests were performed with subsequent Dwass-Steel-Critchlow-Fligner comparisons. Subsequently, also in Jamovi, an analysis was carried out with two factors in which each variable was observed independently and the relationship between them, for which Scheirer-Ray-Hare tests were performed through the Rj Editor module.

Results

Phase 1. Analysis with a factor

The results of the Kruskal-Wallis test for 2015 were the following: $H = 42.17$, $gl = 3$, $p = 0$, $\epsilon^2 = 0.141$. To obtain statistically relevant differences between these four groups, subsequent comparisons were made with the Dwass-Steel-Critchlow-Fligner test. The results are shown in table 2. While in table 3 the descriptive values of the data for the year 2015 are shown.

Tabla 2. Comparaciones de Dwass-Steel-Critchlow-Fligner para el año 2015

| Comparación entre los grupos | | W | P |
|------------------------------|---|--------|---------|
| 1 | 2 | -1.016 | 0.890 |
| 1 | 3 | -7.057 | < 0.001 |
| 1 | 4 | -6.974 | < 0.001 |
| 2 | 3 | -5.299 | 0.001 |
| 2 | 4 | -5.368 | < 0.001 |
| 3 | 4 | -0.834 | 0.935 |

Fuente: Elaboración propia

Tabla 3. Valores descriptivos de cada grupo en el año 2015

| Grupo | Internet en casa | Dictamen de inglés | N | Media | Desv. Std | Mediana | Rango intercuartil |
|-------|------------------|--------------------|-----|---------|-----------|---------|--------------------|
| 1 | Sí | Satisfactorio | 156 | 1049.23 | 110.31 | 1060 | 144 |
| 2 | No | Satisfactorio | 75 | 1037.28 | 118.62 | 1036 | 192 |
| 3 | Sí | Insatisfactorio | 39 | 949.23 | 94.34 | 964 | 144 |
| 4 | No | Insatisfactorio | 30 | 940.80 | 89.01 | 928 | 102 |

Fuente: Elaboración propia

The results of the Kruskal-Wallis test for 2016 were the following: $H = 49.28$, $gl = 3$, $p = 0$, $\epsilon^2 = 0.176$. Statistically relevant differences between these four groups were obtained through subsequent comparisons with the Dwass-Steel-Critchlow-Fligner test. The results are shown in table 4. The descriptive values for the year 2016 are shown in table 5.

Tabla 4. Comparaciones de Dwass-Steel-Critchlow-Fligner para el año 2016

| Comparación entre los grupos | | W | P |
|------------------------------|---|--------|---------|
| 1 | 2 | -0.215 | 0.999 |
| 1 | 3 | -7.983 | < 0.001 |
| 1 | 4 | -6.654 | < 0.001 |
| 2 | 3 | -6.252 | < 0.001 |
| 2 | 4 | -5.787 | < 0.001 |
| 3 | 4 | -0.758 | 0.950 |

Fuente: Elaboración propia

Tabla 5. Valores descriptivos de cada grupo en el año 2016

| Grupo | Internet en casa | Dictamen de inglés | N | Media | Desv. Std | Mediana | Rango intercuartil |
|-------|------------------|--------------------|-----|---------|-----------|---------|--------------------|
| 1 | Sí | Satisfactorio | 161 | 1090.86 | 84.14 | 1084 | 120 |
| 2 | No | Satisfactorio | 55 | 1086.62 | 96.18 | 1084 | 120 |
| 3 | Sí | Insatisfactorio | 46 | 990.61 | 100.58 | 988 | 150 |
| 4 | No | Insatisfactorio | 19 | 977.89 | 84.78 | 1012 | 168 |

Fuente: Elaboración propia

The results of the Kruskal-Wallis test for 2017 were the following: $H = 121.60$, $gl = 3$, $p = 0$, $\epsilon_2 = 0.233$. To obtain statistically relevant differences between these four groups, subsequent comparisons were made with the Dwass-Steel-Critchlow-Fligner test. The results are shown in table 6. The descriptive values for the year 2017 are shown in table 7.

Tabla 6. Comparaciones de Dwass-Steel-Critchlow-Fligner para el año 2017

| Comparación entre los grupos | | W | P |
|------------------------------|---|---------|--------|
| 1 | 2 | -3.065 | 0.133 |
| 1 | 3 | -12.388 | <0.001 |
| 1 | 4 | -11.829 | <0.001 |
| 2 | 3 | -6.809 | <0.001 |
| 2 | 4 | -6.922 | <0.001 |
| 3 | 4 | -0.740 | 0.954 |

Fuente: Elaboración propia

Tabla 7. Valores descriptivos de cada grupo en el año 2017

| Grupo | Internet en casa | Dictamen de inglés | N | Media | Desv. Std | Mediana | Rango intercuartil |
|-------|------------------|--------------------|-----|---------|-----------|---------|--------------------|
| 1 | Sí | Satisfactorio | 297 | 1045.86 | 107.16 | 1060 | 144 |
| 2 | No | Satisfactorio | 75 | 1012.96 | 112.04 | 1036 | 192 |
| 3 | Sí | Insatisfactorio | 87 | 927.31 | 86.36 | 940 | 120 |
| 4 | No | Insatisfactorio | 65 | 919.69 | 78.60 | 916 | 96 |

Fuente: Elaboración propia

Phase 2. Two-factor analysis

For the year 2015, the Scheirer-Ray-Hare test allowed to obtain the following values: for Ha1: $H = 2.33$, $p = 0.12$; para Ha2: $H = 39.84$, $p = 0$; para Ha3: $H = 0.02$, $p = 0.96$. In this way, it could be determined that by 2015 only the English language opinion was significant for reading comprehension. Table 8 shows that students with satisfactory opinions had higher scores (median = 1060, interquartile range = 168) than students with unsatisfactory opinion (median = 940, interquartile range = 132).

Tabla 8. Estadísticos descriptivos; prueba de Scheirer-Ray-Hare para el año 2015

| | Con internet | Sin internet | Totales |
|-------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Dictamen satisfactorio en inglés | $n = 156$ Media = 1049.23 Desv. std. = 110.31 Mediana = 1060 Rango int. = 144 | $n = 75$ Media = 1037.28 Desv. std. = 118.62 Mediana = 1036 Rango int. = 192 | $n = 231$ Media = 1045.35 Desv. std. = 112.95 Mediana = 1060 Rango Int. = 168 |
| Dictamen insatisfactorio en inglés | $n=39$ Media = 949.23 Desv. std. = 94.34 Mediana = 964 Rango int. = 144 | $n = 30$ Media = 940.80 Desv. std. = 89.01 Mediana = 928 Rango int. = 102 | $n = 69$ Media = 945.57 Desv. std. = 91.49 Mediana = 940 Rango int. = 132 |
| Totales Internet en casa | $n = 195$ Media = 1029.23 Desv. std. = 114.34 Mediana = 1036 Rango int. = 144 | $n = 105$ Media = 1009.71 Desv. std. = 118.91 Mediana = 1012 Rango int. = 192 | |

Fuente: Elaboración propia

For the year 2016, the Scheirer-Ray-Hare test yielded the following results: for Ha1: $H = 0.586$, $p = 0.44$; para Ha2: $H = 48.45$, $p = 0.0$; para Ha3: $H = 0.249$, $p = 0.61$. In this way, it could be determined that by 2016 only the English language opinion was significant for reading comprehension. As shown in Table 9, students with satisfactory opinions had

higher scores (median = 1084, interquartile range = 120) than students with unsatisfactory opinion (median = 988, interquartile range = 132).

Tabla 9. Estadísticos descriptivos de los datos analizados con la prueba de Scheirer-Ray-Hare para el año 2016

| | Con internet | Sin Internet | Totales dictamen de inglés |
|-------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Dictamen satisfactorio en inglés | <i>n</i> = 161 Media = 1090.86 Desv. std. = 84.14 Mediana = 1084 Rango int. = 120 | <i>n</i> = 55 Media = 1086.62 Desv. std. = 96.18 Mediana = 1084 Rango int. = 120 | <i>n</i> = 216 Media = 1089.78 Desv. std. = 87.15 Mediana = 1084 Rango int. = 120 |
| Dictamen insatisfactorio en inglés | <i>n</i> = 46 Media = 990.61 Desv. std. = 100.58 Mediana = 988 Rango int. = 150 | <i>n</i> = 19 Media = 977 Desv. std. = 84.78 Mediana = 1012 Rango int. = 168 | <i>n</i> = 65 Media = 986.89 Desv. std. = 95.75 Mediana = 988 Rango int. = 132 |
| Totales Internet en casa | <i>n</i> = 207 Media = 1068.5 Desv. std. = 97.2 Mediana = 1084 Rango int. = 120 | <i>n</i> = 74 media = 1058.7 Desv. std. = 104.4 Mediana = 1060 Rango int. = 144 | |

Fuente: Elaboración propia

For the year 2017, the Scheirer-Ray-Hare test allowed to obtain the following values: for Ha1: $H = 20,244$, $p = 0.0$; for Ha2: $H = 100.34$, $p = 0.0$; for Ha3: $H = 1.01$, $p = 0.31$. In this way, it was determined that by 2017 both the English language opinion and having or not having internet at home were significant for reading comprehension. Students with satisfactory opinion in English had higher scores (median = 1036, interquartile range = 144) than students with unsatisfactory opinion (median = 916, interquartile range = 120). On the other hand, students with internet at home obtained higher scores in reading comprehension (median = 1012, interquartile range = 168) than students who did not (median = 952,

interquartile range = 144). The descriptive statistical results that were obtained for 2017 are shown in table 10.

Tabla 10. Estadísticos descriptivos de los datos analizados con la prueba de Scheirer-Ray-Hare para el año 2017

| | Con internet | Sin Internet | Totales dictamen de inglés |
|-------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Dictamen satisfactorio en inglés | <i>n</i> = 297 media = 1045.86 Desv. std. = 107.16 Mediana = 1060 Rango int. = 144 | <i>n</i> = 75 Media = 1012.96 Desv. std. = 112.04 Mediana = 1036 Rango int. = 192 | <i>n</i> = 372 Media = 1039.23 Desv. std. = 108.82 Mediana = 1036 Rango int. = 144 |
| Dictamen insatisfactorio en inglés | <i>n</i> = 87 Media = 927.31 Desv. std. = 86.36 Mediana = 940 Rango int. = 120 | <i>n</i> = 65 Media = 919.69 Desv. std. = 78.60 Mediana = 916 Rango int. = 96 | <i>n</i> = 152 Media = 924.05 Desv. std. = 82.95 Mediana = 916 Rango int. = 120 |
| Totales Internet en casa | <i>n</i> = 384 Media = 1019 Desv. std. = 114.10 Mediana = 1012 Rango int. = 168 | <i>n</i> = 140 Media = 969.66 Desv. std. = 108.20 Mediana = 952 Rango int. = 144 | |

Fuente: Elaboración propia

Discussion

Interpretation of the analysis with a factor

The following findings were common for the three years analyzed: 2015, 2016 and 2017. It was found that there are significant statistical differences in the reading comprehension of the students according to the study group to which they belong. It was observed that students who have internet at home and who obtained a satisfactory opinion in the English language obtained the highest scores, while students without internet at home

and with an unsatisfactory opinion in English had the lowest scores. Students who had only one of the two factors studied were kept in an intermediate arithmetic score zone.

In subsequent tests it was observed that all the differences between the groups were statistically significant with the exception of comparisons between groups 1 and 2, as well as between groups 3 and 4. In both cases, the constant variable was the English and the variable with change was the one that measured the first digital divide. In this way, there was reason to think that having internet at home was not as relevant to reading comprehension as the result of the English opinion. For this reason it was decided to carry out an analysis with two factors to observe the independent effect of each variable, as well as the interaction between both on reading comprehension.

Interpretation of the analysis with two factors

The two-factor analysis showed that, in the three years analyzed, the English language opinion was the variable with significant effect on reading comprehension. Only in 2017 also the indicator variable of the first digital divide was significant. Thus, in 2015, 2016 and 2017, students with a favorable opinion in English obtained higher scores in reading comprehension. On the other hand, although also in the three years the students with internet at home obtained the highest reading comprehension score, this relationship was only statistically significant in 2017.

Implication of the results

The results show that a segment of new students entering the UPV begins their university studies in unequal conditions with the rest. The lack of access to the Internet from home and the unsatisfactory mastery of the English language are related to reading comprehension, which is a required and necessary transversal competence in the university. The results invite us to take measures to correct the deficiencies detected and support the students in their academic goals.

Comparison of the results obtained with the analyzed literature

The findings of this research are consistent with the work of Castaño et al. (2014), because they indicate that a small digital divide is related to favorable conditions in the academic life of students. They also coincide with the perspective of Ma et al. (2019), who states that the study of the digital divide is relevant from various angles. In the present investigation it was found that students with Internet access at home tend to obtain higher scores in reading comprehension. Likewise, the results are in line with the suggestions of Salmerón et al. (2018), who positively relate Internet activities at home - such as readings from that digital space - with reading comprehension. Finally, the authors of this work also highlight, as Martínez and Herrera (2013) do, that the analysis of the results of the Exani-II exam can be used as a means of research and diagnosis of the conditions that characterize students again entry.

Limitations of the study

The study was limited to Cd. Victoria, Tamaulipas, Mexico, specifically to new students entering the UPV. Only the data of new students in the years 2015, 2016, 2017, which were provided by the department of school services of the UPV were taken into account.

Conclusions

The research presented in this article confirmed the existence of the first digital divide between new students entering the UPV, who are part of a home without internet service. Another finding revealed the existence of students who do not have a satisfactory level of English proficiency and also have a low level of reading comprehension in Spanish. It was shown that these two factors together create an academic disadvantage compared to students who are part of a home with internet and have an adequate level of English. In addition, the importance of studying and reducing the digital divide was shown, as well as promoting reading comprehension skills in English and Spanish in students.

This leads to reflect on the unequal conditions of some students and the way in which they can contribute to improving this situation from within the same university. In this sense,



the creation of support and inclusion programs can be a viable alternative in which students must be involved before their official entrance to the university. This is a challenge that must be faced, coupled with the process of design, creation and maintenance of initiatives to serve students in vulnerable academic situations.

This study represents a first approach to understand the digital divide in a context of complex social reality such as that of the UPV. The findings allowed us to understand the relationship between some factors that can influence the academic performance of students. Studies are proposed, such as future work, that identify causalities among the variables studied, for which a different data collection instrument could be designed and applied to the Ceneval Exani-II.

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