

International Journal of Human Sciences Research

USE OF DIGITAL TOOLS IN TEACHING METHODS - HIGHER EDUCATION LEARNING

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Abstract: The use of digital tools from the current pandemic triggered countless teaching-learning methods in Higher Education as part of educational technological innovation. The lack of training in the use and management of educational platforms, as well as in digital tools by teachers and students, has been the main problem of this study since the teaching given and learning acquired did not have the same quality at the beginning and effectiveness as in face-to-face mode. A mixed methodology (qualitative and quantitative) was adopted, with the data collection instrument being the form applied to 213 students from a Higher Education Institution. The results obtained showed that the students are satisfied with the use of the applied methodology and the work carried out in virtual environments. It was concluded that digital tools directly influence teaching-learning methods through illustrative, dynamic and analytical study, developing optimal learning in times of Covid-19.

Keywords: Digital Tools, Learning, Teaching, Higher Education.

INTRODUCTION

One of the main challenges of virtual education has been to transmit knowledge in a precise and playful way through an illustrative, dynamic and analytical language in such a way as to improve the level of learning in Higher Education students. Educational processes are constantly evolving due to technological advances, which as of 2020 due to the current pandemic caused by Covid-19, are directly related to the use of digital tools in teaching-learning processes in virtual environments.

The study problem focuses on the multiple digital tools that exist in the teaching-learning processes in Higher Education through which both teachers and students, not having adequate preparation in the use of these tools, have delays in the fulfillment of their

activities. academic activities such as planning of study blocks, preparation of content, didactic material, generator of structured test evaluations, among others, in such a way that there is a decrease in the effectiveness of the knowledge imparted.

The objective of this study is to analyze how the use of digital tools influences the teaching-learning processes in a Higher Education Institution. The scientific literature of this work is based on the most relevant theories of digital tools and teaching-learning processes since virtual education has currently had several controversies regarding the professional profile that not only Higher Education students will have but also those who they just started school.

This study presents the following hypothesis: The use of digital tools positively influences the teaching-learning processes in the students of a Higher Education Institution.

DEVELOPMENT

THEORY OF TEACHING-LEARNING PROCESSES

Navarro y Samón (2017), considered that: the teaching process is the interrelation between teacher and student, where the teacher organizes the student's activity according to the subject of study, and as a result of this activity, the student assimilates the knowledge imparted.

This way, the teacher-student interrelation and the assimilation of the content by the student are achieved, however, they do not specify exactly the ways that the student uses to achieve the desired learning. According to Salvatierra (2021), the teaching process is "a system of teacher actions aimed at organizing the practical and cognitive activity of the student with the aim of solidly assimilating the contents of education" (p. 15). In short, when the teacher exposes, explains, illustrates, demonstrates, argues, bases; the student

summarizes, models, adds, selects, associates, integrates, eliminates, combines. For Llanga and López (2019), teaching strategies are defined as “the procedures or resources used by teachers to achieve significant learning in students, for which different didactic

mechanisms are developed in order to facilitate understanding in an active way” (p. 29).

Table 1 mentions the teaching methods according to Telles.

Practice Related	Project related	Theory related
Cases studies Learning by competencias Seminars and Workshops Group work.	Problem resolution. Autonomous Learning Learning through project elaboration.	Oral tests Written tests Exhibitions

Note. Taken from General considerations of the less used teaching methods in universities education in Cuba (p. 9), for Telles Yoandri, (2019), Universidad Martha Abreu, Cuba.

Table 1. Traditional teaching methods according to Telles.

Traditional teaching methods form the basis of the knowledge that the teacher wishes to impart, they are the key to the performance

of an efficient teaching where students can be located scientifically.

Deductive	Assume the role of facilitator and encourage participation in classes
Analogical	Make comparisons in the results obtained.
Symbolic	Explain algebraic language and relate it to the subject of study.
Intuitive	Develop skills to determine the possible answer.
Passive	Promote active listening where only the teacher participates.
Dogmatic	Apply the traditional method, the teacher explains and the student listens.
Heuristics	Develop cognitive skills in the algebraic process.
Analytical	Analyze the ideal development process in application problems.
Synthetic	Expose knowledge of the particular to the general.

Note: Taken from Method and Techniques of Mathematics (p. 10), by Marino Latorre Ariño and Carlos Javier Seco del Pozo, (2019), Marcelina Champagnat University.

Table 2. Objectives of general teaching methods.

Teaching methods in Higher Education allow students to develop new verbal, numerical and abstract skills because they are the ones who will develop the content of the class with the guidance of the teacher, being the protagonists at all times through use and application. academic digital tools provided by the teacher.

In March 2020, the Covid-19 is present in Ecuador, being the first country in Latin America to close all educational establishments, later the World Health Organization (WHO), declared it a pandemic affecting all sectors of the country. due to multiple restrictions, there is a serious concern for the academic development of

students where the use of virtual platforms did not have adequate use in the Institutions that had this tool.

Román (2020) states that “the health crisis caused by Covid-19 not only represented an economic, social and political crisis, but also an educational one, with limitations on the development of new skills that affect learning levels” (p. 31). The current Covid-19 pandemic has made several educational processes difficult. The University Rectors set themselves challenges to deal with this situation, carrying out permanent training in the optimal use of educational platforms and digital tools for both teachers.

DIGITAL TOOLS THEORY

The use of technological tools in teaching implies a new conception in the capacities of the students in which not only their intellectual aptitudes are considered, but also all those that account for their integral formation. Among the most relevant aspects generated by new technologies are those related to facing the requirements and difficulties to access, manage and use information, which implies: knowing how to use the Internet, knowing search strategies, access and knowing how to use information, have the ability to synthesize and organize and systematize and finally, have the ability to assess compliance with information needs, this has also been incorporated as competencies for the use of ICTs in the professional training profile (González and Morales, 2021).

Romero (2018) states that “knowledge and innovation does not focus on the inclusion of technological devices in the educational system, but rather to understand that the construction of knowledge must understand that it can only be processed and managed by the brain” (p.93).

Cárdenas, Farías & Méndez (2017),

stated that: “innovation transforms multiple spaces of the educational system in: teaching processes, availability of resources for learning; study and evaluation programs; management and direction of the educational institution; and, use of technology for academic purposes” (p. 19). The implementation of innovation in any of these processes has a transcendent effect to transform education, from the classroom to the management of the educational institution. To analyze some of the most relevant factors involved in the application of digital tools through the use of Information and Communication Technologies (ICT) in higher education, it is convenient to specify:

From our perspective, the greatest interest lies in the observation of the relationship between the use of ICTs, fundamentally the Internet, and the changes that occur in educational practices, understanding in this case, as suggested by Coll (2003), that the key is not in technology or pedagogy, but in the pedagogical use of technology (Escontrela and Stojanovic, 2014, p. 23).

Digital tools undoubtedly produce a change in society and undoubtedly in educational establishments. According to Quiñones (2016) in his scientific work “ICTs and their influence on educational management” he concluded that “access to new teaching and learning processes, taking advantage of the functionalities offered by ICTs, will be complemented with various interactive activities in new educational environments. virtual” (p. 7).

Table 3 details the most used digital tools in the development of a class through virtual environments.

Teaching – Learning	Description
Conocimiento previo	
Lluvia de ideas https://www.lucidchart.com/pages/es/ejemplos/software-de-lluvia-de-ideas	Genera lluvia de ideas previo a la construcción del conocimiento.
Cronología de actividades https://es.padlet.com/dashboard	Almacena murales con notas y videos donde interactúan los estudiantes.
Development	
Mental maps https://www.mindmeister.com/es/brainstorming	Create mental maps joining ideas by multiple connectors and subdivisions.
Infographics https://genial.ly/es/	Create interactive content such as infographics, templates, ads, etc..
Office 365 https://www.microsoft.com/es-ES/microsoft-365?ms.url=office365com	Store, share, and take assignments online where multiple students can interact.
Google Forms https://www.google.com/intl/es/forms/about/	Design forms for quantitative research.
Evaluation	
Virtual tests https://quizizz.com/join	Take quizzes with random questions and create multigames.
Plagiarism https://www.plag.es/	Taken from Digital tools for teaching mathematics (p. 6), Diego Jiménez, (2020), Mathematics.

Note: Taken from Digital tools for teaching mathematics (p. 6), Diego Jiménez, (2020), Mathematics.

Table 3. Gigital tools.

AUTHOR CONTRIBUTION

Digital tools in teaching processes have generated a positive change in teaching-learning methods since currently all teachers must be well trained in the use of digital platforms for the efficient development of the class in virtual environments, as well as this This way, the knowledge imparted will be efficient and well received by students, improving their professional development in each of the areas of knowledge.

MATERIALS AND METHODS

This investigative work was developed in a Higher Education Institution of Ecuador during the first semester of the year 2021, being its methodology of mixed type, that is, qualitative because according to the theories

consulted in the academic repositories and indexed journals, the bases were supported. scientific tools of digital tools and teaching-learning methods, most used since 2020, the start of the pandemic.

The type of qualitative research according to Guerrero (2016) aims to deepen specific cases and not to generalize; His concern is not primarily to measure, but rather to qualify and describe the social phenomenon based on determining features, as perceived by the elements themselves that are within the situation studied.

The type of quantitative research uses data collection to test hypotheses, based on numerical measurement and statistical analysis, establishing behavior patterns and verifying theories” (Hernández, Fernández,

and Baptista, 2006, p. 5).

The technique of observation in the performance of the students was of vital importance because through it the level of learning in the use and application of digital tools in virtual environments was evidenced. This study is of a descriptive type because the instrument of the form was applied for data collection and analysis of the results, with the population of students being finite, which was validated by an expert Director of a Higher Education Institution according to the coefficient Cronbach's alpha through the Likert scale from 1 to 5. Flores (2017) "The purpose of this research is to obtain real data through statistical results."

Population: Ventura (2017), defines the population as "a set of elements that contain certain characteristics of the object of study" (p. 648). The population consisted of 213 students from various university careers during the first semester of 2021.

Sample: Otzen and Manterola (2017) indicated that "the sample is a subgroup of the population, where a certain amount of data is collected according to statistical calculation and these must be representative according to the size of the population" (p. 229).

Type: The selected sample was non-probabilistic, and due to the difficulty of access to be carried out in person due to the current pandemic caused by Covid-19, it was carried out through the Google Forms form for higher education students. His calculation for the finite population was expressed as follows:

$$n = \frac{N * Z_{\alpha}^2 * p * q}{e^2 * (N - 1) + Z_{\alpha}^2 * p * q}$$

Where:

N : is the total number of the population (213 students);

Z_{α}^2 : is the reliability percentage of the survey, $(1.96)^2$ which is equal to 95%;

p : is the probability of success of the survey (0,50);

q : is the probability of survey failure (0.50) and

e : is the estimation error of the study (0,05),

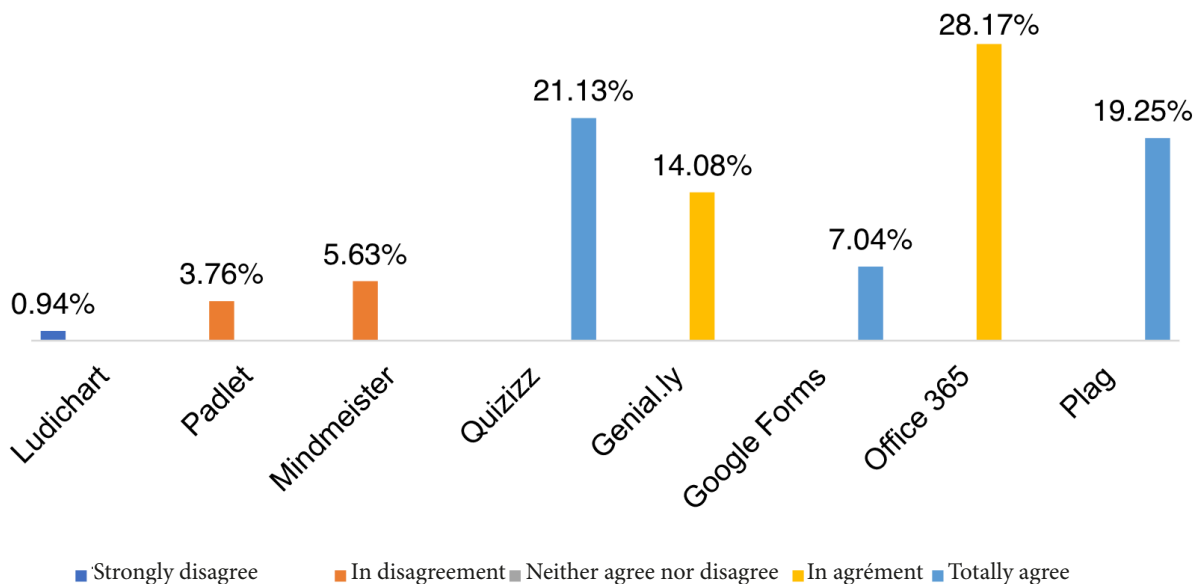
With these data and the application of the formula, the following was obtained: $n = 137$ being the number of the sample to be surveyed through the Google Forms form.

DATA ANALYSIS AND INTERPRETATION

The analysis and interpretation of the collected data was carried out through descriptive statistical analysis in Microsoft Excel through the distribution of frequencies using tables and graphs with a Likert scale of five levels; and for qualitative data, validation of the form was requested from a Higher Education Executive teacher to verify the hypothesis proposed in this study, relating the use of digital tools in teaching-learning methods.

DISCUSSION OF THE RESULTS

After applying the digital tools in the teaching processes in a Higher Education Institution during the third quarter of the year 2021, the following results were determined according to the selected validation instruments. According to the results obtained from the survey applied to the students, the following was obtained.



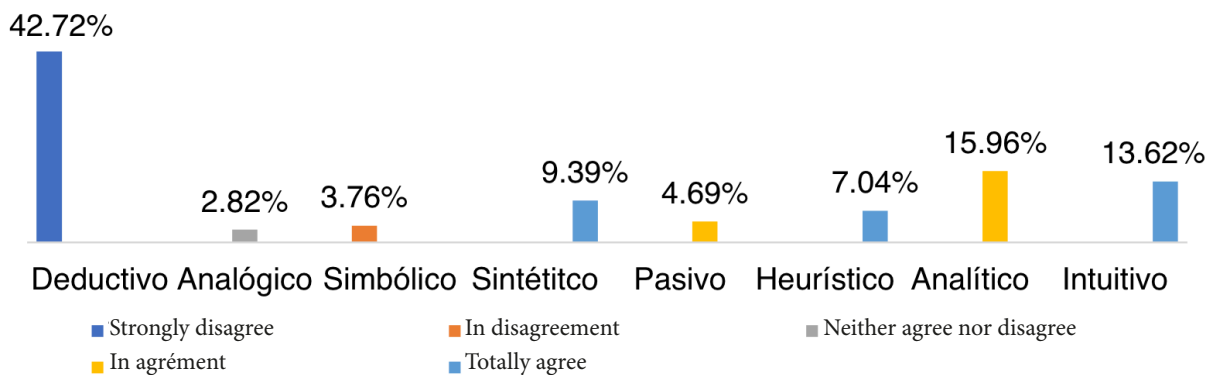
Note: The graph represents the most used digital tools in virtual environments.

Figure 1. Digital tools used.

Figure 1 shows the digital tools most used by the students of a Higher Education Institution where they have managed to understand the correct use of some digital tools.

28.17% of respondents strongly agreed that Office 365 enabled them to multitask online, as well as share documents in the cloud via Google Drive, so documents are stored quickly and securely regardless of the file's capacity. On the other hand, 21.13%

the students surveyed agreed that through the Quizizz tool, they managed to better understand the knowledge imparted because the tool was used during the classroom as a test to check what was learned. that makes learning more precise according to the applied deductive method. In another context, 19.25% indicated that Plag allowed them to check the level of plagiarism in their work prior to submission and this way they can be sure that they have done quality work.



Note: The graph represents the most used digital tools in virtual environments.

Figure 2. Teaching methods – applied learning.

According to the teaching methods applied, 42.72% of the students surveyed fully agreed that the deductive method is ideal for the development of a class, starting with the brainstorming of a general topic, and then disaggregate the information into various concepts until building the central idea of the subject of study.

15.96% identified with the analytical method because, through the use of possible viable alternatives for problem solving, a single path can be built that manages to define the appropriate procedure to have optimal learning and participation within the virtual classroom environment.

Although for many students the new teaching methods have been of great difficulty, 13.62% have preferred the intuitive method because knowledge is built from a series of premises, theories, theorems and properties in such a way that the knowledge acquired according to the experience and learning is associated with the new one and this way stimulate the student to be more participatory using the appropriate digital tools.

Higher education faces one of the greatest challenges in history and that is the digital transformation of all educational processes, the correct use of educational platforms and digital tools being of vital importance, creating virtual spaces for optimal learning with content of academic quality.

CONCLUSIONS

The development of this research work concludes that, from the current pandemic, educational processes have been digitized, starting with the construction of knowledge through educational platforms and then giving way to the use and application of digital tools in the different areas of knowledge, which was determined when promoting technological innovation in students.

According to the development of this

work, the research was based on the most relevant theories related to traditional teaching-learning methods and digital tools, being the ones that students master best: Office 365, Quizizz, Genial.ly, Plag and Google Forms, in such a way that they can carry out their work safely and with quality.

The methodology applied was of a mixed type where the Director of a Higher Education Institution argued that the use of digital tools positively influences teaching-learning methods because it is easier for current students to use digital media that facilitates their search. of new tools that improve not only the presentation of their work but also the knowledge acquired.

According to the quantitative study, the results of the form applied to students indicated that 28.17% master the Office 365 digital tool due to the multiple activities carried out in Microsoft Word, Excel, Power Point, among others, while 42.72% indicated that the deductive method is the most appropriate for their learning process because they feel identified from their first years of studies through which it has allowed them to better analyze the contents.

This way, it has been verified that the hypothesis proposed in this study has had a favorable result in this same investigative work that is adjusted to all educational levels in the country.

REFERENCES

- Alzate Rodríguez, E. J., Montes Ocampo, J. W., & Escobar Escobar, R. M. (2018). Diseño de actividades mediante la metodología ABP para la Enseñanza de la Matemática. *Scientia Et Technica*, 18(3), 542-547.
- Cárdenas, G. C., Farías, M. G., & Méndez, C. G. (2017). ¿Existe Relación entre la Gestión Administrativa y la Innovación Educativa? Un Estudio de Caso en Educación Superior. *REICE. Revista Iberoamericana sobre Calidad, Eficacia y Cambio en Educación*, 18-22. Retrieved from <https://www.redalyc.org/pdf/551/55149730002.pdf>
- Escontrela, R. M., & Stojanovic, C. L. (2014). La integración de las TIC en la educación: Apuntes para un modelo pedagógico pertinente. *Revista de pedagogía*, 25(74). Retrieved from http://ve.scielo.org/scielo.php?script=sci_arttext&pid=S0798-97922004000300006
- Flores. (2017, Septiembre 12). *Qué es la investigación cuantitativa*. Retrieved from SIS: <https://www.sisinternational.com/investigacion-cuantitativa/>
- Gil, G. R. (2018). EL USO DEL APRENDIZAJE BASADO EN PROBLEMAS EN LA ENSEÑANZA UNIVERSITARIA. *Revista Mexicana de Investigación Educativa*, 23(76), 73-93. Retrieved from <http://www.scielo.org.mx/pdf/rmie/v23n76/1405-6666-rmie-23-76-73.pdf>
- González, B. D. (2016). Aprendizaje Basado en Proyectos aplicado a la enseñanza matemática. *Ciencia y tecnología*, 45-48.
- González, E. V., & Morales, M. R. (2021). USO DE HERRAMIENTAS TICs PARA EL LOGRO DE APRENDIZAJE SIGNIFICATIVO EN LA UNIVERSIDAD DE LA FRONTERA. *Gestión Educativa*, 14-19. Retrieved from <https://recursos.educoas.org/sites/default/files/2086.pdf>
- Guerrero. (2016). La investigación cualitativa. *INNOVA*, 1 - 9.
- Hernández, Fernández, & Baptista. (2006). Enfoque cuantitativo. *Investigación y Desarrollo*, 3 - 12.
- Jerónimo, L. C. (2019). Uso y Desarrollo de Estrategias de Enseñanza en Programas de Educación: Prácticas de Estudiantes de Grado y Posgrado en Colombia. *Redalyc, Revista Latinoamericana de Estudios Educativos*, 15(2), 158-174. doi:<https://doi.org/10.17151/rlee.2019.15.2.8>
- Jiménez, D. D. (2020). Herramientas digitales para la enseñanza de las matemáticas en la Educación Básica. *Scielo, Matemática*, 1-12.
- Jofré M., C., & Contreras H., F. (2015). Implementación de la Metodología ABP (Aprendizaje Basado en Problemas) en Estudiantes de Primer año de la Carrera de Educación Diferencial. *Estudios Pedagógicos*, XXXIX(1), 99-113.
- Llanga, V. E., & López, I. I. (2019). Metodología del docente y el aprendizaje. *Revista Atlante: Cuadernos de Educación y Desarrollo*, 26-38. Retrieved from <https://www.eumed.net/rev/atlante/2019/02/docente-aprendizaje.html>
- Martí, J. A., Heydrich, M., Rojas, M., & Hernández, A. (2018). Aprendizaje basado en proyectos: una experiencia de innovación docente. *Revista Universidad EAFIT*, 46(158), 11-21.
- Martí, J. A., Heydrich, M., Rojas, M., & Hernández, A. (2020). Aprendizaje basado en proyectos: una experiencia de innovación docente. *Revista Universidad EAFIT*, 11-21. Retrieved from <https://www.redalyc.org/pdf/215/21520993002.pdf>
- Miguel, R. J. (2020). La educación superior en tiempos de pandemia: una visión desde dentro del proceso formativo. *Revista Latinoamericana de Estudios Educativos*, 13-40. doi:<https://doi.org/10.48102/rlee.2020.50.ESPECIAL.95>
- Navarro, L. D., & Samón, M. M. (2017). Redefinición de los conceptos método de enseñanza y método de aprendizaje. *EDUSOL*, 17(70), 26-33. Retrieved from <https://www.redalyc.org/journal/4757/475753184013/html/>
- Navarro, L. D., & Samón, M. M. (2017). Redefinición de los conceptos método de enseñanza y método de aprendizaje. *Redalyc Edusol*, 17(60), 60. Retrieved from <https://www.redalyc.org/journal/4757/475753184013/475753184013.pdf>
- Oriol, B. A. (2016). Resiliencia. *Educación Médica*, 15(2), 77 - 78.

Otzen, T., & Manterola, C. (2017). Técnicas de Muestreo sobre una Población a Estudio. *Int Morphol*, 35(1), 227-232. Retrieved from <https://scielo.conicyt.cl/pdf/ijmorphol/v35n1/art37.pdf>

Pérez Rodríguez, P. M. (2016). Revisión de las teorías del aprendizaje más sobresalientes del siglo XX. *Tiempo de educar*, 5(10), 39-76. Retrieved from <https://www.redalyc.org/articulo.oa?id=31101003>

Quiñones. (2016, Septiembre 14). *Las Tic y su influencia en la gestión educativa*. Retrieved from Aula. Interactiva.TIC: <https://sites.google.com/site/aulainteractivatic/las-tic-y-su-influencia-en-la-gestion-educativa>

Restrepo Gómez, B. (2015). Aprendizaje basado en problemas (ABP): una innovación didáctica para la enseñanza universitaria. *Educación y Educadores*, 8, 9-19.

Robles AL, J. J. (2021). Conflictos familiares y económicos en universitarios en confinamiento social por covid-19. *CuidArte*, 10(19), 00-00.

Romero, M. G. (2018). Calidad educativa: engranaje entre la gestión del conocimiento, la gestión educativa, la innovación y los ambientes de aprendizaje. *REXE, Revista de Estudios y Experiencias en Educación*, 17(35), 91 - 106.

Salvatierra, P. N. (2021). Tesis de Posgrado. *ESTRATEGIA METODOLÓGICA SUSTENTADA EN LA ENSEÑANZA SITUADA PARA LA MEJORA DE LAS PREFERENCIAS DE LOS ESTILOS DE APRENDIZAJE*. Universidad Técnica de Machala, Machala. Retrieved from <http://repositorio.utmachala.edu.ec/bitstream/48000/17290/1/NANCY%20CAROLINA%20SALVATIERRA%20PENARANDA.pdf>

Silva, Q. J., & Maturana, C. D. (2017). Una propuesta de modelo para introducir metodologías activas en educación superior. *Innovación educativa*, 17(73), 117-132.

Telles, Y. E. (2019). Consideraciones generales de los métodos de enseñanza menos utilizados en la educación superior en Cuba. *Scielo*. Retrieved from <http://scielo.sld.cu/pdf/rces/v39n2/0257-4314-rces-39-02-e7.pdf>

Ventura, L. J. (2017). ¿Población o muestra?: Una diferencia necesaria. *Revista Cubana de Salud Pública*, 47(3), 648-649. Retrieved from <http://scielo.sld.cu/pdf/rcsp/v43n4/spu14417.pdf>

Villalba, Q. C. (2016). El enfoque de resiliencia en Trabajo Social. *Psicología educativa*, 1 - 30.