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Artículos científicos

La aplicación de las TIC en los procesos de enseñanza-aprendizaje en estudiantes de nivel medio superior en Tepic, Nayarit

The Application of ICT in the Teaching-Learning Processes by High School Students in Tepic, Nayarit

A aplicação das TIC nos processos de ensino-aprendizagem em estudantes do ensino médio de Tepic, Nayarit

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Resumen

La presente investigación tiene como objetivo principal difundir información estadística que permita conocer la utilidad de las herramientas tecnológicas aplicadas en el nivel medio superior en la ciudad de Tepic, Nayarit, México. Asimismo, analiza a través de los estudiantes el manejo y conocimiento de las tecnologías enfocadas en ambientes de aprendizaje y tecnológicos. Para determinar la muestra, se empleó la técnica de muestreo no probabilístico por conveniencia; para la recolección de la información, se aplicó un cuestionario estructurado con 10 preguntas cerradas a 150 estudiantes. La información obtenida fue procesada bajo el programa Statistical Package for the Social Sciences (SPSS) versión 19. Cabe mencionar que para el tratamiento y análisis de la información se crearon tablas de contingencia. Los resultados demuestran que la gran mayoría de los estudiantes utiliza constantemente la computadora para desarrollar tareas, trabajos de investigación; sobre todo, es un dispositivo electrónico de apoyo para los estudiantes y profesores dentro del plantel. Asimismo, los alumnos hacen uso de programas ofimáticos orientados a la

creación de documentos y presentaciones electrónicas. Se observa que este tipo de herramientas tecnológicas se adaptan a las necesidades educativas.

Palabras clave: ambientes de aprendizaje, bachillerato, educación de jóvenes, tecnología digital, tecnología educativa, TIC.

Abstract

The main objective of this research is to disseminate statistical information that allows knowing the usefulness of the technological tools applied at the upper middle level in the city of Tepic, Nayarit, México. Likewise, it analyzes through students the management and knowledge of technologies focused on learning and technological environments. To determine the sample, the non-probabilistic sampling technique was used for convenience; for the collection of information, a questionnaire structured by 10 closed-type questions was applied to 150 students. The information obtained was processed under the Statistical Package for the Social Sciences (SPSS) version 19 program. It is worth mentioning that for the treatment and analysis of the information contingency tables were created. The results show that the vast majority of students use constantly the computer to develop tasks, research papers; above all, it is an electronic support device for students and teachers on campus. Likewise, the students make use of office programs oriented to the creation of electronic documents and presentations. Finally, it is observed that this type of technological tools is adapted to the educational needs.

Keywords: learning environments, high school, youth education, digital technology, educational technology, ICT.

Resumo

O principal objetivo desta pesquisa é disseminar informações estatísticas que nos permitam conhecer a utilidade das ferramentas tecnológicas aplicadas no nível médio superior na cidade de Tepic, Nayarit, México. Da mesma forma, analisa através dos alunos a gestão e o conhecimento de tecnologias voltadas para ambientes de aprendizagem e tecnológicos. Para determinar a amostra, a técnica de amostragem não probabilística foi utilizada por conveniência; Para coletar as informações, foi aplicado um questionário estruturado com 10 perguntas fechadas a 150 alunos. As informações obtidas foram processadas sob o Statistical Package for the Social Sciences (SPSS) versão 19. É importante mencionar que foram criadas tabelas de contingência para o tratamento e a análise das informações. Os resultados mostram que a grande maioria dos estudantes utiliza constantemente o computador para realizar tarefas, trabalhos de pesquisa; Acima de tudo, é um dispositivo de suporte eletrônico para alunos e professores no campus. Da mesma forma, os alunos fazem uso de programas de automação de escritório orientados à criação de documentos e apresentações eletrônicas. Observa-se que esse tipo de ferramenta tecnológica se adapta às necessidades educacionais.

Palavras-chave: ambientes de aprendizagem, ensino médio, educação de jovens, tecnologia digital, tecnologia educacional, TIC.

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Introduction

The universe of education has changed profoundly: the birth of a new era of digital education bets on social human expression. In this way, the arrival of a new paradigm of social development is among us. This development is known as technological inclusion (Petrella, 2001, cited in López, Damián, Garza and Rosales, 2017).

Colorado and Edel (2012) affirm that, currently, with the advances in technology, teachers experience changes in their cognitive structure by virtue of facing new ways of learning to teach, that is, having access and learning to use different technological resources as tools for the teaching-learning process.

And according to Razo and Cabrero (2015):

Information technologies are an increasingly common resource in the work of students in class, although they are mainly used as means for the dissemination and communication of data, that is, in projections, in the presentation of the class, in the explanation and solving questions and in transcription activities (p. 26).

Taking into account the above, the present research, carried out in the city of Tepic, Nayarit, Mexico, has the main objective of disseminating statistical information that allows us to know the usefulness of the technological tools applied at the upper middle level. Likewise, it analyzes through the students the management and knowledge of technologies focused on teaching-learning.

To close this section we will say that, following Hernandez (2017), current students use technological tools to facilitate learning, and that the search to improve study brings with it the task of involving technology with education.

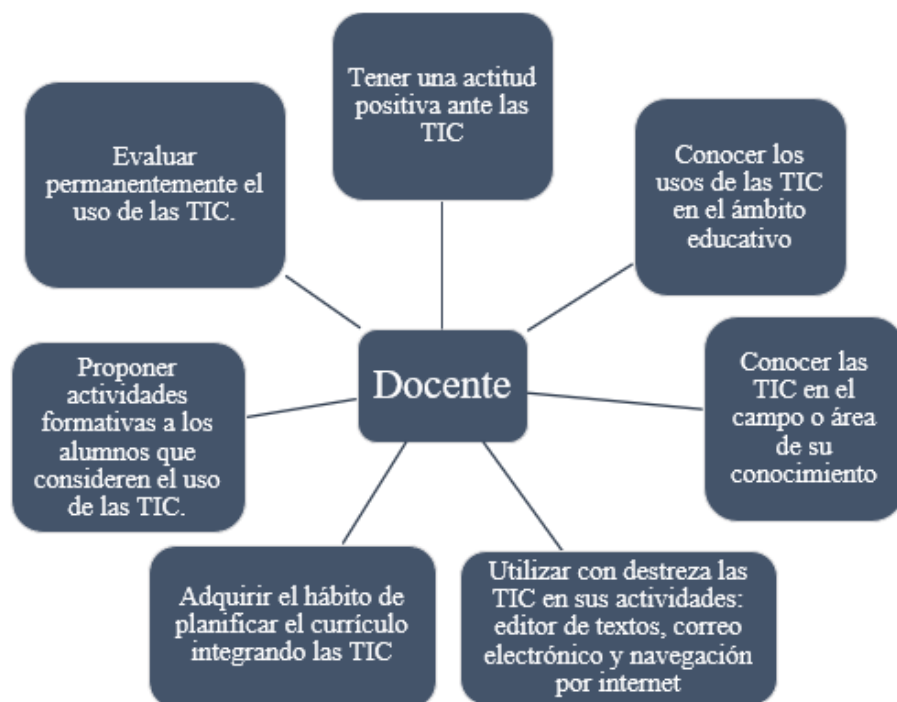
ICT in education

The use of information and communication technologies (ICT) in the classroom has an impact that manifests itself, according to the vision of a group of teachers who participated in the work of Muñoz (2011), in opening the possibility to teachers and students to access from the classroom remote information, images, videos, listening resources, which facilitate learning.

Likewise, Zenteno and Mortera (2011) affirm that the integration of ICT to the teaching-learning process implies changes in education, where the student and teacher need to incorporate skills and abilities in the management of educational technology within the classroom. Hence, teachers constantly seek information about how to use ICT in teaching and learning processes (Kishi, Avril and Nonaka, 2014).

In this regard, Morales (2013) defines the digital skills that a teacher must have for the proper use of ICT in the classroom, as shown in Figure 1.

Figura 1. Competencias digitales del docente



Fuente: Elaboración propia con base en Morales (2013)

Therefore, ICTs are tools that have contributed to the transformation of society in various aspects, including, of course, education, where they have had a strong impact. A clear example is the students who are currently training in universities and institutions (Montoya, 2019). It is true that, according to Kubota (2014), the use of these technologies in educational sectors varies, depending on education, systems, school cultures and mainly technological environments.

ICT as a teaching-learning resource

In order to promote the acceptance of technology, and maintain an ICT-based environment, teachers, principals and coordinators should provide technical support on the use of these tools, and thus promote education (Terashima, Nakagawa , Kobayashi and Murai, 2019).

Likewise, the training guides people to have a better performance in the management and knowledge of these electronic tools, understanding that this, the training, aims to improve both the process and the final product (Montoya, 2019).

For their part, Rodríguez, Martínez and Lozada (2009) conceive of digital with increasing importance, to such a degree that it imposes on the teacher the mastery of ICT to reinforce learning within education.

The relevance of ICT in education results from pedagogical procedures and didactic activities, since these are what motivate one type or another of learning; for example, with expository teaching, ICT promotes reception learning; With a teaching oriented to the active and participative construction of knowledge by the students themselves, ICT facilitate learning by discovery. In this sense, teachers use technologies to do substantially the same thing they had been doing, but in a faster, more dynamic and attractive way. (Santiago, Caballero, Gómez y Domínguez, 2013, p. 102).

Finally, Takabayashi (2017) considers that, with the appearance of several innovative technological means, students can choose their own way of learning. In addition to this, with the development of ICT, many students can access information more easily.

Statistical data on the use and knowledge of ICT in the state of Nayarit

Below, Table 1 presents statistics on the management and knowledge of ICT in the state of Nayarit. These figures were provided by the National Institute of Statistics and Geography [Inegi] (2015).

Tabla 1. Estadísticas sobre el uso de las TIC en Nayarit

<ul style="list-style-type: none"> • En 2014, de la población de seis años o más del estado, 45.2 % se declaró usuaria de Internet.
<ul style="list-style-type: none"> • 46.1 % de los nayaritas de seis o más años usaba computadora.
<ul style="list-style-type: none"> • En 2014, 35.9 % de los hogares del estado de Nayarit cuenta con una conexión a Internet.
<ul style="list-style-type: none"> • 64.1 % de los hogares cuenta con un servicio de telefonía independiente de su modalidad.
<ul style="list-style-type: none"> • 29.8 % de los hogares nayaritas tiene acceso a la televisión digital.

Fuente: Elaboración propia con base en Inegi (2015)

Thus, the importance of information management in decision-making in all areas of life is undoubtedly linked to access and use of ICT; In this dynamic, the computer and the Internet are undoubtedly the leading elements of the growing technological acceptance (Inegi, 2015). Likewise, Garza (2013) maintains that the Internet is a medium whose nature implies the discriminated use of information that adheres to individual profiles of conception of social reality.

Main goal

The following research has the main objective of disseminating statistical information that allows us to know the usefulness of technological tools applied at the upper middle level. Likewise, it analyzes through the students the management and knowledge of technologies focused on teaching-learning.

Research question

From the above, the following research questions are derived: are the technological tools useful in the teaching-learning processes within the upper secondary education system? Do the students present prior knowledge for the management of the technological tools? What electronic resources does the student use to carry out his / her school activities?

Methodology

This work was carried out with a descriptive approach of a quantitative type. To determine the sample, the non-probability sampling technique was used for convenience, that is, it allows selecting those accessible cases that agree to be included (Otzen and Manterola, 2017). To better illustrate convenience sampling, it is the one with which the sample units are selected according to the convenience or accessibility of the researcher (Tamayo, 2001). Taking into account the above, a sample of 150 students was determined.

Information gathering method

To collect the information, a structured questionnaire with 10 closed questions was applied to students enrolled in the upper middle level, who belong to the first, second and third year of high school, as shown, by way of illustration, in figure 2.

Figura 2. Alumnos respondiendo el cuestionario

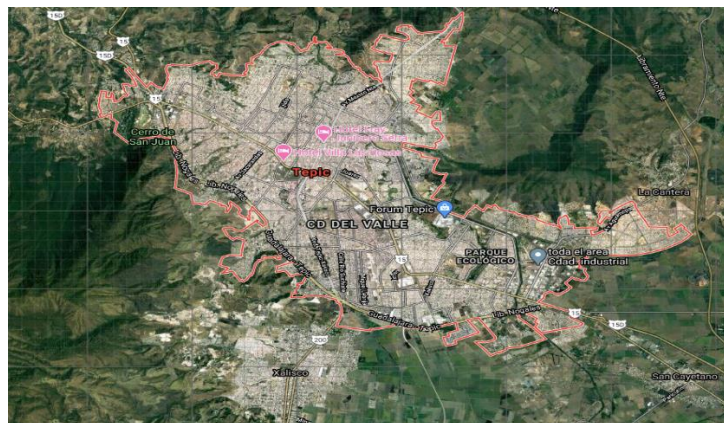


Fuente: Elaboración propia

The information obtained was processed under the statistical program Statistical Package for the Social Sciences (SPSS) version 19. It should be mentioned that for the treatment and analysis of the information, contingency tables were created, where the results are presented together with their respective graphs.

The investigation was carried out in the city of Tepic, located in the state of Nayarit, Mexico. The state borders Sinaloa and Durango to the north, and Durango, Zacatecas and Jalisco to the east (Aregional, 2009) (see figure 3).

Figura 3. Ubicación geográfica de la ciudad de Tepic



Fuente: Elaboración propia con base en imágenes del Google Maps (s. f.)

Results

The results and discussion of the applied questionnaire are presented below.

According to the results obtained, the ages of the first-year students are as follows: 24.7% are between 15 and 25 years old; 2.7% between 26 and 35 years old, and 6% between 36 and 45 years old. In the second year, 24.7% are between 15 and 25 years old; 6% from 26 to 35 years old, and 2.7% from 36 to 45 years old. Regarding the third year, 17.3% is in the range 15-25 years; 8% in the 26-35 year old; 6% in the range 36-45 years, and 2% in the age range 46-50 years. These figures are also observed in Table 2.

Tabla 2. Edad de los estudiantes encuestados

Edad	Primer año	Segundo año	Tercer año	Total
15 a 25 años	24.7 %	24.7 %	17.3 %	66.7 %
Recuento	37	37	26	100
26 a 35 años	2.7 %	6 %	8 %	16.7 %
Recuento	4	9	12	25
36 a 45 años	6 %	2.7 %	6 %	14.7 %
Recuento	9	4	9	22
46 a 50 años	0 %	0 %	2 %	2 %
Recuento	0	0	3	3

Fuente: Elaboración propia

Regarding sex, the results indicate that, taking into account the total sample, the first-year male participants make up 10% and the female participants 23.3%. As for the second year, those of the male sex make up the figure of 13.3% and those of the female sex that of 20%. Finally, of the total, 10.7% are male and third year, and 22.7% female and third year, as shown in Table 3.

Tabla 3. Sexo de los estudiantes encuestados

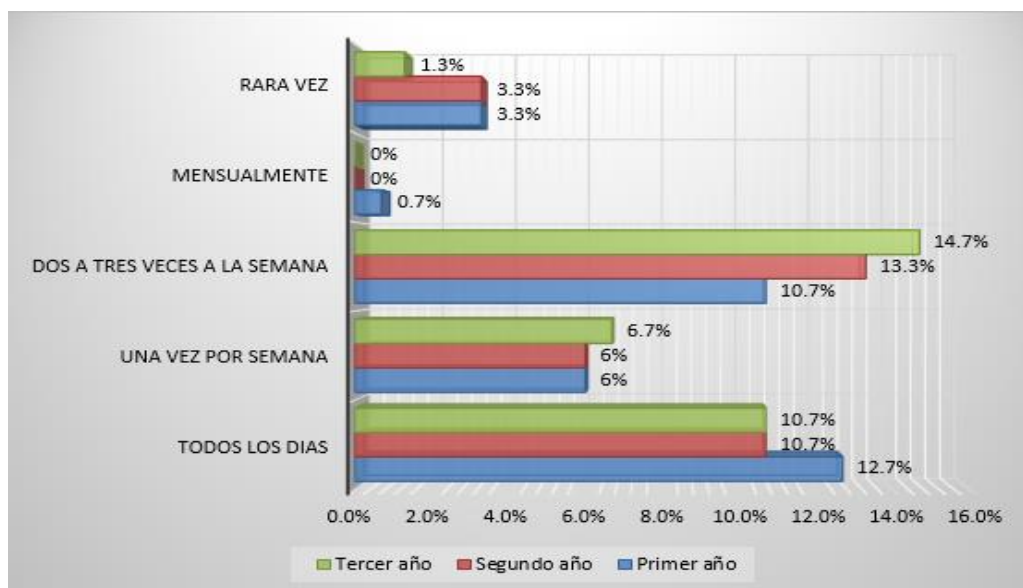
Sexo	Primer año	Segundo año	Tercer año	Total
Masculino	10 %	13.3 %	10.7 %	34 %
Recuento	15	20	16	51
Femenino	23.3 %	20 %	22.7 %	66 %
Recuento	35	30	34	99

Fuente: Elaboración propia

Use of technologies

Now, regarding the question "How often do you use a computer equipment, or your own equipment, during your studies?", The results for the first year were: 12.7% every day, 6% once a week, 10.7% two to three times a week, 0.7% monthly and 3.3% rarely. For the second year, 10.7% indicated that every day, 6% once a week, 13.3% two to three times a week and 3.3% mentioned that rarely. For the third year, 10.7% answered that every day, 6.7% once a week, 14.7% two to three times a week and 1.3% rarely uses computer equipment, as seen in figure 4.

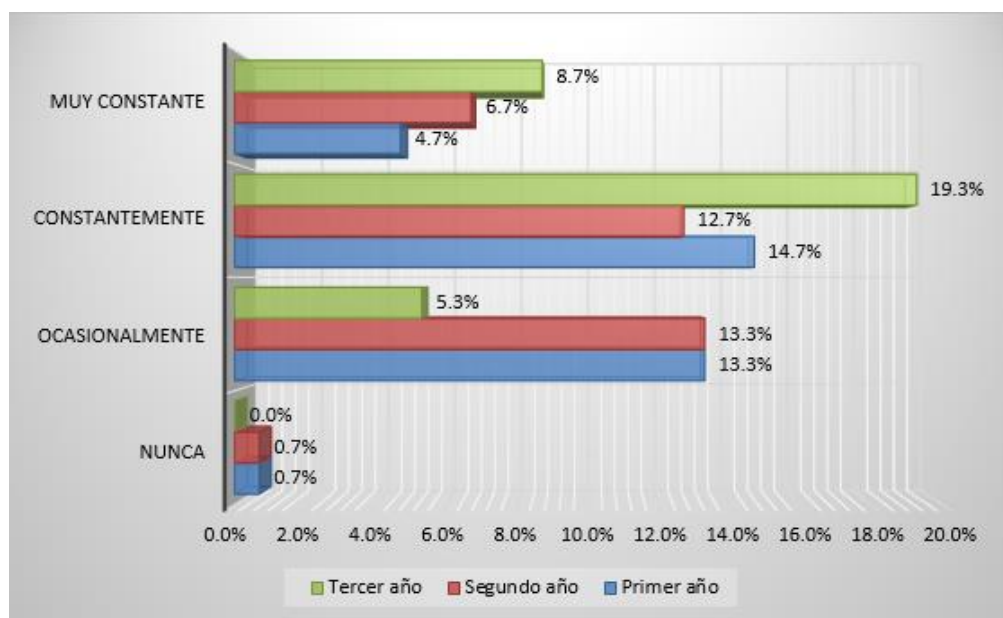
Figura 4. ¿Con qué frecuencia utilizas un equipo de cómputo, o tu propio equipo, durante tus estudios?



Fuente: Elaboración propia

When asked “How often does the teacher ask you to make use of technologies (Internet, search engines, programs, tutorials, email, forums, etc.)? 0.7% of first-year participants mentioned that never, 13.3 % replied that occasionally, 14.7% constantly and 4.7% very frequently frequent this type of technology. Regarding the second year, 0.7% of the participants opted to say that never, 13.3% mentioned that occasionally, 12.7% constantly and 6.7% very constantly. Finally, the third year students in 5.3% mentioned that occasionally, 19.3% said that it was constantly and 8.7% answered that it was very constant, as shown in figure 5.

Figura 5. ¿Con qué frecuencia el profesor te pide que hagas uso de las tecnologías (Internet, motores de búsqueda, programas, tutoriales, *email*, foros, etc.)?

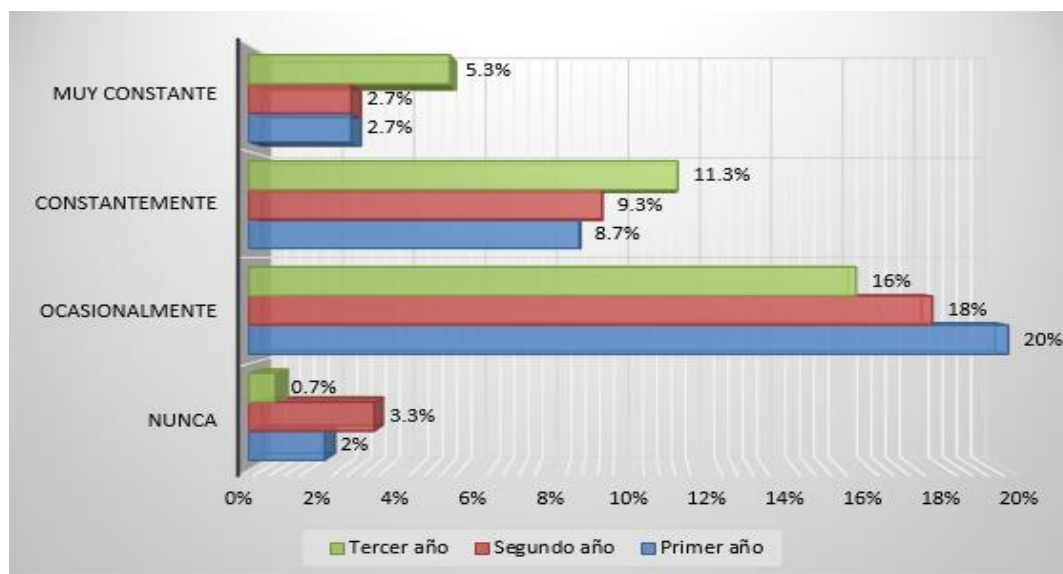


Fuente: Elaboración propia

For the next question, “Do you use devices such as a projector, computers to carry out activities in the classroom?”, The results are as follows: first year, 2% answered never, 20% occasionally, 8.7% constantly and 2.7% very constant; In the second year, 3.3% said that never, 18% occasionally, 9.3% constantly and 2.7% very constantly, and with respect to third-year students, 0.7% expressed that never, 16% occasionally, 11.3% constantly and 5.3% consistently. very constant.

Furthermore, it is recognized that the majority of students use electronic devices to support their activities within the classroom, allowing a more fluid interaction between teaching and learning, as seen in Figure 6.

Figura 6. ¿Utiliza dispositivos tales como proyector, computadoras para realizar actividades dentro del aula?



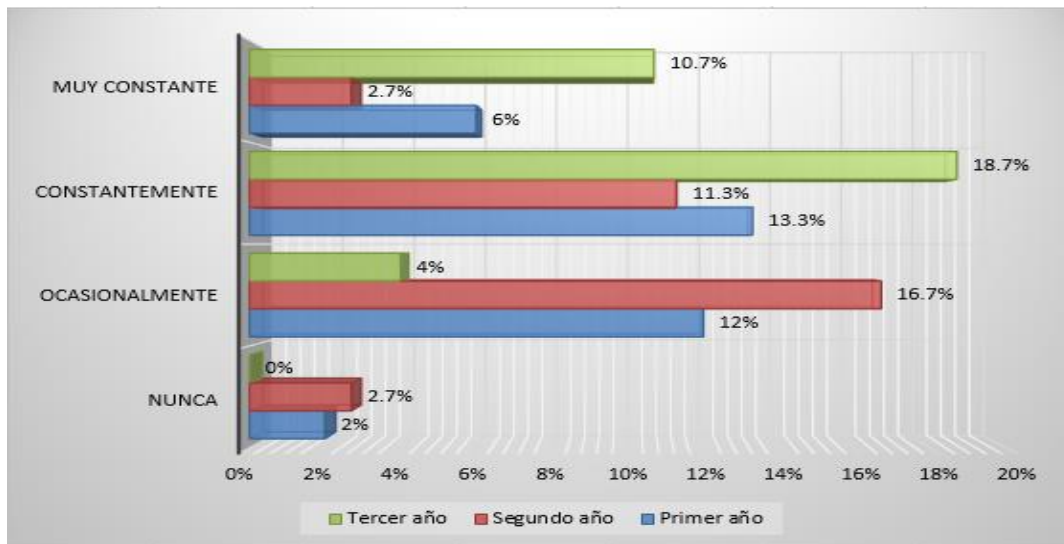
Fuente: Elaboración propia

Regarding the item “Do you use the computer to carry out team tasks?”, Of the students surveyed in the first year, 2% answered that they never, 12% occasionally, 13.3% constantly, and 6% mentioned that it was very constant.

On the other hand, 2.7% of second-year students said that never, 16.7% that occasionally, 11.3% expressed that constantly and 2.7% said that very constantly. Lastly, 4% of third-year participants said that occasionally, 18.7% opted for answering constantly, and 10.7% confessed that they do so very consistently.

It is worth mentioning that the vast majority of students constantly use the computer to carry out tasks, assignments and research; above all, it is an electronic support device for students and teachers on campus, as shown in figure 7.

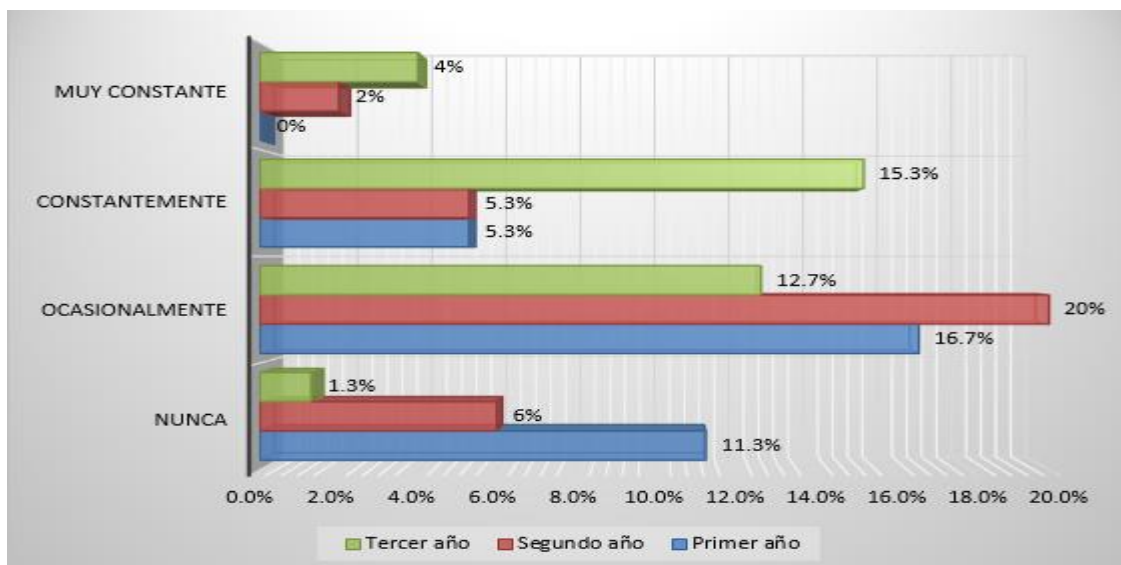
Figura 7. ¿Hace uso de la computadora para desarrollar tareas en equipo?



Fuente: Elaboración propia

The results to the question "Have you sent homework or any other type of attached documentation via email?" They are as follows: 11.3% of the first year said that they have never sent attached documentation, 16.7% that occasionally and 5.3% that constantly. Regarding the second year set, 6% said never, 20% occasionally, 5.3% constantly and 2% very constantly. In the third year, 1.3% mentioned that never, 12.7% that occasionally, 15.3% constantly and 4% very constantly (see figure 8).

Figura 8. ¿Ha enviado tareas o cualquier otro tipo de documentación adjunta a través del correo electrónico (*email*)?

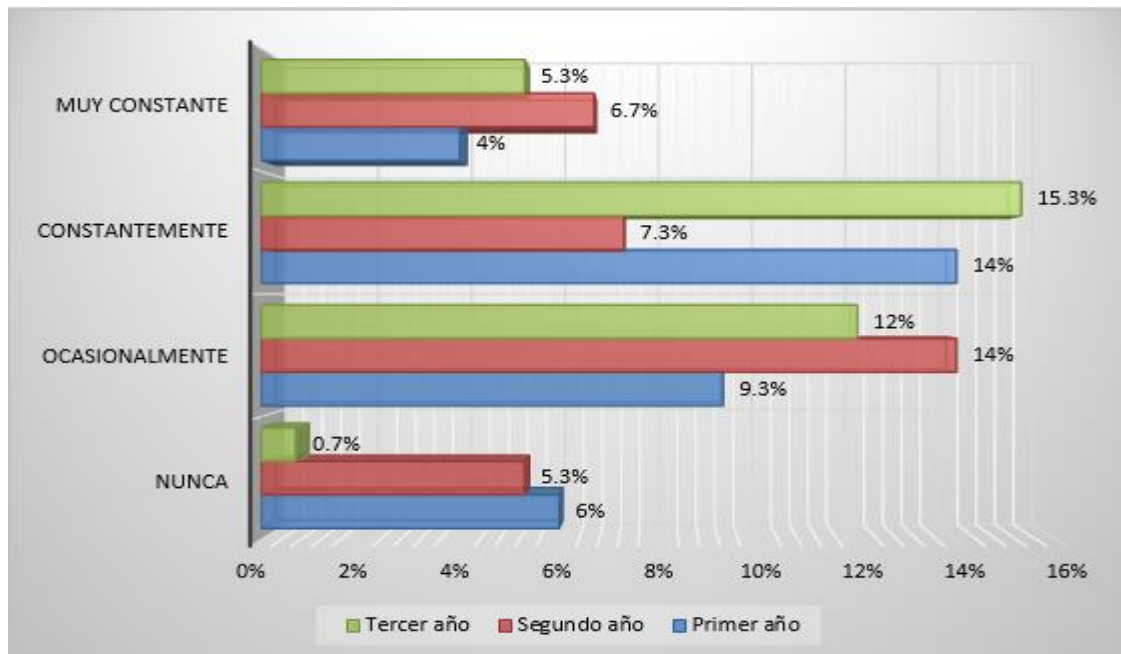


Fuente: Elaboración propia

"Have you downloaded electronic resources available on the Internet to carry out your academic activities?" was the question that continued, and to which 6% of the freshmen 6% answered that they have never downloaded resources from the Network, 9.3% occasionally, 14% constantly and 4% very constant. Regarding the second year, 5.3% said that never, 14% that occasionally, 7.3% expressed that they do this constantly and 6.7% very constantly. Finally, 0.7% of third-year students expressed that never, 12% occasionally, 15.3% constantly, and 5.3% very constantly.

The results show that students make use of these available resources and that thanks to this they perform better within the school, as shown in figure 9.

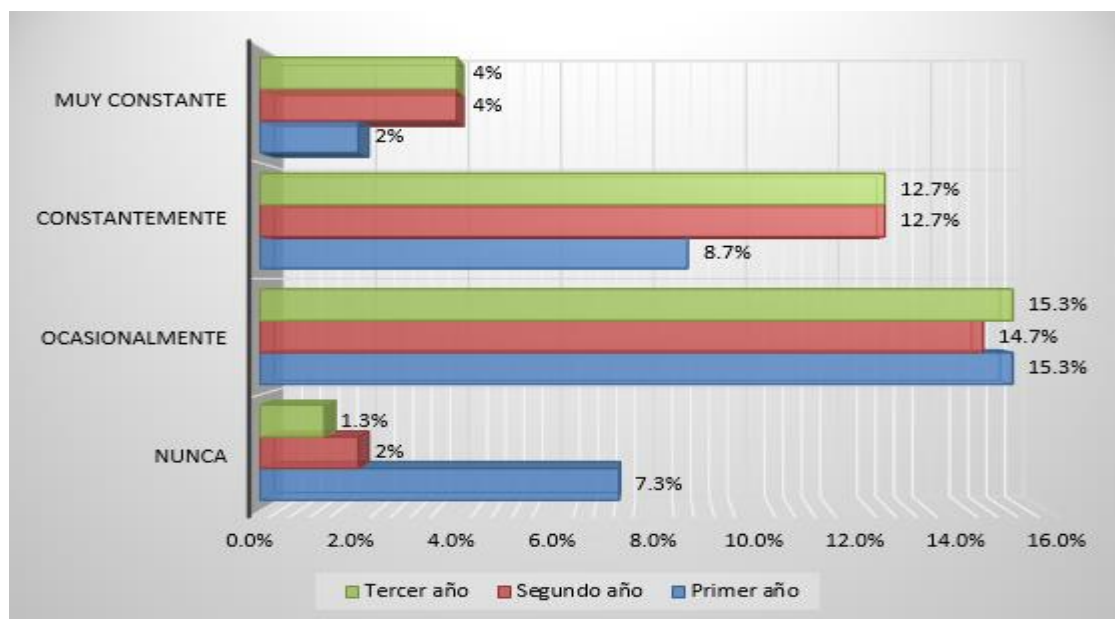
Figura 9. ¿Ha descargado recursos electrónicos disponibles en Internet para desarrollar sus actividades académicas?



Fuente: Elaboración propia

However, 7.3% of first-year students responded that teachers have never provided electronic materials to teach the class, 15.3% said that occasionally, 8.7% constantly and 2% very consistently. Regarding second-year students, 2% said that they never did, 14.7% occasionally, 12.7% constantly, and 4% that they do it very constantly. Third-year students reported that 1.3% of teachers do not provide materials for electronic use, 15.3% do so occasionally, 12.7% constantly, and 4% very constantly, as shown in figure 10.

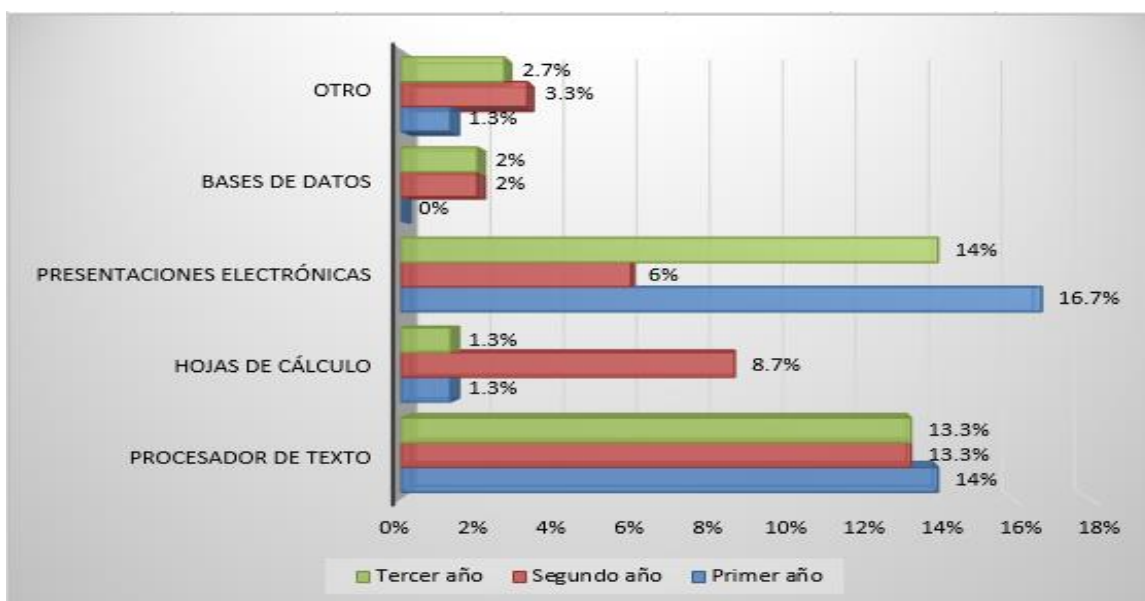
Figura 10. ¿Los profesores han proporcionado materiales de uso electrónico para impartir la clase?



Fuente: Elaboración propia

Finally, the results show that the students of the different grades make use of programs oriented to the creation of documents and electronic presentations. This is understood since this type of office software is tailored to the needs of schoolchildren, so they are highly supportive in their academic training, as shown in Figure 11.

Figura 11. ¿Cuál de estos programas utiliza constantemente para sus actividades académicas?



Fuente: Elaboración propia

Discussion

The following results demonstrate that the average age of the students involved who use this type of technological tools ranges between 15 and 25 years, a range that includes 66.7% of the total population surveyed. Also, that 66% female students are more familiar with this type of tools. It is worth noting that the constant use of these technologies opens a digital gap for the performance and development of school and social activities that are demanded today in the educational sphere.

Thus, with the 150 students surveyed, it was determined that for the three high school grades the frequency with which they use computer equipment during their studies is two to three times a week (38.7%). In addition, 46.7% is constant with the use of technologies, for example, the management of search engines, programs, video tutorials, email, office tools, etc.

The weakest area observed was the use of devices such as the projector or the computer itself in the classroom. In this sense, teachers should encourage the use of electronic devices in the classroom, through concurrent activities with this type of technology, or by implementing workshops to strengthen their skills.

The student was also asked if they have sent attached documentation through email, and it was found that 49.4% make occasional use of this type of tool.

One of the strengths found in this research was the management of the resources available within the Network by the participants: it can be seen that 36.6% of the students download this type of resources to complete tasks and research work, among others. .

Finally, the students of the different grades make use of office programs to create documents and electronic presentations, because this type of program is adapted to the needs of the students, as well as the implementation of collaborative work between them.

Conclusions

Certainly, we live in a world where new technologies are revolutionizing the way of teaching and learning. ICTs have taken the role of supporting tools for teaching. They are very useful in private and public educational institutions, without neglecting the social part, where they play an important role. It is now difficult to conceive of education without the inclusion of these tools.

The results found in this research demonstrate that students are familiar with this type of technology, mainly for information management and manipulation. It is observed that, of the total of students surveyed, 98.7% make use of them; They show that they have the ability to use the Internet, search engines, programs, tutorials, email, forums, etc. In this way, it is known that students resort to the electronic resources available within the Network necessary for their academic development.

In this line, 95.3% of the surveyed students use the computer as a primary technological tool for the development of tasks or research work, and above all it is a support device for students and teachers on campus; However, we must not lose sight of the fact that the remaining percentage, 4.7%, does not make use of these technologies for school activities or simply downplays the benefit provided by this type of tool.

Likewise, students make use of office programs aimed at solving basic and common activities. In this regard, 40.6% of the students use word processors to create documents and other necessary documentation, while 36.7% require working with electronic presentations for the exhibition of research work and teamwork within the classroom; not less important is the fact that 22.6% refer to making use of spreadsheets for tasks focused on statistics, a database for the management and manipulation of information.

In sum, attending to the research questions posed previously, much of education is focused on the use and knowledge of ICT, from which it is possible to have self-taught students trained in problem solving and information management. , and form study groups and achieve the collaboration that teamwork requires, all of which opens a gap towards a continuous and technological education within the campus.

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