Revista Iberoamericana para la Investigación y el Desarrollo Educativo
ISSN 2007 - 7467

https://doi.org/10.23913/ride.v12i24.1166

Artículos científicos

El impacto de la pandemia en estudiantes de nivel secundaria en Sinaloa, México

The Impact of the Pandemic on Basic School Students in Sinaloa, México

O impacto da pandemia em estudantes do ensino médio em Sinaloa, México

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ISSN 2007 - 7467

Resumen

La covid-19 apareció por sorpresa a finales del 2019 y generó dificultades en todas las áreas de la sociedad. Esta investigación se enfoca en analizar el impacto de la pandemia en estudiantes de educación básica. Para ello, se consideraron tres aspectos principales: el apoyo de los padres, el uso de la tecnología y el impacto de la pandemia en la familia. Y se administró un instrumento a una muestra de 271 estudiantes. Los resultados muestran que los padres o tutores están brindando un importante apoyo a los estudiantes en sus actividades escolares y que los estudiantes están ansiosos por regresar a clases de forma presencial. Así, de entre todo lo acontecido, ha aparecido la posibilidad de mejorar la educación basada en un esquema educativo más flexible.

Palabras clave: apoyo de los padres, covid-19, educación básica, pandemia.

Abstract

The COVID-19 appeared by surprise at the end of 2019 and generated difficulties in all areas of society. This research focuses on analyzing the impact of the pandemic on basic education students. To do this, three main aspects were considered: parental support, the use of technology and the impact of the pandemic on the family. And an instrument was administered to a sample of 271 students. The results show that parents or guardians are providing important support to students in their school activities and that students are eager to return to classes in person. Thus, among all that has happened, the possibility of improving education based on a more flexible educational scheme has appeared.

Keywords: parental support, COVID-19, basic education, pandemic.

Resumo

A covid-19 apareceu de surpresa no final de 2019 e gerou dificuldades em todas as áreas da sociedade. Esta pesquisa tem como foco analisar o impacto da pandemia nos alunos da educação básica. Para isso, foram considerados três aspectos principais: o apoio dos pais, o uso da tecnologia e o impacto da pandemia na família. E um instrumento foi aplicado a uma amostra de 271 alunos. Os resultados mostram que os pais ou responsáveis estão prestando importante apoio aos alunos em suas atividades escolares e que os alunos estão ansiosos para

retornar às aulas presenciais. Assim, entre tudo o que aconteceu, surgiu a possibilidade de melhorar a educação a partir de um esquema educacional mais flexível.

Palavras-chave: apoio parental, covid-19, educação básica, pandemia.

Fecha Recepción: Octubre 2021 **Fecha Aceptación:** Abril 2022

Introduction

At the end of 2019, a phenomenon emerged in China that changed the behavior of people in the world. As of March 2020, the World Health Organization (WHO) characterized coronavirus disease 2019 (covid-2019) as a pandemic. By then, the type 2 coronavirus causing severe acute respiratory syndrome (SARS-CoV-2) had already spread to all continents, its high degree of transmissibility and mortality had been proven (Cahapay, 2020; Gutierrez, 2020). . Until 2019, pandemics were a well-founded assumption; they were anticipated, but there was not enough attention. The question was not if a pandemic would happen, but when and where it would start (Gutierrez, 2020).

The COVID-19 outbreak affected all aspects of human activities globally: education, research, sports, entertainment, transportation, worship, social gatherings/interactions, the economy, business, and communication. policy (Onyema et al., 2020). The effects are immense, not only because of the associated morbidity and mortality, which already makes it an international public calamity, but also because of its collateral effects on family productivity, employment and income. Indeed, the economy of nations is also one of the victims, of the negative consequences. By reducing the consumption of perishable and non-perishable products, and the production of goods and services at a global level at half speed, income is seriously affected (Gutierrez, 2020).

The education sector is one of the most affected by the pandemic. In an attempt to contain the spread of covid-19, educational institutions in the vast majority of countries around the world have had to quickly adapt to the situation and temporarily suspend face-to-face instruction, moving to a remote learning teaching model. (Di Pietro, Biagi, Costa, Karpiński y Mazza, 2020; Teräs, Suoranta, Teräs y Curcher, 2020).

The pandemic initiated an extensive, sudden and dramatic digital transformation in society. The pandemic forced an extraordinary digital leap in daily life and practices, including care and attention by families to their children and their education. Suddenly, a

whole generation of children and adolescents had to start managing and mastering digital tools to participate in their compulsory basic education. This required significant adjustments, not only from students and teachers, but also from their families, school administration, and society as a whole. Teachers and schools had to take the lead in this sudden and unexpected digital transformation of basic education without being well prepared for it (Iivari, Sharma, & Ventä, 2020).

School closure in its face-to-face form and the adoption of distance learning can negatively affect student learning through four main channels: less time spent learning, symptoms of stress, a change in the way students students interact and lack of motivation to learn. However, despite this, distance education is essential to ensure the continuity of learning in situations where face-to-face classes are suspended (Di Pietro et al., 2020).

Covid-19 and school closures may not affect students equally. Students from disadvantaged backgrounds may experience more significant learning loss during this emergency period. This may be due to differences in parental financial support, parental monthly income, student education, schools attended, and digital skills students had prior to the pandemic (Di Pietro et al. , 2020).

Definitely, not all students are in equal conditions to participate in digitized basic education. There are problems with internet access, devices and necessary applications. There are students and families who lack them (Onyema et al., 2020). Even in these moments of pandemic, it is likely that there will be crises in both students and teachers, as has been reported in several countries, where each other, including parents, complain about the high workload that came with the change due to the health emergency (Gutierrez, 2020). On the other hand, one of the main problems of current distance education is that parents, unexpectedly, have had to assume the role of teacher. In many cases, parents do not have the training resources, the time, the material conditions and the disposition of spirit required to get ahead (Ruiz, 2020).

Considering the pandemic and the new academic load of mothers and fathers, this research focuses on determining the support that students have received in the distance learning process in the northern area of the state of Sinaloa, Mexico. This study considers basic level students in secondary education, that is, students between 11 and 15 years old. An instrument with four main categories was designed and applied: 1) basic information, 2) parental support, 3) use of technology, and 4) the impact of the pandemic on the family and

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their opinion about it. With the information collected, a descriptive analysis is made and relationships between variables that can help interpret the situation in students are sought.

This article is organized as follows. The second section establishes research background. The third section explains the work methodology to collect information through an experiment. The fourth section shows the results of the experiment. The fifth section describes the discussion of the results. Finally, the conclusions and references used in this document are displayed.

Background

Next, some aspects that surround the research are described and establish a context that allows us to understand its importance.

The model of education at the secondary level in public schools in Mexico

In the words of the Ministry of Public Education [SEP] (2017):

> The purpose of basic and upper secondary education is to contribute to forming free, participatory, responsible and informed citizens, capable of exercising and defending their rights, who actively participate in the social, economic and political life of Mexico and the world. In other words, the Educational Model seeks to educate people who have the motivation and ability to achieve their personal, work and family development, willing to improve their social and natural environment, as well as to continue with their academic and professional training. (p. 46).

The educational model includes five main axes, through which it is expected that it will contribute to the children and young people of our country developing their potential to be successful in the 21st century (SEP, 2016, 2017): 1) The curricular approach, 2) The school at the center of the education system, 3) Teacher training and professional development, 4) Inclusion and equity, and 5) The governance of the education system. This section emphasizes four main elements included in the model, which converge with the purpose of the study shown in this article: aspects of socialization, the use of technology, the role of the teacher and the role of parents. in the teaching-learning process.

Similarly, the SEP (2017) presents the student's graduation profile at the end of each educational level. In the case of secondary level, in the field of "digital skills", it is indicated

that the graduate "compares and chooses the technological resources available to her and uses them for a variety of purposes in an ethical and responsible manner. He learns various ways to communicate and obtain information, select it, analyze it, evaluate it, discriminate it and organize it" (p. 52).

Prior to the pandemic, secondary school adolescents already made considerable use of information and communication technologies (ICT) to support themselves in school tasks, highlighting the use of the Internet. It is worth mentioning that ICT was then a support tool, but not the main instrument in the teaching-learning process. However, with the pandemic the role was reversed.

The role of teachers and parents in adolescent learning

The SEP (2017) also proclaims the pedagogical principles of teaching. The third of them, "Offering accompaniment to learning", is broken down as follows:

> Effective learning requires accompaniment from both the teacher and other students. Directors, teachers, librarians, parents and others involved in the formation of a student generate educational activities and provide environments and social and cultural spaces conducive to the intellectual and emotional development of the student (p. 87).

Even though the benefit of parental participation was stated, in the pre-pandemic model, only school actors were commonly involved in the adolescent learning process. Particularly in Mexico, there are families where parents do not have the academic level to accompany their children in homework. However, under the circumstances of the pandemic, the role of parents, especially mothers, has changed from an observer to an important agent in supporting their children in learning.

Other principles enunciated by the SEP (2017) are the following:

> *Show concern for your students' interests*
>
> - It is essential that the teacher establishes a close relationship with the student, based on their interests and their particular circumstances. This closeness will allow you to better plan teaching, and look for contextualizations that invite them to get more involved in their learning."

Give a strong weight to the intrinsic motivation of the student

- The teacher designs strategies that make knowledge relevant, foster the student's appreciation for himself and for the relationships he establishes in the classroom with others. In this way, it encourages the student to take control of their learning process."

Understand evaluation as a process related to planning and learning

- When the teacher provides feedback to the student with clear, objective and constructive arguments about their performance, the evaluation acquires meaning for them as it provides elements for self-regulation and improvement of their learning. (pp. 88-89)

During the pandemic, the close relationship between teacher and student has become complicated, whether due to asynchrony in classes, the barrier of electronic communication, or limited opportunities for teamwork supervised by the teacher. Under these circumstances of individualized learning, the adolescent does not have the scenarios through which he can assess the benefit of the relationships established in the classroom.

On the other hand, the feedback that the teacher normally sends to the students in face-to-face learning has been considerably reduced in the remote environments that the pandemic has imposed.

Socialization aspects in school education

Yet another pedagogical principle highlights the role of socialization in learning:

Recognize the social nature of knowledge

- Social interaction is irreplaceable in the construction of knowledge, for which it is essential to foster collaboration and foster environments in which group work is central.
- Cooperative work allows students to debate and exchange ideas, and for the most advantaged to contribute to the training of their classmates. Thus, it fosters the emotional development necessary to learn to cooperate and live in a community.
- The student must know that she shares the responsibility of learning with the teacher and with her peers. (p. 88).

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As can be seen, the same educational model contemplates the social coexistence of adolescents, inside and outside of school, as a basis for constructive learning. However, under the circumstances of the pandemic, social coexistence for learning has been highly affected.

The impact of the covid-19 pandemic on adolescents

The covid-19 pandemic is both a health crisis and a social and economic threat; it has created extremely challenging situations, particularly for the most vulnerable. The impact on children, adolescents and their families was and continues to be devastating, with illness, isolation, fear and loss of livelihood (United Nations Children's Fund [UNICEF], 2020).

To date, there is no precise evidence of the impacts of the pandemic on human aspects, especially on the psychological impact of confinement due to covid-19 in the general population (Sánchez, 2021). However, there are real manifestations of emotional problems in the young population, and there are studies that assess the psychological impact of the situation as significant, with symptoms of depression, anxiety and stress ranging from moderate to severe and a notable prevalence of symptoms of post-traumatic stress (Li , Wang, Xue, Zhao, and Zhu, 2020).

In the case of adolescents, their vulnerability is undeniable, since their adaptation, assimilation and creativity capacities are distinctive, which are qualities that allow a successful transition through unsuspected situations (Sánchez, 2021). Then, it would be necessary to assess what condition this population would be in and what its prospects would be before this sudden and complex experience.

The educational field is a sector directly affected by this situation of confinement. There has been a sudden transition from school education to distance education. In the face-to-face model, the teacher is the transmitter of knowledge and direct supervisor of learning and feedback agent, and coexistence among students plays an important role in achieving constructive knowledge. In a distance education setting, both of these elements are severely diminished. To support the learning of new knowledge, and achieve the transmission of positive messages to peers, it is convenient to face this problem through the proper use of ICT, yes, but in conjunction with the consolidation of family and friendship ties in a suitable environment and with assertive advice from their caregivers (Sánchez, 2021).

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Methodology

This research mainly uses quantitative methodology. This methodology searches for invariants and statistical correspondence relationships between various variables in the mass of data obtained (Núñez, 2017). This type of research should be as objective as possible, so the phenomenon should not be affected by the researcher. Thus, the conclusions must be based only on the evidence of the data (Hernández, Fernández and Baptista, 2014). This research makes a descriptive analysis of the collected data, in addition to hypothesis tests, to find relationships between variables.

On the other hand, it has a slight touch of the qualitative method, since one of the questions is open and an analysis of the students' responses must be made to synthesize and express their ideas. In addition to this, some authors of this research work in the institution of study and know the administrative and academic aspects that prevail, in addition to having direct contact with the students and their families. Despite this, the results of this research, apart from the open question, are based only on the applied instrument and are quantitative in nature.

Sample, participants and study institution

The type of sample is non-probabilistic for convenience. This approach allows selecting those accessible cases that agree to be included. This based on the convenient accessibility and proximity of the subjects for the researcher. However, it should be clarified that the subjects must meet certain characteristics related to the objectives of the experiment (Hernández et al., 2014).

Given the current pandemic and the impossibility of applying surveys in person, this research interacted with the participants through an online survey in order to collect information. The online survey shows different advantages. Here are some of them: 1) it allows to collect a large number of responses quickly and at a very low cost, 2) the data already has an electronic format, which avoids the capture of information and thus saves time in the process, 3) they can do statistical analysis while the application process is in process, 4) the design of the online questionnaires allows an interface with the ability to use graphics, sound and video, so in some cases it can provide a higher response rate and 5) the perceived

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feeling of the Internet as an anonymous medium can be useful to investigate sensitive topics (Rocco and Oliari, 2007).

The survey was created and distributed over the Internet using Google Forms. Thus, it was possible to reach the participants to their homes. Despite the advantages mentioned above, a percentage of students did not answer the survey, because they did not have some form of internet connection or because there was no motivation to answer the survey, since participation was voluntary.

The participants were students from the SNTE High School morning shift in the city of Los Mochis. The only requirement to participate was to be enrolled in said high school and to have the motivation to participate in the research. The ages of the students ranged between 11 and 15 years and the three school grades were covered. ($\bar{X}_{edad} = 12.54$, $DE = 0.91$). The instrument was answered by 133 men (49.1%) and 138 women (50.9%) for a total of 271 participants.

The high school is located in a middle class area of the city of Los Mochis. It is a public school that subsists mainly with the resources provided by parents. She is in high demand on her morning shift, so groups are usually at full capacity. The school receives students mainly from the surrounding neighborhoods. It should also be noted that the students are mainly from the middle class, although there is also a minority from the lower class.

The high school's work scheme in the face of the pandemic was to leave activities through various platforms. He highlighted the use of WhatsApp and its groups, mainly for sending and receiving activities. Some other teachers formed groups in Google Classroom and did video conferences through Zoom or Google Meet. Teacher meetings were held periodically to review progress and solve problems in school activities.

Procedure

The experiment was developed as follows:

1) An analysis was made and a survey was designed to be applied online. The survey contains five general data questions, 14 multiple-choice questions, and one open-ended question.

2) The survey was applied two months after starting the 2020-2021 school year remotely.

3) The survey was distributed through WhatsApp groups with the help of the prefects in charge of each grade, who encouraged participation in the survey.
4) The data was collected automatically by the survey system used; the system even generated some easy-to-interpret graphs.
5) With the information collected, a descriptive statistical analysis was made and then an analysis to find relationships between variables.

Instrument to collect data (survey)

The survey was divided into four main areas:

1) *Basic information:* related to student data such as group, grade, age, gender and the average of the last grade completed. They were asked about their last grade of study because they had not yet finished the first trimester and their closest grade from the last year. These attributes represent variables related to the rest of the areas.
2) *Family support in school activities:* as its name indicates, it refers to the support provided by the mother, father or some other family member, and even non-family member, to carry out school activities. The issues for this area are:
    a) My parents or guardians are aware of my activities at school.
    b) Currently, how often do I receive support from my parents (guardians or family) to do my homework and school activities?
    c) I consider that the support of my parents (guardians or family) for my school activities has increased since classes are remote.
    d) Who mainly supports me for my school activities?
    e) Do your parents motivate you to study and get good grades?
3) *Use of technology:* this area considers whether the student has the necessary technology for distance communication, as well as the mastery of its use.
    a) Do I have the necessary electronic devices (computer, laptop, cell phone) to carry out my classes remotely?
    b) I have problems using technology in distance education (WhatsApp, email, Classroom, Zoom, Google Meet).
    c) How often does someone in your household need to be connected to the Internet at the same times as your classes?

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d) Do you have adequate space in your home to work? (desk, chair, lighting, without so much noise in the background).

e) Do I have internet for my school activities?

4) *The pandemic and distance education:* refers to the opinion of students regarding the pandemic and education, as well as the impact on their homes.

a) What kind of education do you prefer?

b) I feel comfortable with the dynamics of distance education that I am currently leading.

c) Has covid-19 financially harmed your family in any way? (job loss, drop in family income, unplanned expenses or travel)

d) Has any family member been sick with covid-19?

e) What is your opinion regarding the pandemic? (open question)

Statistic analysis

For the treatment and analysis of the data, the statistical tool SPSS is used. This tool offers advanced statistical analysis, plus it is easy to use, flexible, and scalable. Likewise, this tool includes a variety of graphs to represent the work information, which allows the data to be interpreted in a better way. The research graphs and some tables were generated with SPSS.

An intra-subject analysis was applied, that is, the same experiment was applied to all students and internal aspects of the sample were analyzed to explore whether the results obtained had a relationship between variables. To find these relationships, the data analysis applied several statistical tests (Flores, Miranda y Villasís, 2017; Hernández *et al*., 2014):

- Chi square: this test is used when you want to test relationships between categorical or nominal (qualitative) variables. It should be noted that the samples must be independent. If a variable is quantitative, a discretization process can be applied to make it qualitative. This test can be applied regardless of the type of distribution.
- Fisher's exact test: This test has the same objectives as the chi square. And it must be used instead of the chi square when the frequency found in the cells is less than five and these cells exceed 20% of the total number of cells generated between the crossing of both variables.

- Student's t test: this test is applied to related and independent samples with quantitative variables and normal distribution. It is generally used to compare averages between two groups. Generally, one variable is quantitative and the other qualitative.

Results

The results are part of the reality that the basic education student is experiencing at the secondary level, therefore, these results are different from what could have been taken in different circumstances.

As mentioned above, there were 271 students who participated in the survey: first graders were 141, second graders 94, and third graders 36. The most important results of the section family support in school activities are as follows (see table 1 for more details):

- “My parents or guardians are aware of my activities at school”: 91.88% of students argue that parents are almost always or always aware of their activities at school.
- "Currently, how often do I receive support from my parents (guardians or family) to do my homework and school activities?": 80.08% of students frequently receive support from their parents (guardians or family) to carry out their activities schoolchildren.
- “I consider that the support of my parents (guardians or family) for my school activities has increased since classes are remote”: 85.61% of the students argue that the support of parents (guardians or family) has increased since the remote classes as an emergent method.
- “Who mainly supports me for my school activities?”: a low percentage (5.54%) of the students do not receive support from a family member for their school activities; the rest do receive support from their mother or father, mainly (72.32%), although other family members, such as siblings, also provide support.
- “Do your parents motivate you to study and get good grades?”: 91.15% of students are motivated by their parents to study and get good grades.

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Tabla 1. Concentrado de resultados sección apoyo de la familia en actividades escolares

		Frecuencia	%
Mis padres o tutores están al tanto de mis actividades en la escuela (2X)	Nunca	0	0.0 %
	Casi nunca	8	3.0 %
	Neutral	14	5.2 %
	Casi siempre	41	15.1 %
	Siempre	208	76.8 %
	Total	271	100.0 %
Actualmente, ¿Con qué frecuencia recibo apoyo de mis padres (tutores o familia) para hacer mis tareas y actividades de la escuela? (6X)	Nunca	7	2.6 %
	Casi nunca	16	5.9 %
	Neutral	31	11.4 %
	Casi siempre	62	22.9 %
	Siempre	155	57.2 %
	Total	271	100.0 %
Considero que el apoyo de mis padres (tutores o familia) para mis actividades escolares aumentó desde que las clases son a distancia (7X)	No	34	12.5 %
	Sí	232	85.6 %
	No recibo apoyo de mis padres	5	1.8 %
	Total	271	100.0 %
¿Quién me apoya principalmente para mis actividades escolares? (9X)	Mis padres	196	72.3 %
	Mis hermanos	40	14.8 %
	Un familiar	17	6.3 %
	Otra persona	3	1.1 %
	Nadie	15	5.5 %
	Total	271	100.0 %
¿Tus padres te motivan para estudiar	No	1	0.4 %
	Casi no me apoyan	10	3.7 %
	Neutral	13	4.8 %

y obtener buenas calificaciones? (12X)	Casi siempre me apoyan	24	8.9 %
	Sí	223	82.3 %
	Total	271	100.0 %

Fuente: Elaboración propia

Some important aspects related to the student and the use of technology are described below (see table 2 for more details):

- "Do I have the necessary electronic devices (computer, laptop, cell phone) to carry out my classes remotely?": Most of the students (73.06%) have at least one electronic device that serves as a means of establishing communication digitally with their teachers.
- “I have problems using technology in distance education (WhatsApp, mail, Classroom, Zoom, Google Meet)”: almost half of the students (48.34%) confessed that they have no problems with the use of software, although the rest has had problems at some point.
- “How often does someone in your household need to be connected to the Internet at the same times as your classes?”: the results are widely distributed among the different response categories, although it is possible to see that always or almost always (46.87%) a person in the household also occupies the internet connection.
- “Do you have adequate space in your home to work? (desk, chair, lighting, without so much noise in the background)”: almost half of the students do not have or sometimes do not have a suitable place to work (46.87%).
- “Do I have the internet for my school activities?: a high percentage, 81.55%, of the students have the internet to carry out and send their school activities.

Tabla 2. Concentrado de resultados sección uso de la tecnología.

		Frecuencia	%
¿Cuento con los dispositivos electrónicos necesarios (computadora, laptop, celular) para llevar a cabo mis clases a distancia? (3Y)	No	24	8.9 %
	A veces	49	18.1 %
	Sí	198	73.1 %
	Total	271	100.0 %
Tengo problemas para usar la tecnología en la educación a distancia (WhatsApp, correo, Classroom, Xoom, Meet) (4Y)	No tengo problemas	131	48.3 %
	Algunas veces no tengo problemas	40	14.8 %
	Neutral	44	16.2 %
	Algunas veces sí tengo problemas	21	7.7 %
	Si tengo problemas	35	12.9 %
	Total	271	100.0 %
¿Con qué frecuencia alguna persona en tu hogar necesita estar conectado a Internet en los mismos horarios de tus clases? (8Y)	Nunca	59	21.8 %
	Casi nunca	25	9.2 %
	Neutral	60	22.1 %
	Casi siempre	45	16.6 %
	Siempre	82	30.3 %
	Total	271	100.0 %
¿Tienes en tu hogar un espacio adecuado para trabajar? (escritorio, silla,	No	53	19.6 %
	A veces	74	27.3 %
	Sí	144	53.1 %

iluminación, sin tanto ruido en el fondo) (10Y)	Total	271	100.0 %
¿Dispongo de internet para mis actividades escolares? (14Y)	No	15	5.5 %
	A veces	35	12.9 %
	Sí	221	81.5 %
	Total	271	100.0 %

Fuente: Elaboración propia

The opinion of the students regarding the pandemic and the distance education they currently carry out was (see table 3 for more details):

- “What type of education do you prefer?”: 66.79% of the students prefer face-to-face or traditional education, 22.51% feel comfortable with both modalities.
- "I feel comfortable with the dynamics of distance education that I am currently leading": a little more than half of the students (55.35%) are comfortable with virtual education so far.
- “Has covid-19 hurt your family financially in any way? (loss of employment, drop in family income, unplanned expenses or trips)”: a little more than half of the families of the students (56.06%) have been harmed in some way by covid-19.
- "Has a family member been sick with covid-19?": A little over half of the students (52.77%) have a family member who has been sick with covid-19.

Tabla 3 Concentrado de resultados sección la pandemia y la educación a distancia.

		Recuento	%
¿Qué tipo de educación prefieres? (5Z)	Virtual	29	10.7 %
	Presencial	181	66.8 %
	Cualquiera	61	22.5 %
	Total	271	100.0 %
Me siento cómodo con la dinámica de la educación a distancia que estoy llevando actualmente (1Z)	No	28	10.3 %
	Algo incómodo	14	5.2 %
	Neutral	79	29.2 %
	Algo cómodo	53	19.6 %
	Sí	97	35.8 %
	Total	271	100.0 %
¿De alguna manera la covid-19 ha perjudicado económicamente a tu familia? (pérdida de empleo, baja en los ingresos familiares, gastos o viajes no planeados) (11Z)	No	119	43.9 %
	Sí	152	56.1 %
	Total	271	100.0 %
¿Algún familiar ha enfermado de covid-19? (13Z)	No	128	47.2 %
	Sí	143	52.8 %
	Total	271	100.0 %

Fuente: Elaboración propia

These are the results in general. In the discussion section, an in-depth analysis of the data and the relationship between the variables is carried out.

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Statistic analysis

According to an exploratory analysis of the data, some relationships between variables were found. The first hypothesis represents the main finding of the investigation, since it is directly related. The second and third hypotheses represent secondary findings, since they are indirectly related to the research. The hypotheses are described below.

Hypothesis one

The student's average (academic performance) is related to the attention that parents or guardians put in the activities of the students' school.

To validate the relationship between the variables, Fisher's exact test was applied. To work with nominal variables, the following data preparation was followed:

With the Average variable, categories were made considering the quartiles (mean = 8.27, SD = 0.96).

• Although the Parental attention variable is already categorical or nominal, three categories were created considering: 1) a fusion with the response options never and almost never and 2) another fusion with the options always and almost always. So we have three categories.

• A hypothesis test is defined:

• H_0: the student's average is not related to the attention that their parents or guardians put in the students' school activities.

• H_1: the student's average is related to the attention that their parents or guardians give to the students' school activities.

According to the hypothesis tests, if the significance value is less than 0.1, then H_0 is rejected and H_1 is accepted; otherwise, H_0 is accepted and H_1 is rejected. This with a confidence level of 90%.

Fisher's test gave a p-value of 0.86, which indicates that we can accept the research hypothesis at a confidence level of 90%. So we can say that the student's average is related to the attention that their parents or guardians put in school activities.

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Hypothesis two

Student scores are related to age.

A descriptive analysis of table 4 allows us to observe a relationship between ages and grades. The table describes the average ages by grade level and their respective grade point average. The data indicates that as the students get older, the general average of the grade decreases.

Tabla 4 Comparativo de medias entre edades y calificaciones

Variable	1.er año	2.o año	3.er año
Edad	11.92 (DE = 0.56)	12.95 (DE = 0.56)	13.95 (DE = 0.55)
Calificaciones	8.4 (DE = 0.85)	8.1 (DE = 1.0)	8.0 (DE = 1.1)

Fuente: Elaboración propia

To validate the relationship between variables, the chi-square statistical test was applied. Since the statistical test considers two nominal variables, the average of the students was divided into four categories according to the quartiles of the Average variable. Table 5 represents the contingency of both variables and the frequency distribution between the generated boxes.

- A hypothesis test is defined:
- H_0: Student scores are not related to age.
- H_1: Student scores are related to age.

H_0 corresponds to the null hypothesis and H_1 to the research hypothesis. According to the chi-square test, if the significance value is less than 0.05, then H_0 is rejected and H_1 is accepted; otherwise, H_0 is accepted and H_1 is rejected. This with a confidence level of 95%.

With the chi-square test, a p-value of 0.000 with six degrees of freedom (df) was obtained, therefore, the research hypothesis is accepted: the students' grades are related to age.

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Tabla 5 Tabla de contingencia: promedio (cuartiles) contra el grado escolar

		Grado			Total
		1.er año	2.o año	3.er año	
Promedio general del último año cursado (cuartiles)	Calificación baja	10	25	11	46
	Calificación regular	43	30	9	82
	Calificación buena	62	24	9	95
	Calificación muy buena	26	15	7	48
Total		141	94	36	271

Fuente: Elaboración propia

Hypothesis three

There is a significant difference between the averages of women and men

To validate the difference in means, the Student's t-test was used. This test involves relating two variables: one categorical or nominal and the other numerical. In the case of the Average and Sex variables, it was not necessary to apply any preprocessing, since the first is numerical and the second is nominal. The hypotheses are as follows:

- H_0: there is no significant difference between the averages for women and men.
- H_1: there is a significant difference between the averages of women and men.

According to Student's t-test for mean difference, if the significance value is less than 0.05, then H_0 is rejected and H_1 is accepted; otherwise, H_0 is accepted and H_1 is rejected. This with a confidence level of 95%. Student's t-test showed a p-value equal to 0.044, which implies that we accept H_1, that is, there is a significant difference between the means of women and men.

Discussion

Next, the analysis of results organized by three categories of the applied instrument and the statistical analysis are described.

Family support in school activities

According to the results (see table 1 for more details), the majority of students indicate that their parents are aware of their school activities, that they support them during the activities and, in turn, motivate them to study. and get good grades. This is equivalent to the fact that 85.85% (on average) of the students always or almost always have parental attention to carry out their activities responsibly and excel in their studies.

The family is the first institution that exerts influence on the student, since it transmits values, customs and beliefs through daily coexistence. Likewise, it is the first educational and socializing institution for the student (Sánchez, 2006). Mothers and fathers are the main support in the homes for the students, although, in the absence of the parents, due to various circumstances, the siblings also support. A low percentage indicates that they do not receive support from their parents. The pandemic has played a fundamental role in this regard, because although it has benefited some families where work has increased, it has affected others and some parents lost their jobs. In many homes, the members of the families have had to stay at home and this improved the communication and attention of the parents with the students. Therefore, a high percentage of students indicate, according to the results of this research, that their parents have had more contact and support with them since the pandemic began.

On the other hand, some parents have faced difficulties in supporting students in their school activities, such as not having strategies to promote learning, difficulties in expressing themselves and little understanding of the methods used by teachers in class (De la Cruz, 2020). Despite this, parents do their best trying to fill these gaps. Some other parents have not been able to support as much as they would like because work has increased and they spend less time at home than before the pandemic.

There are benefits that are obtained with the support of parents in school activities such as (Domínguez, 2010): increased motivation of students, reduction of conflicts and resistance to change, responsibility is shared and productivity is increased.

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Use of technology

This area regains interest in the times of covid-19, since computer technology becomes the means for remote communication, sending and receiving tasks, and research (see table 2 for more details). Most of the students have electronic devices for their school activities. Approximately a quarter of the students indicate that, although they do not have their own electronic media, they rely on friends, neighbors or relatives to comply with this aspect. Some others, mainly those of the lowest class, do not have electronic means.

Today's children have been surrounded by digital technology since birth; Since then, his life and daily practices have been linked to the use of social networks, smartphones, tablets and the Internet. Digital technology has been integrated into the way they live and learn (Iivari et al., 2020). Despite this, access to technology is not the same for all students. According to the results, almost half of the students dominate the technology, others have problems depending on the application and a percentage, although low (12.92%), have serious problems with the technology. These results indicate that not everyone is 100% proficient in the use of technology. To master technology, it is necessary to use it and always be in contact with it, many students in this study do not have that relationship that characterizes the so-called digital children of today. On the other hand, students who report having problems using technology have the lowest grade point average, namely 7.9. That is: qualifications match your technology skills. In this sense, the socioeconomic status of the students plays an important role, because if prior to the pandemic these students did not have access to technological devices with all the economic impact, it was more difficult to acquire such devices.

Internet access is vital to be communicated in virtual education. According to the results, a high percentage have Internet access, either through an Internet provider with unlimited bandwidth or through a cell phone system or other means with limited bandwidth. The latter (limited bandwidth) represents a problem for families, since, having only one cell phone with internet access, students have to wait until their parents arrive from their work activities to be able to download their activities and be able to send them answered. In addition, that videoconferences are null due to the high consumption of bandwidth in the service. Some of the students do not have internet, but they solve it with friends, neighbors or relatives to minimally send homework. Among the factors that condition access to quality online education are social class, race, ethnicity, gender, geographic location and the type of

educational institution to which they belong (Lloyd, 2020). Social class has a high impact for the study area of this research.

Having turned the home into a full-time school has brought benefits, but also problems. The homes had to adapt to the new needs, trying to incorporate study areas that include desks, chairs, lighting, silence during videoconferences, among other aspects. The students in this research indicate that almost half do not have or sometimes do not have adequate space to work in their homes. Problems are compounded when more than one student occupies the same space in the home for their school activities. Even if you have an internet connection, it has to be shared. As the students indicate, most of them have to share an internet connection, which impacts the quality of communication and causes unstable transmissions in video conferences.

The pandemic and distance education

Students argue that they prefer face-to-face education over virtual education (see table 3 for more details), although not overwhelmingly. The profile of distance learning students requires skills such as proactivity and planning ability, as well as discipline and organization; however, these capacities are not cultivated in traditional schools (Navarrete, Manzanilla and Ocaña, 2020). The opinion of the students surveyed leaves these capacities aside to indicate that social confinement is the one that has had the greatest impact on them. Although not directly defined, the student sees school as an area where she can socialize with her peers while receiving an education. Despite this, almost half of the students feel comfortable with the virtual educational style (not an impressive figure either). A very low percentage (15.5%) feel discomfort in the emerging system due to covid-19, while the rest are neutral. Confinement has affected the student on physical, psychological, and emotional levels (Brooks et al., 2020). According to the work "Psychological impact on Mexican university students due to confinement during the COVID-19 pandemic" (2020), after three weeks of confinement, 664 Mexican students showed depressive symptoms (4.9%), psychosomatic (5.9%), associability (9.5%), stress (31.92%) and apneas (36.5%). After almost two years of confinement, and after so many emotional and psychological changes, the students began to get used to isolation.

On the other hand, 56.09% of students affirm that their family has been economically harmed by the ravages of covid-19. In addition, in a very similar percentage (52.77%) a

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family member has fallen ill with covid-19. According to the results, these two variables have a relationship. The chi-square test establishes a p-value of 0.008 (df = 1), which indicates that when a person falls ill with covid-19, the family's economy is also affected. Considering the socioeconomic level of the families of the students in this study, unforeseen expenses represent a strong impact on the economy, since families in general are not from the upper class and do not have emergency economic support.

The main concerns of the students reflected in the open question are:

- Face-to-face classes are missed.
- It is very uncomfortable to be locked up at home, although this is a necessity.
- The use of face masks, gel and continuous hand washing is tedious.
- Some mothers and fathers cannot work, this affects the family economy.
- Family members have died due to the disease.
- There is fear that a member of the family will get sick.
- The homework system is exhausting.
- Some students do not have the electronic means to communicate and submit assignments.
- The new distance work system is sometimes complicated and learning is less than in face-to-face education.
- The new normality has appeared with very drastic changes.
- Family and friends are missed due to social distancing.

The aspects that are repeated the most point to a need to return to face-to-face classes, to the negative economic impact that the pandemic has left on families and to the fact that many relatives have fallen ill with covid-19, there have even been deaths. Despite these negative points, the students also argue positive aspects:

- We can have a reflection on how fragile humanity is.
- More positive coexistence between relatives.
- We are forming new hygiene habits.
- Students appreciate the school in its face-to-face mode.

The students of this research are not indifferent to the events that are happening in Mexico and the world. Although in many cases they feel frightened by this new reality, they

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are aware that it deals with teamwork and cooperation of people to reduce infections, as well as applying hygiene habits consciously and consistently.

Hypothesis analysis

Analyzing the results of the hypothesis tests, we obtain the following statements.

Hypothesis one

The student's average (academic performance) is related to the attention that parents or guardians pay to their children's (students') school activities (accepted research hypothesis).

It is important to note that if parents or guardians are involved in their children's education, their children will have more opportunities to excel academically. The study (Nofrizal, Nirwana and Alizamar, 2020) concluded that the greater the concern for parental care (mother and father), the greater the student's achievement motivation. The study found that the attention of the mother influences 14.4% of the student's performance and the attention of the father influences 12.9%. The attention of each other (mothers and fathers) contributes 15.6% to student performance.

When parents are involved in their children's education, there are benefits to both the parent and the student, as it often improves the student's self-esteem, helps parents develop positive attitudes toward school, and provides parents with a better understanding of the teaching process (Sánchez, 2006).

Hypothesis two

Student grades are related to age (accepted research hypothesis).

Student scores are related to age. This relationship may be due to the complexity of the new topics as the student progresses through the grades, combined with the changes in adolescence caused by their biological, social and psychological development.

A student who lowers her grade should be a focused student and treat her with appropriate measures to determine what happens to her grade. Following Palacios and Andrade (2007), having a low average favors adolescents to present risk behaviors, such as tobacco, alcohol and drug use, suicide attempts, high scores in aggression, antisocial behavior, theft and

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criminal behavior . Special attention should be given to those cases with low grades or with a drastic drop in grades, since some risk behavior could occur.

Hypothesis three

There is a significant difference between the averages for women and men (accepted research hypothesis).

Sex influences the grades of students, in this case, being a woman implies having a higher probability in grades than men. Hernández et al., 2014) also support this relationship by accepting the same hypothesis test. The researchers did statistical tests with half a million students, and obtained as a result that women have a higher average than men. In addition, the Parajuli and Thapa (2017) research also concluded that women have better academic performance than men.

Conclusions

Covid-19 presented an opportunity to reflect on the goals of the educational system. This system for many years opposed major changes. The resistance came from administrators, professors or even the students themselves. However, in recent decades, it has taken small steps motivated by technological advances. Now, forced to march by a pandemic, we have made new advances, although the shortcomings of the educational system have also been shown, which was not prepared for times of disasters, diseases and emergencies. In general, teachers had to modify their pedagogical strategies, students used technology to learn, and parents became guides and learners to help their children in this new scenario.

On the other hand, the pandemic brought with it research opportunities in various areas given the novelty and lack of knowledge about the disease. This research highlights the following points: 1) in general, parents or guardians pay more attention to students in their school activities in the face of the new educational modality. 2) Most of the students in this research have electronic devices and the Internet to prepare and present their tasks, although the aspect of videoconferences is not fulfilled in the same way. 3) The mastery of the use of technology is not complete, the students have problems with the software tools. 4) The students want the situation to normalize to return to school in person. 5) Almost half, up to

the time of application of the instrument, had close relatives who fell ill with covid-19 and suffered from economic problems at home.

In addition, some aspects supported by hypothesis tests are reinforced, for example, that parental support is significant to obtain better grades, the main contribution of the research. In addition to secondary contributions: 1) the average of students in general tends to decrease as age increases and 2) women in general have better averages than men.

A positive aspect of the pandemic is that the family was reunited and the bond between its members was strengthened. In the educational aspect, parents necessarily became the right and essential arm of teachers to be able to advance in school education. Thus, despite the economic, technological, and emotional difficulties that the family experienced during the pandemic, with distance education, parents became the main guides for their sons and daughters. This is because at home parents are the main figures of support and trust.

Undoubtedly, this pandemic has forced to work in an unforeseen way, through trial and error many times, however, many advances have been made in virtual education, so much so that it is not illogical that the virtual modality be installed as a base. This modality came from improvisation, although well managed it can be a form of teaching for those who have complications with the transfer that traditional education implies, for example: students with mobility disabilities, students from remote regions, but with an Internet connection, parents with complications (work, illness) to take their children to and from school, among other cases.

It should be noted that there is a niche of students who do not have access to the Internet and who could not answer the instrument applied in this research. However, even if some did not have internet, they found a way to solve their problem. Therefore, the results of this research apply to students willing to participate in the research and with access to the Internet. It is important to clarify that many students did not answer the instrument only due to lack of interest. However, there is a group of students who do not have the same economic resources as the rest, this group is the most disadvantaged by the new distance school system, since there is no school achievement and in many cases it borders on desertion.

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Future lines of research

This research found several important aspects for the subject of study, although aspects that generate lines of future research also emerged.

The first line arises when considering those students who do not have access to the internet, the data collection work is more complicated because they have to personally answer the instruments, however, it is interesting to analyze the impact that covid-19 has had on these students who do not have adequate means to communicate remotely.

At the time of completing this investigation, there were still no qualifications for the 2020-2021 cycle. This was the second cycle of the pandemic, which gave the Government the opportunity to prepare a more organized distance education system, compared to the improvisation at the end of the 2019-2020 cycle. Therefore, as a second line of investigation, it is possible to obtain the grades of different cycles to compare with variables already registered in this investigation and the impact of parental support and technology.

As a third and last line, an analysis of variables could be established considering parents or teachers and making crosses between the vision of adolescents and the rest of the actors involved in education.

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