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*Artículos científicos*

## **Experiencias de estudiantes universitarios en su proceso de aprendizaje a distancia**

*Experiences of university students in their distance learning process*

*Vivências de universitários em seu processo de ensino a distância*

**Sonia Verónica Mortis Lozoya**

Instituto Tecnológico de Sonora, México

[sonia.mortis@itson.edu.mx](mailto:sonia.mortis@itson.edu.mx)

<https://orcid.org/0000-0002-7020-2308>

**Ramona Imelda García López\***

Instituto Tecnológico de Sonora, México

[igarcia@itson.edu.mx](mailto:igarcia@itson.edu.mx)

<http://orcid.org/0000-0003-0091-3427>

**Angélica Crespo Cabuto**

Instituto Tecnológico de Sonora, México

[angelica.crespo@itson.edu.mx](mailto:angelica.crespo@itson.edu.mx)

<https://orcid.org/0000-0003-1846-2505>

**Guadalupe González Gracia**

Instituto Tecnológico de Sonora, México

[guadalupe.gonzalez@potros.itson.edu.mx](mailto:guadalupe.gonzalez@potros.itson.edu.mx)

<https://orcid.org/0000-0002-7703-3519>

\* Autor de correspondencia

## Resumen

El objetivo de esta investigación fue analizar las experiencias de los estudiantes de la licenciatura en Educación sobre su proceso de enseñanza-aprendizaje durante la pandemia generada por el covid-19 con el fin de recabar información que permita mejorar la práctica pedagógica futura. Para ello, el enfoque usado fue cualitativo de tipo fenomenológico y participaron 38 estudiantes distribuidos en cuatro grupos focales (uno por semestre). Los estudiantes reportaron problemas físicos y emocionales, falta de algunas habilidades, problemas de acceso, así como algunas dificultades en las actividades asincrónicas y en clases sincrónicas. Además, emitieron sugerencias sobre la infraestructura tecnológica, la formación de profesores y de ellos mismos. Estos resultados fueron muy útiles en la preparación del regreso paulatino a las aulas durante la pospandemia debido a la identificación de aspectos por mejorar con respecto a la infraestructura tecnológica, habilitación docente y formación de estudiantes, por lo que se impactó en la mejora de cursos en diferentes modalidades educativas.

**Palabras clave:** aplicación de las TIC al aprendizaje, aprendizaje en línea, educación a distancia, enseñanza a distancia, enseñanza remota, estudiantes, universidad, TIC, uso de herramientas y metodologías basadas en las TIC.

## Abstract

The objective of this research was to analyze the experiences of undergraduate students in education about their teaching-learning process during the pandemic, in order to have information to improve learning during the post-pandemic. The approach was qualitative of phenomenological type and 38 students participated, distributed in 4 focus groups, one per semester. Students reported: physical and emotional problems, lack of some skills, access problems, some difficulties in asynchronous activities and in synchronous classes. In addition, they made suggestions about the technological infrastructure, the training of teachers and themselves. These results were very useful in the preparation of the gradual return to the classroom during the post-award period due to the identification of aspects to be improved with respect to technological infrastructure, teacher training and student training; therefore, it had an impact on the improvement of courses in different educational modalities.

**Keywords:** application of ICT to learning, online learning, distance education, distance teaching, remote teaching, students, university, ICT, use of ICT-based tools and methodologies.

## Resumo

O objetivo desta pesquisa foi analisar as experiências dos alunos do Bacharelado em Pedagogia quanto ao seu processo de ensino-aprendizagem durante a pandemia gerada pela covid-19 a fim de colher informações que permitam melhorar a prática pedagógica futura. Para isso, a abordagem utilizada foi qualitativa do tipo fenomenológica e 38 alunos participaram de quatro grupos focais (um por semestre). Os alunos relataram problemas físicos e emocionais, falta de algumas habilidades, problemas de acesso, bem como algumas dificuldades nas atividades assíncronas e nas aulas síncronas. Além disso, emitiram sugestões sobre infraestrutura tecnológica, formação de professores e sobre si mesmos. Esses resultados foram muito úteis na preparação para o retorno gradual à sala de aula no pós-pandemia devido à identificação de aspectos a serem aprimorados em relação à infraestrutura tecnológica, qualificação de professores e formação de alunos, o que impactou na melhoria dos cursos em diferentes modalidades de ensino.

**Palavras-chave:** aplicação das TIC à aprendizagem, aprendizagem online, educação a distância, ensino à distância, ensino à distância, alunos, universidade, TIC, utilização de ferramentas e metodologias baseadas nas TIC.

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## Introduction

Given the urgent need for social isolation due to the health crisis caused by the SARS-CoV-2 virus (causing Covid-19), in most countries of the world, education had to migrate towards distance learning. This situation represented a great challenge for most higher education institutions, mainly due to the gaps in terms of access to technology by students (Canales and Silva, 2020). In this regard, the United Nations Educational, Scientific and Cultural Organization (Unesco) (2020) indicates that, worldwide, around 826 million students do not have a computer and 703 million do not have internet access. in their homes.

In Mexico, data from the National Institute of Statistics and Geography (Inegi) (2019) indicate that 53.3% of households in the country do not have a computer due to lack of economic resources, while the 50.7% that do have a computer lack Internet connection. In this sense, various studies carried out with university students during the pandemic (Adnan and Anwar, 2020; Bossolasco et al., 2020; Cárdenas, 2020; Huanca-Arohuanca et al., 2020; Yela et al., 2021) carried out in Argentina, Colombia, Pakistan, Peru and Mexico, respectively, they identified that more than 50% of the participants in these studies do not have Internet access or it is limited due to the signal or the cost of the service.

In addition, other research (Bossolasco et al., 2020; Colman, 2021) indicates that not all young people perceive themselves to be competent in the use and application of information and communication technologies (ICT). Therefore, it is important to point out that the lack of access to technological resources can be considered one of the disadvantages and main barrier of the e-learning modality (Manrique et al., 2021; Verdezoto and Chávez, 2018).

Considering the above, it is necessary to know the perception of students regarding their academic performance in the distance modality. The findings of an investigation with university students from Chile and Nicaragua (Acevedo and Amador, 2021) indicate that the former considered that they had a satisfactory learning experience, although their main limitation was the lack of practical instances due to total isolation. On the contrary, in Nicaragua the classes were “cut”, although there was not total isolation, and they rated their learning as very good due to their efforts and that of their teachers.

Likewise, the results obtained by Barrutia et al. (2021) indicate that the majority of Peruvian students participating in their qualitative study show a moderate level of satisfaction with the virtual modality because they consider that there is a lack of technological literacy, mainly among teachers. In addition, six out of ten students commented that they have not yet finished adapting and feel a greater load of activities.

On the other hand, in an investigation carried out by Olum et al. (2020) with 214 Ugandan medical and nursing students, close to 50% believe that online learning is not an effective teaching method and reduces the quality of knowledge. Similarly, Adnan and Anwar (2020) observed that 50.8% of students express that it is not possible to complete their courses effectively in this modality.

Additionally, the findings of various works indicate that students, due to the obstacles they face, have a negative disposition towards this modality, which is why they

prefer face-to-face (Manrique et al., 2021). Some of the reasons they point out are the overload of activities, the lack of clarity in the instructions, the little feedback received and the lack of empathy and effective communication (Barrutia et al., 2021; Lovón and Cisneros, 2020; Manrique et al., 2021; Pequeño et al., 2020; Reyes, 2015; Tejedor et al., 2020). Some university students even state that they have not obtained the expected learning (Guzmán et al., 2021), which coincides with Lovón and Cisneros (2020), since these authors report that young people cannot understand the topics well due to connection failures. during synchronous classes or difficulties they encounter in the use of programs or requirements for their classes.

In addition to the above, alterations in mental health have been reported, such as anxiety, frustration, fear, sedentary lifestyle, depression and post-traumatic stress disorder (Buitrago et al., 2021; Lovón and Cisneros, 2020; Ramírez-Ortiz et al., 2020), hence they have considered the possibility of withdrawing partially or totally from the school year (Lovón and Cisneros, 2020).

On the other hand, in terms of teacher preparation, various investigations have shown the perspective of students, who perceive that there is less accompaniment, lack of knowledge and mastery of technological tools, as well as excessively long synchronous sessions that cause fatigue and boredom in students (Chanto y Loáiciga, 2022; Lovón y Cisneros, 2020; Manrique *et al.*, 2021; Ortega-Sánchez, 2021).

Due to the above, the students propose actions that can significantly favor learning in the distance modality, such as a) recording the synchronous sessions; b) share support materials and c) reinforce the technological mastery of teachers so that they are trained in the introduction of techniques such as the flipped classroom, case studies and gamification (Chakraborty et al., 2020; Reyes, 2015). These proposals can be beneficial for student learning, since by using merely expository sessions they only create a "face-to-face classroom mirror", which is a problem for student involvement and interaction in their learning process (Chanto and Loáiciga, 2022).

On the contrary, in other studies, some university students highlight positive aspects of this modality: for example, Uruguayan students positively value the virtual learning process (Pequeño et al., 2020); in India they consider that this alternative is viable given the circumstances faced (Chakraborty et al., 2020), and in Mexico participants with a very good command of the ICTs used during the health contingency show satisfaction for having adequate technological resources (Sapien et al., 2020). Thanks to the challenges presented,

Mexican students have managed to overcome themselves, develop skills such as patience, organization, resilience, autonomy, responsibility, stress management, adaptation, and discipline (Carbajal-Vaca, 2021; Portillo et al., 2020). In addition, they highlight some advantages of ICTs such as the availability of information and collaborative learning, although they also point out disadvantages such as failures in the Internet connection, distractions during class, and they consider that they are obtaining less learning (Sapien et al., 2020).

In fact, in a study carried out by the authors of this research, a sample of 160 students was used to find out the situation of students of the Bachelor of Education Sciences (LCE) with respect to their access to ICT. The results indicated that only 28.1% had access to a desktop computer and 62.5% to a laptop at home. In fact, 70.6% of the participants shared these devices with a member of their family; 84.4% had a cell phone and 81.9% had access to the Internet service at home, hence it is considered very significant to delve into the experiences that these students had in their training process during the pandemic.

Therefore, the objective of this study is to analyze the experiences that the students of the Bachelor of Education Sciences had about their teaching-learning process during the pandemic caused by Covid-19, since in this way it will be possible to count on Accurate information to improve future pedagogical practices.

## **Materials and method**

This research was of a qualitative nature and was based on the phenomenological approach, which allowed exploring the consciousness of the individual to understand the way in which he interprets the meanings that surround him. (Fuster, 2019).

### **Participants**

The LCE population consisted of 260 students: 73 belonged to the first semester; 65 to third; 70 to fifth, and 52 to seventh. The sample consisted of 38 students, aged between 17 and 33 years ( $M = 21$ ); 32 women (84%) and 6 men (16%). The distribution of students by semester was as follows: 13 from the first; 5 of the third; 10 of the fifth; and 10 of the seventh. The sampling techniques were of the voluntary type and cases: the first, because it allows obtaining in-depth data on values, experiences and meanings of a social group; the



second, because the subjects considered they had sufficient knowledge and experience of the subject (Mendieta-Izquierdo, 2015).

### Data collection technique

The focus group technique was used, which allows participants to comment and develop a theme or fact from their personal experience to create a collective dialogue based on questions asked by the researcher (Franco, 2017). For this, four focus groups corresponding to each of the mentioned semesters were formed. The meetings were held through Google Meet. In this regard, it is important to mention that, given the modality, the participation of the students could be affected because they could keep their cameras off and there was no face-to-face interaction.

### Instrument

A semi-structured interview guide was used to inquire about their experience as students in the distance or remote modality. This was validated by five expert researchers on the subject. The composition of the interview is shown in Table 1.

**Table 1.** Interview Categories and Trigger Questions

Axis	Categories	Trigger Questions
Training process	Learning in the e-learning modality	What is your situation to finish the semester remotely and what is the perception of your learning so far?
Student dimension	Infrastructure conditions and technological access	What have been the challenges from your technological conditions to study remotely at home?  What are your infrastructure conditions in the situation we are in?
Teaching dimension	Teaching skills	What do you require from teachers, coordination or the institution, so that your educational process has positive results this semester?  What are the good practices that your teachers have developed that have helped your learning?

Source: Own elaboration

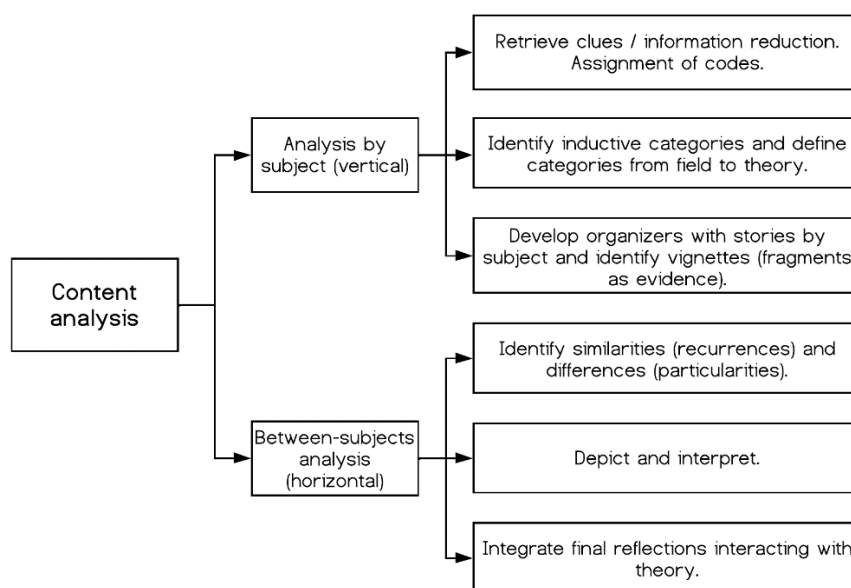
### Analysis of the information

To carry out the qualitative data analysis, the proposal of Madueño-Serrano (2014) was used (Fig. 1). The process began with the transcripts of the four focus groups and later

the coding and categorization was carried out. Keys were used to represent each participant; that is, P for the number of participant and S for the semester, which formed the keys P1S1, and so on. These transcripts were analyzed with the MAXQDA 2020 software. For the first level, Madueño-Serrano (2014) proposes five moments:

1. Recovery of clues and reduction of information.
2. Analysis towards reflection of the second phase of interviews.
3. Reduction of information from the second interviews.
4. Identification of inductive categories.
5. Define categories from the field to the theory.

**Figurae 1.** Proposal for the analysis of information



Source: Madueño-Serrano (2014)

Due to the length of the information in the focus groups, moments two and three of second interventions with the participants were not carried out. For this reason, what was done at moments one, four and five is described:

- Recovery of clues and reduction of information: In each focus group, the most representative passages were identified and selected depending on what was narrated by the participants; Based on this, codes were provided that emerged according to the information.
- Identification of inductive categories: From the deductive categories (already established) new inductive categories arose, so called because they were obtained from the most relevant fragments of the contributions of the subjects.



- Defining categories from the field to theory: For this moment, the categories that arose within the research field were defined from theoretical references in order to facilitate the grouping of evidence and presentation of results.

With this information, a matrix of categories and the contributions of each focus group corresponding to each of them and the codes used were obtained. In the second level, the same categories of the first were preserved. For this horizontal analysis, coincidences were sought between what was stated by each participant, as well as discrepancies and particularities. The axes, categories and reports of the four groups were concentrated in a new matrix that allowed an order in terms of the presentation of the results.

## Results

The results obtained were grouped into three axes, from which 10 categories were derived. The axes were the following: students, teaching skills and training process. The categories derived from the student axis were a) attitudes towards the modality, b) health problems, c) lack of skills and d) conditions of infrastructure and technological access. Regarding teaching skills, they were grouped into the following categories: a) good practices, b) areas of opportunity, and c) student requirements. Regarding the formative process axis, the following categories were addressed: a) learning activities, b) work overload and c) synchronous classes (table 2).

**Table 2.** Inductive categories obtained from data analysis

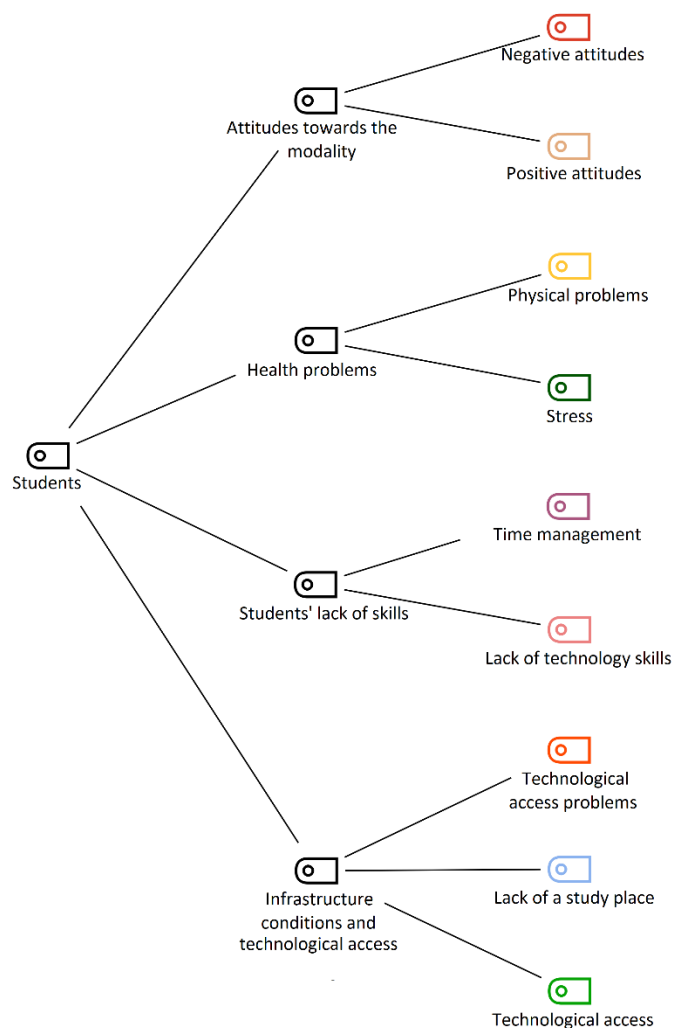
Axes	Categories	Description
Students	Attitudes towards the modality	It refers to the like or dislike for the modality; that is, to the negative or positive opinions towards it (Alabdullaziz et al., 2011)
	Health problems	Situations that negatively affect the well-being of people (Paniagua, 2013)
	Lack of skills	Lack or shortage of technical mastery on the part of the students, which can hinder their learning process (Ricoy & Fernández, 2013)
	Infrastructure conditions and technological access	Know if they have technological devices and software that allow them to continue their classes (Acosta et al., 2014)
Teaching skills	Good practices Opportunity areas Students' requirements	Skills of the teacher that help carry out their functions to meet the educational objectives that have been set (Becerril et al., 2015)
Training process	Learning activities Work overload Synchronous classes	It's made up of the factors that lead to student learning: activities, materials and planning (Orozco & García, 2017)

Source: Own elaboration

## Students

The student dimension axis was subdivided into four categories (Fig. 2). The findings obtained in each of them are described below.

**Figure 2.** Categories about students



Source: Own elaboration

**Attitudes towards the modality.** Most of the attitudes of the participants were negative (n = 17): a) disgust for the modality, "I personally don't like it" (P1S5) and "I feel very stressed, and I feel that I don't perform as I should perform... I have work and school... I don't feel motivated as a student" (P6S7); b) feeling of not learning, "I feel like I'm not learning anything" (P5S5, P2S3 and P4S3); and c) carry out activities solely for compliance "sometimes I only worry about delivering the tasks on time and I put learning in the background" (P2S1). However, some students expressed positive aspects (n = 5), arguing that it will help them better manage their time and that they like the modality: "the main advantage of this is that we are learning to work under a lot of pressure, we are learning to manage our time is a little better..." (P3S7) and "I feel that if I am learning the truth, I can say I like the virtual modality and that I am working well" (P5S3).

Health problems. Some students ( $n = 5$ ) stated that this modality caused physical problems related to vision, back pain, exhaustion, insomnia, stress, among others: "I started the semester very well, but right now I am, as my classmates say, very tired. One of the consequences that I have been feeling is that I have insomnia at night, a lot of tiredness as they say, my eyesight, on my back" (P4S7). In addition, emotional problems related to stress, confinement and modality ( $n = 6$ ): "I am also putting too much pressure on myself and I know that there is still a long way to go, but I feel that I am putting pressure on myself, I am stressing myself out." " (P4S7); "There is a lot of stress due to the academic load, the sudden change in activities, and also thinking about whether the activity is good or bad" (P7S7). The main health problems were physical (back pain, exhaustion and eyestrain), as well as emotional (students felt pressured and stressed) (Fig. 3).

**Figure 3.** Health problems



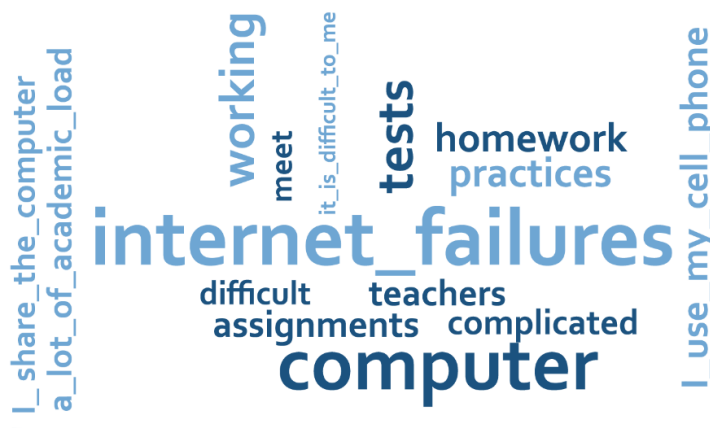
Source: Own elaboration

**Lack of skills in students.** They indicated a lack of technological skills ( $n = 3$ ), especially the first-semester students because they had difficulties using the technological platform: "the main problem, the truth is that I had, was in the first week, adapting to the I-virtual (technology platform) university" (P2S3). In addition, they consider that they lack skills to manage time ( $n = 4$ ) and to organize their academic work: "personally, I have not yet learned to manage 100% with tasks and one always surprises me at the last" (P4S1 ); "The fact of having to manage your times for tasks, well, in my case I feel that that fails me a bit..." (P1S7).

Infrastructure conditions and technological access. More than half of the students ( $n = 22$ ) commented that they had Internet access failures and did not have their own

computer, which they shared with family members; due to this, they borrowed a computer or used their smartphone to continue their study classes (Fig. 4). This is how they indicated it: "The Internet goes away a lot and it takes me out of the classes and from here until I connect again, if you want, I have left 10 minutes of the class and well, there is already something that I did not understand" (P7S5); "My sister, who has just entered university and she uses the computer that we have at home, my father is also working, my brother is also working and is studying, so, let's say, access to the computer or a technological resource for Being working and keeping an eye on my homework and classes is quite difficult for me" (P1S5). Likewise, some students ( $n = 3$ ), in addition to not having technological equipment, did not have a fixed space to carry out their activities and take their classes, so they had to be in uncomfortable places where it was difficult for them to concentrate: "I struggle a lot to concentrate on my classes because I take them in the living room... it's a hassle because sometimes my mom talks, she has the TV on and I tell her to keep quiet and she doesn't listen to me" (P4S3); "In my house there is no space, there are many people and it is a small house, I have to do homework when everyone is sleeping" (P4S5).

**Figure 4.** Infraestructure conditions and technological access

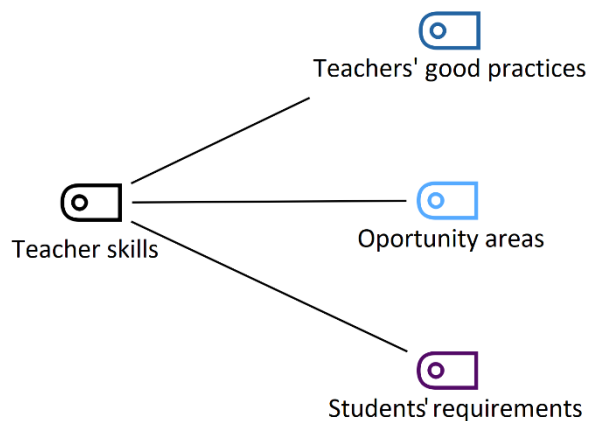


Source: Own elaboration

### Teaching skills

The axis of teaching skills was the most addressed by students ( $n = 23$ ) and the results were grouped into three categories: good practices, areas of opportunity, and student requirements (Fig. 5).

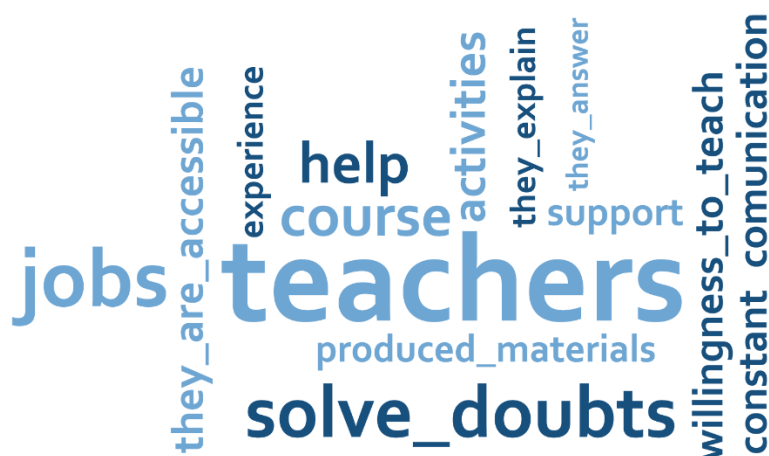
**Figure 5.** Teaching skill categories



Source: Own elaboration

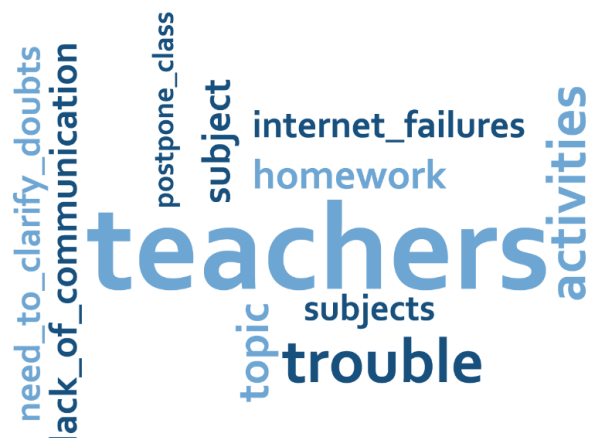
**Good practices.** A little more than half of the students (n = 20) indicated that the teaching seemed effective due to the accompaniment received by the teacher; their willingness to teach, their experience, attention to their doubts and constant communication, which includes the production of digital teaching materials to clarify doubts (Fig. 6). Some of their answers were the following: "Well, the truth is, I do like the way the teachers teach us, since they give us certain information for the subject to be carried out for the week... they are still very accessible for any questions and we can approach them with them through mail or WhatsApp" (P1S1); "It gives us spaces to express our doubts and even makes materials, that is, apart from the class, it makes materials such as videos, it gives us more readings to understand the subject" (P3S5); "They have been very understanding because, for example, sometimes I don't have Internet and they record the sessions for us so that when they already have Internet they send them to us so we can see them, they have also extended the deadlines for handing in assignments, tasks, They have been modified to be shorter, that is, we have had a little more contact with them and at least for me, when I ask them about a task, they answer us more quickly and give us correct feedback" ( P9S7).



**Figure 6.** Good teaching practices

Source: Own elaboration

**Areas of opportunity.** The students also expressed various negative aspects or areas for improvement in teaching practice ( $n = 24$ ), such as little empathy for the technical problems that prevent them from accessing synchronous sessions, as well as a lack of communication and support, by not clarifying their doubts about the contents or activities in some subjects (Fig.7). These were some of their comments: "I have noticed that there are teachers who do not understand if my classmate loses the Internet, if they have problems with the microphone, if they have problems with the camera..." (P3S3); "They are also under a lot of pressure because they have a lot of load both from their school work and from their activities outside of the degree and well, I feel that this is taking us now, yes, as they say 'de tie' of no, there is no clear communication, assignments, feedback is being done too superficially or too superficially, classes or activities" (P1S7).

**Figure 7.** Areas of opportunity in teaching practice

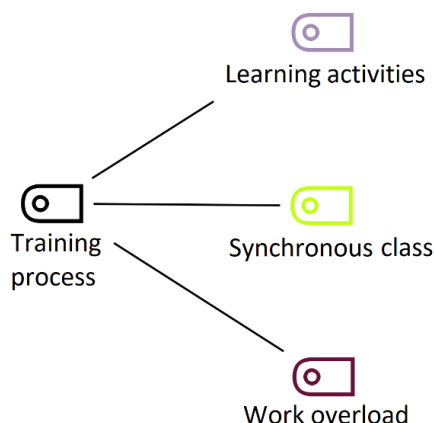
Source: Own elaboration

**Student requirements.** Regarding the requirements to their teachers to improve their training process, some of the requests expressed ( $n = 15$ ) were the following: constant communication, empathy in unexpected situations, variety of strategies, sharing materials, as well as recording synchronous sessions. For example, "constant communication from teachers, activities on the platform that sometimes this small problem that continually delays us and of course understanding that it is not our mistake" (P8S1); "That they be more empathetic and that they put themselves in the students' shoes on occasions when we do not have Internet or something similar" (P9S5) and "I say that they maintain the variety of strategies that they are implementing, such as forums, videos, all of this also makes the classes more dynamic and they are cool" (P4S7).

### Training process

Finally, regarding the formative process axis, the majority ( $n = 27$ ) of the students expressed their comments, from which three categories were derived (Fig. 8).

**Figure 8.** Training process' categories



Source: Own elaboration

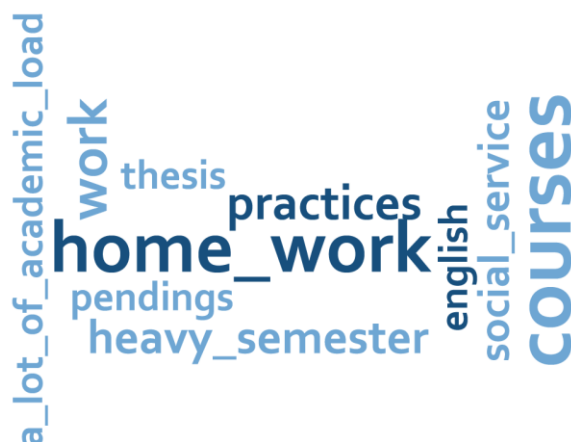
**Learning activities.** The comments (n = 10) focused on the instructions for the activities, arguing that they are not understandable or not described correctly (they even indicated that some were not significant); They also commented on the delivery dates, since they do not always indicate them correctly and that confuses the students (Fig. 9). For example: "what we talked about is that if it became virtual it's fine, that is, we wouldn't have any problem, but as long as the instructions are clear, because sometimes it happens with this teacher, she tells us something and in I-virtual she says something else and he sends us material from something else or the materials are not there, then this confusion comes in even more" (P6S5); "...sometimes it is very obvious to me that they just copy and paste the instructions from other activities and they do not put the evaluation criteria correctly and it is seen that they are from other activities..." (P4S7); "I have noticed that in our subjects there are many complementary activities; that is, we do not see the case or the objective; that is, we even realize that they are complementary activities that is only to avoid having this 'gap' in the matter" (P7S7).

**Figure 9.** Learning activities

Source: Own elaboration

**Synchronous classes.** Regarding the frequency and duration of synchronous classes through videoconference applications, the students ( $n = 5$ ) consider that it is not enough to see their teachers once a week, since they do not learn as they would like: "I think it also has to do with time, for example, for certain classes we only have one hour, so we don't have time to express our doubts all" (P1S1); "many times it doesn't even last as long as that matter" (P5S5); "Some teachers exceed their class time. I agree that we are in a virtual modality and it can still be presented that we do not have many classes and so on, but we made a schedule..." (P5S3).

**Work overload.** They also expressed ( $n = 12$ ) a work overload in this modality because they had to carry out at least one activity a week for each subject (social service or their professional practices); In addition, the students of the last semesters were also developing their thesis to graduate (Fig. 10). Also, in addition to being students, some worked or were parents: "Well, at the moment I am working and I am studying and I am taking eight subjects, six for the semester and two for a semester that I had to do, that I had pending and well with work I have" (P1S5); "I am married and I have two children, it has been very, very, very heavy, it is very heavy to send remotely because, well, it is very difficult to sustain everything at the same time" (P3S7); "I am one of the people who plans and I say 'okay, I am going to do these tasks this weekend or throughout the week'; and, nevertheless, I continue doing the tasks, advancing, that is, an impossible case seems to me and I discuss it with my classmates, that in addition to advancing, I can never finish" (P7S7).

**Figure 10.** Work overload

Source: Own elaboration

## Discussion

Despite the adversities that the e-learning modality has brought with it due to the pandemic situation, some students recognized that this situation helped them improve their ability to manage time and take better advantage of technology. These findings coincide with those obtained by Carbajal-Vaca (2021), Portillo et al. (2020) and Sapién et al. (2020), where positive attitudes stand out, since thanks to the challenges presented they have been able to develop skills such as patience, organization, resilience, autonomy, responsibility, stress management, adaptation and discipline. In this regard, Canales and Silva (2020) point out that to achieve learning in distance courses, these skills are necessary, in addition to correct teaching practice, innovation, distribution of synchronous and asynchronous times, among others.

However, regarding the attitudes of the students, the majority were negative. For example, they dislike the modality, since they consider that they are not learning and that they only carry out the activities to be fulfilled. This coincides with the findings of several studies indicating that this modality is not an efficient teaching method because it reduces the quality of knowledge and demotivates students (Adnan and Anwar, 2020; Olum et al., 2020).

Regarding health problems, some students suffered both physical and emotional discomfort: eyestrain, headaches, backaches, and stress stood out. These findings coincide with those obtained in other studies where it is reported that students have suffered physical

and psychological manifestations very similar to the aforementioned discomforts (Acevedo and Amador, 2021; Buitrago et al., 2021; Carbajal-Vaca, 2021; Chakraborty et al. ., 2020; Pequeño et al., 2020; Ramírez-Ortiz et al., 2020; Yela et al., 2021).

Regarding the lack of digital skills, this was noticeable in the students of the first semesters, since they were not familiar with the institutional platform, which made its use difficult. In this regard, Bossolasco et al. (2020) found that not all students perceived themselves to be competent in the use and application of technologies for their online learning. In the same way, Colman (2021) points out that, having these difficulties, they cannot fully use the functions offered by said virtual environment, which reduces learning opportunities.

On the other hand, the students expressed difficulties in managing their time due to their personal, work and academic responsibilities. In this sense, Pérez-López et al. (2021) point out that this model requires greater discipline, time management and organization. For this reason, it is necessary to develop in students self-discipline, autonomy, self-learning, time management and self-management skills, as well as the self-direction of their training process (Canales and Silva, 2020; Rugeles et al., 2015).

In addition, they highlighted that the activities on the platform were not clear, so they commented that not all courses have precise instructions, effective communication, and meaningful activities for learning. In this regard, Reyes (2015) points out that online communication is one of the functions of the teacher in this modality; Hence, it is necessary to clearly define the activities and instructions to facilitate the work of the students.

Regarding infrastructure conditions and technological access, students from all semesters commented on experiences of problems accessing the Internet or a computer; it was difficult for them to attend their remote or distance classes, as well as carry out asynchronous activities through the university's technological platform. This situation is related to the disadvantage of e-learning, since it represents an obstacle for students of this modality, since it is verified that not all of them have access to technological resources (Mego, 2019; Verdezoto and Chávez, 2018). Other studies (Acevedo and Amador, 2021; Adnan and Anwar, 2020; Cárdenas, 2020; Huanca-Arohuanca et al., 2020; Portillo et al., 2020; Yela et al., 2021) indicate difficulties in accessing both the Internet and to a computer, either due to the high cost of this network service or connectivity problems; all this derived from the inequity that exists in Mexico and in other countries to access these technological resources.



Regarding the competences of the teaching staff, some negative aspects were found, such as the lack of communication, empathy and preparation of the teacher in the use of technology, which coincides with the results of several studies (Barrutia et al., 2021; Chakraborty et al. ., 2020). In this sense, Huanca-Arohuanca et al. (2020), Chakraborty et al. (2020) and Guzman et al. (2021) consider that it is necessary to introduce new teaching techniques, more empathy and understanding on the part of teachers.

In the same way, it is essential to recognize and value the teaching work, since some students argued that thanks to the efforts of their teachers they had a "very good" learning; in addition to the fact that the materials that were prepared for them were of great help, which contributed to developing their skills with the use of technology (Acevedo and Amador, 2021; Chakraborty et al., 2020; Pequeño et al., 2020; Portillo et al. ., 2020). They also commented that some teachers made an effort to prepare their materials, follow up on them, and resolve all their doubts. The foregoing demonstrates the fulfillment of the role of teachers as facilitators of e-learning courses, where they apply interactive teaching methods of interest to the student and in accordance with their technological resources (Canales and Silva, 2020).

Regarding the recommendations of the students, who are also future teachers, they ask that the synchronous sessions be recorded and that the materials and classes be shared with them. For this reason, they pointed out that it is necessary for teachers to show more empathy, constant communication, feedback and more activities focused on meaningful learning. With the above, the need to further develop the teacher's skills in this modality is highlighted, such as constant communication with students, monitoring their process, feedback and technological mastery (Reyes, 2015).

In the training process, the asynchronous learning activities carried out through the university's technological platform did not meet the expectations of the students, since they considered that the instructions were not clear and that these activities were insignificant for the achievement of learning; they even thought that some only increased their academic load. The foregoing coincides with the results of Chanto and Loáiciga (2022), who show that for some students the virtual classroom (Moodle) was not necessary for their learning; instead, the Internet connection and educational videos were essential. This is probably because these activities were asynchronous and some students complained about the lack of support from some teachers, which contributed to the lack of comprehension.

In addition, this modality led to an academic overload because, in addition to being students, some worked and were also parents. This coincides with the findings obtained by Manrique et al. (2020) and Lovón and Cisneros (2020), who point out that these responsibilities mean that they cannot organize themselves effectively to carry out their learning activities.

On the other hand, the students of the present investigation also expressed disagreement regarding the periodicity and duration of their synchronous or distance classes; On the one hand, one class per week for an hour or an hour and a half did not seem enough to them; but, on the other, they complained that the duration of the sessions was excessive. This contrasts with the findings of Chanto and Loáiciga (2022), where university students highly valued the interactions with their professors through videoconference sessions; Even the majority expressed that, although at the beginning of the confinement it was difficult for them to maintain attention during these classes, they later got used to it. Regarding the duration of the classes, according to Lovón and Cisneros (2020), a large number of students found it difficult to maintain attention when the synchronous sessions were too long; Furthermore, despite the fact that the majority of the students participating in other research (Chanto and Loáiciga, 2022) considered that the sessions helped them with their learning; however, several of them reported that they felt tired, bored, or stressed during these sessions.

## Conclusion

Although the change of modality was totally sudden for all of them, the present investigation contributed to know the opinion of the education students of the university under study. In addition, it was possible to determine that this pandemic situation constituted a challenge for some teachers, since they entered a totally unknown environment that forced them to be trained in the use of technological tools. Likewise, thanks to the findings of this study, several refresher courses for teachers and extracurricular training for students were recommended, including time management and the use of the institutional technological platform (Moodle).

It is therefore concluded that the challenges faced by teachers do not end in the "new normal" or post-pandemic, since courses continue to be offered in different modalities; In the case of the university under study, we worked with the following: face-to-face (traditional education), face-to-face + remote (a group in the classroom plus a

remote group in all classes), synchronous remote (remote group with asynchronous classes and activities synchronous) and remote asynchronous (totally virtual, with asynchronous activities through a technological platform). Since courses with these new modalities will continue to be offered, it is important to analyze them, as well as identify their impact on student learning.

In this sense, the development of digital skills in teachers and students must continue and train the latter in time management. In fact, strategies for the psychological support of students must also be developed and their integration into face-to-face activities at the university encouraged to counteract the consequences caused by a confinement that lasted more than two years.

Finally, it is important to highlight the importance of the findings of this research for the university that is the object of this study because both factors —personal (related to students and professors) and institutional (indicated by the voice of those involved in the educational process) , in this case the students) openly expressed “their feelings” and offered relevant information for the coordination of this educational program of the university. This had an impact on the preparation for the gradual return to the classrooms due to the identification of aspects that must be improved corresponding to technological infrastructure, teacher qualification programs and student training; all this in order to achieve the learning objectives, especially since the courses are taught through the multimodal model of education, including the hybrid model.

### **Future lines of research**

Based on the findings of this study, there is a need to further investigate the impact of the multimodal model both in the teaching-learning process and in the institutional aspect (technological infrastructure), which will serve to specify the challenges that must be overcome. in its implementation. In the same way, make a timely follow-up to the academic performance of the students in each of the educational modalities to identify those aspects in which more attention is required and to adapt the study plans and programs.

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Rol de Contribución	Autor (es)
Conceptualización	Sonia Mortis Lozoya
Metodología	Ramona Imelda García López
Software	Guadalupe González Gracia
Validación	Angélica Crespo Cabuto
Análisis Formal	Ramona Imelda García López
Investigación	Guadalupe González Gracia
Recursos	Angélica Crespo Cabuto
Curación de datos	Sonia Mortis Lozoya y Ramona Imelda García López (por igual)
Escritura - Preparación del borrador original	Sonia Mortis Lozoya
Escritura - Revisión y edición	Angélica Crespo Cabuto y Ramona Imelda García López (por igual)
Visualización	Guadalupe González Gracia
Supervisión	Sonia Mortis Lozoya y Ramona Imelda García López (por igual)
Administración de Proyectos	Sonia Mortis Lozoya y Ramona Imelda García López (por igual)
Adquisición de fondos	Sonia Mortis Lozoya