University student population: perception of class modality types in the context of COVID-19*[1]

Edith Susan Pillaca-Medina[2]
ORCID: 0000-0003-4204-5939

Julio Fernando Pérez Sáez[2]
ORCID: 0000-0002-7075-7194

Juan Carlos Ponce Ramírez[2]
ORCID: 0000-0002-3723-0550

Wilfredo Trasmonte Pinday[2]
ORCID: 0000-0002-9190-4595

Antonio Jesús Matos Alejandro[2]
ORCID: 0000-0001-5040-6111

Julio Pablo Godenzi Vargas[2]
ORCID: 0000-0001-9153-7441

Abstract

The effects on different human groups caused by social isolation due to the SARS-CoV-2 pandemic are currently being known. In this context, one of the least favored sectors and that even until the end of 2021 had not resumed activities to a great extent of Latin America was the education sector and, in the face of a new variant of the virus, it is possible that these activities will continue virtually in 2022. In this regard, the present study aims to show the appreciation of the students, mainly university students, in order to know the perception and assessment regarding the class modality types in the context of COVID-19. For this, a quantitative and descriptive study was designed based on the interpretation of information obtained from surveys carried out on 198 students from the National University of San Cristóbal de Huamanga in Peru. The results regarding the qualification of learning in the virtual modality of the theoretical classes show that 58.1%

of students mention that it was regular and 31.3% that it was good, regarding learning in the virtual modality of the experimental classes, 43.4% mention that it was regular and 38.9% deficient. Their preferences in most cases is to have theoretical classes virtually and/or blended; and experimental laboratory classes in face to face and/or blended; Likewise, under the current context of COVID-19, 85.4% of students state that they prefer their health over their professional training.

Keywords

Students' perception – Virtual classes – Higher education – Teaching-learning – Pandemic.

Introduction

Due to the uncontrolled increase in infections worldwide caused by the SARS-CoV-2 virus that causes the COVID-19 disease, the WHO declared a pandemic on March 11, 2020 (WHO, 2020). It was then that economic, social, educational activities, among others, were affected and paralyzed in much of the world. Latin America was no exception in relation to the social isolation measures suggested by the WHO and the different countries had to quickly legislate in relation to restrictive measures that limited the free movement of people, including the closure of schools and universities. Thus, in Peru, a National Sanitary Emergency is declared on March 11, 2020, for a period of ninety (90) calendar days (PERU, 2020), due to the detection of SARS-CoV-2 in the crew of an international commercial flight.

The Ministry of Education, as the governing body, dictates the measures so that the public and private entities in charge of providing the educational service at all levels postpone or suspend their activities. These measures are mandatory (PERU, 2020). At the beginning of May 2020, it was thought that the pandemic would end soon and that there would be a return to normality. Instead, the situation worsened, so face-to-face university classes were postponed. University education has been directly affected, generating a delay in the normal development of all its activities.

Iglesias Paradas and other authors (2021) cite that, in order to control the spread of the virus, all physical universities were forced to move to online or virtual instruction, which required changing teaching methods and resources to adapt them to distance education. The Inter-American Development Bank (IDB, 2020) points out that the university was forced to modify its pedagogy mechanisms to adapt to those of tele-education - distance learning, seeking to stay in operation, considering the start of virtual dictation as an accelerated solution, where "[...] the main danger is that learning inequalities widen, marginalization increases and the most disadvantaged students are unable to continue their studies" (IESALC, 2020, p. 5).

Most higher education institutions preferred action in this to online learning, which is the best available alternative for continuing education. However, the inability to purchase electronic products such as laptops, mobile devices, etc., and the availability

of internet connection and necessary infrastructure is a topic of debate among educators and policymakers (SAXENA; BABER; KUMAR, 2020). The current health emergency has also made it possible to recognize that achieving equity in higher education for vulnerable groups in society remains one of the greatest challenges (ALCÁNTARA, 2020).

Given this reality, the San Cristóbal de Huamanga National University, which was not prepared to carry out this teaching modality, was forced to modify its university teaching mechanisms to adapt to virtual teaching, identifying major difficulties in responding to this new process such as the lack of instruments for evaluating the student's knowledge in the new context, few teachers trained for virtual education, limited access to technologies by students.

For all these reasons, the San Cristóbal de Huamanga National University decided to use free Information and Communication Technology (ICT) tools such as the Google Classroom Platform that allows managing academic materials, and Google Meet for academic video conferences, about the latter, Batista points out that "It is an online platform with its corresponding free mobile application, which facilitates its use through web access and also from mobile devices with the Android or iOS operating system" (2018, p. 2).

Unlike experiences that are planned from the outset and designed to be online, emergency remote teaching is a temporary change of instructional delivery to an alternate mode of delivery due to crisis circumstances (HODGES et al., 2020). Aboagye, Yawson and Nyantakyi (2020), in their study, revealed that the most important challenge for students to study online was accessibility issues. This was followed by social issues, speaker issues, academic issues, and generic issues.

In this regard, the transition process to virtual teaching was quite a challenge for teachers and students. Even considering that there are studies that conclude that virtual education in Peruvian universities is subject to failure due to the lack of certain skills of those who impart knowledge and the lack of internet access by students from peripheral spaces that represent the excluded majority from a country with serious economic, social and political deficiencies (HUANCA-AROHUANCA et al., 2020).

In some universities around the world, various investigations have been carried out, each with its particularities, so Bordoloi, Das and Das (2021) carried out a study to understand the perceptions of teachers and students regarding the online learning service in different universities in India, finding that in this country there are digital divides between rich and poor, with the student population being the most vulnerable and affected sector, both by the pandemic and by the type of response of educational institutions.

Ramírez and other authors (2020) carried out a study that sought to know the perceptions of university students in Bolivia towards virtual education, the results show that the perceptions of students about virtual education are affected by factors that must be overcome, among which the economic ones, the poor connectivity, the low quality of the internet signal, the teaching methodologies and the teaching aids stand out. Expósito and Marsollier (2020) conducted an investigation in order to explore the strategies, pedagogical and technological resources used by teachers in the virtual education model in the face of the global health emergency in Argentina, these results highlight the socio-

educational inequalities of the students, who show that the pandemic situation highlighted the inequality of educational opportunities between public and private institutions, the differences between those who had better access to technological resources and the internet, and the differences in the cultural capital of families. Olivares Parada, Olivares Parada and Parada Rico (2020) carried out an investigation in order to determine the changes in attitudes, uses and training interests in information and communication technologies by university professors during the SARS-CoV-2 pandemic, in which they mention that teachers have had to undertake a learning career on the use of ICT, making a spectacular turn to the development of traditional academic activities, as well as interaction spaces. In addition, they have had to turn to a new pedagogical model that boasts critical analysis, two-way interaction, permanent evaluation of processes and feedback from them, in order to maintain educational quality in a virtual context.

On the other hand, León (2021) carried out an investigation on the academic and psychosocial implications of virtual pedagogical practice, at a university in Costa Rica. It found that in the social implications the student group referred to not having an adequate physical space in their homes to continue with the educational process, in the same way they alluded to the little access that the majority has to computer resources and internet access, all this has resulted in maintaining high levels of stress, manifesting itself on a physical level in back pain and headaches. They also referred to positive factors such as not having to travel to the study center and being in the family. Lovón and Cisneros (2020) point out that the problems of the students are the adaptation to the new educational reality and the stress caused by the process of adaptation to the new teaching methodology.

In this regard, currently under these pandemic circumstances, some variants of the SARS-CoV-2 virus are causing concern in the world (RIBAS; GIOVANETTI; JUNIOR, 2021), so the restart of face-to-face classes cannot be announced in teaching university education in the near future. Therefore, it is essential to have studies that allow us to analyze and evaluate results to improve processes and increase the quality of university education.

In this context, the present study aims to provide information on university education in times of the pandemic, taking into account the perspective of the students and knowing the perception they have regarding the modality of virtual classes in the context of the SARS CoV-2 pandemic. It is against this background that we try to know the perception of university students regarding the aspects that significantly affected more the teaching and learning process in the virtual modality, the perception regarding the qualification of the teaching and learning of the theoretical classes and laboratory practices in the virtual modality, and the preferences of the students regarding the modality of classes they wish to take, considering their health, economic, family situation and their professional training.

Methodology

Design and study population

Quantitative and descriptive study based on information obtained from cross-sectional surveys. The survey was designed with input of all the teachers of the UNSCH

Professional School of Food Industry Engineering and was proposed to a pilot group of twenty students whose answers allowed the format to be improved, in the same way the suggestions of a researcher specializing in educational issues were used to obtain the final version of the survey.

Selection of participants

The conduct of the surveys was carried out amongst students of the professional school of Engineering in Food Industries of the National University San Cristóbal de Huamanga. For this purpose, all those enrolled in the 2020-II semester (April-August 2021) who have completed the 2020-I semester (August-December 2020) were invited to participate, which were a total of 276 students. The invitation was made through the *Classroom platform*, where a guide was attached in which the objectives of the research were explained and it was specified that their participation would be voluntary. The informed consent form was sent to obtain the voluntary authorization from the student through his/her signature. The respective survey was attached indicating the link of the google forms. The survey was conducted before the start of the 2020-II academic semester. In total, 198 students who agreed to participate voluntarily were surveyed.

Description of indicators and data analysis

The surveys were carried out through *google forms* and processed to obtain the results in percentages for each indicator. A descriptive and reflective analysis of the three indicators was carried out so as to know the perception of university students (Table 1).

Table 1 - Indicators used for this study

Indicators	Description
Perception of the students regarding the aspects that most affected *the teaching-learning process in the virtual modality*	Teacher's domain of computer media, health condition, internet connectivity, relationship between teacher and student, personal and family economic factor.
Students' perception regarding the *qualification of the teaching and learning of the theoretical and practical virtual classes (laboratory) in the virtual modality:*	Qualification of the teaching of the theoretical and practical classes (laboratory) in virtual modality, qualification of the learning of the theoretical classes and the practical classes (laboratory) in virtual modality.
Perception of preference of the modality of virtual university classes of the present semester under the context of the pandemic.	Preference of the study modality for the theoretical and practical classes, preference of the study modality according to health, economic, family situation, preference of the study modality according to professional training that student wants to achieve.

Source: Prepared by the authors.

Ethical considerations

The research was carried out taking into account ethical aspects and was approved by the Research Ethics Committee of the Universidad Nacional San Cristóbal de Huamanga. Before conducting the virtual surveys, the students were made to sign the informed

consent form. Participation was voluntary. The results were treated confidentially without mentioning the names of the participants.

Results and discussion

Place of residence

According to the results on the place where they received their virtual classes during the year 2020 shown in Figure 1, we observe that, of the total student population of the professional school, 64.1% received their classes in the city of Ayacucho, followed by 23.7% who received their classes in a rural area, 10.6% received their classes outside the region and 1.5% in a provincial capital of the region. These results confirm that the majority of the student population resides in the city of Ayacucho, despite the fact that they come from other towns in the interior of the Ayacucho region.

Figure 1 - Place where students received their virtual classes during the semester 2020 I
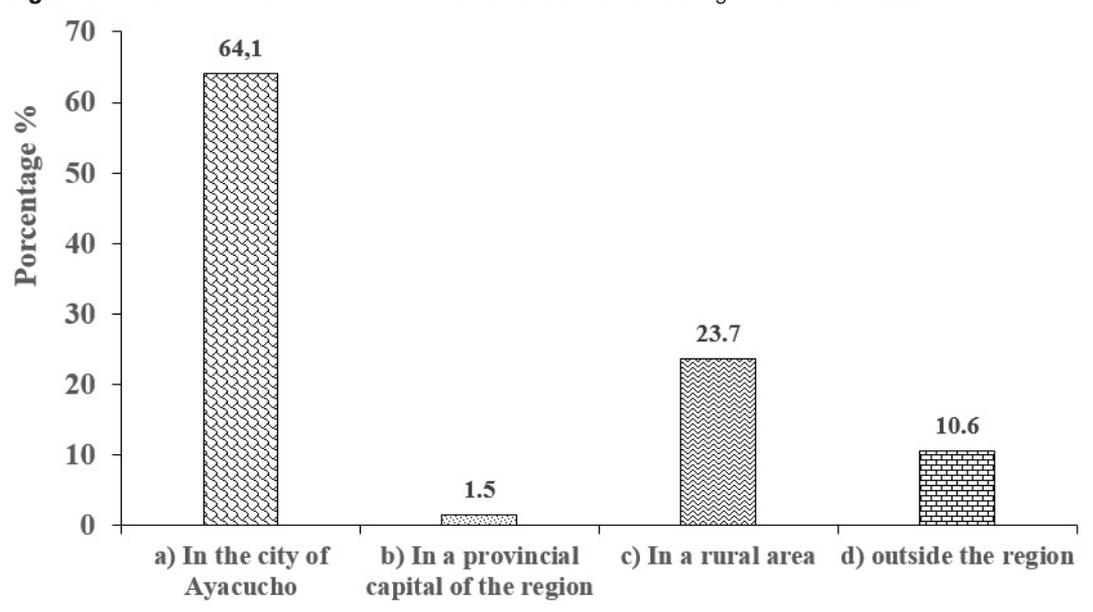
Source: Prepared by the authors.

Social immobility due to the effects of COVID-19 delayed the start of the 2020-I academic semester and once it began, students had to choose the best accessibility conditions for their virtual classes. The highest percentage of students received their classes in the city of Ayacucho (64.1%), this includes many students who, coming from rural areas, decided to stay in the city because of the facilities offered in connectivity services, since they are more robust compared to the internet services offered by connectivity

companies in rural areas, where coverage is not the best. 10.6% of the students received classes in other regions where they feel comfortable in the company of the family and where there is also an efficient connectivity signal. The students who had the greatest connectivity problems were those who stayed in rural areas, where the service is not the best for remote work of virtual classes, 1.5% were affected by this situation. The preference of students to remain in the city of Ayacucho as an urban area during the development of their virtual classes is based on the technological challenges. These challenges include the inability to access or use online learning and teaching tools, difficulties adjusting particularly for students living in rural areas and those from low-income families, as well as associated stress, depression, and anxiety (MSELEKU, 2020). The use of technology plays an important role in the cognitive engagement and academic performance of students (AGUILERA-HERMIDA, 2020).

It was found that a sizeable proportion of students preferred to remain in the city of Ayacucho, risking their health and cost of living by not staying with their families in rural and marginal urban areas, mainly due to the accessibility of virtual classes. These results are different from the studies carried out by Pérez López, Vázquez and Cambero (2021) in Extremadura, Spain, in which 54.6% of the students have experienced the confinement in the rural environment and 54% did so in the urban environment. In our study, 23.7% preferred to comply with the confinement in the company of the family in rural areas outside the city of Ayacucho.

Teaching-learning process in the virtual modality

Table 2 shows the factors that influenced the teaching-learning of university students in the 2020-I semester.

Table 2 - Rating of the factors that influenced the teaching and learning of the semester 2020-I (virtual modality)

Factors	Very deficient	Deficient	Regular	Good	Very good
	Percentage (%)				
Teacher's domain of computer media	1.0	6.6	56.1	34.8	1.5
Internet connectivity	15.2	34.8	41.4	6.6	2.0
The teacher-student relationship	1.5	16.7	56.6	24.7	0.5
Health condition	3.0	10.1	37.4	47	2.5
Personal and family economic condition	11.1	38.4	42.9	7.6	0

Note: N = 198
Source: Prepared by the authors.

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Domain of the teacher on computer media: 56.1% of students state that it was regular and a group of 34.8% state that it was good. Olivares Parada, Olivares Parada and Parada Rico (2021) carried out an investigation in Colombia during Covid-19. They found that the social space of virtual interaction and the use of technologies are assumed by 82% of teachers with a positive attitude. The university does not have its own educational platform and teachers made use of the platforms available on the network: Google Classroom and Meet. In general, at the university level, teachers have received training in ICT from previous years, but it was in this context of a pandemic that it was carried out with greater intensity, which allowed us to adapt in the best possible way to a teaching virtual. However, according to the results, the students perceive that the teaching and learning process in the virtual modality was regular, which forces us to rethink and improve our teaching strategies to guarantee the professional training of our students.

Internet connectivity: in relation to Internet connectivity, 41.4% indicate that it was regular and 34.8% that it was deficient. Rural students were the most affected by connectivity problems. These results are different from those presented in other realities as found by Osorio, Montoya and Isaza (2020) in the perception of second-semester Medicine students during the time of the pandemic, where only 2.4% of students indicates poor connectivity.

Expósito and Marsollier (2020) point out that the pandemic situation highlighted the inequality of educational opportunities between public and private institutions, the differences between those who had better access to technological resources and the internet. Kulal and Nayak (2020) point out that universities and other educational institutions must provide excellent training and support to both students and teachers, they also indicate that one of the main problems of rural students is the lack of smartphones or computer laptop, and network problems.

It should be noted that the San Cristóbal de Huamanga University delivered the internet modems to the students late, as well as to the teachers, who assumed an additional cost in internet coverage. These results coincide with those indicated by Aguilar when he affirmed "[...] that the violent uprising of virtual environments in cities that were not prepared to face this type of emergency brought a series of difficulties, the main ones being economic and educational" (2020, p. 217).

Teacher-student relationship: in this regard, 56.6% answered that it was regular and 24.7% that it was good; 16.7% that it was deficient; 1.5% that it was very deficient and only 0.5% that it was very good, which shows that communication between teacher and student should be improved even more in a virtual study modality. Del Hierro, García and Mortis (2014) carried out an investigation on the perception of university students about the teacher's profile, finding that the greatest weakness was in communication skills with students. Rizo (2020) points out that the teacher of the virtual modality must have a vocation, commitment and social responsibility to guide the learning process, play an active role in the virtual environment fulfilling each of the functions so that students acquire the knowledge and skills in the learning process. It is also important to point out that a good relationship not only depends on the teacher, but also on the student, as the author mentions in terms of the role of the student: he must also be an active subject of his own learning, he must take into account the roles represented in self-discipline, self-

learning, knowing how to analyze, reflect and participate in collaborative work, and this allows them to make their learning process profitable and of good quality.

On the other hand, in reference to health conditions, the students who stated that they had completed the semester in good or very good health conditions accounted for 49.5%; 37.4% indicate that their health condition was regular; 10.1% did so in deficient health condition and 3% in very deficient health condition. Regarding factors related to personal and family economic conditions, 42.9% of the students stated that they had regular economic and family conditions; 38.4% deficient and 11.1% very deficient.

Level of influence of the factors studied: The factors with the most negative influence on the teaching-learning process of students in the 2020-I semester were internet connectivity (48.0%) followed by the economic factor (24.7%); a group of 17.2% expresses the relationship between the teacher and the student; a group of 5.6% has been affected by health problems (mainly COVID) and the domain of computer media by teachers has been the factor with the greatest negative influence for 4.5% of the students, as displayed in Figure 2.

Figure 2 - Factors with the most negative influence on the teaching-learning process of the semester 2020-I (virtual modality)
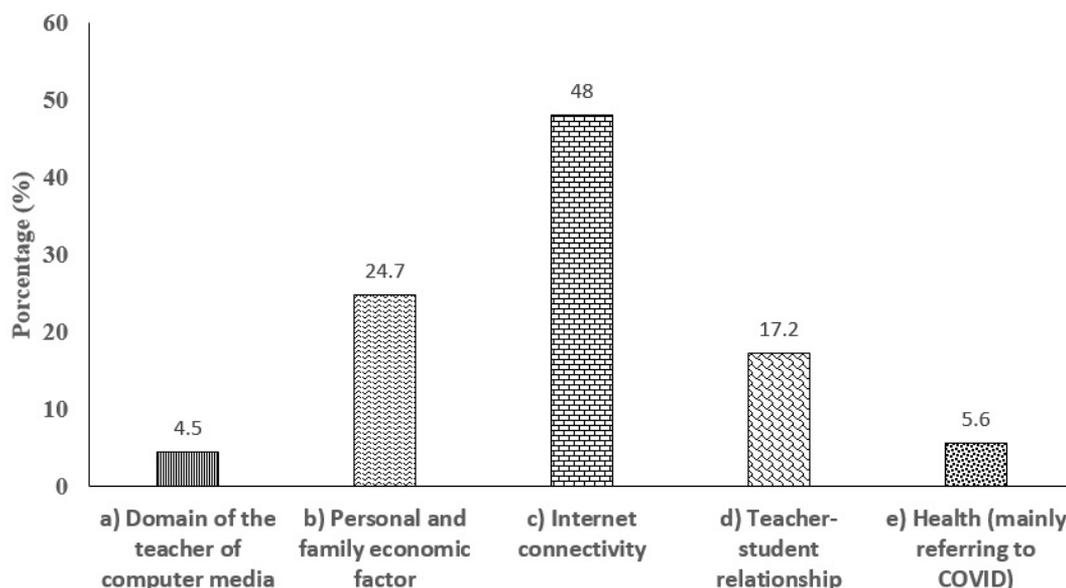
Source: Prepared by the authors.

These results of high negativity in most of the factors are predictable since, as García (2021) indicates: the conditions of distance education have occurred without prior planning, there were connectivity and equipment problems for the majority of those affected, there was no proper teacher training plan, nor was there a plan for preparing

students regarding self-discipline and self-regulation of their work, and the negative attitude of many teachers could unbalance the final data of any assessment. These negative results are ratified by the Inter-American Development Bank (IDB, 2020), in its study on higher education in times of COVID 19.

> [...] in universities where there were no preliminary experiences in tele-education, great difficulties have been identified in responding immediately to the creation of an effective technological platform, seeing some educational systems and the training of thousands of students compromised. (2020, p. 2).

In this regard, the current situation of the pandemic caused by SARS-CoV-2 has revealed many underlying vulnerabilities and inequalities in the educational system, consequently, it has significantly disrupted the lives of students from marginalized and vulnerable backgrounds, especially from low-income families (BONAL; GONZÁLEZ, 2020). However, the university must not neglect the commitment to ensure the continuity of the courses in an equitable and inclusive manner, identifying and promptly serving the student population that is in conditions of socioeconomic disadvantage (MIGUEL, 2020).

Qualification of teaching and learning of virtual classes

Qualification of vocational training in the context of the pandemic: regarding the qualification of vocational training in the context of the pandemic, the students state that 61.6% was regular; 17.2% indicate that it was very deficient; 13.6% state that it was good; 6.1% that it was deficient and 1.5% that it was very good. Results are observed in Figure 3.

Figure 3 - Qualification of vocational training in the context of the pandemic
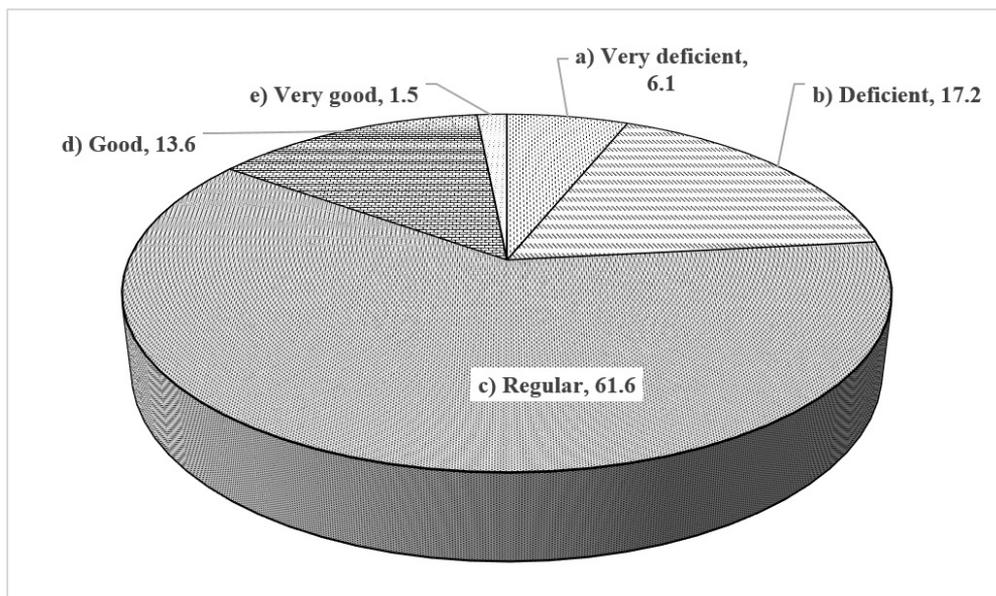
Source: Prepared by the authors.

The fact that 85% of the students rate the professional training as regular to very deficient is in line with the work carried out by Cedeño (2020) with dentistry students from various academic semesters in Ecuador, in which 80% consider that their learning through the internet in the context of the health emergency due to COVID-19 is from regular to low rate. These results indicate that students perceive academic training in this context as inefficient and that it will limit their professional performance. In a study carried out at the Pontificia Universidad Javeriana in Cali, Colombia, 91.5% of students consider that virtual modality has lessened the rigor of their learning process in the system. Contrary to this, 63.4% consider that their learning has been significant during the COVID-19 pandemic (OSORIO; MONTOYA; ISAZA, 2020).

Other factors that influenced professional training are those pointed out by Gillis and Krull (2020): the majority of students felt that their academic success was inhibited by feeling unmotivated, distracted and/or anxious due to COVID-19, most also reported feeling less motivated due to mental health issues and difficulty sleeping. The academic overload in students in virtual teaching significantly affected their mental stability and learning (LOVÓN; CISNEROS, 2020).

Appreciation of the teaching-learning process: Table 3 shows the results referring to the appreciation of the students regarding the teaching and learning of the virtual theoretical and practical (laboratory) classes.

Table 3 - Qualification of the teaching and learning of the semester 2020-I (virtual modality)

Qualification regarding	Very Deficient	Deficient	Regular	Good	Very Good
	Porcentaje (%)				
Teaching of theoretical classes	1.0	7.1	54.5	35.4	2.0
Teaching of practical classes	13.1	40.9	38.9	6.1	1.0
Learning of the theoretical classes	1.5	6.6	58.1	31.3	2.5
Learning from practical classes	10.6	38.9	43.4	6.6	0.5

Note: N = 198
Source: Prepared by the authors.

54.5% of students state that the teaching of the theoretical classes in the virtual modality was regular and another group of 35.4% state that it was good. In reference to the modality of virtual practices (laboratory), 40.9% state that the teaching was deficient, followed by 38.9% who state that it was regular, highlighting the lack of audiovisual material and interactive software in their virtual practices. Regarding the learning they obtained from the theoretical classes in the virtual modality, 58.1% stated that it was regular and 31.3% that it was good. For the learning of the laboratory practices of the virtual modality, the evaluation was as follows: 43.4% stated that it was regular and 38.9% indicated that it was deficient.

In general, the teaching of the theoretical classes in the virtual modality was between regular and good, results similar to those found by Ramírez and other authors (2020), where the students rate 60.7% of the virtual classes as regular, a 28.4% as good, 8.7% perceive them as bad and only 2.2% of students perceive them as very good.

Regarding the learning of the practical classes in the virtual modality, the perception was between regular and deficient. Similar results are found in careers where laboratory practices are required to acquire the necessary skills, as is shown by Abbasi and other authors (2020), who conducted research at a medical school in Pakistan during Covid-19. They found that 77% of students have negative perceptions towards e-learning and 85% of students prefer face-to-face teaching. Only 31% of students indicate that the quality of electronic teaching is satisfactory. E-learning is found less attractive due to its limitations regarding the practical aspects of learning in the laboratory and clinical setting.

Bazán Ramírez and other authors (2020) carried out an investigation showing favorable results for virtual education with postgraduate students during physical distancing in Peru. These results may be due to a better economic position of students at the master's and doctoral level, unlike our students at the undergraduate level, in addition, these differences depend on the careers studied. Our curriculum shows many courses with labs and engineering courses that are more difficult to adapt in a virtual environment.

Preference of the modality of university classes

Regarding the modality of theoretical classes to be received in the 2020-II semester, 51.5% express their virtual preference, followed by 38.4% who prefer the blended modality, a very small group of 10.1% express their preference for the face-to-face class, in accordance with the digital trend of the current generation, in such a way that they considered an alternative to optimize their time in relation to a face-to-face class. Regarding the preference of the modality of the laboratory practice classes, 46.5% express their preference of face-to-face practice, followed by 41.4% by the blended modality and 12.1% in virtual modality. The results are shown in Figure 4.

Figure 4 - Preference of the modality of theoretical classes and practical classes (laboratory) for the semester 2020-II
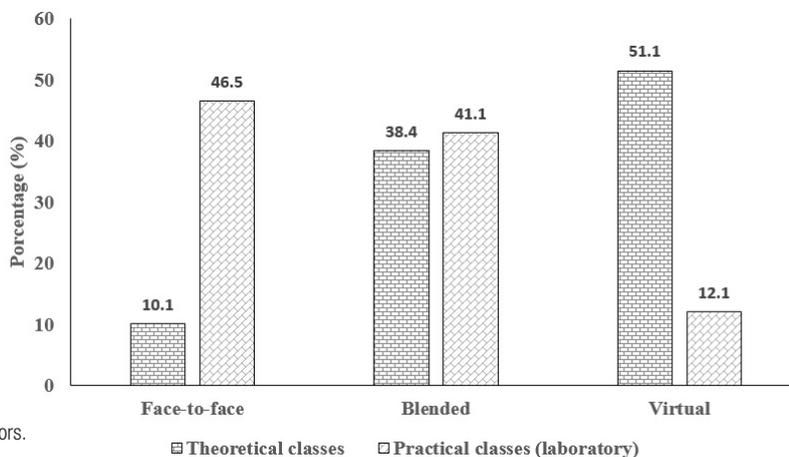
Source: Prepared by the authors.

Table 4 presents the results of the preference that the students would have for the classes of the following semester after the virtual experience in the 2020-I semester.

Table 4 - Preference of the study modality in the following semester (2020-II)

| Class modality	Face-to-face	Virtual	Blended
	Percentage (%)		
According to your health situation	12.1	42.4	45.5
According to your financial situation	20.2	35.4	44.4
According to your family situation	14.1	41.4	44.4
According to your professional training you want to achieve	59.6	7.6	32.8

Note: N = 198
Source: Prepared by the authors.

Students, according to their health condition, would prefer 45.5% blended classes, followed by 42.2% virtual classes and 12.1% face-to-face classes. Regarding the economic situation, 44.4% prefer blended classes, 35.4% prefer virtual and finally 20.2% prefer face-to-face classes. Seeing the family situation in which the students find themselves, 44.4% respond that they prefer blended classes, 41.4% prefer virtual classes and a small percentage of 14.1% prefer face-to-face classes. In accordance with the goal set to achieve their professional training, 59.6% responded that they prefer face-to-face classes, followed by 32.8% blended classes and 7.6% virtual.

In relation to the choice of their preference between their health care and their professional training under the current situation of the pandemic, the results are observed in Figure 5. 85.4% of students state that they prefer their health and a group of 14.6% prefer the choice of their professional training.

Figure 5 - Students' choice between their health care and their professional training under the current situation of the pandemic.
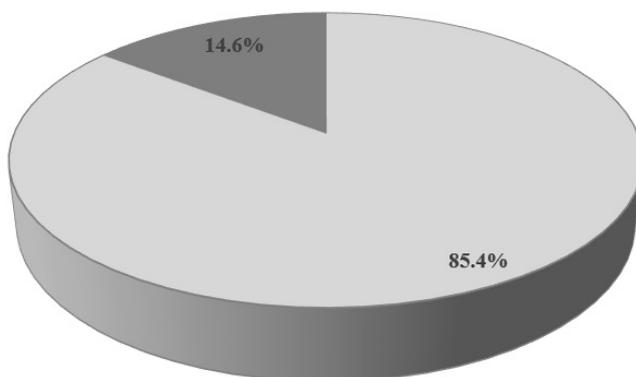
☐ a) My health   ☐ b) My professional training

Source: Prepared by the authors.

The preference for the theoretical classes of the students in virtual form is greater (51.5%) compared to the blended modality (38.4%) and face-to-face (10.1%). This due to the effect of preventing the spread of the virus and protecting your health in the difficult time of the pandemic. This preference occurs especially in students who do not have connectivity problems; this result is consistent with a study conducted in India where students' preference for online learning was 70%. Using content analysis, we found that students prefer recorded classes with quizzes at the end of each class to improve learning effectiveness. Students felt that the flexibility and convenience of online classes makes it an attractive option, while broadband connectivity issues in rural areas make it challenging for students to make use of online learning (MUTHUPRASSAD et al. to 2021). According to Morales (2020), students state that personal relationships in virtual modality classes are not as close as in face-to-face modality; some express that it is always possible to improve and achieve an adequate delivery of information by the teacher, in the same way, experts and teachers agree with students in the fact that virtuality does not allow an ideal teacher-student interaction to achieve better learning , especially in the communicational aspect, non-verbal language and face to face.

It is likely that, over time and with improved skills, students will increase their preferences for theoretical classes in a virtual and blended manner, as observed in the work carried out by Aguilar Salinas and other authors (2019), who carried out a study in a Faculty of Engineering in Mexico, about the blended modality in which it is evident that the liking of the blended modality increased by 18% from the period 2016-2 to 2017-1. As a large percentage prefers that their theoretical classes be virtual, a great commitment is required not only from the teacher but even more from the students. As Rizo (2020) mentions, the role of the virtual student that allows the generation of knowledge is directly related to the capacity for self-management, expressed in self-discipline, self-learning, critical and reflective analysis, as well as in collaborative work.

In relation to the laboratory practice classes, the face-to-face modality is preferred (46.5%) compared to the virtual practical classes (12.1%), because the student in the virtual modality of the laboratory practices does not directly develop the practical tests. According to the perception of the students, with the virtual theoretical classes there is not much problem in receiving the knowledge, but the face-to-face practical classes in the laboratory are necessary to complement and strengthen the theoretical concepts. According to Morales (2020), the theoretical activities could become virtual classes and the practical activities must be face-to-face, in a field. Students find it complex to carry out an exclusively virtual career, they ask for face-to-face activities with virtual classes, possibly because they have experienced the fully face-to-face career and do not know the virtual resources and their potential. Orozco (2020) points out that it is not enough to think about the return to the new normality, nor to think about overcoming the pandemic in the new normality; It is not enough to talk about the post-pandemic and its challenges. Without a doubt, we will have to reflect on all this under the conviction that education as a social, political and pedagogical practice, and as a project, is the task of those of us who work in the educational field and of society as a whole.

To improve the quality of virtual education, it is necessary to permanently evaluate the planning and quality of educational processes. This planning is based on the number

of students served, the availability of instructional material, the quality of teachers, the quality and relevance of teaching strategies and student-teacher interaction, to name just a few (GARCÍA-ARETIO, 2012; MARTÍN, 2014; FERNÁNDEZ, 2014 apud DURÁN, 2015). According to Ojeda Beltrán, Ortega Álvarez and Boom Carcamo (2020), the students' perception considers that the tools incorporated in the platform are useful when it comes to enriching knowledge and contribute to the continuous improvement of learning, and they perceive that they would have more opportunities of acquiring knowledge on the platform if more virtual learning tools were used. It has been found that, due to the low level of Internet connectivity for educational purposes, it is not possible to access fully online or synchronous teaching-learning facilities for all in an equitable manner; therefore, asynchronous forms in education can provide the optimal learning opportunity for everyone in a more flexible and convenient way (BORDOLOI; DAS; DAS, 2021). According to Tejedor and other authors (2021), the impact of the pandemic on higher education requires a clear restructuring of the academic organization. Virtual and hybrid models require study materials adapted to new interaction scenarios. Kual and Nayak (2020) point out that change is constant and inevitable, therefore, anything in this world tends to become obsolete with each new advance or development, and intelligence lies in the ability to adapt to change.

Final considerations

The aspects that most affected the teaching and learning process of students in the virtual modality were internet connectivity (48%), followed by personal and family economic status (24.7%) and the relationship between teacher and student. (17.2%). The students perceive that their teaching and learning in the virtual modality of the theoretical classes was between regular and good, while the perception of the practical classes (laboratory) was between regular and deficient. Their preference, for the most part, is to have theoretical classes between virtual and blended classes and practical classes (laboratory) between face-to-face and blended classes.

Similarly, in the virtual modality, students can obtain information immediately through the web and ask questions, which requires the greatest preparation of the teacher, which increasingly improves the level of teaching, however, at the level of laboratory practices there are many limitations as well as in the care of exams. Despite the limitations, this type of virtual education is a great alternative in situations such as COVID-19, until it returns to normal, even more so if we consider that 85.4% of students state that they prefer their health to their professional training in the context of the pandemic.

It thus emerges that, it is necessary to improve the connectivity system before the start of classes. Teachers should be trained more on ICT, the institution should have its own educational platform, provide feedback on teaching to the student and improve the relationship between teacher and student. With all these considerations, teachers are committed to the continuous improvement of teaching to guarantee the professional training of students and, without a doubt, in a return to normality we will have better tools acquired by the experience lived.

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Edith Susan Pillaca-Medina has a master's degree scientiae in Nutrition from the La Molina National Agrarian University. She is currently a professor at the Professional School of Engineering in Food Industries of the National University San Cristóbal de Huamanga, Ayacucho-Peru.

Julio Fernando Pérez Sáez has a master's degree scientiae in Food Technology from the La Molina National Agrarian University. He is currently a professor at the Professional School of Food Industry Engineering at the San Cristóbal de Huamanga National University, Ayacucho-Peru.

Juan Carlos Ponce Ramírez holds a PhD in Food Science from the Federico Villarreal National University. He is currently a professor at the School of Food Industries of the San Cristóbal de Huamanga National University, Ayacucho-Peru.

Wilfredo Trasmonte Pinday holds a Master scientiae in Food Technology from the La Molina National Agrarian University. He is currently a professor at the Professional School of Food Industry Engineering at the San Cristóbal de Huamanga National University, Ayacucho-Peru.

Antonio Jesús Matos Alejandro holds a Master scientiae in Food Technology from Alas Peruanas University. He is currently a professor at the Professional School of Food Industry Engineering at the San Cristóbal de Huamanga National University, Ayacucho-Peru.

Julio Pablo Godenzi Vargas has a master's degree in Agribusiness from the National University of San Cristóbal de Huamanga. He is currently a professor at the Professional School of Food Industry Engineering at the San Cristóbal de Huamanga National University, Ayacucho-Peru.