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RESEARCH ARTICLE

Face-to-face education with a virtual support: an experience of Honduras on COVID-19 times

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Abstract

The aim of this research has been to reveal the educational proposal carried out by one of Honduras universities to virtualize its processes during COVID-19 and to determine the satisfaction of professors and students regarding the proposal. This research, under an exploratory and non-experimental descriptive design, had two phases: reconstruction of the experience and a satisfaction study using a Likert-5 point scale tool carried out to a sample n = 1156 students and n =130 professors. The results have allowed to identify three transition stages to virtualization: ensuring, reorganizing and implementing; to define face-to-face education with a virtual support as the modality study applied, and to verify a high level of satisfaction of students and professors. The results allow the transition and development of a face-to-face education with a virtual support modality as an alternative to the virtualization of educational processes in higher education.

Keywords: face-to-face education with virtual support; COVID-19; higher education; electronic learning

Educación presencial con mediación virtual: una experiencia de Honduras en tiempos de la COVID-19

Resumen

El propósito de esta investigación ha sido revelar la propuesta educativa desarrollada por una universidad de Honduras para virtualizar sus procesos durante la COVID-19, así como determinar el grado de satisfacción con esa propuesta que manifiestan sus estudiantes y docentes. Con carácter exploratorio y descriptivo no experimental, tuvo dos fases: reconstrucción de la experiencia y estudio de satisfacción a través de un instrumento tipo Likert-5 aplicado a una muestra n = 1156 estudiantes y n = 130 docentes. Los resultados han permitido identificar tres etapas en el paso a la virtualización: aseguramiento, reordenamiento e implementación; definir la modalidad de estudios implementada como una educación presencial con mediación virtual; y constatar un alto grado de satisfacción de estudiantes y docentes. Los resultados permiten avanzar hacia el desarrollo de un modelo de educación presencial con mediación virtual como alternativa para la virtualización de los procesos educativos en la educación superior.

Palabras claves: educación presencial con mediación virtual; COVID-19; educación superior; aprendizaje virtual

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Educação presencial com mediação virtual: uma experiência de Honduras nos dias do COVID-19

Resumo

O objetivo desta investigação foi revelar a proposta educacional desenvolvida por uma universidade hondurenha para virtualizar seus processos durante a pandemia COVID-19, bem como determinar o grau de satisfação com essa proposta, que seus alunos e professores manifestam. Com caráter descritivo exploratório e não experimental, teve duas fases: reconstrução da experiência e estudo de satisfação por meio de instrumento do tipo Likert-5 aplicado a uma amostra n = 1156 alunos e n = 130 professores. Os resultados permitiram identificar três estágios para virtualização: garantia, reordenação e implementação; definir o tipo de estudo implementado como uma educação presencial com mediação virtual; e verificar um alto grau de satisfação dos alunos e professores. Os resultados permitem avançar no desenvolvimento de um modelo de ensino presencial com mediação virtual como alternativa para a virtualização de processos educacionais no ensino superior.

Palavras-chave: educação presencial com mediação virtual; COVID-19; ensino superior; aprendizagem virtual

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Introduction

The first months of 2020 have been marked by an unprecedented global situation. COVID-19 became a pandemic that transformed the day-to-day lives of human beings and their social institutions. Although the realities of different countries and higher education institutions are very different, they all face a common problem: how to maintain a quality education in a context of physical social distancing. For many institutions, the decision has been to switch from a face-to-face model to some form of Internet-assisted education (Crawford et al., 2020; IESALC-UNESCO, 2020).

During this transition, a first problem related to the conceptual framework has emerged, since—as it has been widely identified in previous studies—there is still no consensus on the terminology used in the field of education carried out with some type of spatial or temporal dislocation (Bates, 2019; García Aretio, 2020). The use of different categories to refer to the same reality, or of the same category to designate different realities has been aggravated by the attempt to nominalize educational practices in conditions of confinement or physical social distancing.

Although the descriptions of the pedagogical practices implemented around the world in this period are very similar, several new terminologies or adaptations of the existing ones have emerged to name them, including: online education (Bao, 2020), emergency remote learning (Hodges et al., 2020), technology-assisted face-to-face education (Monasterio & Briceño, 2020), technology-assisted attendance (Universidad EAN, 2020); or a combination of some of these terms: online education in an emergency remote learning context (Johnson et al., 2020).

It is still too early to attempt a meta-analysis of the experiences reported by original research during the pandemic, but zooming in on some of the early studies in different countries reveals commonalities in the actions taken (Abdulrahim and Mabrouk, 2020; Bao, 2020; Basilaia *et al.*, 2020; Chick *et al.*, 2020; Crawford *et al.*, 2020; Ding *et al.*, 2020; Dutton & Mohapatra, 2020; Ebner *et al.*, 2020; Moreno-Correa, 2020; Moszkowicz *et al.*, 2020; Reimers and Schleicher, 2020; Zhang *et al.*, ., 2020).

The first coincidence lies in the recognition that what has been happening is not an innovation process carefully designed and validated before its universalization, but a massive response that is being developed on the fly according to the capabilities of each institution. This is the context in which the experiences documented to date originated from.

The second coincidence lies in its distinctive features:

1) continuation of face-to-face courses and programs through tools that allow for the virtualization of the educational process;

2) although some asynchronous activities are carried out, there is a predominance of synchronous activities that seek to adapt the didactics of on-site presence to a virtual presence;

3) an attempt to apply to the virtual campus the same rules of the physical campus.

Correlating these characteristics with the opinion of several experts on the subject (Abreu, 2020; Hodges *et al.*, 2020; Pardo Kuklinski & Cobo, 2020), we can rule out that the educational reality described is a process of distance education or online education. Although there is a virtualization of the process, it is essentially based on synchrony and there is no evidence that a conception of learning adjusted to the pace of each student prevails, but rather the opposite.

If we focus on the context in which it originates, it seems reasonable to assume the idea of remote (non-presential) emergency teaching (education). Beyond the nuances, two main ideas emerge here: the process occurs with a space disruption for the participants, and it is caused by an emergency in an exceptional situation. This is a convenient and opportune definition, since it exonerates professors and administrators from any error or failure of the alternative adopted and, by framing it only within an emergency context, centers all the focus on the originating condition, ruling out the possibility of improving the initial response.

The idea around education being technology-mediated or technology-assisted is less convincing because it is tautological, since face-to-face education (understood as physically on site) or distance education can and has been supported by some type of technology (mechanical, analogical, digital, or other).

What supports the participation of people in a physically disrupted educational process is a virtual environment, but this is not conditioned by the technologies themselves, but by the use of such technologies.

Returning to the three distinctive features identified, the attempt to combine, or at least timidly bring together aspects of face-to-face and online distance education stands out. The first thought might be that this is a *blended learning* process, but the use of this modality in multiple areas of higher education has been widely documented in thousands of scientific journals (Bartolomé *et al.*, 2017), and shows marked differences with what has been happening. In this regard, Mayadas *et al.* have presented a complete inventory of course and program modalities with some type of virtual support on the Internet (2015) and none of them exactly match the distinctive features of the experiences described during the COVID-19 context.

What then should we call this body of somewhat innovative experiences that have been taking place in higher education institutions from the main geographical regions?

Three key features have been documented: it is face-to-face, it is virtually supported, and it articulates synchrony and asynchrony, but with an emphasis on the former, so it is proposed to call it "face-to-face education with virtual support."

The situation described calls for attention from the scientific community worldwide because it is necessary to report experiences that could be applied in other contexts and to develop the most appropriate pedagogical methods. As part of this global concern about the problem described above, researchers from Universidad de San Pedro Sula (USAP) in Honduras and Universidad de Artemisa in Cuba have implemented the joint research project "Educational experiences in times of COVID-19" (EdSup-2020-1).

The foregoing paper reports the initial results of this research project with the aim of reconstructing the educational proposal developed by USAP in response to the situation generated by COVID-19 and verifying the level of student and professor satisfaction with the educational proposal implemented.

Method

Design

The research was under an exploratory and non-experimental descriptive design. To carry it out, two phases were implemented: I) reconstruction of USAP's educational proposal in the face of the pandemic; and II) study of student and professor satisfaction with the educational proposal implemented.

Context

The study was carried out at Universidad de San Pedro Sula (USAP), the second higher education institution founded in Honduras, located in the city of the same name.

The university has had a virtual campus since 2012, when it began a project to virtualize the educational process, which is now managed through the Moodle virtual learning environment, which has been integrated with digital tools such as those provided by Google *Suite* for Education, virtual laboratories, among others.

Each academic year is organized into three 15-week terms scheduled to begin in January, May, and September. The educational process in all degree programs is developed on the basis of a hybrid model in which each student arranges his or her own curriculum according to his or her learning needs. Courses are offered through two basic modalities: face-to-face and distance, with three variations: Face-to-Face, where the process occurs essentially synchronously with face-to-face group interactions; Virtual Education (distance), consisting, essentially, of an asynchronous virtual process (19% of the courses are designed for this variation of the distance modality); Distance with Virtual Support (blended), where the mostly asynchronous virtual process is combined with synchronous face-to-face meetings each week (54% of the courses are designed for this variation of the distance modality).

This flexibility means that most students experience a combination of modalities throughout the program, although the face-to-face mode has dominated up to now (see Figure 1).

Participants

Based on a non-probabilistic sampling, the participants in this study were students and professors directly involved in the face-to-face education process with virtual support carried out at USAP in the 2020-2 term who voluntarily decided to participate upon invitation sent through mailing lists and WhatsApp.

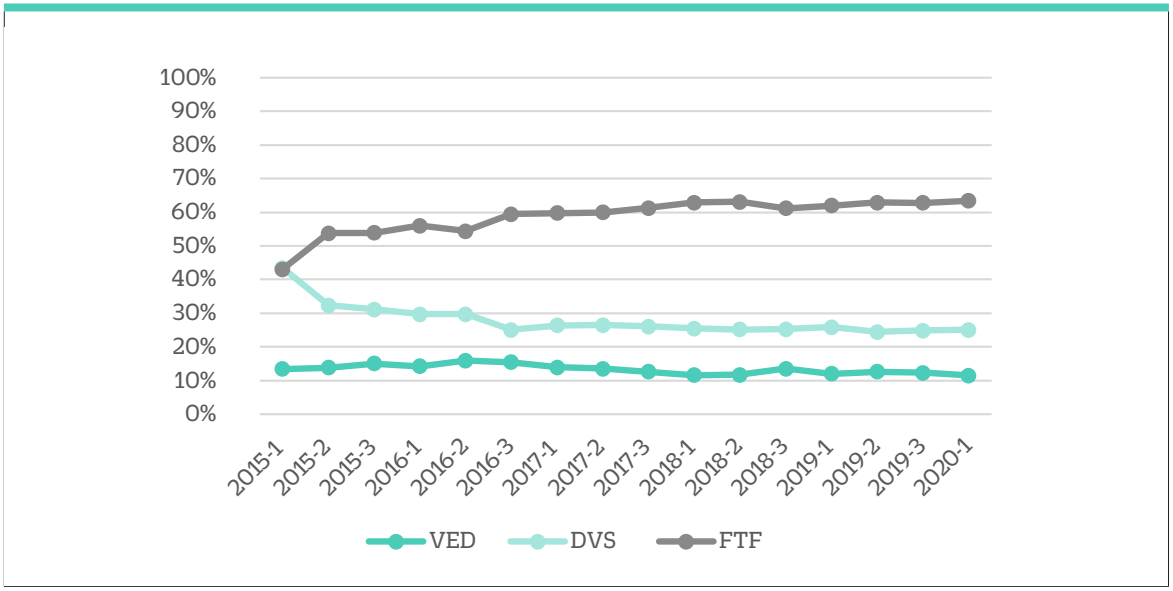

Figure 1. *Enrollment by Modalities Offered.*

Source: Prepared by the authors based on data from the USAP General Secretariat.

Among the students, the participation was n = 1,156, between 17 and 61 years old (M = 22.3), of whom 81.1% are midway through their studies, while 4.6% have just started university and 14.3% are about to finish.

Among the professors, participation was n=130, of whom 64.2% had more than five years of experience in university teaching and 64.6% had had previous experience teaching courses on virtual platforms; while 19.2% had developed skills to use Moodle although they had no previous experience.

Both among professors and students, all degree programs taught at USAP are represented.

Instruments

To identify the satisfaction level of the students and professors who have participated in this experience, two questionnaires[1] were designed for each group based on a Likert-type scale derived from the following operationalizations (see Table 1).

An initial pilot test (n = 15) was applied to fine-tune the two instruments. After correcting some of the items to the initial instruments, a Cronbach's Alpha coefficient α = 0.96 was obtained for the instrument applied to students and α = 0.94 for the one applied to professors, which shows high internal consistency and reliability (Cronbach, 1951).

Procedures

In Phase I (reconstruction of the educational proposal) all academic information generated by USAP since January 2020 was systematized: a) minutes from the directive committees, b) internal communication between the academic departments, c) guidelines for the teaching-learning process, d) webinars. Once the information was collected and organized, a periodization of the academic actions and a description of the fundamental aspects of the educational proposal developed in this context were established. A first draft was presented to the university directive body so that they could enrich it, and from the results obtained it was possible to reconstruct the educational proposal so far implemented.

1 Available at https://figshare.com/s/efe0dab5126f-cfed4fdf

In Phase II, by the end of the third week of classes, a survey was designed and applied to students and professors on their satisfaction with the face-to-face education modality with virtual support.

The instruments were administered through Google Forms and remained open for 72 hours after being announced. Participation was voluntary after reading the informed consent form and completely anonymous.

Data analysis

Cronbach's alpha coefficient, descriptive analysis, and frequency analysis were performed using IBM-SPSS v22.

The satisfaction level was obtained by calculating the arithmetic mean of the total number of answers provided in each case, within the Likert-type scale (Boone & Boone, 2012), and interpreted using a proportional range adjusted for the possible values: 1 ≤ x < 1.8 = Very dissatisfied; 1.80 ≤ x < 2.6 = Dissatisfied; 2.60 ≤ x < 3.4 = Neither dissatisfied nor satisfied; 3.40 ≤ x < 4.2 = Satisfied; 4.20 ≤ x ≤ 5 = Very Satisfied.

In order to determine the degree of coherence in the answers provided by students and professors and the accuracy of their possible stochasticity, the multidimensional correlation coefficient r_{pj} (Pérez Jacinto, 2015) was applied according to the formula:

$$r_{pj} = 1 - \frac{12 \sum_{p=1}^{n} \sum_{j=1}^{N} d_{pj}^2}{(n^2 - n)(N^3 - N)}$$

Where n is the number of subjects; N, the number of aspects to be considered; and r_{pj}, the distance between the ranges of each aspect.

To facilitate the interpretation of the coefficient results, Pérez Jacinto (2015) typified the ranges by associating the significance levels of Student's theoretical t-distribution to Lukasieviv Tarski's multi-value logic propositional system, from which he determines: $r_{pj} \geq 0.823$ = highly coherent or. highly non-stochastic; $0.823 > r_{pj} \geq 0.708$ = quite coherent or quite non-stochastic; $0.708 > r_{pj} \geq 0.576$ = coherent or rather non-stochastic; $0.576 > r_{pj} \geq 0.337$ = incoherent or stochastic; $0.337 > r_{pj} \geq 0.297$ = quite incoherent or quite stochastic; $r_{pj} < 0.297$ = highly incoherent or highly stochastic.

Table 1

Operationalization of the Satisfaction with the Face-to-Face Education Process with Virtual Support Variable

Dimensions	Categories	Items
Students		
Technological	T1: Accessibility to technological resources	1,2
	T2: Utility of the technological resources used	3,4
	T3: Design quality of the resources used that make them visually and sonically attractive.	5,6
	T4: Personal competencies for the use of the technological tools employed.	7
Didactics	D1: Organization, clarity, and accessibility of content	8,9
	D2: Clear orientation towards objectives	10
	D3: Quality of synchronously delivered classes	11
	D4: Motivating activities to continue asynchronous learning	12,13,14
	D5: Professors' use of technological tools	15
	D6: Professors' communication with their students during the synchronous or asynchronous educational process	16,17
	D7: Interactions generated within the learning group	18,19
	D8: Methods and styles of evaluation used	20
Professors		
Technological	T1: Accessibility to required technological resources	1,2
	T2: Utility of the technological resources used	3,4
	T3: Design quality of the resources used that make them visually and sonically attractive.	5,6
	T4: Personal competencies for the use of the technological tools employed.	7
Didactics	D9: General pedagogical conception of the model	8,9,10,11
	D10: Didactic structure of the proposed model for synchronous classes	12
	D11: Methodological preparation	13,14
	D12: Educational communication processes	15,16
	D13: Evaluation system	

Source: *Own elaboration.*

Results

Periodization of academic actions

The reconstruction of the different academic actions has allowed to identify three stages in USAP's strategy for dealing with the pandemic: the ensuring stage (between February 3 and March 11); the reorganization stage (between March 12 and May 17); and the implementation stage (from May 18).

Stage I: Ensuring

Monitoring of the epidemic evolution and the responses of the education systems in the affected countries began in February. This stage was characterized by the design and development of training actions for professors and the design of a regulatory apparatus to deal with possible scenarios should the epidemic spread to Honduras. Among the academic actions carried out were the following:

- February 3: Monitoring of the epidemic evolution and design of training actions for professors begins.
- February 15: Beginning of "Design and development of online learning activities," a course for professors. It lasted eight hours and was designed to enable them to apply the methodological guidelines in force at the time for the development, design, and implementation of learning activities in virtual learning environments.
- February 21 and 22: The course "Elaboration of questionnaires on the educational platform" is given with a duration of 16 hours and the objective that professors were able to develop questionnaires in Moodle with different types of items for learning assessment.
- March 1: Beginning of the design stage of a virtual course that would allow for the intensive preparation of professors to face a possible scenario of total virtualization of educational processes.
- March 3: Launch of the academic management system module for fully virtual enrollment of freshmen students. This module was prepared in the face of an impending crisis that would not allow face-to-ace enrollment of freshmen students.
- March 4: Massive lectures on hygiene measures to prevent contagion began, with an open call for students, professors, and administrative personnel.
- March 6 and 7: The course "Management of virtual bibliographic resources" is given to train professors in the application of selection criteria for texts from the e-Libraries and how to use them in their virtual courses.
- March 11: The first case of infection is announced in Honduras.

Stage II: Reorganization

On March 12, at a time when the end of the first academic term of 2020 was approaching, the decision was made to switch all academic activities to a virtual modality. Thus, began a stage defined as "Reorganization." During this stage, the closing of the first term was guaranteed through emergency actions, and the first version of the "face-to-face education with virtual support" model was developed, which would be applied as of the second academic term. The university's virtual campus was also improved.

Among the academic actions carried out are the following:

- March 15: A notice is issued with the guidelines to carry out the virtual work for the closing of the term for each modality and with the organizational calendar for the second term.
- March 16: For the first time in the history of the university, completely virtual enrollment for freshmen students begins, with the application of the academic management system developed in Stage I.
- March 16 to 22: content in video and text format with the final topics for the courses of the ongoing term are shared with the students.
- March 23 to 29: final evaluations for the term are taken virtually by means of an exam or an integrating activity, according to the characteristics of the subjects.
- March 25: the research process to design a model for face-to-face classes in conditions of physical social isolation begins. The first steps are taken to design a joint research

project with Cuban researchers. A survey of the digital tools' ecosystem available to the university for the virtualization of the different educational processes begins.

- March 27: the implementation of the research project "Ed-Sup-2020-1: Systematization of educational experiences in times of COVID-19" begins.
- April 5: the new variation of the face-to-face modality is defined, which will be implemented with the name Face-to-Face with Virtual Support. Moodle is reaffirmed as the university's virtual learning environment and Google Meet as the appropriate tool for face-to-face classes with virtual support in this context.
- April 22 to May 11: the course "Virtual education: didactic and technological elements and their implementation" begins, which had been prepared since March 1. As part of the course, eight webinars are offered. All professors were enrolled so that they could have access to the materials and tutorials on how to use the virtual tools. A total of 243 professors participated in the face-to-face sessions with virtual support.

Stage III: Implementation

This stage is unfolding as this paper is being written. It is marked by the milestone of offering for the first time in the history of USAP an academic term entirely under virtually supported conditions. It has been characterized by the permanent training offered to professors and the observation of how the model conceived is being implemented, while, at the same time, it is being reconfigured on the basis of the results that are observed.

- May 18: Beginning of the 2020-2 academic term under virtualization conditions. The face-to-face modality is offered with the same schedules that were planned for normal conditions, but now it is taught on a virtual environment supported by the ecosystem of digital tools shown in Figure 2.

In this virtual ecosystem, the educational process unfolds articulating the synchronous process guided by the professor with asynchronous spaces coordinated by the professor or generated by the students themselves as part of their learning needs. In this model, not only do the activities in the synchronous process condition those in the asynchronous one, but

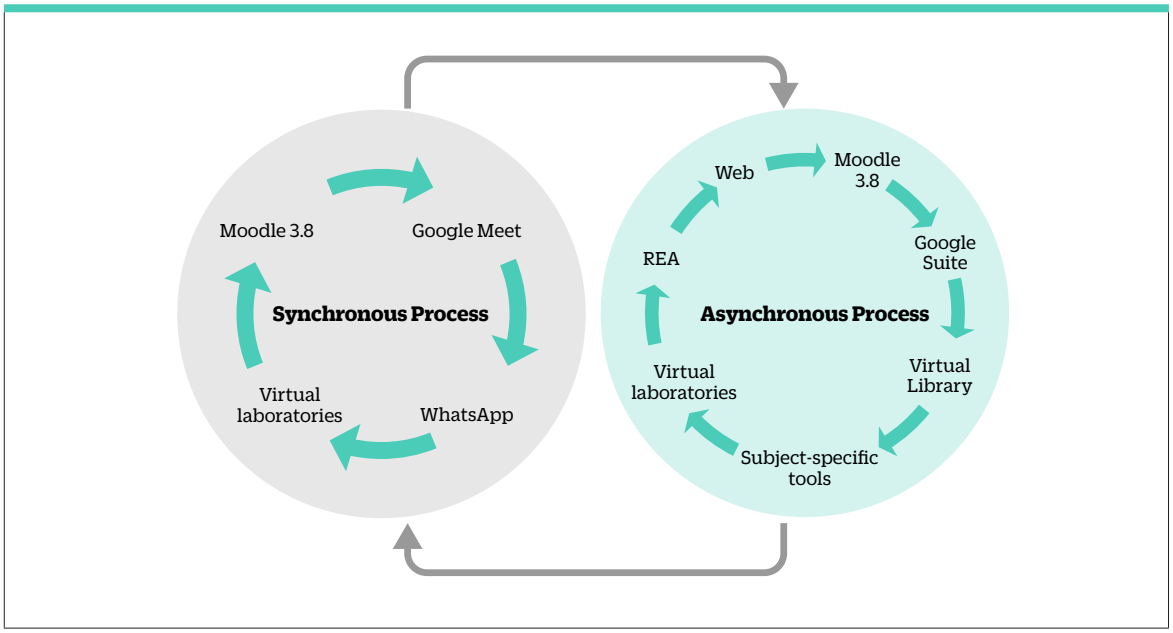

Figure 2. *Ecosystem of Digital Applications that Make Up the Face-to-Face Model with Virtual Support Applied in USAP.*
Source: *Own elaboration*

the information generated in an asynchronous context conditions the development of the subject itself and the different didactic components of the teaching activities organized synchronously.

- June 8: the course for professors "Pedagogical conceptions for evaluation through questionnaires and integrative tasks with rubrics" begins. Two webinars and 21 practical workshops are held.
- June 5 to 9: questionnaires on satisfaction with the process developed through face-to-face and virtual support are applied.

Student and Professor Satisfaction with the Use of Face-to-Face Education with Virtual Support

The answers provided by students and professors on the satisfaction survey applied reveal an r_{pj} multidimensional correlation coefficient of 0.627 and 0.638 respectively. In both cases, these are consistent results, with a low Stochasticity level.

These instruments reveal that after the first three weeks, more than 80% of the professors and students are satisfied or very satisfied with the way virtually supported face-to-face teaching has developed, while only less than 3% reported feeling dissatisfied or very dissatisfied (see Figure 3).

In that regard, there are no statistically significant differences between the Technological and Didactic dimensions.

Regarding satisfaction in both surveyed groups with respect to the Technological dimension, professors have a mean of 4.23 (very satisfied) and students, of 4.08 (satisfied). With respect to the Didactic dimension, the results have been 4.19 and 4.03 respectively (satisfied in both cases).

When analyzing the students' levels of satisfaction by category, it reveals that the highest satisfaction is with T4, while the categories with which they express the lowest satisfaction are D4 and D8 (see Table 2).

When asked what they would change about the way classes are conducted during the current confinement, 41% answered "nothing."

Among the main aspects to be changed stated by the remaining 59% are the demand for greater interaction between professors and their students and more dynamic classes, that it is not mandatory to have the cameras on except when participating because it is a distraction, that professors exploit the potential of technological tools when conducting classes with virtual support, the duration of synchronous activities, and the forms of evaluation. One of the students' demands is the option to have adequate equipment to participate in this educational modality at home, since 15% of the participants in the study have only been able to access through cell phones with Internet access.

In the case of professors, the categories with which they are very satisfied are D11, T2, T3, and T4, while D13 and D12 report the lowest levels of satisfaction (see Table 3).

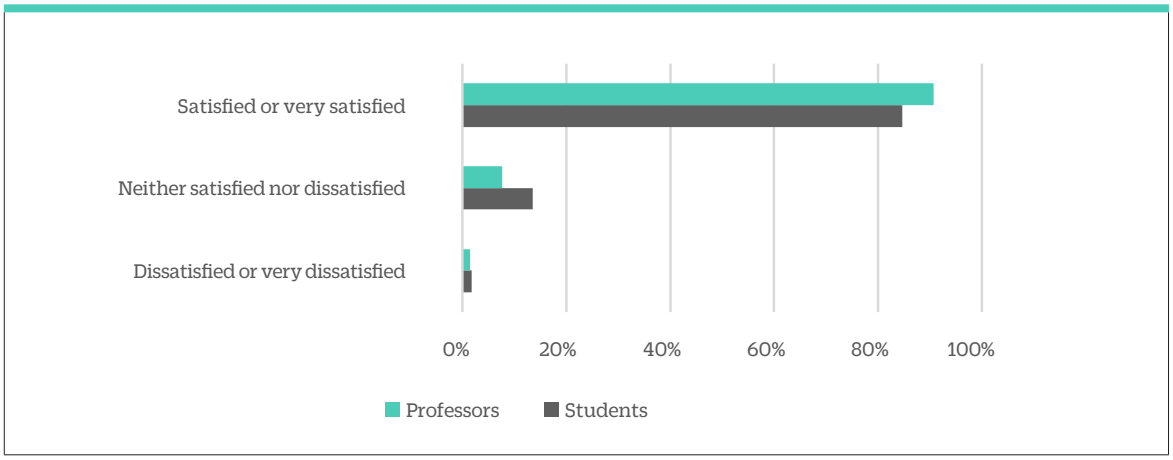

Figura 3. *Relative Frequency of Overall Satisfaction Levels Expressed by Students and Professors.*
Source: *Own elaboration*

Table 2

Satisfaction Levels by Categories of Analysis Expressed by Students

Categories	Relative frequency					Mean	S.D.
	VS	S	N	D	VD		
T1: Accessibility to technological resources	37.5%	51.0%	7.3%	3.8%	0.4%	4.06	0.693
T2: Utility of technological resources	34.3%	49.9%	10.8%	4.2%	0.7%	4.01	0.760
T3: Design quality of the resources used	38.3%	50.8%	8.1%	2.1%	0.7%	4.12	0.710
T4: Personal competencies for the use of technology	37.3%	50.5%	9.9%	1.9%	0.3%	4.22	0.728
D1: Organization, clarity, and accessibility of content	36.2%	51.0%	8.3%	4.0%	0.5%	4.06	0.728
D2: Clear orientation towards objectives	29.5%	49.9%	17.5%	2.5%	0.6%	4.05	0.789
D3: Quality of synchronously delivered classes	34.3%	43.3%	15.8%	5.2%	1.4%	4.04	0.913
D4: Motivation to continue asynchronous learning	34.4%	41.2%	20.6%	3.0%	0.8%	3.96	0.755
D5: Professors' use of technological tools	33.5%	49.6%	14.0%	2.0%	1.0%	4.13	0.790
D6: Professors' communication with their students	41.2%	43.5%	8.7%	5.3%	1.4%	4.08	0.841
D7: Interactions generated within the learning group	34.5%	47.8%	12.2%	4.4%	1.0%	4.03	0.806
D8: Methods and styles of evaluation used	28.5%	48.6%	17.6%	3.9%	1.5%	3.99	0.865

Note: *VS-Very satisfied; S-Satisfied; N-Neither satisfied nor dissatisfied; D-Dissatisfied; VD-Very dissatisfied; S.D.-Standard deviation.*
Source: *Own elaboration*

Table 3

Satisfaction Levels by Categories of Analysis Expressed by Professors

Categories	Relative frequency					Mean	S.D.
	VS	S	N	D	VD		
T1: Accessibility to technological resources	47.7%	40.0%	6.2%	5.4%	0.8%	4.14	0.768
T2: Utility of technological resources	50.0%	43.8%	3.1%	3.1%	0.0%	4.28	0.653
T3: Design quality of the resources used	40.8%	47.7%	7.7%	3.8%	0.0%	4.25	0.721
T4: Personal competencies for the use of technology	40.8%	47.7%	7.7%	3.8%	0.0%	4.25	0.761
D9: General pedagogical conception	50.8%	40.0%	7.7%	1.5%	0.0%	4.19	0.658
D10: Didactic structure for synchronous classes	40.0%	42.3%	14.6%	2.3%	0.8%	4.18	0.824
D11: Methodological preparation	50.8%	39.2%	6.2%	3.8%	0.0%	4.29	0.695
D12: Educational communication processes	43.1%	46.2%	5.4%	5.4%	0.0%	4.13	0.727
D13: Evaluation system	33.1%	47.7%	17.7%	1.5%	0.0%	4.12	0.747

Note: *VS-Very satisfied; S-Satisfied; N-Neither satisfied nor dissatisfied; D-Dissatisfied; VD-Very dissatisfied; S.D.-Standard deviation.*
Source: *Own elaboration*

With respect to the question about what they would like to change in the way classes are taught under these circumstances, their main complaints focus on the physical and technological conditions when working from home, the use of Google Meet for videoconferences, the duration of synchronous activities, and the forms of student evaluation. However, 35% of the respondents consider that no changes should be made.

When asked whether they consider that the educational modality applied is adequate for the current conditions of confinement, there is a greater difference between the opinions of students and professors: (see Figure 4).

An equally significant difference was revealed when asked whether they would like to continue taking or teaching classes through this modality once the confinement ends. 60% of the professors and 45.7% of the students surveyed are in favor of continuing with the face-to-face modality with virtual support, as opposed to a 19.2% and 37.2% that would not like to continue with this modality.

The percentage of professors who would not like to continue with this modality is 19.2% and 37.2%. The percentage of professors and students claiming that they still cannot decide whether or not they would like to continue with this modality is 20.8% and 17% respectively.

Discussion and Conclusions

The results of this study are part of an emerging line of research that seeks to explain the different responses of higher education systems to the conditions of physical social isolation imposed by COVID-19 (IESALC-Unesco, 2020; Crawford *et al.*, 2020).

In view of the tendency to approach the current situation only as an emergency—which has been gaining ground according to Hodges *et al.*, (2020)—this article argues that a new model of education has begun to evolve: face-to-face education with virtual support. USAP's educational practice during the first academic term in which this modality was implemented shows that the initial moment of forced virtualization was followed by the construction of a pedagogical model that could have an impact on university education, since 60% of professors and 45.7% of students are in favor of continuing to work in this way once the current health emergency is over.

This transition to the virtualization of higher education processes has been proposed previously by other authors, such as the case of Bates' "law of equal substitution" (2019, p. 522), or the rethinking of the higher education model after the pandemic

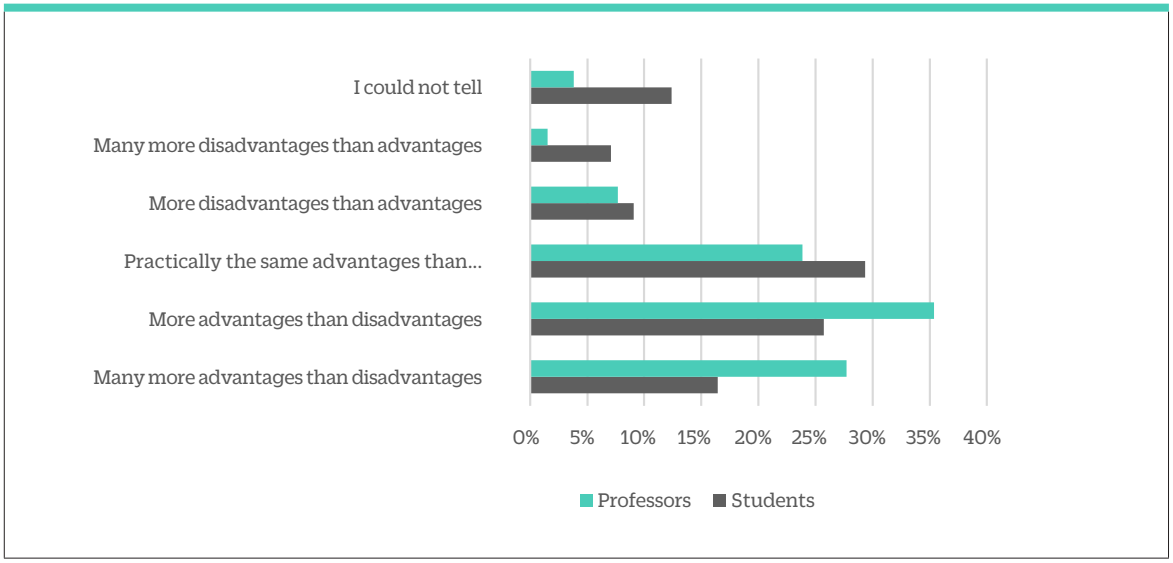

Figure 4. *Students' and Professors' Perceptions on the Advantages and Disadvantages of the Modality Employed.*
Source: *Own elaboration*

(Zhu & Liu, 2020), but in this paper the topic is approached from the line of reasoning: need—construction of a model of face-to-face education with virtual support as a response to that need—and satisfaction of professors and students with the model that is being developed. The relevance that future research implements the proposed model is thus reinforced.

The data supporting these claims show robustness in their internal consistency and relate to previous research that has revealed higher levels of student satisfaction with hybrid processes when compared to strictly face-to-face processes (Dziuban *et al.*, 2018; Matari, 2020) and to surveys conducted in the context of COVID-19 (Abdulrahim and Mabrouk, 2020; Ralph, 2020; Watermeyer *et al.*, 2020). However, it is possible that under the present circumstances, a lower level of expectation is shown by the students, and that this may influence the high levels of satisfaction found (Pardo Kuklinski & Cobo, 2020). A possible bias to also be considered is participants' tendency to give answers that they consider to be socially desirable, a phenomenon documented in previous studies during the application of Likert-type scales (Matas & Matas, 2018).

Another aspect that may explain the high levels of satisfaction is the hypothesis that the forced transition to virtualization of university processes has had greater acceptance among students and professors in institutions that had previously offered at least part of their classes through distance education or *blended learning* and had native or customized technological infrastructure for virtualization. This hypothesis, implicit in recent studies (Abdulrahim & Mabrouk, 2020; Ebner *et al.*, 2020), not only helps explain the results obtained but can also draw upon these results to be used as argumentative evidence in future research.

In the specific case of USAP, having designed 73% of the courses to be implemented with virtual support, and the fact that 44% (see Figure 1) were being taught through distance or blended learning, has facilitated the transition to the new modality. In addition, it has been important to have begun to guarantee the transition to virtuality several weeks in advance, and that the most important aspect in the ensuring and reorganizing stages has been the preparation of the faculty.

The combination of the above elements may have influenced the fact that the greatest satisfaction for professors is the training they have received from the university and that they show great confidence in their technological competencies to teach with virtual support. This, although related to other studies conducted in the current context, is significantly higher than what is reported by better ranked universities internationally (Ralph, 2020; Watermeyer *et al.*, 2020).

However, the fact that students' lowest levels of satisfaction relate to the existence of motivating activities to continue learning asynchronously and the evaluation methods leads to believe, in line with Zhu and Liu (2020), that what is most important is not the technological tools and the skills professors believe they have to use them, but the educational model used, and the didactic competencies applied.

Therefore, based on the evidence provided by this research and supported by the findings of other studies that are being conducted simultaneously, it can be inferred that a) there is a close relationship between the technological infrastructure a university has and its capacity for resilience in emergency situations that require physical social distancing, as well as between this capacity for resilience and the satisfaction level of students and professors with the educational process conducted with virtual support; b) however, ultimately, it will be the educational model and didactic competencies that will guarantee quality education; and c) today it is a priority to advance towards the development of a model of face-to-face education with virtual support that will provide an alternative for moving towards the virtualization of educational processes in higher education.

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