

INFLUENCE OF INFORMATION AND COMMUNICATION TECHNOLOGY USES ON STUDENTS OF TWO PERUVIAN UNIVERSITIES IN THE POST-PANDEMIC CONTEXT

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Abstract

There is no doubt about how the Covid-19 pandemic has changed education around the world. In this context, the use of Information and Communication Technology (ICT) has been fundamental for continue delivering classes during quarantine season. Thus, this paper tries to analyze what was the use of ICT in two Peruvian universities through semi-structured interviews with 21 students who are in the last years of their careers. The preliminary results show that there were no adequate plans to deliver that kind of education, that most professors did not take advantage of these tools, and that the students experienced different difficulties in having adequate formation during virtual classes.

Keywords: Information and Communication Technology, Virtual classes, Covid-19, University

Introduction

The use of ICT tools has expanded globally due to the unprecedented circumstances of the Covid-19 pandemic. However, higher education institutions have not adequately responded, as they have primarily adopted the Emergency Remote Teaching (ERT) model (Hodges et al., 2020). As a result, the pandemic has had a significant impact on the economy, healthcare system, and education worldwide. Numerous studies have been conducted to examine the response of governments, universities, and students to this new reality. Along these lines, I conducted an investigation focusing on the case of Peru, especially in the case of the students of two public universities in the southern region. It should be mentioned that on March 16, 2020, the first case in Peru was announced (Andina, 2021). Subsequently, on March 11, in-person classes were postponed, and Legislative Decree No. 1495 was issued, which seeks to exceptionally enable the provision of educational services in a semi-in-person and remote manner in educational institutes and schools. In this context, on April 1, 2020, more than 3.4 billion people—approximately 43% of the world's population—had to confine themselves around the world. This social confinement had a significant impact on both school education and university education. In response to this global pandemic, the most apparent solution was to shift to online teaching, resulting in a rapid increase in virtual courses.

The challenges faced in transitioning to online learning have been numerous and varied. For example, Peru had one of the longest school closures, lasting 75 weeks, being one

of the countries with the longest period where students were unable to attend in-person classes (UNESCO, 2021). In consequence, students had to adapt to two years of virtual classes, making Peru one of the last countries in the region to implement a system of face-to-face or blended learning worldwide. In this way, institutions linked to education maintained their academic activities through online teaching, allowing for the continuation of the learning process, especially in subjects with a large theoretical component in their content. However, due to the urgency to continue teaching processes and the limited time for planning and preparation, maintaining the quality of teaching-learning activities, institutions have found it difficult to maintain the quality of the teaching-learning process in this new modality, a tremendously relevant aspect throughout the world. In addition, the World Bank (2021) published a report on the response of various countries to virtual education, which highlights the multimodal response given by different nations. This approach involved utilizing various elements such as television, radio, Internet, cell phones, etc., were able to provide an adequate response to the health and educational emergency that was occurring. In light of this situation, I conducted interviews with 21 university students from two public universities located in southern Peru, where I examined their adaptation of the Emergency Remote Teaching model during the 2 years of virtual classes and the benefits and disadvantages of that experience.

Literature review

The studies about the use of ICT resources in higher education started to mushroom in the last 3 years due to the pandemic situation. However, the application of those studies dates back many years. And it experimented with different periods, *“As can be observed, early e-learning studies were mainly focusing on the technological aspects of e-learning. Then, when e-learning became established, the focus of researcher has shifted to the attitudes and interactions of e-learning users.”* (Masa'Deh et al., 2023). In that case, we can find many articles that mention the perceptions or attitudes of the students about the use of technology in education such as an analysis of whether the students were satisfied with the online delivery of their teaching amid COVID-19 (Ahmed et al., 2023; Chen, 2023) or how experiments using VR applications and other technological resources can stimulate the learner experience (Agbo et al., 2023). Besides, we have a study of how the use of these ICT tools influences the 'affect', 'behavior,' and 'cognition' of some students (Alam et al., 2023)

Likewise, other studies focus on the environment and

how the professors have been using the technology or adapting to new virtual teaching situations, applying traditional phone applications for educational purposes (Escobar & Gómez, 2020). The situation caused by the Emergency Remote Teaching model (Hodges et al., 2020) obligated professors and students to adapt to a new way of delivering education. Nevertheless, in the university setting, there has been a positive response to student engagement, resulting in improved academic performance. This can be attributed to the fact that most students are digital natives (Hanaysha et al., 2023). On the other hand, this also highlights the need for us to reconsider and gain a better understanding of e-learning tools, as they represent an opportunity for internalizing education and adapting to different circumstances through MOOC platforms (Keshavarz & Yuan, 2023). Although a great number of governments and institutions had the capabilities to develop adequate virtual education or create e-learning platforms, this situation also affected undeveloped countries that have faced connectivity problems during the last few years. As a result, economic inequalities were reflected in the limited use of technological resources (Williamson et al., 2020). Therefore, it is important to continue promoting a model that encourages the ease of adaption and motivation for using ICT in education and teaching searching for user satisfaction and quick adaptation to new technologies and situations (Masa'Deh et al., 2023)

It will be necessary to review the role of teachers, adaptation, successful cases, and challenges that appeared during the pandemic. At this point, I could highlight some cases such as the study by Johanna Ingemarsson (2021) who studied the adaptation of English teachers in the delivery of virtual classes in Sweden. It also proposes studying virtual education in the pandemic from different perspectives, such as that of ERT which focuses on how schools have had to adapt to this situation of pandemic and what strategies they have used for their distance classes. Although the majority of students have technological elements (computers, tablets, etc.) this is not reflected in their correct use in classes, in addition to the fact that a large group of teachers have not adapted digital skills to their classes (König et al., 2020). Besides, the adaptation of teachers to the use of these technologies has been growing even after the post-pandemic era. Thus they agree that ICT provides access to a wide range of high-quality and relevant resources for scientific teaching-learning (Sharma et al., 2023). In consequence, we can observe the institutionalization of online education (Shin, 2021; Hama-di & El-Den, 2024), where the discussion surrounding online classes is oriented towards the strengths of the institution, public health concerns, the value of in-per-

son classes, and the adaptations made to facilitate virtual learning. In such a way, this review highlights that despite disparities in income, access to technology, resources, and teacher formation, the pandemic has had a profound impact on the world and generated fundamental changes in the delivery of education.

Summary of Findings

The use of information and communication technologies (ICTs) has allowed distance education to continue; although this is not the only factor involved. Effective and high-quality e-learning programs require both an organizational model and a pedagogical model. Likewise, in distance education, there are various learning approaches, such as blended learning modality, also known as blended learning or hybrid class, distributed learning; and online education or E-learning, which was the predominant model during the first 2 years of

the pandemic in Peru. Furthermore, during the last two years the term “emergency remote teaching” has gained traction, referring to the online education that has emerged during the pandemic: “ is a temporary shift of instructional delivery to an alternate delivery mode due to crisis circumstances” (Hodges et al., 2020), this change in the educational model has occurred suddenly, without adequate planning, unlike the distance programs that several universities have been offering in recent years. This lack of planning is compounded by the politicization and existing distrust towards online education.

To study the development and repercussions of this model, I conducted interviews with 21 students from two public universities located in southern Peru, in the cities of Arequipa and Tacna. I used virtual ethnography (Hine, 2000) and worked with a non-probability sample

Table 1
Characteristic of participants

Number	Academic year of study (2023)	Name	Gender	University	Type of high school
1	3rd	E1	Female	UNJBG	Public
2	3rd	E2	Female	UNSA	Private
3	3rd	E3	Female	UNJBG	Parochial
4	3rd	E4	Male	UNSA	Private
5	3rd	E5	Female	UNSA	Parochial
6	4th	E6	Male	UNJBG	Public
7	4th	E7	Male	UNJBG	Public
8	4th	E8	Female	UNSA	Public
9	4th	E9	Female	UNJBG	Public
10	4th	E10	Female	UNSA	Public
11	4th	E11	Male	UNSA	Parochial
12	4th	E12	Male	UNSA	Parochial
13	5th	E13	Male	UNJBG	Private
14	5th	E14	Female	UNJBG	Parochial
15	5th	E15	Male	UNSA	Private
16	5th	E16	Female	UNJBG	Parochial
17	5th	E17	Female	UNSA	Public
18	5th	E18	Male	UNJBG	Public
19	5th	E19	Female	UNSA	Public
20	5th	E20	Female	UNJBG	Public
21	5th	E21	Male	UNSA	Public

(Hernández et al, 2010). As a result, I selected students who are in 3rd, 4th, and 5th academic study years, taking into account that the undergraduate studies in Peru last 5 years. I contacted the students through the aid of professors and the class delegates, with permission from the director of the undergraduate programs to conduct these interviews. Likewise, I elaborated a list of questions about the use of ICT technologies during virtual classes and their use when they returned to in-person classes, thus I could conduct semi-structured interviews.

Each interview lasted approximately 35 minutes. For this purpose, I conducted the interviews using the Zoom platform; with the consent of the participants for transcription and interpretation. The interviews were conducted in Spanish and were recorded and translated into English for this article. In this way, I transcribed the data in Spanish and then translated excerpts into English for presentation in this article. To translate these excerpts, I have slightly edited the students' words for clarity. The interview data were analyzed using a thematic analysis (Braun & Clarke, 2019). The analysis focused on the students' use of ICT, their use during the pandemic, the mastery of these tools by their teachers external problems that they have experienced during virtual classes, the performance of the students using these tools, and the use of these tools after emergency remote teaching situation.

Then, different dimensions of student voices and feelings were grouped to generate the main categories by coding their responses. As a result, I decided to choose the next 3 core categories according to the response of the students and use a code to represent each of them.

Tools and Platforms Used During Virtual Classes

Remote and virtual education has had an enormous impact on our daily lives. Many parents now have the opportunity to spend more time with their children at home, supervising their educational tasks. Teachers have been forced to adapt to new educational tools to teach their classes such as video platforms like Zoom, Google Meet, or Microsoft Teams (Diaz, 2021). Some teachers have gone beyond to the PowerPoint slides, and have decided to adopt tools like Canvas, Prezi, Genially or Keynote into their teaching methods. Traditional quizzes are now being conducted through programs like Google Forms, Kahoot, Quizzies, or Socratic, and in-class videos and animations are becoming much more common in classes. Many institutions have also taken steps to enhance and improve their virtual education platforms, allowing teachers to review assign-

ments, leave messages, or upload sessions online. While, in the case of universities, they have decided to repower their virtual platforms, or adopt new ones like Blackboard, Canvas, Moodle, Google Classroom, etc. It is evident that these changes will continue to be relevant even after the return to in-person or hybrid classes (Shin, 2021), since the pandemic has accelerated the way technology is used in education. Most of these changes will likely become permanent fixtures in the education system.

However, while most students are familiar with these tools, institutions and professors often neglect to utilize them during the return of in-person classes. This is although they could be used to make up for missed classes or hold virtual classes through programs such as Zoom or Google Meet to recuperate classes or have virtual classes when the university is closed by different events (strikes, concerts, remodeling, admission exams, etc.). Even though professors have received training or self-educated themselves on how to use these tools for teaching, they are not being fully utilized.

Fidel: What tools or platforms did the professors use to deliver your classes?

E6: Initially, they tried to use Zoom, but the platform had some problems because it was limited to 40 minutes or it was complicated for the professors, finally we used Google Meet for the rest of the semester.

...

Fidel: What tools or platforms did the professors use to deliver your classes?

E11: At the beginning, they have been learning how to use this platform, so, they learn and teach at the same time, and deliver their classes by Zoom, but they started to use DUTIC (the platform created by the university) and the university has good results in this way.

...

Fidel: What tools or platforms did the professors use to deliver your classes?

E21: Most of the professors dictate the class as a monologue; however, some of them try to use tools such as Padlet, Quizzies, or other tools, that motivate us to be more engaged in classes.

The use of technology has not been adequate, and the use of these platforms has been abandoned when the students return to in-person classes; as a result, the satisfaction of the students with these platforms has not been achieved (Ahmed & Saboor, 2023). Hence it is necessary to invest more time and resources in using these tools.

Use of technology by Professors

In general, technology has not been utilized by the professors during the past two years of virtual classes. Many students have expressed that their professors do not turn on their cameras or even use slides, resulting in a “boring monologue” during class. Additionally, most professors were not familiar with ICT technologies; thusly, they received fast capacitation about the use of some tools, but their skills continued to be minimal during the virtual classes. This is a common issue that has been observed globally (Ingemarsson, 2021; König et al., 2020; Hanaysha et al., 2023) and can be attributed to various factors such as the professors not being digital natives, Inadequate training on ICT resources, and technological devices or even infrastructure problems (such as limited access to the internet or electricity).

Fidel: Do you think that the professor engaged the student during virtual classes?

E16: Not, they say that they delayed starting the virtual classes because they have capacitation, but they do not use the technology, not use the camera and the sessions were so boring, even though I prefer to do other things instead of being all the day sitting how the professor read his articles.

Fidel: Did they use slides or another program?

E16: Only 2 or 3 professors use slides, the most of them only talk during the class or present a PDF of some papers.

...

Fidel: Did the professors use in a good way their technological resources?

E13: Most of them did not use them, they did not turn on their camera or I think that they did not know how to present their slides to the students, sometimes was so boring that I used to lie in my bed and listen to the classes as if it were a podcast.

...

Fidel: Did the professors use in a good way their technological resources?

E5: Some of them use some technological resources and obligate us to turn on our cameras, for me that generates distractions. Happily, the classes were recorded and that helped to consult these materials later.

Nobody of the interviewees manifested that their professors had developed a strong use of technology. Thus, it is fundamental to raise awareness among teachers about the use of technological resources and how these can improve the performance and motivation of the students.

Difficulties experienced by the students

Students experienced many difficulties in continuing with their virtual classes, the most of them complained about the quality of education that they received. As a result, they manifested that they were self-educated due to the circumstances of the Covid-19 pandemic, something similar in different places (Yu, 2021). They suffered stress because of the constant use of technology (Choque & Malaga, 2021) visual fatigue, or presented difficult emotional or economic situations, added to it, their family underrated virtual education:

Fidel: What situation do you think affected you more during virtual classes?

E13: My family thought that virtual classes were not relevant, and demanded more time for helping in domestic work, besides I lived in an avenue, that sometimes is noisy and that affected my performance in virtual classes.

Likewise, other groups of students, have to deal with connection problems or their devices do not work well:

Fidel: Did you have a good internet connection during your virtual classes?

E11: No, because I live in a rural region and there is no internet provider in that place, so I need to buy a chip and recharge money to continue with my virtual classes.

...

Fidel: Have you experienced any issues with your internet connection?

E18: Yes, because we live in a little house with many people and we need to share the internet with them, sometimes my Wi-fi collapses and it is very difficult to have classes.

...

Fidel: Have you experienced any issues with your internet connection?

E8: Of course, especially when my power went out. I needed to communicate to the delegate of that course about that situation to justify my absence. [...] Besides, I would like to go outside and develop more fieldwork related to my career.

Fidel: What was your principal device for assisting your virtual classes?

E6: In the beginning was my laptop, but it broke down on 2 occasions, was so terrible because that happened before presenting a final assignment.

In this case, the investment in developing a better internet connection and an adequate way to deliver virtual classes is justified. Besides, it would be indispensable

to invest in programs that research more about the performance of the students after returning to in-person classes, and possible mental health problems occasioned due to the Covid-19 pandemic.

Conclusion

The pandemic has brought - and will continue to bring - enormous transformations in our education. As a result, the concept of hybrid or blended classes has emerged, which combines virtual and in-person learning and has been adapted since 2022. Many teachers have had to adapt their traditional teaching methods and embrace technology, using computers, cell phones, and tablets to continue providing education during challenging times. This research proposal focuses on the use of ICT during virtual classes and how students have been adapting to my new educational reality in the post-COVID-19 pandemic context. It also explores the consequences of this change on their education and academic performance, as they have been facing various challenges such as family, health, or economic problems, which are associated with the pandemic and other factors.

Finally, it is worth noting that many professors have not developed strong skills in using ICT resources, and some are limited to using their classical PowerPoint slides. In consequence, universities should implement a coordinated plan involving professors, students, and staff to improve these skills and effectively respond to future events or take advantage of technological advancements to enhance student performance.

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