ICTs after COVID-19 a perspective from university professors

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Abstract. Institutions of higher education have had the need to address the COVID-19 pandemic by investing in technology to enable their faculty to maintain and continue with the study modalities offered. The Universidad Politécnica Salesiana in Ecuador, since 2010 began a digital transformation that specifically supported the face-to-face mode of study. This paper aims to contribute as input to the body of work that shows the perspectives of university teachers who use ICT tools for their teaching and learning processes after the pandemic from the perspective of a polytechnic university in Ecuador. Longitudinal research with an empirical-analytical and quantitative approach was carried out. Student tracking data is collected through the learning management system. An analysis is carried out contrasting with the information from a survey addressed to 77 university professors. 82% of teachers say that ICT learning management platforms are an opportunity for the development of current learning processes. The academic management developed by the Universidad Politécnica Salesiana in Guayaquil has made it possible to overcome the effects of the pandemic thanks to the existing technological ecosystem. The outlook of the professors is positive after the confinement, facing the new normality as a current opportunity.

Keywords: Access to Education, Educational Technology, Private Education, Blended Learning, Hybrid Learning.

1   Introduction

The digital transformation has had a strong impact on education in the wake of the COVID-19 pandemic (Cárdenas Tapia et al., 2023; Kahraman & Bicen, 2022; Ramírez-Montoya, 2020; Rojko et al., 2022). Educational institutions of higher education have considered it necessary to invest heavily in technology and technological services to respond to the problem of communication and access to information for students in an emerging online education situation (Boonmoh et al., 2022; Cárdenas et al., 2023; Llerena-Izquierdo & Ayala-Carabajo, 2022; Universidad Politécnica Salesiana, 2020).

At the Universidad Politécnica Salesiana in Ecuador, with facilities in three cities, Cuenca, Quito and Guayaquil, and with thirty years of service, a digital transformation began in 2010 that specifically supported the face-to-face mode of study

(Universidad Politécnica Salesiana, 2020). Over time, the availability of virtual cooperative learning environments supported by a learning management system in Moodle, allowed teachers and students to have a platform for the continuous learning process integrating digital resources created and designed by the teachers themselves (López-Chila et al., 2021; Rodés Paragarino & Gewerc, 2023; Universidad Politécnica Salesiana, 2022).

This paper aims to contribute as input to the body of work that shows the perspectives of university teachers who use ICT tools for their teaching and learning processes after the pandemic from the perspective of a polytechnic university in Ecuador (Aguilar Gordón et al., 2022; Carrillo & Flores, 2020; Dunajeva et al., 2022; Nguyen et al., 2022).

2   Theoretical Framework

With the arrival of the COVID-19 pandemic, all educational structures turned their efforts to hybrid educational models where ICT had a greater relevance and strength (Howell, 2022; Hu & Yu, 2022; Llerena-Izquierdo & Ayala-Carabajo, 2021). The paradigms of virtual, distance and online education modalities were strengthened, generating possibilities for new experiences from a post-pandemic modality (Boonmoh et al., 2022; Nguyen et al., 2022) In addition, the transition from one modality to another with the use of technologies or technological services has had an impact on the way higher education institutions develop, use and integrate curricular content (Kahraman & Bicen, 2022; Ziemba & Eisenbardt, 2022). The teaching work carried out in times of pandemic made it possible to rethink the way in which its members, within a higher education institution, face new challenges for the development of techno-pedagogical capabilities and computer skills that in turn allow to continue minimizing the digital divide with the use of ICTs for the following years (Mishna et al., 2021; Ramírez-Montoya, 2020; Ziemba & Eisenbardt, 2022).

3   Methods

Longitudinal research of empirical-analytical and quantitative approach is carried out. The data on student access monitoring through the learning management system (Moodle) is collected from the public reports of the Universidad Politécnica Salesiana in Ecuador (Universidad Politécnica Salesiana, 2020, 2023) as a case study. Then, an analysis of the information from the Salesian Polytechnic University in the city of Guayaquil is carried out, contrasting with the perspectives of its university professors from the point of view of the use of ICTs that allow responding to the challenges of teaching work after the pandemic, using the survey technique. The participating group corresponds to 77 university professors who belong to engineering careers. The survey is structured in four approaches, addressing Internet connection, the use of devices or equipment for connection, the use of communication software and the perception of university professors with the use of ICTs after the pandemic.

4   Results

The results show that, at the Universidad Politécnica Salesiana, in the city of Guayaquil, in the initial periods before and after the COVID-19 pandemic, there is a strong use of those technological resources that served as support during the transition from presence to confinement and from confinement to return to the classroom. An average of 7500 students per academic semester from October 2020 to October 2022 (Universidad Politécnica Salesiana, 2020, 2022) access, use and dedicate study time to virtual learning platforms, i.e. 94% maintain regular access to virtual courses that support the face-to-face mode of study after the COVID-19 pandemic (Universidad Politécnica Salesiana, 2023), (see Fig. 1).
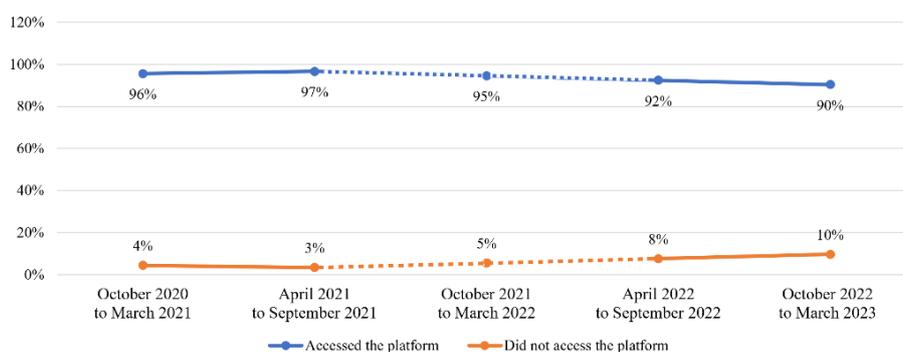
Fig. 1. Total students and teachers accessing and not accessing the learning management system in an emerging virtual e-learning environment during and after the pandemic.

On the other hand, the results of the survey of university professors reflect that 82% say that learning management platforms are an opportunity for the development of new teaching and learning processes in higher education institutions that offer study options in different modalities as a notable positive aspect (see Table 1).

Table 1. Comparison of the positive and negative aspects of four investigated approaches.

Researched approaches	Positive	Negative
The availability of the Internet connection	70%	30%
The use of devices or equipment for connection	76%	24%
Use of communication software	80%	20%
The perception of university teachers with the use of ICTs after the pandemic	82%	18%

5   Discussion

Two crucial points are discussed, the reality of the university is different from the realities of a public university or in a rural setting (Magaço et al., 2021), but during

the years prior to the pandemic, the management of the directors, teaching staff and the environment in which they carry out their educational activities has been strengthened by sound decisions with a defined mission and vision (Universidad Politécnica Salesiana, 2022). The second crucial point is the economic factor that during the COVID-19 pandemic, the world experienced a health crisis under unequal conditions in all regions (Hu & Yu, 2022; Rojko et al., 2022), the lack of Internet access availability evidenced abysmal differences between social strata. The economic expense, the acquisition of programs for communication and its impact for the Universidad Politécnica Salesiana led to use economic resources in a preventive way according to its style and charisma (Llerena-Izquierdo & Ayala-Carabajo, 2022). Finally, it is discussed that in different Latin American countries the availability of Internet access devices varies according to the existing policies that affect the possibility of importation or the type of brands and models allowed by the large communication companies in the locality (Llerena-Izquierdo & Ayala-Carabajo, 2021; Mishna et al., 2021).

6   Conclusions

The academic management work developed by the Universidad Politécnica Salesiana, in the city of Guayaquil, since 2010 with the decision to incorporate technology to support the educational management of the university professor in the face-to-face modality has allowed overcoming the effects of the COVID-19 pandemic and the transition to return to normality in a hybrid modality still in force. Thanks to the integrated technological ecosystem and with the possibility of introducing new tools such as learning analytics, the university is betting on the use of ICTs as a pillar for teacher and student management that shows improvements in the learning process. The perspectives of the teachers currently see as positive the preparation time in the years prior to the confinement and that the teaching staff knew how to face it as an opportunity. Finally, the results reflect that after the pandemic, the continued use of resources, especially learning platforms by teachers and students, has become a new form of communication that provides new ways of teaching and learning.

7   Limitations and Future Research

The limitations of this study are directed to the environment where the university provides the service, being the city of Guayaquil the main port of the country that confronts health security situations, due to the migratory access to citizens from nearby countries with economic, social and health differences that generate continuous controlled epidemiological outbreaks. Future work will focus on the development of renewable learning content for effective retention of students in the first years of study and the impact of ICTs at the initial levels.

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