



Advancing university management during the pandemic of COVID-19 at ESPOCH

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Abstract. The university action to the issues that came along with COVID-19 needed to embrace the whole management system for facing the challenges related to infrastructure, water, waste management, transport, and education. Escuela Superior Politécnica de Chimborazo (ESPOCH) has focused most of its efforts into building and maintaining its infrastructure. The linkage to society has become of paramount importance for ESPOCH, during this time, the university becoming the first and biggest vaccination site in the city. Moreover, several conferences related to training and business ideas for entrepreneurs have been launched, always keeping sustainability in mind. Universal access for people with disabilities and the use of efficient lightning is a common characteristic of all the new buildings; the residues are technically disposed of having managed 4413 m³ of them during 2020. The same technical disposal of residues is applied for recyclable, biodegradable, dangerous and inert ones. Additionally, the campus green areas have been maintained and forested using native species planting about 500 new trees during the last year. The opportunities brought by the pandemic have been harnessed to strengthen the setting and infrastructure of ESPOCH while at the same time serving the surrounding community.

Keyword:

university management, COVID-19, Latin America, sustainability, higher education.

1. Introduction

Higher education institutions play a key role in advancing sustainable initiatives and sharing the sustainable development goals [1] both to students and to the communities surrounding them. Even with the challenges that came along with the COVID-19 crisis, the response of universities worldwide was to keep on teaching and undergoing research; for

keeping the activities running, the university management had to radically change [2], [3].

Escuela Superior Politécnica de Chimborazo is a public institution of higher education, with main location in the city of Riobamba, Province of Chimborazo (Ecuador); it has two secondary campuses located in the Amazon Region namely Norte Amazónica and Morona Santiago. The management at ESPOCH had to change to adapt to online teaching; active research projects also needed to be continued, therefore, the laboratories needed special regulations. Additionally, social demands related to anti-COVID initiatives including vaccination had to be considered and attended.

This work describes the university management at ESPOCH during the pandemic of COVID-19 including its improvement to create solutions against coronavirus, waste management, promoting events related to sustainability, and building a greener university campus. The challenges to create a fully online environment while maintaining the physical one are also highlighted.

2. University management during COVID-19

COVID-19 brought opportunities along with all the chaos and devastation that shocked the world. People around the globe have witnessed the consequences of the generalized mistreatment of humanity towards the environment we all live in. Recently, the IPCC has stated the responsibility of human influence into the warming of the atmosphere, ocean and land [4]; ESPOCH has aligned its management practices with sustainability approaches that are described in the following sections.

2.1. Creating solutions to fight the pandemic

Fabrication of elements to fight coronavirus. Since the beginning of the pandemic crisis, ESPOCH has used its laboratories for making sanitizing gel to supply the public health network in the province of Chimborazo. As a result, more than 22 000 liters of seized illegal alcohol were turned into 500 liters of antibacterial gel; this service has continued to deliver a constant supply for students, researchers and professors that are progressively returning to the university. Additionally, face shields were 3D-printed for health personnel and a prototype of a respirator was presented and approved by the Ministry of Health [5].

Becoming the biggest vaccination site for the province. When the first doses of COVID-19 vaccines started to arrive in the country, there was neither a clear vaccination plan nor adequate physical infrastructure to undergo the phases of registration, pre-observation, inoculation, and post-observation. ESPOCH's Faculty of Public Health used its whole building to create an efficient vaccination process, keeping in mind the distancing and monitoring as shown in Fig. 1



Figure 1. First vaccination site in the province of Chimborazo at ESPOCH

2.2. University initiatives related to sustainability

Table 1 shows the ten most important initiatives lead by ESPOCH during the pandemic, in the beginning, the presentations were online and dealt mainly with improving education using more advanced technologies. The need of presenting the results of research projects and continuing with yearly recurring conferences impelled the administration to successfully continue the events in a virtual environment. More recently, some events are coming back to be in-person, because of the need for physical field projects.

Table 1. Events related to sustainability promoted by ESPOCH.

Name of the Event	Mode	Date
Presentation of the project: "Technological frameworks to implement virtual laboratories"	Virtual	July 20 th , 2020
Presentation on strategies to mitigate air pollution	Virtual	August 7 th , 2020
Presentation of the project "Synthesis of materials for water treatment"	Virtual	January 30 th 2021
Workshop on the project "Electrochemical valorization of solid waste in the province of Chimborazo"	Virtual	February 1 st 2021
Multidisciplinary conferences "Environmental sciences as a development axis"	Virtual	February 4 th 2021
Presentation of results of the project "Socio-ecological vulnerability in the basin of Chimborazo river"	Virtual	March, 8 th 2021
First international conference on innovation, science, and technology "Amazonía Viva"	Virtual	March, 17 th 2021
Presentation of results of the project "Solutions to	Virtual	April 9 th 2021

sustainable entrepreneurship practices”		
Signing of a MoU with FAO to foster sustainable agriculture	In person	April 21 st 2021
Launch of the first championship on sustainable projects	In person	July 16 th 2021

Waste management. As a response to active use of the university infrastructure, waste products have been produced as shown in Table 2. Most of the waste comes from new building construction; however, all the waste is responsibly treated either by the university or by hired third-party companies.

Table 2. Waste management at ESPOCH

Type of waste	Volume (m ³)	Percentage of total (%)
Recyclables	12,67	0,29
Biodegradables	6,42	0,14
Ordinary	9,51	0,21
Construction	4413,64	99,36
Dangerous	0,23	0,01

2.3. Building a greener campus

The absence of most of the students due to coronavirus resulted in a sharp reduction of campus-related \ consumption and greenhouse gases production. The university physical development office took this opportunity to innovate and conduct new sustainable activities which are closely related to the SDGs; these activities are described in Table 3.

Water management. The available water at ESPOCH comes from an underground source, during the pandemic, the tanks and wells have been maintained and physicochemical analysis of the water quality has been performed on a regular basis.

Building management. A new plan was deployed for new buildings requiring them to have accessibility features and efficient lighting. There is an ongoing effort to change low efficiency appliances to high efficiency ones throughout the campus. Additionally, all the buildings have brand new bike parking spaces and the bike route inside the university has been updated and marked [6].

Table 3. University actions related to the SDGs

Sustainable development goal	Activity
6 – Clean water and sanitation	<ul style="list-style-type: none"> Physicochemical analysis of the university water sources
7 – Affordable and clean energy	<ul style="list-style-type: none"> All new buildings have LED lighting There is a plan to replace all the bulbs on campus for high-efficiency ones
9 – Industry, innovation and infrastructure	<ul style="list-style-type: none"> The new buildings have accessibility features, and there are ramps all around ESPOCH
11 – Sustainable cities and communities	<ul style="list-style-type: none"> There has been a responsible management of waste

	<ul style="list-style-type: none"> ● A new bike route was created around the university campus
12 – Responsible consumption and production	<ul style="list-style-type: none"> ● An internal legal body was implemented to make sure that the university practices are aligned to sustainability
15 – Life on land	<ul style="list-style-type: none"> ● A reforestation plan was carried out involving 500 native species trees

Reforestation initiatives. The main campus of ESPOCH is constantly reforested using native species, during the past year, about 500 new trees of native species have been planted. The initiatives are also replicated in the experimental extensions as shown in Fig. 2; the responsible use of water, land, and student involvement are considered in these plans.



Figure 2. Reforestation initiatives at ESPOCH

ESPOCH has been part of the UI GreenMetric World University Rankings since 2018. The feedback from the rankings has aided the university authorities into focusing their efforts in the weak indicators, while keeping momentum into the strong ones [7].

3. Concluding Remarks

COVID-19 brought a severe crisis to the planet, where higher education institutions have been also hit. As a response to the society, ESPOCH has advanced its management system regarding both its physical and online infrastructure. With the aid of the feedback from UI GreenMetric, the weak indicators have been improved, as an example, almost all the procedures are paperless, and an environmental code was approved in order to become a more sustainable university.

As some in-person activities continued during the pandemic, the water analysis and waste treatment continued, assuring responsible management of the university residues. Construction activities continued with a focus on accessibility and energy efficiency; reforestation initiatives helped to green the campus during the pandemic. Finally, the university fulfilled its responsibility with the Ecuadorian society by helping it to face and overcome the COVID-19 crisis.

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