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Digital Communities at the Service of Post-Pandemic Virtual Education: Case of Canton Riobamba

Byron Napoleón Cadena Oleas[1], Alfredo Rodrigo Colcha Ortiz[2], Paulina Fernanda Parra Alvarez[3], Viviana del Roció Mera Herrera[4], Raquel Virginia Colcha Ortiz[5]

Abstract

A digital community is an area of interest that uses digital technologies such as mobile phones, the Internet, and email to communicate, network, and disseminate information. In this context, this article aimed to evaluate the results in the implementation of free internet access points in the communities of urban and rural parishes of the Riobamba canton as a tool for access to virtual education. The focus of the research was qualitative at the application level, it is prospective-transversal; theoretical methods such as descriptive, inductive were used; as well as empirical methods such as documentary analysis and the use of the ArcGIS Insights Program for data entry as well as to evaluate the results proposed in the objective. In the development of the research, 1459 homes in five urban and 13 rural parishes were visited. The informants were 1488 students of different levels of instruction. Making a semi-structure interview in the diagnosis, 56.68% have devices, 43.32% do not. 19% have mobile data, 18.34% have broadband, only 4% with fiber optic broadband. 28% have no connection, 8% do it through friends: so, the Decentralized Government of the Riobamba canton installed 86% of Wi-Fi points in urban parishes while 24% did so in rural parishes. This is an investigation that may lead to further investigations.

Keywords: *Rural community, post-pandemic, virtual education, digital communities, social sustainability.*

1. INTRODUCTION

Latin America and the Caribbean are characterized by carrying on their backs a matrix of social inequality marked by socioeconomic class, gender, age, ethnicity and race, territory, disability and migratory status that have created multiple effects such as exclusion, marginalization, discrimination, etc. The 2030 Agenda for Sustainable Development seeks to ensure that no child, adolescent, elderly, woman, migrant, indigenous, Afro-descendant or disabled person is left behind. On the other hand, Goal 4 ensures inclusive, equitable and quality education and promotes lifelong learning opportunities for all.

[1] Escuela Superior Politécnica de Chimborazo (ESPOCH) Riobamba- Ecuador, bcadena@espoch.edu.ec, https://orcid.org/0000-0002-4535-5265
[2] Ministerio de Telecomunicaciones y de la Sociedad de la Información MINTEL, alfredo.colcha@mintel.gob.ec, https://orcid.org/0009-0005-2280-5189
[3] Universidad Nacional de Chimborazo, (UNACH) Riobamba, Ecuador, pfpara@unach.edu.ec, https://orcid.org/0000-0002-1429-0454
[4] Universidad Nacional de Chimborazo, (UNACH) Riobamba, Ecuador, vmerah@unach.edu.ec, https://orcid.org/0000-0002-3823-860
[5] Escuela Superior Politécnica de Chimborazo (ESPOCH) Riobamba, Ecuador, raquel.colcha@espoch.edu.ec, https://orcid.org/0000-0002-3252-9158

Education is a human right, an important driver of development and one of the most effective tools for reducing poverty and improving health, and achieving gender equality, peace and stability, In addition to generating high and consistent returns in terms of income, it is the most important factor in ensuring equality and inclusion.(Banco Mundial, 2022)

Economic hardship and the devastating effects of the COVID-19 pandemic contributed to the slowdown and stagnation in the progress of educational attainment between 2015 and 2021 against the targets of SDG4 of the Education 2030 Agenda (UNESCO, UNICEF Y CEPAL, 2022).

Smart and effective investments in people's education are essential to building human capital and ending extreme poverty. In this context, this article aimed to analyze the results in the implementation of free internet access points in the communities of the rural parishes of the Riobamba canton as a tool for access to virtual education for university students, in this consideration the research aimed to answer the following question: What did students require to enter online education? In which places were the Wi-Fi zones installed? What did the installation of Wi-Fi zones depend on?, these are the questions that have been tried to answer through this research.

The term "rural" is not easy to define, maybeThe most obvious characteristic of rural communities ishislow population density incomparisonwith more areasUrban.According to. Los Angeles Times world population: 7,900,000 , s(Los Angeles Times, 2022)e estimates that 3 billion people (about 40% of the world's population) live in rural areas of developing countries. Most people rely on small family farms for income and livelihoods, yet information on university students from rural areas is limited.

Much of what constitutes rural life is tied to conservatism. (Ashwood, (2018); Boso, (2019) and life in the countryside, creating images of dirt roads, tractors¬¬ and a small family community in which everyone knows each other, in addition, rural identity in particular has many links related to its own consmovisión and many limitations that in turn impacts rural students when they embark on their university careers within higher education.(Leon & Jackson, 2018)(Goldman, 2019)

The population in Latin America and the Caribbean (LAC) is around 663,000,000, of which 123 million people (19%) live in rural areas of which 50 million work, and rural employment supports one in five workers in the region.

According to the Department of Economic and Social Affairs of the United Nations, in Ecuador there are 18,416,475 inhabitants (2.8% of Latin America), of whose population 36% live in rural areas. The admission of students to the public university in Ecuador. (Countrymeters, 2023)(Countrymeters, 2023)

The newspaper El Comercio, indicates that:

Each academic semester more than 262,000 high school graduates apply for one of the 123,000 places in the country's public and co-financed universities. But only 18% of those favored come from rural schools. This reflects that rural high school graduates have less access to universities in Ecuador.

It is not a recent problem, but it has worsened since 2020, when covid-19 abruptly forced 4.3 million students to opt for theVirtual educationinEcuador. More than one million correspond to rural areas, where shortages continue to be faced.(El Comercio, 2023)

According to IGI Global, a rural community is a physical space where they live outside the city and towns. (Dictionary Search, 2007). According to statistics, there are fewer people and houses are distant from one and the other, agriculture is the primary business for the most part.

The Pan American Health Organization (PAHO) refers to the post-pandemic to the way of living after having gone through a global disease, as a condition that is usually diagnosed 3 months after the onset of the COVID-19 example disease. The COVID-19 pandemic sent shockwaves between health and the global economy. The result is evident, the gap between rich and poor has widened, multiple inequalities have increased, machismo and authoritarianism have intensified, but, above all, the enrollment and permanence of students at different levels of instruction has decreased.(OPS, 2022)

Contingent alternatives have been implemented for the control of the disease and some strategies have been defined for the mitigation of impacts that have been generated, rooted in local networks and solidarity. Glo-solidarities, interconnections and mutual (and inverse) learning have been strengthened.

Post-pandemic transformations are thought out and enacted. In particular, three areas of challenge to rethink are revealed: 1) Scientific advice and evidence that is used in politics, established power relations and political-economic and in socio-political-ecological processes. 2) The second is how the function of the economy with the presence of COVID-19 has shown that the economic model based on capital must be reviewed and build one that responds to the new challenges generated by the pandemic. 3) There is concern about how new forms of politics can become the basis of relations between citizens and states to face a pandemic, or indeed, other crises, such as climate change, attending to structural and emerging transformations, favorable practices, such as those revolving around mutual solidarity and care.

Our analysis is informed by several broader bodies of literature that also, in different ways, address the relationships between structural conditions and specific, contingent, often rebellious conditions.

In the twenty-first century, connectivity cannot be a luxury item. It is a right, when the pandemic began, few countries had governance, trained personnel, available infrastructure, learning platforms and digital governance systems. Online learning has become a dynamic platform.

Although 79% of the region is covered by broadband networks, only 45% of people can access daily connectivity, less than half of the population. Existing data on rural and urban coverage show.

ECLAC (2020) indicates that: in the region, 67% of urban households are connected to the Internet, while in rural areas only 23% of them are. In terms of age groups, young people and older adults have the least connectivity: 42% of those under 25 and 54% of people over 66 do not have an Internet connection. The cost of mobile and fixed broadband service for the population in the first income quintile reaches 14% and 12% of their income, respectively. This is around 6 times the reference threshold of 2% of income recommended by the United Nations Broadband Commission.

At least 77 million people living in rural territories in Latin America and the Caribbean lack connectivity with minimum quality standards. (IICA, 2020)In some countries, more than 90% of rural households do not have an Internet connection. 22% of vulnerable students did not have access to the internet and only 19% had a computer at home, it is also indicated that, the(BID, 2022)Internet was particularly essential for continuity of learning during the closures of schools, colleges and universities.In public schools and rural areas, synchronous interactions between teachers and students were less frequent due to their low access to virtual education platforms.

The new offer will be based on flexibility, local proximity and responsiveness. Connectivity is a key element in the digitalization of education services. According to the standards of the Alliance for Affordable Internet (A4AI), most countries in Latin America and the Caribbean currently do not have minimum requirements that allow online studies. The post-pandemic will be characterized by a new demand based on online channels that

will involve an effort by countries and the private sector to deliver a better service. Basic for educational connectivity. We do not have an educational connection service with a minimum speed of 10 Mbps or 4G connection, fixed connection and enough data to be available on a smart device every day.

The first predictions of communities of individuals and groups connected to computers were made in 1968 by J.C.R. Licklider and Robert Taylor, who as research managers for the U.S. Defense Advanced Research Projects Agency (DARPA) launched the research that resulted in the creation of the first community of its kind. ARPANET, which was the forerunner of the Internet.

Online communities have their own set of guidelines and needs, such as participation, moderation, and online community management. A virtual community constitutes a group of people, who may or may not meet face-to-face, who exchange words and ideas through the mediation of digital networks. Virtual communities are social aggregations that emerge from the network with enough human feeling, to form networks of personal relationships in cyberspace. In essence, a digital, online, or Internet community is a group of people with a shared interest or purpose who use the Internet to communicate with each other.(Bond, 2020)(Zancajo, Verger, & Bolea, 2022)(Rheingold, 2023)

According to several authors, a digital community has the following characteristics:

More control: if a community is created on social networks or under an open source, these are subject to each and every one of their changes, without being able to comment.

More security: Community providers prioritize privacy – it's their job. With a Facebook or LinkedIn group, you have limited ability to protect your members' privacy and your own information.

More data: On a social media platform, they get invaluable data that their community will inevitably generate about their members and customers. If you create your own online community, you'll have access to all that data, which will help you understand your users and create a curated experience for them.

More community management tools: With a community platform like Higher Logic's, engagement tools are integrated, specifically designed to help you create an engaging experience.

Science, technology and innovation have long been recognized as the foundation of socio-economic development and important contributors to sustainable development. According to the Oxford Languages dictionary, sustainability is: 1) the ability to maintain itself at a certain pace or level; 2) the sustainability of economic growth", avoid the depletion of natural resources to maintain ecological balance. The pursuit of global environmental sustainability.(Diccionario Oxford, 2020)

Sustainability is a long-term goal towards a more sustainable world while sustainable development involves the processes to achieve this goal. (Wolff & Ehrström, 2020)

According to the United Nations Global Compact, social sustainability is a proactive way to manage and identify business impacts on employees, value chain workers, customers and local communities, in this context,(Capitalismo consciente, 2021)

The UN Global Compact is a call for companies to incorporate 10 universal principles related to human rights, labour, the environment and anti-corruption into their strategies and operations, as well as to act in ways that advance social goals and the implementation of the SDGs. (Kingo, 2019).

Environmental and Social Sustainability (ESS) is the adaptation and integration of precautionary environmental and social principles and considerations into decision-making processes.(UN Environment Management Group, 2022)

Magis and Shinn stress that social sustainability should be understood as distinct from the dimensions of ecological and economic sustainability. This means that, on the one hand, social sustainability is distinct and, on the other, it must be understood as part of the whole sustainability dilemma. One problem in education is that social sustainability is heavily value-laden, and value-laden topics have always been a challenge in education.(Dillard, Dujon, & King, 2009)(Wolff L.-A. , 2011)

The analysis has identified three preponderant areas of response: the digitalization of the education system, educational inequalities and teacher development. Social sustainability seeks to strengthen the cohesion and stability of populations and their vital development along with the environment and the economic, the social sphere is essential to improve the inclusion and opportunities of unprotected communities.

2. METHODOLOGY: MATERIALS AND METHODS

The research was carried out under the qualitative approach, at the application level, it was prospective – transversal, theoretical methods were used such as: deductive, inductive and empirical method such as: documentary survey and analysis, use of the ArcGIS Insights Program that allowed to enter the results of the information and from there install the wifi points to facilitate students access to virtual education given the effects of the pandemic.

2.1 Research questions

The following research questions have been asked based on the objectives of the study mentioned in the introduction.

RQ1 What did students require to enter online education?

RQ2: Where were the Wi-Fi hotspots installed?

RQ3: What did the installation of Wi-Fi zones depend on?

2.2 Semi-structured interviews

Using the ArcGIS Insights Program, the study began with information regarding the existence of both digital tools and technological access of the sectors of influence, this process enabled the collection of information, as well as for the analysis of results.

2.3 Research process

For the development of the research, the following stages were considered:

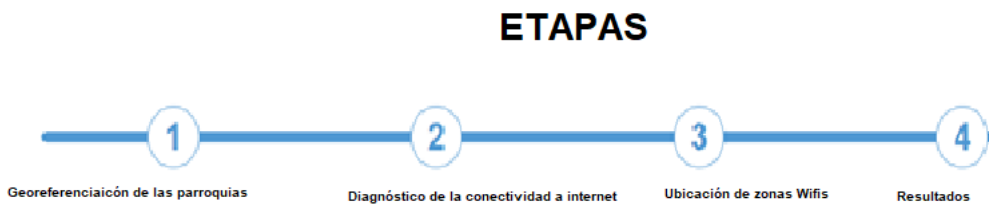

Figure 1. Research process

2.4 Study population

The study visited 1459 households located in both urban and rural parishes where 1488 students of different levels of instruction were identified.

3. RESULTS AND DISCUSSION

The study population consisted of 1459 homes visited in which 1488 students of different levels of instruction were identified.

Using the ArcGIS Program, the territories under study were identified, Figure 1.

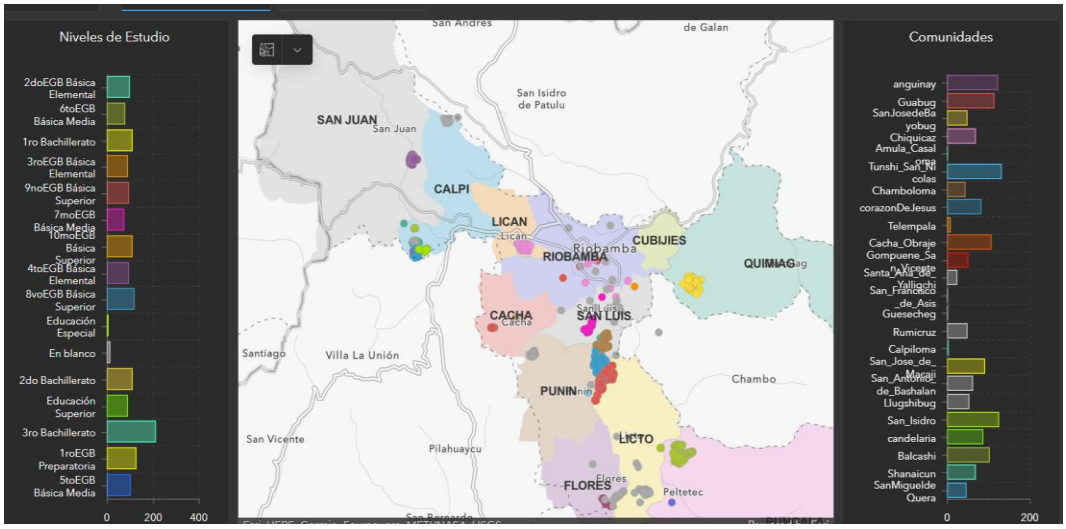

Figure 1. Location and levels of education of the population of the canton Riobamba.

Source: Esn, HERE, Gamin, Foursquare METWASA, USGS: The Municipal Decentralized Government of Riobamba Canton.

A structured interview was applied to identify whether or not they have devices, the type of connection they have and the place where they connect Figure 2.

According to the data indicated in Figure 2, 56.68% have devices in the home, 43.32% do not count. 19% have mobile data, 18.34% have wireless broadband, 4% fiber optic broadband and 2% that lend the signal to other people.

As for the ways to connect to the internet, 28% indicate that they have no connection, 8% state that they do it through friends, 6% connect in another way, 4% of relatives, 1% with signals from institutions and 1% in Wi-Fi zones.

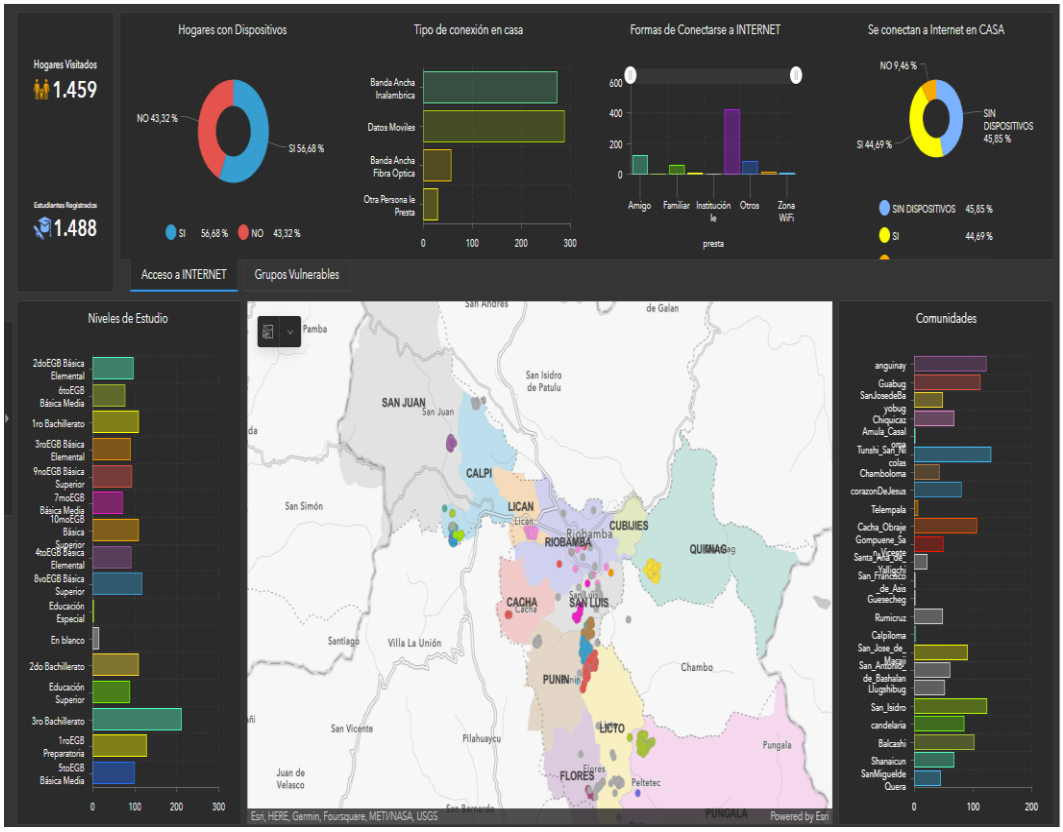

Figure 2. Existence of devices and connections

Source: Source: Esn, HERE, Gamin, Foursquare METWASA, USGS: The Municipal Decentralized Government of Riobamba Canton.

Finally, in the question if they connect to the home internet, 45.85% connect without devices, 44.69% connect to the home internet and 9.46% do not connect.

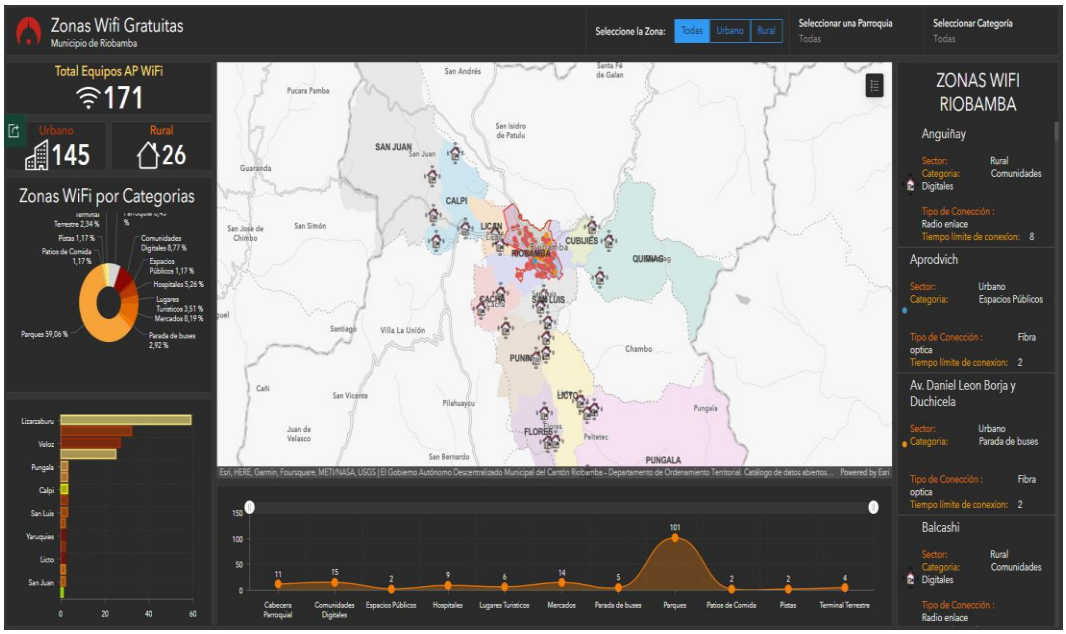

Figure 3. Wi-Fi hotspots

Source: Source: Esn, HERE, Gamin, Foursquare METWASA, USGS: The Municipal Decentralized Government of Riobamba Canton.

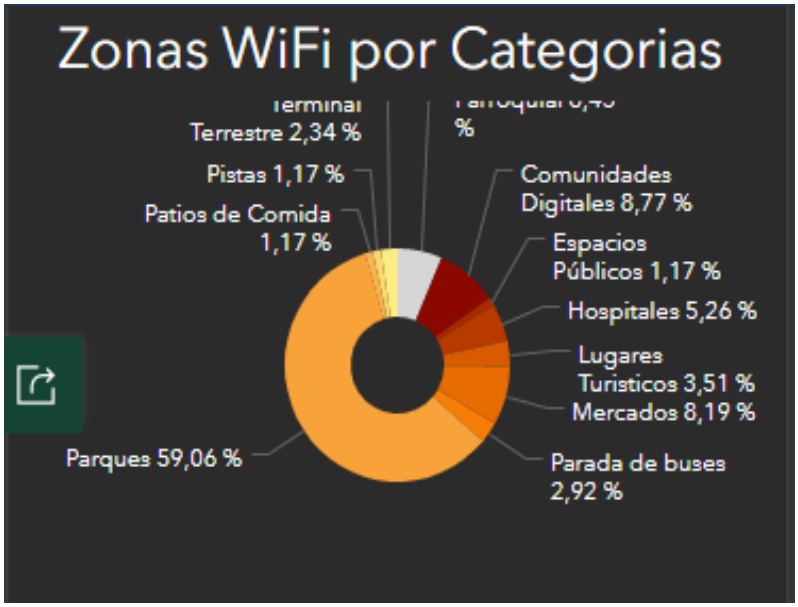

Figure 4. Wi-Fi zones by category.

Source: Esn, HERE, Gamin, Foursquare METWASA, USGS: The Municipal Decentralized Government of Riobamba Canton.

From Figure 4, it is evident that the installation of Wi-Fi zones correspond to public areas such as the land terminal, digital communities, among others.

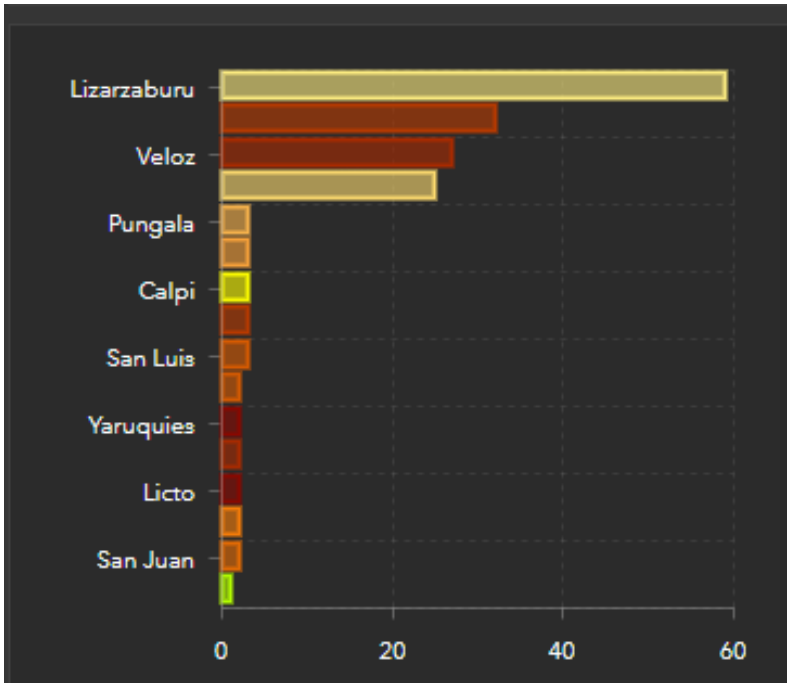

Figure 5. Wi-Fi zones Parishes of the Riobamba Canton.

Source: Esn, HERE, Gamin, Foursquare METWASA, USGS: The Municipal Decentralized Government of Riobamba Canton.

Figure 5 shows that the connection points 86% were located in parishes in urban areas while 24% did so in rural parishes.

Table 1. Wifi point distribution Urban Parishes

Parroquias Urbanas	**No. puntos**
Lizarzaburu	59
Velasco	32
Veloz	27
Maldonado	25
SUMAN	143

Table 2. Wi-Fi point distribution Rural Parishes

Parroquias Rurales	**No.puntos**
Pungala	3
Punin	3
Calpi	3
Flores	3
San Luis	3
Cacha	2
Yaruquies	2
Lican	2
Licto	2
Quimiag	2
San Juan	2
Cubijies	1
SUMAN	**28**

Source: Esn, HERE, Gamin, Foursquare METWASA, USGS: The Municipal Decentralized Government of Riobamba Canton.

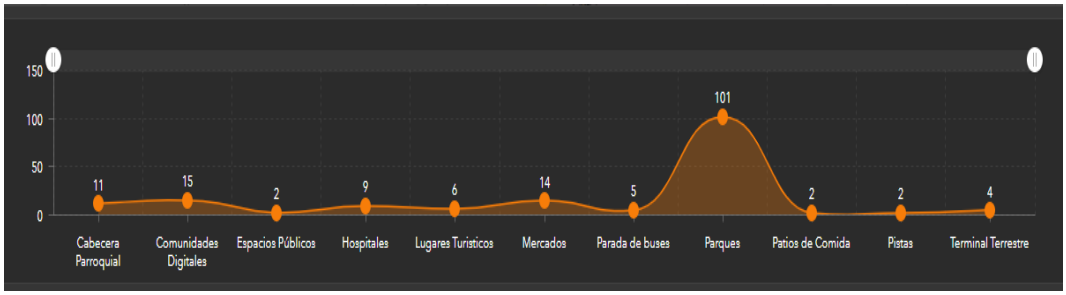

Figure 6. Location of endpoints.

Source: Source: Esn, HERE, Gamin, Foursquare METWASA, USGS: The Municipal Decentralized Government of Riobamba Canton.

Figure 6 shows that Wi-Fi points were installed in public areas of both urban and rural parishes.

As indicated by Howard Rheingold, virtual communities are social aggregations that emerge from the network with enough human feeling, to form networks of personal relationships in cyberspace. The results presented give reason that the wifi zones installed both in the urban and rural parishes of the canton Riobamba – Ecuador, enabled students to access the new modality of studies (online).(Rheingold, 2023).

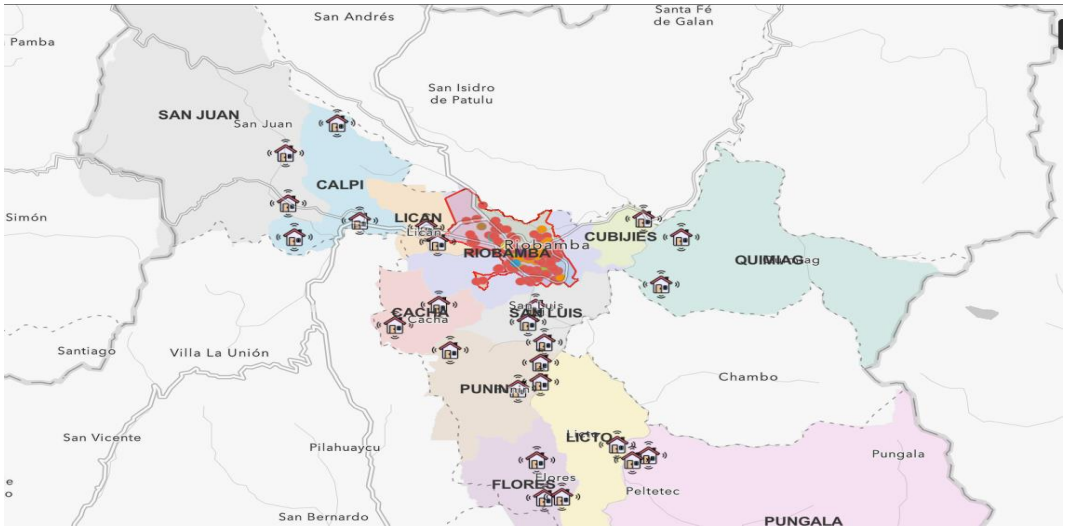

Figure 7. Wi-Fi points installed in the urban and rural parishes canton Riobamba.

Source: Source: Esn, HERE, Gamin, Foursquare METWASA, USGS: The Municipal Decentralized Government of Riobamba Canton.

4. CONCLUSIONS:

The study has made it possible to identify the weaknesses that both urban parishes and those of the rural sector maintained and maintain regarding access to internet connectivity, this deepened more with the presence of the pandemic, nobody in the world was prepared to face it and everyone to a greater or lesser degree had to improvise as many strategies as operational processes so that students did not leave school.

Last June the Ecuadorian Government recognized that 70% of students had suffered connectivity difficulties and another 15% had not had regular contact with their teachers in recent weeks. In the canton Riobamba despite the fact that 56.68% of respondents claim to have devices(El País, 2021), 18.34% have wireless broadband, 4% fiber optic broadband and 2% that lend the signal to others.

In this context, the Decentralized Autonomous Government of the Riobamba canton, of 100% of installed points, 86% did it in urban areas and 24% in rural areas, in fact, there is an explanation, in urban areas the population is greater than in rural areas, a strategic factor of research. On the other hand, it is indicated that the objective of building Digital Communities at the service of post-pandemic virtual education was met.

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