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Social and educational risk factors in Ecuadorian indigenous children during the COVID-19 pandemic.

ABSTRACT

The effects on education due to the COVID19 pandemic are quite complex and exposed the existing digital divide. In this sense, an analysis of academic activities in Ecuadorian children between 5 and 14 years of age is carried out, with the aim of identifying the technological needs and socioeconomic factors that have a negative impact on the learning process. The 2020 national survey of employment, unemployment and underemployment was used, with a sample of 3'733,950 inhabitants in that age range, performing a risk analysis based on contingency tables and correlation analysis using chi-square test, the factors analyzed were: connectivity, class attendance, socio-cultural factors, child labor and access to ICT. A strong

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relationship was identified between the risk of child labor and poverty in indigenous children, resulting in a decrease in educational opportunities.

Key words: indigenous Population, Basic Education, Information Technology, Data Analysis, Child Labor.

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RESUMEN

Los efectos en la educación debido a la Pandemia de COVID19 son bastante complejos, y puso al descubierto la brecha digital existente. En este sentido se realiza un análisis de las actividades académicas en niños ecuatorianos de entre 5 a 14 años, con el objetivo de identificar las necesidades tecnológicas y factores socioeconómicos que tienen un impacto negativo en el proceso de aprendizaje. Se utilizó la encuesta nacional de empleo, desempleo y subempleo de 2020, con una muestra de 3'733.950 habitantes en ese rango de edad, realizando un análisis de riesgo basado en tablas de contingencia y análisis de correlaciones usando prueba de chi cuadrado, los factores analizados fueron: conectividad, asistencia a clases, factores socioculturales, trabajo infantil y acceso a las TIC. Se logra identificar una fuerte relación entre el riesgo de trabajo infantil y la pobreza en niños indígenas, derivando esto en una disminución de oportunidades educativas.

Palabras Clave: población indígena, Educación Básica, Tecnología de la Información, Análisis de Datos, Trabajo de menores.

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Fatores de risco sociais e educacionais em crianças indígenas equatorianas durante a pandemia de COVID-19.

RESUMO

Os efeitos na educação devido à pandemia de COVID19 são bastante complexos e expuseram a divisão digital existente. Nesse sentido, é realizada uma análise das atividades acadêmicas em crianças equatorianas entre 5 e 14 anos, com o objetivo de identificar necessidades tecnológicas e fatores socioeconômicos que afetam negativamente o processo de aprendizagem. Foi utilizada a pesquisa nacional de emprego, desemprego e subemprego 2020, com uma amostra de 3.733.950 habitantes nessa faixa etária, realizando uma análise de risco com base em tabelas de contingência e análise de correlação usando o teste qui-quadrado, os fatores analisados foram: conectividade, frequência às aulas, fatores socioculturais, trabalho infantil e acesso às TIC. É possível identificar uma forte relação entre o risco de trabalho infantil e a pobreza em crianças indígenas, resultando na diminuição das oportunidades educacionais.

Palavras-chave: população indígena, Educação Básica, Tecnologia da Informação, Análise de Dados, Trabalho infantil.

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INTRODUCTION

Ecuador has been one of the countries of Latin America hardest hit by the global pandemic of COVID-19 with over 30,777 deaths to date (Datosmacro, 2021) and a 5.2% increase in the poverty (BBC News Mundo, 2021, May 20) likely attributable in part to the 70-day shutdown of the economy in 2020. However, COVID-19 not only had a devastating impact on the health and economic well-being of the Ecuadorian population, but it also simultaneously exposed and exacerbated the existing digital gap within the country (itself both a symptom and reflection of the divergent socio-economic conditions of the populace).

Location and the digital gap

According to the Universal Plan of Service 2018-2021 of the Ministry of Telecommunication and Information Society (MINTEL, 2018), the diverse geography of Ecuador (mountain ranges, valleys, tropical forests etc.) have been obstacles in the installation of telecommunication service throughout the country. This is particularly evident in rural areas, where a large portion of the indigenous population (68.3% according to the population census conducted by MIDUVI in 2015), the majority of whom are poor (79.66%), live. This means that the limited or lack of access to new information technologies (ICTs) such as the internet, disproportionately affects the indigenous population and, as a consequence, may have put a strain on their inclusion in the Basic Education system during the pandemic.

To verify the extent to which this occurred, this study will compare the access of ICTs of the school-going indigenous population between the ages of 5 and 14 to that of the non-indigenous population of the same age group and examine the consequent ability of the students of both groups to attend online classes and carry out their academic activities during the COVID 19 pandemic. The principal objective of this study is to identify the technological necessities of the children in the Basic Education System and reveal how these may have had a negative impact on their ability to further their learning during the pandemic (Muñoz et al., 2022). The findings of this study will be particularly useful in order to gauge the effects of the lack of access to new technologies on the education of the most vulnerable sector of the Ecuadorian population. This 5-14 age group was singled out for this analysis for no other reason than the fact that it represents the age range of students in the Basic General Education (EGB) system in Ecuador.

METHODOLOGY

The study utilizes data extracted from the National Survey of Employment, Unemployment and Underemployment (ENEMDU) of December 2020 conducted by the National Institution of Statistics and Population Census (INEC). Within the framework of the INEC study, a descriptive analysis with the aid of contingency tables, frequencies and percentages was carried out. The contingency tables were used to analyze the association between two variables of the following list of variables:

- i. Ethnic group;
- ii. Area;
- iii. Attending classes;
- iv. Type of connection available for educational activities;
- v. Reason for not attending;
- vi. Worked last week;
- vii. Activity provided in order to aid your household;

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- viii. Condition of inactivity;
- ix. Category of occupation;
- x. Workplace;
- xi. Possession of a laptop or desktop computer to carry out daily activities;
- xii. Possession of a tablet to carry out daily activities;
- xiii. Possession of a smartphone to carry out daily activities;
- xiv. Poverty;
- xv. Extreme poverty (INEC, 2020).

A risk analysis was also done and the correlation between the variables was analyzed by utilizing the chi-square test. In addition to this, the software Spad v.4.5, offered by the Faculty of Humanities of the University of the Aegean was used to carry out data analysis (Kouliani & Stefanos, 2015).

THE DESCRIPTIVE ANALYSIS

According to the ENEMDU, 85.58% of indigenous girls and boys aged 5 to 14, reside in rural areas, which is more than 3 times the percentage of non-indigenous boys and girls within the same age group (26.16%) (Table 1). According to the report made by the Ministry of Telecommunication and the Information Society (MINTEL), much of the rural areas of Ecuador are lacking in telecommunication infrastructure (2018, 10), which means that indigenous children in the Basic Education system are less likely to have optimal access to information technology and therefore were more disadvantaged when it came to virtual classes and keeping abreast with their assignments during the pandemic.

Table 1. Contingency table: Area – Ethnic group

		Ethnic group		
		Indigenous	Non-Indigenous	Total
Área	Urban	89,592 14.42%	2,298,214 73.84%	2,387,806 63.95%
	Rural	531,753 85.58%	814,391 26.16%	1,346,144 36.05%
Total		621,345 100.00%	3,112,605 100.00%	3,733,950 100.00%

According to the data in Table 2, the inadequately serviced rural areas regarding internet accessibility would appear to affect indigenous boys and girls in relatively the same way as there does not seem to be any significant difference in percentage between indigenous boys (50.19%) and indigenous girls (49.81%) from 5 to 14 years of age who reside in rural areas. The same could be said of the non-indigenous rural population between the ages of 5 and 14, although in this case the girls are slightly more represented (50.10%) than the boys (49.9%) (table 2). Based solely on this data, it would be difficult to assess whether boys are more or less exposed to ICTs than girls given the fact that the overriding condition for internet accessibility, or at least as presented by MINTEL (2018), is location, in which case both indigenous boys and girls living in remote areas stand relatively the same chance of being excluded from these services. Cecchini (2005), on the other hand, in a more general study on the digital gap in Latin America found that the digital gap could not only be characterized by age and ethnicity but also by gender as the author found all of these variables to be inextricably tied to poverty (19, 2005).

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Table 2. Contingency table: Sex – Ethnic group

		Ethnic group		
		Indigenous	Non-Indigenous	Total
Gender	Male	311,870 50.19%	1,551,425 49.84%	1,863,295 49.90%
	Female	309,475 49.81%	1,561,180 50.16%	1,870,655 50.10%
Total		621,345 100.00%	3,112,605 100.00%	3,733,950 100.00%

Connectivity through mobilization

Given the abovementioned lack of telecommunication infrastructure in rural areas and that all of the classes during the pandemic were online, it would seem logical to expect that there would be a significant drop in school attendance among indigenous children during the COVID-19 lock down. This lack of accessibility to the internet, in addition to the fact that more than half of the indigenous population (66.82%), as opposed to a mere 8.20% of the non-indigenous population, do not possess any type of electronic device to connect to the internet from home, should have guaranteed low school attendance among indigenous children. However, according to INEC (2020) as much as 98.07%, of indigenous boys and girls between the ages 5 and 14 attended classes during the pandemic. That is roughly 2% higher than the percentage of non-indigenous individuals who attended classes (95.96%), even though non-indigenous children exceed the indigenous children by 50% in their access to the internet by broadband cable (Table 4).

Table 3. Contingency table: Attending classes – Ethnic group

		Ethnic group		
		Indigenous	Non-Indigenous	Total
Attend classes	Yes	609,343 98.07%	2,986,712 95.96%	3,596,055 96.31%
	No	12,002 1.93%	125,893 4.04%	137,895 3.69%
Total		621,345 100.00%	3,112,605 100.00%	3,733,950 100.00%

The data on broadband connection is significant given that it represents the primary way that indigenous students, albeit a small percentage (17.20%), were able to connect to the internet, the secondary being by smartphone device (15.98%). That said, it is worth noting that these two percentages combined only represent a third of the percentage of non-indigenous students (91.8%) who have access to the internet (table 4). Additionally, since the data reveals that laptops or personal computers are scarce commodities in the indigenous household (according to Table 11 as much as 90.37% of indigenous children between the ages of 5 and 14 do not possess a laptop or computer), it could be assumed that these indigenous children, if and when they were able to connect, did so through their smartphones and quite possibly away from their homes where it may be assumed that they would have had better access to the internet given that as recently as in 2017 only 16.62% of homes in rural areas had internet connection (MINTEL, 2018). The lack of broadband connection would still appear to still have had some bearing on internet connectivity for rural indigenous children during the pandemic as several newspaper articles highlight. One particular newspaper report showcased the plight of an indigenous mother who had to borrow money to buy a computer and hire the

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services of the internet in another town with broadband service and that of three siblings, Abigaíl (8), Anahí (10) and Bryan (15), who would walk 6 kilometres to the urban centre of their district to be able to carry out their school activities (La Hora, May 10, 2021). Another article points out that as many as 56 million students live in places where they are not even able to get a signal for their mobile phones and in some cases parents try to offset the difficulty of not having access to the internet at home by trying to connect to free WiFi areas in the town squares or bus stations just so that they could send off their children's assignments to the teachers (Constante, 2020).

Although far from conclusive due to the lack of further data, based on some of these testimonies and given what is known thus far about the telecommunications infrastructure in the rural areas, it may be safe to assume for now that the high attendance rate of these online classes on the part of indigenous students, was largely due to the mobilization of this sector of the population to areas where connection to the internet was possible, such as urban/town centres, something that was not so much of a necessity for non-indigenous children due to the fact that as many as 68.73% had access to broadband connection (table 4).

Table 4. Contingency table: Type of internet connection for educational activities – Ethnic group

		Ethnic group		
		Indigenous	Non-Indigenous	Total
Type of connection for educational activities	Broadband / fiber optic.	104,787 17.20%	2,052,842 68.73%	2,157,629 60.00%
	Mobile / cellular Internet.	97,376 15.98%	688,989 23.07%	786,365 21.87%
	Does not have possession of either	407,181 66.82%	244,880 8.20%	652,061 18.13%
Total		609,344 100.00%	2,986,711 100.00%	3,596,055 100.00%

Poverty a primary factor in the inaccessibility of ICTs

The study by UNICEF (2020), on the digital gap students faced during the COVID 19 pandemic in Spain, draws a direct relation between poverty and the kinds of technological devices available in a household. If there are economic restraints, the technological device more readily accessible tends to be the mobile phone as it tends to be the cheapest option compared to the tablet or a personal computer. Despite this, less than half of indigenous students between the ages of 5 and 14 had access to a smart phone at home (40.43%), and the majority of the ones that did (36.88%), had to share it with another family member. Compare that to 69.73% (table 13) of non-indigenous children of the same age group who had access to a smartphone at home although, like the indigenous students, most of these non-indigenous students (55.56%) had to share the phone with another family member. Not having exclusive recourse to electronic devices of this kind due to limited economic resources would appear to be a more generalised problem in Ecuador. This would have likely posed a problem when it came to participating in online classes, especially in households with more than one sibling as reported in the article, *Los niños que tienen que recibir sus clases virtuales por teléfono (El País, 2020, May 6)*.

Table 13. Contingency table: Possesses a smartphone to carry out your daily activities (educational, work, recreation, etc.) - Ethnic group

		Ethnic group		
		Indigenous	Non-Indigenous	Total
Possesses a smartphone to carry out your daily	Yes, exclusive possession	22,058 3.55%	441,042 14.17%	463,100 12.40%
		229,149	1,729,212	1,958,361

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activities (educational, work, recreation, etc.)	Yes, collectively with another household member	36.88%	55.56%	52.45%
	Not available	370,138 59.57%	942,351 30.28%	1,312,489 35.15%
Total		621,345 100.00%	3,112,605 100.00%	3,733,950 100.00%

That said, optimal learning experience for virtual classes does not simply depend on having exclusive access to a smartphone but rather on the type of electronic device that the student uses to access the internet. In other words, using a smartphone as opposed to a computer or tablet to carry out online activities or complete assignments has its limitations. For example, downloading assignments was more complicated with the smartphone especially one with insufficient capacity to download pdf documents (Franco, May 6, 2020 el País). However, as INEC data reveal, as much as 90.37% of indigenous individuals between the ages of 5 and 14 do not possess a computer to carry out their daily activities (educational, labor, recreation, etc.). The equivalent percentage for non-indigenous individuals is 68.64% (table 11). However, in the event that they did, 9.32% out of the 9.63% of these indigenous children who had access to a laptop or personal computer, had to share it with another member of the household. In contrast, non-indigenous children who had computers or laptops (26.62%) in their houses practically tripled that of indigenous children.

Table 11. Contingency table: Possesses a laptop or desktop computer to carry out daily activities (educational, labor, recreation, etc.) - Ethnic group

		Ethnic group		
		Indigenous	Non-Indigenous	Total
Possesses a laptop or desktop computer to carry out daily activities (educational, labor, recreation, etc.)	Yes, exclusive possession	1,953 0.31%	147,485 4.74%	149,438 4.00%
	Yes, collectively with another household member	57,880 9.32%	828,545 26.62%	886,425 23.74%
	Not available	561,512 90.37%	2,136,575 68.64%	2,698,087 72.26%
Total		621,345 100.00%	3,112,605 100.00%	3,733,950 100.00%

This gap between indigenous and non-indigenous students with regards to having personal computers at home is reduced with respect to tablets. It would appear that these two groups would rather make the sacrifice to spend on a computer or laptop when upgrading from a smartphone as 97.31% of indigenous people do not have a tablet to carry out their daily activities compared to a similar percentage for non-indigenous individuals is (91.73%) (table 12).

Table 12. Contingency table: Possesses a tablet to carry out your daily activities (educational, work, recreation, etc.) - Ethnic group

		Ethnic group		
		Indigenous	Non-Indigenous	Total
Possesses a tablet to carry out your daily activities (educational, work, recreation, etc.)	Yes, exclusive possession	2,815 0.45%	90,344 2.90%	93,159 2.49%
	Yes, collectively with another household member	13,895 2.24%	166,978 5.36%	180,873 4.84%
	Not available	604,635 97.31%	2,855,283 91.73%	3,459,918 92.66%
Total		621,345 100.00%	3,112,605 100.00%	3,733,950 100.00%

Poverty and online attendance

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Whether it is the lack of telecommunications infrastructure in remote regions of Ecuador or the lack of choice regarding the type and use of electronic devices available in the household, the principal contributing factor to the digital gap among children between the ages of 5 and 14 is poverty. According to INEC, up to 79.66% of indigenous Basic Education students live below the poverty line, which would make them two times more likely to experience technological exclusion than non-indigenous students given that the percentage of poor non-indigenous students is almost half that of indigenous students at 38.96% (table 14).

According to the December 2020 data of INEC, there were 12,002 indigenous girls and boys and 125,893 non-indigenous children who did not attend classes (tables 3 and 5) during the pandemic. This data revealed that the reason for not attending school with the highest percentage among indigenous children was the 'lack of economic resources' (28.55%). This percentage, however, could be higher when considering that the factor underlying the other reasons for non-attendance may also be linked to not having enough economic resources. For example, as many as 20.21% of the indigenous children between 5 and 14 claimed that they were prevented from going to school. This may have been done so that the children could tend to what was considered to be more urgent tasks, especially since logging on to online classes implied some sort of financial investment on the part of already struggling parents. A 2020 CEPAL report claims that one of the negative impacts the pandemic has had on the indigenous population is the burden it has placed on children to assume a more active role in the traditional activities of subsistence (2020). As the rate of unemployment increases, the rate of 'sub-employment' which directly affects the children increases (Polanco, 2020). People work 5 times more in rural communities (perhaps due to the demands of farm work), which consequently means that indigenous minors work the most out of their contemporaries (Polanco, 2020). Data from INEC (2020) reveal that up to 99.3% of indigenous children already 'work' informally in agriculture, a fact which becomes particularly relevant when we consider that the percentage of indigenous children who were not allowed to attend school during the pandemic was far more (20.21%) than the percentage of non-indigenous children (0.35%). It is not difficult to comprehend, under these circumstances, why putting food on the table would not be prioritized over keeping abreast with online classes during the very pandemic that has foisted more economic hardships upon the poorest sector of the society (CEPAL, 2020).

Hence if that child's input elsewhere were considered more critical to the family's subsistence, one could see how the lack of economic means would push certain families to being opposed to their children attending school. However, that being said, it is significant that 'work' (farm, household, childcare work etc.) was not included on this list of factors for truancy in the INEC data (2020), which further serves to obscure the reality of child labour in countries like Ecuador (Briceño & Pinzón, 2004), making it difficult to gauge the effects of child labour on Basic Education attendance rates among the indigenous peoples. This is particularly true in indigenous communities in Ecuador where 11.72% of indigenous children between the ages of 5 and 14, as opposed to 1.39% non-indigenous children, are exploited for their labour. Due to insufficient data one can only assume that this difference is attributable to a very high percentage of indigenous children (99.33%) help out their family in labour intensive agricultural work.

To add to this obfuscation of information surrounding child labour, the non-specificity of the reason of 'other' for non-attendance, which represents up as many as 24.27% of indigenous school-going children, is significant enough to be open to speculation. What 'other' reasons could there be for not attending especially when one considers that one of the major limitations for online classes during the pandemic for indigenous children was their lack of access to the internet and suitable electronic devices to join classes. Despite this limited access to ICTs, however, only 3.12% of indigenous children between ages 5 and 14 who did not attend class cited technological shortcomings as their main reason (table 5). The high attendance rate

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among indigenous children during the pandemic (98.07%), coupled with this low percentage of non-attendees due to lack of technological resources (3.12%), could mean that indigenous parents, once the decision was made to send their children to school, made every effort to do so (in some cases by taking out loans) despite their economic and consequently technological limitations. This was the case of Anita Gualichico, mother of three, taxi operator by day, seamstress by night, who decided to buy a smartphone under an installment plan and share the monthly fee for internet service with her neighbour so that she could download the applications her children needed to participate in online classes (Constante, 2020, June 16). Given the determination of some families to have their children continue their schooling despite the debt incurred through loans and monthly fees, the indigenous families who gave the reason for not sending their children as due to lack of access to these technological devices, are more than likely to have felt that the dollar for recharging the mobile phone would have been better spent towards putting food on the table (Constante, 2020, June 16) or by engaging all of the child's time in helping out on the farm (García, 2008).

Table 5. Contingency table: Reason for not attending – Ethnic group

	Ethnic group		Total
	Indigenous	Non-Indigenous	
Reason for not attending Lack of financial resources	3,426 28.55%	33,140 26.32%	36,566 26.52%
Due to school failure	0 0.00%	1,421 1.13%	1,421 1.03%
Due to illness or disability	2,680 22.33%	9,511 7.55%	12,191 8.84%
Their family does not allow them to study	2,426 20.21%	444 0.35%	2,870 2.08%
Reason for not attending Lack of interest in studying	183 1.52%	6,796 5.40%	6,979 5.06%
Due to pregnancy	0 0.00%	479 0.38%	479 0.35%
Due to lack of space	0 0.00%	2,889 2.29%	2,889 2.10%
Due to lack of technological resources (internet, computer, cell phone)	374 3.12%	23,279 18.49%	23,653 17.15%
Other	2,913 24.27%	47,934 38.08%	50,847 36.87%
Total	12,002 100.00%	125,893 100.00%	137,895 100.00%

In terms of child labour, although table 6 shows that the percentage of indigenous individuals between the ages of 5 to 14 working (11.92%) is ten times the percentage of non-indigenous children who work (1.39%), it is possible that the percentage may be higher. Table 7 illustrates that much of this work fall into the category of informal labour as they consist of activities that are linked to the household and consequently difficult to officially track. In fact, these tasks carried out by children alongside family members are not often considered work in the traditional sense (Pedrós, & Ruíz, 2020, November 6).

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Table 6. Contingency table: Worked last week – Ethnic group

		Ethnic group		Total
		Indigenous	Non-Indigenous	
Worked last week	Yes	74,058 11.92%	43,131 1.39%	117,189 3.14%
	No	547,287 88.08%	3,069,474 98.61%	3,616,761 96.86%
Total		621,345 100.00%	3,112,605 100.00%	3,733,950 100.00%

In general terms, 63,514 indigenous girls and boys and 31,460 non-indigenous children carry out activities to contribute to their household. In this context, 99.33% of indigenous individuals who work to support the family economy do so through agricultural labor and caring for animals, while the equivalent percentage for the non-indigenous population is 76.60% (table 7).

Table 7. Contingency table: Activity you did to help in your home – Ethnic group

		Ethnic group		Total
		Indigenous	Non-Indigenous	
Activity you did to help in your home	Helping in a family business.	427 0.67%	6,830 21.71%	7,257 7.64%
	Help with the work of a family member.	0 0.00%	479 1.52%	479 0.50%
	Agricultural work, animal care.	63,087 99.33%	24,098 76.60%	87,185 91.80%
	Other activity for income	0 0.00%	53 0.17%	53 0.06%
Total		63,514 100.00%	31,460 100.00%	94,974 100.00%

Child labour and virtual class attendance

Even though there may be hesitancy in referring to activities that children carry out on the farm alongside their families as 'child labour' within indigenous communities in general (OIT, 2010), these activities are classifiable as child labour by the International Organization of Work (OIT) if they are not suitable for the age of the child taking part in them, prevent him or her from going to school or from having free time to themselves (OIT, 2010). Additionally, given the family based organization of agricultural work in these indigenous communities, the agricultural labour of the children (INEC table 7), despite the fact that it contributes to the family income, is difficult to measure (García, 2008; Nova, 2008), which in turn makes it difficult to determine the extent to which the amount of time the child dedicates to this activity influenced their inability to attend online classes during the pandemic.

'Domestic work', which can include anything from helping to take care of siblings, cooking or cleaning to carrying water for the family, as well as undertaking these same tasks in other household for little or no pay, is another area school going children, particularly girls, (Polanco, 2020, June 11) partake in to help out with the family economy. Yet like agricultural work, domestic child labour has a similar outcome when trying detect or regulate its occurrence even though it can take up as many as 30 hours or more a week of the child's time (*El Telégrafo*, 2019, march 3,). As domestic work is not generally valued as 'work' in the society (*El Telégrafo*, 2019, March 3) it complicates efforts to determine its influence on online attendance during the pandemic which defines work in the narrow traditional sense to mean remunerated activity. In fact, according to the INEC (2020) 'domestic work', is actually cited as one of the

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reasons why children were 'not' able to contribute towards the family economy (table 8) and not why they were 'not' able to attend school (table 7), for example. In this sense, it is understandable that the percentage of both indigenous (0.52%) and non-indigenous children (0.17%) who did no 'work' to support the family because they were busy with domestic work is minimal compared to the percentage of indigenous (98.52%) and non-indigenous children (96.65%) who did not contribute to the family economy because they were students.

Considering that fact that few indigenous households have internet connection and that children had to go in some cases to another town to gain internet access so that they could follow the classes or download the assignments (Constante, 2020, June 16), one could see how being a student as opposed to doing domestic chores, particularly in one's home, would be cited as the predominant reason for not being able to contribute to the family economy. The mobilization for online classes would have taken the children away from their place of work, be it for agricultural or domestic activities.

Table 8. Contingency table: Reason for inactivity – Ethnic group

		Ethnic group		
		Indigenous	Non-Indigenous	Total
Reason of inactivity	Pension	0 0.00%	325 0.01%	325 0.01%
	Student	476,601 98.52%	2,936,240 96.65%	3,412,841 96.91%
	Housewife/domestic worker	2,512 0.52%	5,159 0.17%	7,671 0.22%
	Disabled	2,680 0.55%	13,468 0.44%	16,148 0.46%
	Other	1,979 0.41%	82,703 2.72%	84,682 2.40%
	Total	483,772 100.00%	3,037,895 100.00%	3,521,667 100.00%

Domestic work as a category appears again in table 9 but this time as one of the types of occupation children from ages 5 to 14 have. 'Unpaid domestic worker' has the highest percentage of child labourers with indigenous children representing 97.32% and non-indigenous children 91.34% of unremunerated domestic workers (table 9).

Table 9. Contingency table: Occupation category – Ethnic group

		Ethnic group		
		Indigenous	Non-Indigenous	Total
Occupation category	Private employee	0 0.00%	610 0.82%	610 0.29%
	Day laborer or laborer	260 0.19%	1,846 2.47%	2,106 0.99%
	Unpaid domestic worker.	133,888 97.32%	68,243 91.34%	202,131 95.22%
	Unpaid non-domestic worker.	2,842 2.07%	1,438 1.92%	4,280 2.02%
	Unpaid helper / day laborer.	0 0.00%	2,573 3.44%	2,573 1.21%
	Domestic employee	583 0.42%	0 0.00%	583 0.27%
	Total	137,573 100.00%	74,710 100.00%	212,283 100.00%

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Table 10 shows that up to 94.54% of indigenous children between the ages of 5 and 14 carry out their work activities on privately owned land, which is almost 30% more than non-indigenous children. One could see how the mobilization for internet connectivity for classes, which disproportionately affects indigenous children because they are mostly poor and live in rural communities and therefore have limited access to ICTs, would have more of an impact on child labour in the indigenous communities. It is not clear, however, if the owners of the 'privately owned property' are actually the family of these indigenous children, a fact which could make virtual education by way of mobilization be considered directly responsible for any decrease in family income, and make it more likely for indigenous children to abandon their studies if online classes continue and the current telecommunication infrastructure and fees for connection are not addressed adequately.

Table 10. Contingency table: Work site – Ethnic group

		Ethnic group		
		Indigenous	Non-Indigenous	Total
Work site	Local employer	0 0.00%	610 0.82%	610 0.29%
	Place-to-place labor	0 0.00%	591 0.79%	591 0.28%
	On the Street	0 0.00%	737 0.99%	737 0.35%
	Kiosk	475 0.35%	164 0.22%	639 0.30%
	Private or leased premises	2,553 1.86%	5,650 7.56%	8,203 3.86%
	Dwelling belonging to a third party	3,426 2.49%	583 0.78%	4,009 1.89%
	Personal premises	800 0.58%	11,717 15.68%	12,517 5.90%
	Privately owned land	130,059 94.54%	48,991 65.57%	179,050 84.34%
	Farm land	260 0.19%	5,667 7.59%	5,927 2.79%
	Total	137,573 100.00%	74,710 100.00%	212,283 100.00%

On a related note, almost 80% of the indigenous children between the ages of 5 and 14 (79.66%, to be exact) are poor while less than half of that percentage of non-indigenous children are poor (38.96%). Table 14 serves to show the economic disparity between indigenous and non-indigenous children, which given the negative impact poverty has on ability to buy electronic devices, pay service fees for smartphone or broadband connectivity or on the ability to attract the investment of private telecommunication operators, will continue to be the principal underlying reason for the digital gap between indigenous and non-indigenous children.

Table 14. Contingency table: Poverty - Ethnic group

		Ethnic group		
		Indigenous	Non-Indigenous	Total
Poverty	Non-poor	126,397 20.34%	1,885,960 61.04%	2,012,357 54.23%
	Poor	494,947 79.66%	1,203,726 38.96%	1,698,673 45.77%
Total		621,344 100.00%	3,089,686 100.00%	3,711,030 100.00%

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Additionally, more than half of the indigenous children between the ages of 5 and 14 fall into the category of extreme poverty (58.58%), whereas under a third of that percentage is true for non-indigenous children (15.34%) (table 15). This is important when comes to understanding why a percentage of the indigenous children were unable to attend classes during the pandemic and what this could mean for indigenous children in the Basic Education system in the economic fallout aftermath of the pandemic if classes continue to be online.

Table 15. Contingency table: Extreme Poverty - Ethnic group

		Ethnic group		
		Indigenous	Non-Indigenous	Total
Extreme Poverty	Non-indigent	257,391 41.42%	2,615,627 84.66%	2,873,018 77.42%
	Indigent	363,953 58.58%	474,059 15.34%	838,012 22.58%
Total		621,344 100.00%	3,089,686 100.00%	3,711,030 100.00%

RISK ANALYSIS

Within the framework of risk estimation, two contingency tables were created in order to analyze the association of the variable of being indigenous with the variables of child labour and poverty. According to table 16, on a national scale 3.14% of boys and girls in Ecuador between the ages of 5 and 14 are engaged in labour. Within the indigenous population alone, the percentage of child labourers is almost four times that of this national percentage (11.92%).

Table 16. Contingency table: Ethnic group - Worked last week

		Worked last week		Total
		Yes	No	
Worked last week	Indigenous	74,058 11.92%	547,286 88.08%	621,344 100.00%
	Non-indigenous	43,131 1.39%	3,069,475 98.61%	3,112,606 100.00%
Total		117,189 3.14%	3,616,761 96.86%	3,733,950 100.00%

According to the data extracted from the risk estimate, it is safe to conclude that a 5 to 14-year-old indigenous child runs 9,630 times the risk of being engaged in labor than a non-indigenous child (McHugh, 2009). Additionally, for the indigenous child, the risk of having to work increases by 760.2%, compared to a non-indigenous child (table 17).

Table 17. Risk estimate from the contingency table: Ethnic group- Worked last week

Reason of the advantages for How it is considered (Indigenous / Non-indigenous)	Value	Confidence interval 95%	
		Lower	Superior
For the addressed subject Worked last week = Yes	9.630	9.513	9.748
For the addressed Worked last week = No	8.602	8.503	8.701
N of valid cases	0.893	0.892	0.894
	3,733,950		

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What table 18 shows is that compared to the average scale of poverty (45.77%) of both indigenous and non-indigenous children between the ages of 5 and 14, the percentage of poor indigenous children was significantly above that average (79.66%) even though less indigenous children were surveyed (621,344) than non-indigenous ones (3,089,686).

Table 18. Contingency table: Ethnic group - Poverty

		Poverty		Total
		Poor	Not poor	
Ethnic group	Indigenous	494,947 79.66%	126,397 20.34%	621,344 100.00%
	Non-indigenous	1,203,726 38.96%	1,885,960 61.04%	3,089,686 100.00%
Total		1,698,673 45.77%	2,012,357 54.23%	3,711,030 100.00%

According to the data extracted from the risk estimate, it is safe to conclude that a 5 to 14-year-old child that is indigenous has 6.135 times the risk of being poor than a non-indigenous child (Morris & Gardner, 1988), which increases by 104.5%, compared to a non-indigenous child (table 19).

Table 19. Risk estimation of the contingency table: How it is considered - Poverty

		Value	Confidence interval 95%	
			Lower	Upper
Reason of advantages for (Indigenous / Non-indigenous)	Ethnic group	6.135	6.095	6.176
Reason of advantages for (Indigenous / Non-indigenous)	Ethnic group	2.045	2.041	2.048
Related to poverty = Non-poor addressed subject		0.333	0.332	0.335
Related to poverty = Non-poor addressed subject				
N of valid cases		3,711,030		

According to the risk analysis that emerges from the quantitative information, poverty significantly affects the educational process of indigenous girls and boys between the ages of 5 and 14, leaving them in extreme conditions of vulnerability relating to their access to education as a right and obligation of the state.

The chi-square test

The correlation between the variable of being indigenous with the variables of child labor and poverty was investigated using the chi-square test (χ^2) (tables 16 and 18). Correlations in which Value Test (V.TEST) is greater than or equal to 2 are statistically interesting. The higher the value of V.TEST, the greater the correlation between two variables (Morineau, 1984).

The results of the chi-square test showed that there is a significant correlation between the variables investigated:

- Ethnic group * Worked last week: $\chi^2 = 191.04$ / V. TEST = 13.78
- Ethnic group * Poverty: $\chi^2 = 323.72$ / V. TEST = 99.99

Summary of findings

In this study, the educational and social profile of indigenous Ecuadorians aged 5 upward to 14 was investigated during the global health crisis of the COVID-19 pandemic, by comparing

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this sector to other sectors of the Ecuadorian population belonging to that age group. A descriptive analysis was then made using contingency tables and risk analysis (Martin, 2008).

Connectivity, attendance and socio-cultural factors

The study shows that 85.58% of indigenous individuals between the ages of 5 and 14 reside in rural areas, which have traditionally been areas of limited internet connection (), while the equivalent percentage of non-indigenous children who inhabit these rural areas is 26.16%. Despite this, and the fact that 66.82% of indigenous children between 5 and 14, as opposed to 8.2% of non-indigenous children, do not have any form of connection to the net to carry out educational activities at home, the percentage of indigenous individuals between the ages of 5 and 14 who attend classes (98.07%) during the pandemic was higher than the equivalent percentage of non-indigenous individuals (95.96%)., while the equivalent percentage in the non-indigenous population is 8.20%. That said, there are 12,002 indigenous children and 125,893 non-indigenous children who are currently not attending classes. Based on the study (INEC, 2020) 28.55% of indigenous children and 26.32% of non-indigenous children that do not attend classes are forced into that situation due to lack of economic resources. Additionally, 22.33% of indigenous individuals do not attend classes due to some type of illness or disability, while the equivalent percentage in the non-indigenous population is 7.55%. A slightly lower percentage (20.21%) of indigenous individuals between the ages of 5 and 14 do not attend classes because their family does not allow them to study, a very elevated percentage especially when compared to the 0.35% of non-indigenous population who are not allowed to go to school. It is surprising, however, that despite the limited access the indigenous population has to new technologies, that only 3.12% of the indigenous children surveyed cited lack of technological resources (internet, computer, cellular phone) as the reason for not assisting classes, while nearly six times that amount, precisely 18.49% of non-indigenous children, who have had more access to ICTs, claim that they could not attend school for that reason.

Child labour

With regards to child labour, although working in Ecuador before the age of 15 is illegal in Ecuador, as mentioned in the Constitution (2008) in article 46, literal (?) 2, and chapter V of the Code of Childhood and Adolescence, the percentage of indigenous people aged 5 to 14 years of age who are engaged in labor is 11.92%, while the equivalent percentage in the non-indigenous population is 1.39%. In fact,

63,514 indigenous girls and boys and 31,460 non-indigenous individuals of the same age group carry out activities in order to provide assistance to their household. Agriculture is the primary sector in which children between the ages of 5 and 14 contribute to the family economy with as much as 99.33% of the indigenous children and 76.60% of non-indigenous children carrying out agricultural activities. This is followed by 97.32% of indigenous children who are engaged in some form of unpaid domestic work. The similarly high percentage of indigenous domestic workers imply some crossover with workers in agriculture, which would suggest that the average indigenous child between the ages of 5 and 14 likely works in both areas compared to the non-indigenous child who is more engaged in domestic activities (91.34%) than agricultural activities (76.6%). The significant difference in percentage between non-indigenous domestic workers and non-indigenous agricultural workers may be attributable to the fact that the non-indigenous population tend to inhabit more urban areas (). In fact, 65.57% of them as opposed to 94.54% of indigenous children cite privately owned land as their primary place if work.

ICT access

According to INEC (2020), 90.37% of indigenous children between the ages of 5 and 14 do not have a computer and an even higher percentage (97.31%) do not have tablets to carry

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out their daily activities (educational, labor, recreation, etc.). The percentage of non-indigenous children who do not own computers is drastically lower (68.64%) than that of indigenous children but only slightly lower (91.73%) with regards to tablets. Non-indigenous children outrank the indigenous ones with reference to ownership of electronic devices which enhance their ability to connect to the internet. While 40.43% of indigenous individuals possess a smartphone to carry out their daily activities exclusively or collectively with another member of the household, a much higher percentage of non-indigenous individuals (69.73%) also have this kind of access to a smartphone

CONCLUSIONES

In conclusion, the vast majority of indigenous children between 5 and 14 years of age attended virtual classes during the COVID-19 pandemic albeit under great duress (Casal & Hernández, 2021) since they did not possess the necessary tools (computer, internet connection, etc.) to do so (INEC, 2020). Additionally, indigenous children from 5 to 14 years of age are the poorest and the most subjected to child labour in Ecuador, a reality which not only conditions their ability follow virtual classes, but also further limits their opportunities to continue attending classes.

According to Bonal (2006) there is a correlation between low levels of education in a population and poverty (13). The concept that education is an effective way of eradicating poverty and marginalization of the indigenous population has been the driving force behind such government initiatives in Ecuador as El Plan Nacional de Buen Vivir 2013-2017 and more recently the Plan de Servicio Universal 2018-2021 in response to the digital gap in Ecuador which only serves to exacerbate the marginalization of the technologically underserved indigenous population.

In this last context, especially based on the empirical evidence during the COVID-19 pandemic (INEC, 2020), the application of urgent public policies is proposed in order to equip indigenous girls and boys with the appropriate technological tools to attend their classes and do their assigned homework. In addition to this, policies that will help indigenous families to not have to rely on the labor of their children in order subsist financially along with more effective ways of monitoring this exploitation of children are needed. Ecuador needs a well-educated indigenous population able to hold its own socially, culturally, politically and economically within the framework of the Ecuadorian society of the twenty first century.

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