

Beyond connectivity: Internet for all

Internet in the COVID-19 pandemic: digitalization dynamics and the effects of inequalities

By Fabio Senne¹

The COVID-19 pandemic drastically changed social dynamics, with widespread and unprecedented impacts on access to rights and the labor market. With the migration of essential activities to the Internet – given the adoption of necessary measures of social distancing – there has been growing attention of public debate on the issue of digital exclusion. What are, however, the impacts of the known disparities in access to and use of information and communication technologies (ICT) in the fight against the novel coronavirus? Would the possibility of substituting face-to-face activities with the use of ICT be evenly distributed among the population as a whole? How have disparities in the quality of access to digital technologies affected the emergency adoption of online alternatives?

Over the last two decades, the use of Internet has grown rapidly in Brazil. At the turn

of the century, Internet was a resource available to few. According to the 2000 Brazilian Demographic Census, only 11% of Brazilian households had a computer, a percentage that reached 18% in São Paulo State and only 2% in Maranhão State. In 2001, the National Household Sample Survey (PNAD) of the Brazilian Institute for Geography and Statistics (IBGE) estimated that only 8.5% of households had computers connected to the Internet. Almost 20 years later, the network is an essential part of the daily life of most Brazilians, being used by three out of four individuals, which corresponds to roughly 134 million people connected (the Brazilian Internet Steering Committee [CGI.br], 2020).

However, the deep regional and socio-economic inequalities that mark the Brazilian society are also reproduced in the online environment, with a lower proportion of Internet use in rural areas, among individuals with lower income and education, as well as among older people. In addition, there are persistent disparities regarding the quality of Internet connection in households and the types of devices used to access the network – for most Brazilians, the only connected device is their mobile phones (CGI.br, 2020).

The present article evaluates the dynamics of Internet use in Brazil based on data collected by the ICT Panel COVID-19 between

¹ Doctoral candidate in Political Science at the University of São Paulo (USP), he is a researcher in Digital Inequalities and Public Policies. He is coordinator of ICT Survey Projects at Cetic.br.



Fabio Senne
coordinator of ICT
Survey Projects
at Cetic.br.

June and September 2020, carried out by the Regional Center for Studies on the Development of the Information Society (Cetic.br), department of the Brazilian Network Information Center (NIC.br). Given the limitations imposed by the current health crisis, the ICT Panel COVID-19 adopted innovative strategies for data collection and statistical modeling, which allow for comparisons of online habits that were verified before and during the pandemic.² Initially, we offer a characterization of the network use in Brazil amidst the on-going health crisis, and then discuss how disparities in the quality of access influence the performance of online activities and exploitation of the tangible benefits of Internet adoption. Finally, we seek to present how other inequalities markers are relevant to understand the described scenario.

What has changed with the COVID-19 pandemic?

One of the countless effects of the COVID-19 pandemic was the imposition of difficulties in the collection of statistical data. Surveys traditionally conducted through face-to-face interviews were suspended worldwide,³ making room for telephone and online interviews. Data sources that had not been much explored until now are also being used. One example is monitoring the adherence to measures of social distancing by using geolocation data that is generated by mobile phones.⁴ Although fundamental for the continuity of statistical production, the new methods still have coverage limitations that can result in significant biases. A critical challenge is therefore ensuring that unconnected or vulnerable populations are covered by such measurement efforts.

In the Brazilian case, there is still no robust data on the effective impact of the pandemic on basic access to the Internet (i.e., having or not having access), since the main surveys available were carried out before the health crisis. Based on existing information, it is reasonable to assume, on the one hand, that the need for social distancing has encouraged unconnected people to purchase Internet plans, a trend that positions the network as an essential service. On the other hand, the economic impact of the pandemic on the income of important sections

² Find out more: <https://cetic.br/en/pesquisa/tic-covid-19/>

³ Find out more: <https://cetic.br/en/publicacao/plano-de-contingencia-para-as-pesquisas-tic-do-cgi-br/>

⁴ Variations in the degree of social distancing among Brazilian states were evaluated in the Solidarity Research Network bulletin. Available at: <https://redepesquisasolidaria.org/boletins/boletim-1/as-politicas-para-enfrentamento-do-covid-19-nos-estados-brasileiros-com-distanciamento-social/>

of the population would have hindered access to the Internet. Greater understanding will come from the release of new data on the topic.⁵

As to online activities, the results of the ICT Panel COVID-19⁶ already allow estimating changes in the habits of network users. If data obtained with the survey is compared to similar cut-offs of the population in the ICT Households 2018 and 2019 surveys, a general increase trend in the performance of most investigated activities is observed – strong evidence of the migration of activities that used to be carried out in person to the online environment.⁷

The growth rate, however, was not the same among the different types of network usage. The greatest advances were seen in transactional activities, including electronic public services, financial transactions, and online shopping (as shown in Graph 1). For work and study purposes, the growth was less intense compared to previous years, which may indicate greater complexity for its digitalization. In the case of the educational use of the Internet, the growth was more accentuated precisely in classes DE, which, before the COVID-19 pandemic, declared they would carry out this activity in smaller proportions.

Despite the growth in the performance of online activities, maintenance of the disparity in the use of the network is noticed, according to social classes, which was even more intense for financial transactions, electronic commerce, and work activities. In the case of public services, the gap among classes was reduced in the referred period, which may be associated with the implementation of social programs such as the emergency aid (Auxílio Emergencial) from the Brazilian federal government. Aimed at the low-income population in situations of informality whose family income was heavily impacted by the health crisis, the program adopted a mobile phone application as the preferred means of accessing and receiving the benefit.⁸

In short, the data show that there was a migration of important parts of the population to online practices, which was not enough to solve the digital inequalities regarding the use of the network. Undoubtedly, such differences can have significant implications for the capacity to fight COVID-19 and to mitigate its negative effects.

(...) the results of the ICT Panel COVID-19 already allow estimating changes in the habits of network users.

⁵ A broader set of evidence on the subject will be available in the second half of 2021, in a survey conducted by Cetic.br|NIC.br through telephone interviews, combined with face-to-face interviews in specific locations.

⁶ Available at: <https://cetic.br/en/publicacao/painel-tic-covid-19/>

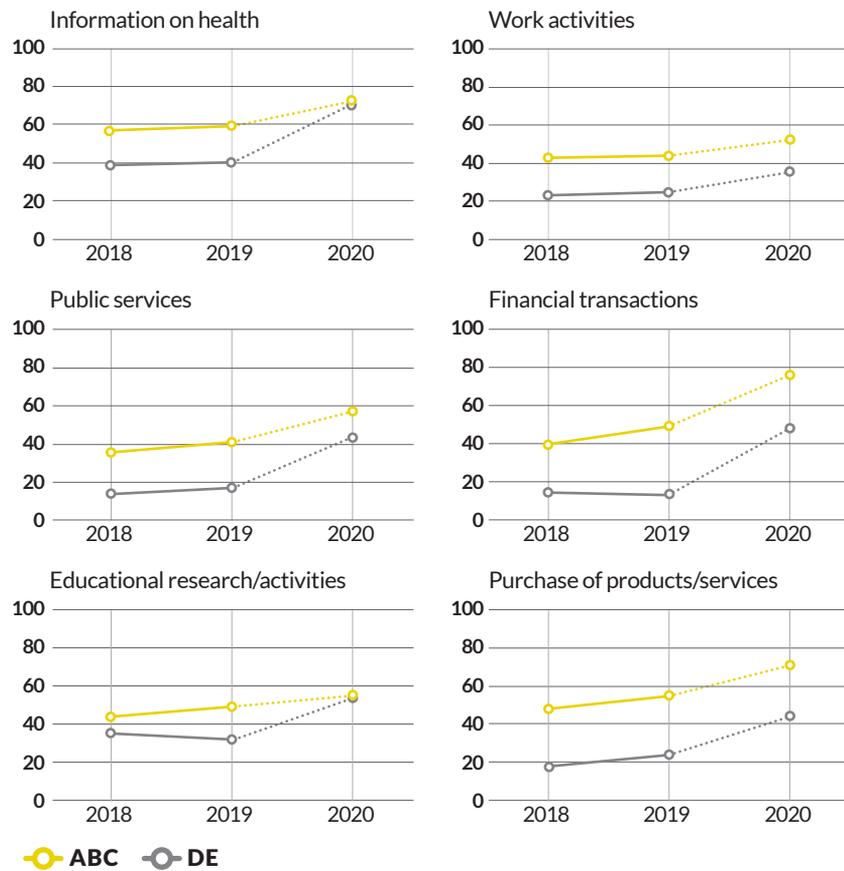
⁷ Indicators referring to the profile of Internet use and online activities were collected in all editions of the ICT Panel COVID-19. The results presented herein refer to the first edition, conducted in June 2020. For comparison with the ICT Households survey, new tabulations were made with common indicators for both studies, considering the respective population and age group cut-offs (16 years old or older).

⁸ Find out more: <https://rededesquisasolidaria.org/en/bulletins/bulletin-5/difficulties-with-the-mobile-application-and-failure-to-use-the-existing-safety-net-hinder-access-to-emergency-income/>

/Internet Sectoral Overview

Graph 1 – ONLINE ACTIVITIES BY SOCIAL CLASS (2018-2020)

Internet users aged 16 years old and older (%)



Source: Prepared by the author.

Differences in the quality of connectivity affect online opportunities

Literature on digital exclusion began to be written in the mid-1990s with the spread of the commercial Internet, focusing on understanding the motivations for having or not having access to the Internet. In general, there was an understanding that the so-called digital divide should be addressed with sectorial telecommunications policies, such as price regulation and expansion of network coverage (Hargittai & Hsieh, 2013).

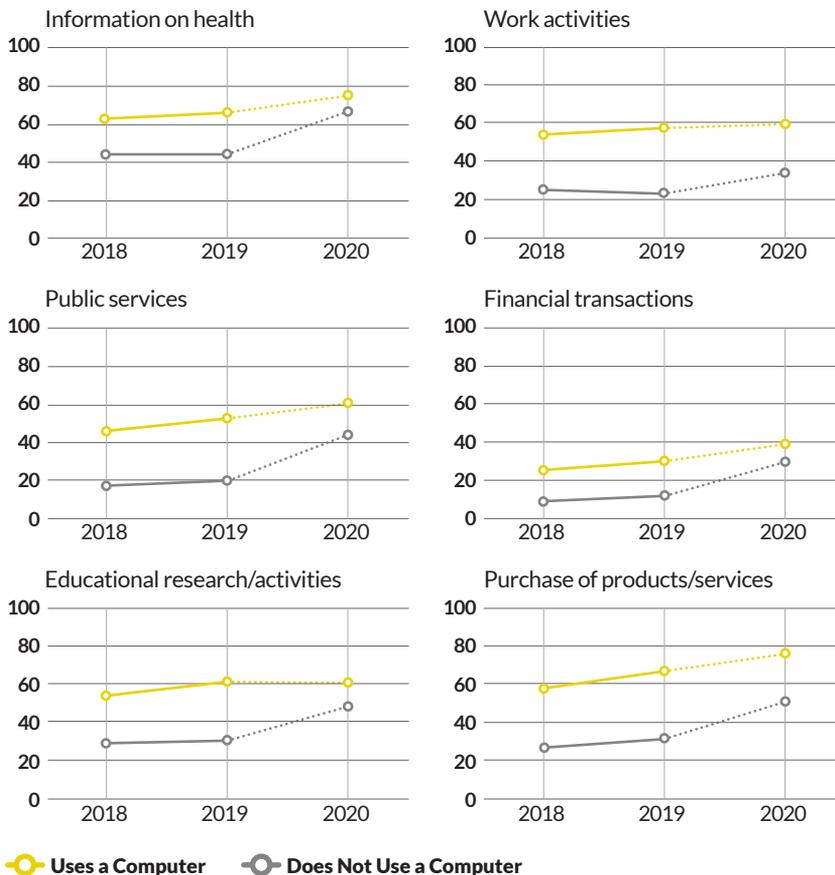
In the mid-2000s, a series of studies on a second level of digital exclusion came to light, regarding disparities in the use of the network among those who had overcome the access barrier. From this perspective, preexisting stratifications in the offline world – ethnicity, gender, and level of education, for example – would be decisive to explain the variations in the types of Internet use. Such literature also started to incorporate factors missing from previous measurement efforts, such as digital skills, understood as the ability to use technologies in ways that allow individuals to increase the benefits of that use and reduce the potential harm or negative outcomes associated with engagement with the online world (International Telecommunication Union [ITU], 2018).

In recent years, the relation between access to and use of the network has become more refined. Numerous studies point out that it is not sufficient to investigate the existence of access as a necessary condition for Internet use. The crucial question is thus which access is available, that is, which qualitative characteristics of this access guarantee "meaningful connectivity". This involves aspects such as how often people use the Internet, with sufficient devices and data on an appropriate speed connection.⁹

The results of the ICT Panel COVID-19 reveal inequalities in the quality of Internet use in at least three indicators. According to the data, those who did not use computers performed online activities in smaller proportions than those who did. Although access to computers is affected by income and level of education – which would explain such variations –, it is remarkable that in a period marked by the health emergency such differences remained significant. The exceptions were educational research and access to information on health, activities in which network usage during the COVID-19 pandemic was less discriminated by device types (Graph 2).

Graph 2 – ONLINE ACTIVITIES BY USE OF COMPUTER¹⁰ (2018-2020)

Internet users aged 16 years old and older (%)



Source: Prepared by the author.

Numerous studies point out that it is not sufficient to investigate the existence of access as a necessary condition for Internet use.

⁹ Find out more: <https://a4ai.org/meaningful-connectivity/>

¹⁰ Following an international methodology, the survey considers desktop computers, laptops, and tablets. Find out more: <https://www.itu.int/pub/D-IND-ITCMEAS-2014>

Remote learning and telework are practices that are even more sensitive to the availability of devices and quality Internet connection.

In addition to the individual use of computers, the conditions of access to devices in households are potentially limiting factors. Sharing devices with household residents can be decisive to make the best use of online opportunities, especially in a context in which workers and students have transitioned to carry out activities on the Internet. A simple ratio shows that users living in households with computers shared with up to two residents carry out educational activities (10 percentage points difference) and work (17 percentage points difference) in greater proportions than those who share their devices with more residents.¹¹

In a scenario marked by the widespread prevalence of mobile phone access – reported by 95% of users interviewed in the ICT Panel COVID-19 – it is also relevant to differentiate those who have access to mobile networks (3G or 4G) from those who rely exclusively on WiFi access. In 2020, the search for health information, for example, was higher among people who use mobile networks (77%) compared to those restricted exclusively to WiFi access (54%). The trend was repeated in the other activities measured in the study.

Remote learning and telework are practices that are even more sensitive to the availability of devices and quality Internet connection. According to a report published by the Economic Commission for Latin America and the Caribbean (ECLAC), download speeds at a level of up to 5.5 Mbps are classified in the category of “low” connectivity – they allow the use of functions such as emails, basic consumption of videos and streaming, but are not suitable for telework or online education. ECLAC argues that these activities are feasible with speeds starting at 18.5 Mbps if used non-simultaneously and above 25 Mbps if used simultaneously (Economic Commission for Latin America and the Caribbean [ECLAC], 2020). The quality of access is particularly sensitive to the performance of ongoing practices and, although the ICT Panel COVID-19 has not investigated Internet connection speed, the disparity in the quality of household broadband among social classes was already observed in surveys conducted before the pandemic (CGI.br, 2020).

Data from the ICT Panel COVID-19 show that in classes DE, the percentage of users who kept up with educational activities during the health crisis was lower than the average of those from other social classes (Graph 3). In addition, among this population, the percentage of those who did not migrate to online education was higher. We see that the use of mobile phones as the main device took place for most students in classes DE, in clear contrast to the trend observed in classes AB. Given such evidence, we can argue that the use of mobile phones was the only alternative available to the most vulnerable parts of the population, a scenario that could be decisive for the aggravation of educational inequalities in the period.

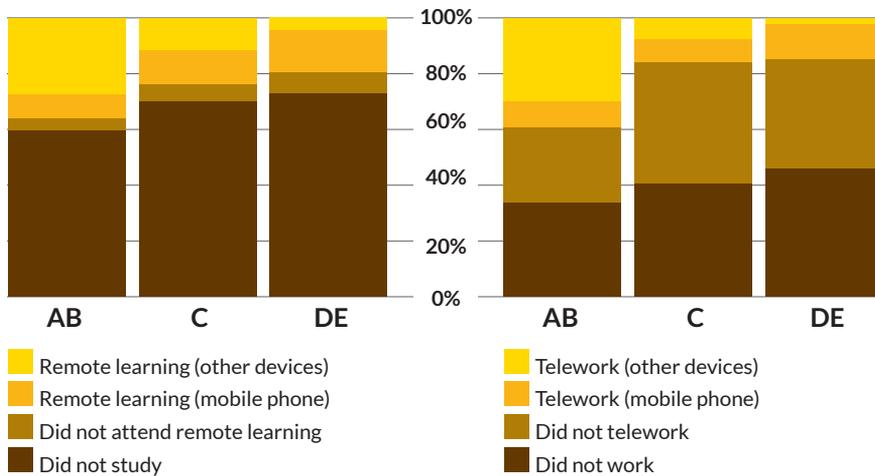
The adoption of telework during the COVID-19 pandemic was also lower among the lower classes. According to a study released by the Solidarity

¹¹ The ratio between the number of residents and the number of computers was calculated based on the users' responses on the total number of residents in their households, regardless of age, and the number of computers (desktop and laptop) present in the household, information used to classify social class, according to the criteria of the Brazilian Association of Research Companies (ABEP).

Research Network¹², whereas people who worked from home were mostly informal workers of lower pay in 2019, the profile of those who telecommute became mainly composed of professionals with Higher Education, teachers, managers, administrators, and office workers in 2020.¹³ According to the results of the ICT Panel COVID-19, 38% of Internet users aged 16 years old and older who performed some type of work during the pandemic adopted telework, a percentage that was higher among the working population with Higher Education (65%). Among those who started to use digital technologies for work, the use of mobile phones largely predominated in classes DE. This also limits the opportunities, among this share of the population, of benefitting from connectivity.

Graph 3 – REMOTE LEARNING AND TELEWORK BY MOST USED DEVICES (2020)

Internet users aged 16 years old and older (%)



Source: Prepared by the author.

Other inequalities reproduced in the online world

In addition to the information that performing online activities was impacted by the quality of connectivity, other social markers previously considered in studies on digital exclusion also proved to be decisive factors during the COVID-19 pandemic.

The age component showed trends that are already known in the literature and in data series that were collected before the health crisis (CGI.br, 2020).

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¹² Find out more: <https://redepesquisasolidaria.org/en/>

¹³ Available at: <https://redepesquisasolidaria.org/en/bulletins/bulletin-16/coronavirus-crisis-brings-changes-to-homebased-work-and-telework-digital-divide-leads-to-drop-in-income-and-reduces-economic-activity/>

/Internet Sectoral Overview

A cross-sectional analysis between sex and color/ethnicity of respondents reveals important differences in the network usage during the pandemic.

Access to online public services, for example, was significantly lower among users aged 60 years old and older (46%) than among adults aged 35 to 44 (60%). The topic of online habits of older individuals gains special relevance in an epidemiological context that considers this public as more vulnerable and a priority in vaccination initiatives.

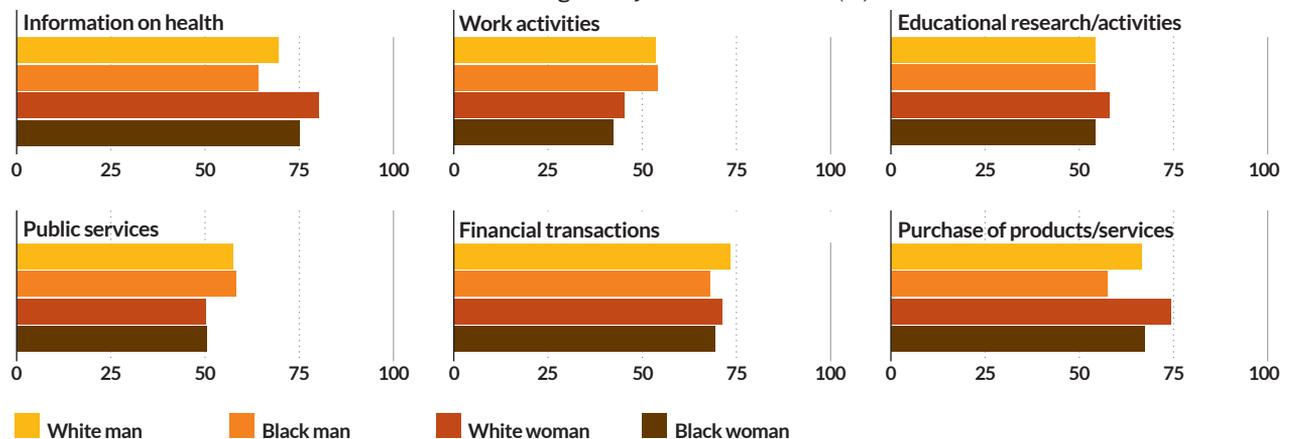
A cross-sectional analysis between sex and color/ethnicity¹⁴ of respondents reveals important differences in the network usage during the pandemic (Graph 4). Women, regardless of their declared color/ethnicity, stood out in terms of access to health information, a trend seen in other surveys prior to the COVID-19 outbreak (CGI.br, 2020). In the field of work and access to public services, the prevalence of men was remarkable – a result that confirms known stratifications in the debate on the digitalization of the labor market.¹⁵

The ICT Panel COVID-19 also investigated work mediated by online applications, such as selling products and services, delivery or driving activities. This modality was carried out mainly by women, self-employed professionals, and domestic workers, as an alternative income for those who were unemployed or had their working hours reduced due to the pandemic.¹⁶

Among financial and commercial transactions, differences regarding color/race were more relevant. White men and women said they performed them in greater proportions. The purchase of products and services, for example, was more frequent among white people than among black or brown people, which suggests the effect of structural inequalities already known in the offline world on matters related to Internet use .

Graph 4 – ONLINE ACTIVITIES BY CROSS-SECTIONAL ANALYSIS OF SEX AND COLOR/RACE (2020)

Internet users aged 16 years old and older (%)



Source: Prepared by the author.

¹⁴ Users who declared themselves as "Asian" or "indigenous", underrepresented in the study sample base, were not analyzed. The aggregation used followed the categorization adopted in the Solidarity Research Network bulletin, available at: <https://redesquisasolidaria.org/wp-content/uploads/2020/05/boletim3.pdf>

¹⁵ Find out more: <https://cgi.br/publicacao/coletanea-tic-governanca-da-internet-e-genero/> and at: <https://centrolatam.digital/publicacion/rlesd-empleo-brecha-genero-latam/>

¹⁶ Find out more: <https://cetic.br/en/publicacao/painel-tic-covid-19/>

Final Thoughts

The COVID-19 pandemic highlighted the effects of digital exclusion on social inequalities, testing the ability to carry out online activities at an extremely sensitive time. During this period, the difference between having or not having conditions to make significant use of the network was directly associated with the possibility of protecting oneself from the novel coronavirus and its economic consequences. To some extent, it is possible to say that, more than ever, quality access to the network was crucial to saving lives.

The concrete impacts of the health crisis on digital exclusion and the effects of online disparities on the aggregate scenario of inequalities are a research agenda that is still under construction. Evidence presented herein indicates paths that should be followed by further research. In this sense, some fields of investigation seem especially promising, capable of offering more precise inputs for public policies in the area. Among them, the following can be mentioned:

1. The need to understand in detail the effects of inequalities in access and the quality of connectivity, determining parameters for meaningful connectivity;
2. The measurement of tangible results of accessing and using ICT for well-being, determining in which contexts digital technologies act as mechanisms that reduce or increase inequalities;
3. The deepening of a “meso” level of analysis, which considers factors that are positioned between individuals (micro) and economic variables (macro), in particular introducing territorial and community dynamics as a central element of the relation between digital and social disparities;
4. And the introduction of an intersectional perspective for inequalities markers, which considers compound vulnerabilities and the effects of structural disparities.

Despite limitations, the available data allow informing a public policy agenda that considers how the health crisis is being faced and the challenges posed in the post-pandemic scenario. First, monitoring the adoption of ICT with a multi-sector measurement ecosystem is a necessary condition for the implementation of public policies capable of mitigating the consequences of digital exclusion. The continuation of conducting surveys on the subject and investing on producing indicators – which includes carrying out the Demographic Census by IBGE – are main topics on the agenda for the next period.

The greater sophistication of access metrics also indicates that policies should address more diversified strategies to promote connectivity. Measures taken by local governments during the pandemic, such as offering mobile data plans to students and zero-rating agreements¹⁷ for educational applications,¹⁸

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¹⁷ This practice carried out by telecommunication service providers consists of applying zero ratings for mobile data traffic of certain applications, resulting in the non-accounting of such traffic for the purposes of a data franchise contracted for Internet access.

¹⁸ An example of this is the government of São Paulo State. Find out more: <https://www.saopaulo.sp.gov.br/spnoticias/educacao-patrocina-dados-de-internet-para-acesso-a-aplicativos/>

(...) the promotion of Internet use is incorporated into the political discourse as a fundamental right to be guaranteed to the entire population, but also as a means of facilitating or enhancing access to other rights and the exercise of citizenship.

are evidence of a vast field hitherto unexplored by public administration. With the regulation of the Fund for the Universalization of Telecommunication Services (Fust)¹⁹ and the legislative debate concerning the subsidy for connection to schools and students, the theme is renewed.

The COVID-19 pandemic also made evident how digital exclusion is not only a mirror of the situation of vulnerability, but an essential part of social care and poverty-reduction strategies. An example of this was the implementation of the COVID Emergency Aid and other programs at the local level. In a context of greater informality in the labor market, the promotion of household connectivity – and not just the digitalization of companies – becomes even more pressing to combat income inequalities.

Finally, the promotion of Internet use is incorporated into the political discourse as a fundamental right to be guaranteed to the entire population, but also as a means of facilitating or enhancing access to other rights and the exercise of citizenship (World Bank, 2016). In this context, the digital divide can reinforce the emergence of a democratic divide – in terms of the seminal contribution of Anglo-American political scientist Pippa Norris, who foresaw the deepening of political divisions caused by differences in the way citizens engage in the network (Norris, 2001). In addition to the impacts on access to income and employment in an increasingly digital economy, the consideration of an expanded agenda regarding the positive and negative effects of disseminating Internet access is intimately connected to decisive debates for the future of democracies, as well as for the urgent affirmation of an environmental and human rights agenda.

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¹⁹ In December 2020, Brazil approved a law that regulates the use of Fund for the Universalization of Telecommunication Services (Fust), allowing the application of the mechanism to finance the improvement of broadband networks. The resources can be used “for the purpose of encouraging the expansion, use, and improvement of the quality of telecommunication networks and services, reducing regional inequalities and encouraging the use and development of new connectivity technologies to promote economic and social development”. Available at: http://www.planalto.gov.br/ccivil_03/_ato2019-2022/2020/lei/114109.htm

Interview I

Internet Sectoral Overview (I.S.O.)_ Why are the concept and metric of meaningful connectivity important beyond the connected and unconnected dichotomy? What is their relevance amidst the COVID-19 pandemic?

Ana María Rodríguez Pulgarín (A.R.)_ Research on digital development must put the user at the center of its analysis. For that, we must move beyond the usual simple binary connectivity metric and start differentiating between varying levels of Internet access. Meaningful connectivity¹ allows us to understand the user's experience and determine if they can fully benefit from and be empowered by the Internet.

The COVID-19 pandemic has put on full display the value of the Internet's power, as well as the cost of having limited Internet access. Unfortunately, as the use and benefits of the Internet grow, so does the need for more data. During the sanitary crisis, a household with limited access would not have been able to learn, work or gain vital medical care remotely. Small business owners, on the other hand, would not have been able to adopt online platforms to sell their goods or services. Meaningful connectivity is a concept that pushes us to go further and think about a new way of understanding what it means to be fully free to use the Internet. To build the digital world that we deserve and need is now more urgent than ever.

I.S.O._ Could you provide examples of public policies that consider the different levels of Internet access? What can be done to meaningfully connect users at the margins?

A.R._ The national broadband plan² is a key tool that helps guide countries towards meaningful connectivity. With no clear targets around 4G mobile connectivity, unlimited broadband connection, access to a smartphone, and daily use of the Internet, countries will have a hard time enabling meaningful connectivity for their citizens, particularly those at the margins of society.

Some examples of specific reforms and public policies that governments can implement to help meaningfully connect more people include eliminating luxury taxation on ICT essentials;³ guaranteeing public spaces that provide free Internet use⁴ (for example, public libraries), which allow entire communities to have access to unlimited connection; and introducing social or preferential tariffs for telecommunication services for vulnerable groups.⁵ Regulations to support community networks⁶ and guarantee funds to support universal access⁷ can also help connect users at the margins.



Ana María Rodríguez Pulgarín

Research Analyst,
World Wide
Web Foundation
& Alliance for
Affordable Internet
(A4AI).

¹ Find out more: <https://a4ai.org/meaningful-connectivity/>

² Find out more: <https://a4ai.org/affordability-report/report/2020/>

³ Find out more: <https://a4ai.org/studies/eliminating-luxury-taxation-on-ict-essentials/>

⁴ Find out more: <https://a4ai.org/five-ways-that-libraries-offer-meaningful-connectivity/>

⁵ Find out more: <https://a4ai.org/studies/lowering-prices-for-marginalised-users/>

⁶ Find out more: <https://a4ai.org/studies/supporting-diy-networking-from-the-regulator/>

⁷ Find out more: <https://a4ai.org/studies/building-the-infrastructure-for-rural-connectivity/>

"Meaningful connectivity offers a new lens through which we could analyze the quality of women's experiences accessing the Internet and understand their underlying challenges."

I.S.O._ How do the concept and metric of meaningful connectivity challenge the current understanding of the digital gender gap in the world, especially in Latin-American countries?

A.R._ The current understanding of the digital gender gap is limited to the dichotomy between connected and unconnected women and men. In this way, a problem that comes in many shades of gray is reduced to black and white. Different levels of connectivity are associated with different limitations and offer different opportunities. The common understanding that there are only connected and unconnected people ignores this important variation. Meaningful connectivity offers a new lens through which we could analyze the quality of women's experiences accessing the Internet and understand their underlying challenges. There are countries where there is no digital gender gap in Internet access. However, when they are analyzed from the meaningful connectivity perspective, our data show that the gap persists. This applies, for example, to Colombia, where the gap in Internet access between men and women is less than 1% (based on the Web Foundation's women-centered approach),⁸ but the digital gender gap in meaningful connectivity is at 16,9%.⁹ In such cases where there is a gender gap in Internet access, it becomes more noticeable when we observe meaningful connectivity. Thus, the Internet access gap by itself is not conveying how meaningful and empowering it would be for women, in any given country, to have access to the Internet. However, the meaningful connectivity concept and measurement do address that knowledge gap.

I.S.O._ What aspects related to security, privacy, and reliability should be considered in meaningful connectivity policies?

A.R._ In general, we say that a person is meaningfully connected when that person can use the Internet to improve their own life. For the Internet to serve this purpose, there must be technical and technological progress, such as access to smartphones, unlimited access to data, etc. However, connectivity will not fulfil this role if it is unreliable or if it jeopardizes the safety of users. A person's access to the Internet can meet many important technical specifications and still not be meaningful. This occurs, for example, when connection is frequently interrupted by government shutdowns or other politically motivated disruptions. Our meaningful connectivity methodology¹⁰ acknowledges this aspect by including a measurement that captures politically motivated government disruptions. In this sense, policymakers working towards increasing meaningful connectivity must establish regulations which minimize predatory activity online that undermines online privacy, security, and reliability.

⁸ Find out more: <https://webfoundation.org/2020/03/the-gender-gap-in-internet-access-using-a-women-centred-method/>

⁹ Find out more: <http://webfoundation.org/docs/2020/10/Womens-Rights-Online-Report-1.pdf>

¹⁰ Find out more: <https://docs.google.com/document/d/1dA6E91Cutzp8rQSNs0ZoJ6YjCoedM9qaeDZmyOEVZk/edit>

Article II

Harnessing the potential of information and communication technologies for persons with disabilities in Latin America and the Caribbean: challenges and opportunities¹

By Heidi Ullmann², Francis Jones³, Robert Williams⁴ and Deirdre Williams⁵

It is estimated that approximately 7% of people in Latin America and the Caribbean (LAC) are living with a disability (...).

Introduction

The 2030 Agenda for Sustainable Development (United Nations [UN], 2015) makes an explicit call to “leave no one behind” in the path towards sustainable development. This ambitious Agenda that was adopted by United Nations Member States in September of 2015 recognizes the need to promote the social, economic, and political inclusion of persons with disabilities. Although several of the Sustainable Development Goals (UN, 2015) refer specifically to this share of the population, persons with disabilities are prevented from fully enjoying their human rights and participating equally in all aspects of society.

It is estimated that approximately 7% of people in Latin America and the Caribbean (LAC) are living with a disability, representing over 34.5 million individuals (Ullmann et al., 2018). This population is diverse, not only due to the different types of disabilities and their severity, but also with respect to the interaction between the disability status and factors, such as age, gender, race/ethnicity, place of residence and socioeconomic status.

Persons with disabilities face greater poverty, lack of opportunities and access to education and employment, as well as the denial of their economic, social, political, and cultural rights due to the persistence of attitudinal, physical, social, and institutional barriers. These barriers not only adversely affect persons with disabilities, but they also constitute a serious impediment for mainstreaming a rights-based perspective in society and development.

It is important to note that the concept of disability has evolved in recent decades. It went from one that focused on individual deficiencies to one that recognizes that restrictions in participation experienced by this population are a

¹ This text is an edited version of the chapter of the same name in the publication *Accessibility and Technologies: An overview of the access and use of information and communications technologies by persons with disabilities in Brazil and Latin America*. Available at: <https://cetic.br/pt/publicacao/accessibilidade-e-tecnologias-um-panorama-sobre-acesso-e-uso-de-tecnologias-de-informacao-e-comunicacao-por-pessoas-com-deficiencia-no-brasil-e-na-america-latina/>

² Social Affairs Officer in the Social Development Division of the United Nations Economic Commission for Latin America and the Caribbean.

³ Population Affairs Officer in the of the Statistics and Social Development Unit of the ECLAC sub-regional headquarters for the Caribbean.

⁴ Former Associate Information Management Officer of the ECLAC sub-regional headquarters for the Caribbean.

⁵ Consultant for the ECLAC sub-regional headquarters for the Caribbean.

(...) while ICT present a great potential for the reduction of social and economic disparities that affect persons with disabilities, they can also exacerbate pre-existing economic or social inequalities or even create new ones.

result of the interaction between their physical, sensorial, cognitive, and mental limitations and societal and environmental barriers (UN, 2006). In parallel, the changes associated with the rise of the digital and information society have profoundly transformed the way in which people interact with each other.

As noted by the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), between 2003 and 2015 – just a little over a decade – the number of Internet users in the region more than doubled, comprising 54.4% of the population (Economic Commission for Latin America and the Caribbean [ECLAC], 2016). The evidence also indicates, however, that access to the Internet and the use of digital media is not evenly distributed within and between the countries of the region, which leads to the conclusion that the potential benefits of information and communication technologies (ICT)⁶ use are not equally distributed among different populations. This uneven access, as well as other economic and social inequalities, can be exacerbated if there are no adequate policies to guarantee digital access and benefits to all sectors of society. In this article, we argue that while ICT present a great potential for the reduction of social and economic disparities that affect persons with disabilities, they can also exacerbate pre-existing economic or social inequalities or even create new ones. Thus, public policies must actively promote the positive role of new technologies to create opportunities that advance the inclusion of all persons with disabilities in all spheres of daily life.

Empowering persons with disabilities through ICT

A 2008 ECLAC study on disability in the Caribbean noted that “contemporary perspectives on disability hold that disability does not originate with an individual’s physical or mental health, but in the societal restrictions faced as a consequence thereof” (Schmid et al., 2008, p. 12). Thus, a major thrust of research and discussion in the context of the situation of persons with disabilities is to recognize that it is the societal restrictions and barriers that generate the disability and limit the possibilities of full participation. In this regard, the objective then is two-fold – on the one hand to provide tools and empower persons with disabilities to promote their participation on an equal basis with others, and on the other hand, to eliminate the barriers in society that prevent this participation from truly occurring. Information and communications technologies offer tools to advance towards both purposes.

There are myriad ways in which ICT can assist and empower persons with disabilities (Table 1). Different types of technologies can foster access to information, products, and services, including the Internet, mobile phones, and other inclusive devices. Access to information and knowledge can enable persons with disabilities to make better decisions and choices in different spheres of their lives. Through ICT, persons with disabilities are able to exercise their right to freedom of expression and opinion. ICT can also facilitate access to health services, education, and training as well as to work, as well as promote greater participation of persons with disabilities in political and public life, and in cultural, sports, recreational and leisure activities. Thus, these technologies

⁶ For the purposes of this article, ICT refers to any information and communication device or application and its content. This definition encompasses a wide range of access technologies, such as radio, television, mobile phones, computers and network software and hardware (International Telecommunication Union [ITU], 2013).

significantly improve social and economic integration of persons with disabilities in society by enlarging the range of activities available to them, and their ability to participate in a wider range of activities in society and by amplifying their voice. In turn, by promoting the inclusion of persons with disabilities in multiple dimensions of life, ICT can also give greater visibility to persons with disabilities and their positive contributions to society.

Table 1 – POTENTIAL USES OF TECHNOLOGIES FOR THE INCLUSION OF PERSONS WITH DISABILITIES, ACCORDING TO TYPE OF TECHNOLOGY

TYPE OF TECHNOLOGY	POTENTIAL USES FOR PERSONS WITH DISABILITIES
Internet	<ul style="list-style-type: none"> • Websites: online education and training courses, social networking, shopping, banking, and other services • Telework • Telemedicine and e-health
Mobile devices and services	<ul style="list-style-type: none"> • Smartphone and tablets • SMS • Emergency services in voice, text, and sign languages • mHealth applications
TV and services	<ul style="list-style-type: none"> • Interactive multimedia services and applications • Access services: text subtitles, audio subtitles, descriptive video • Sign language interpreting
Software and apps	<ul style="list-style-type: none"> • Sign language interpretation over the web • Chat systems • Accessibility software: screen reading, voice to text, screen typing • Accessible e-books and e-documents • Apps for special education and recreation
Emerging ICT	<ul style="list-style-type: none"> • Smart homes • Wearables • Artificial intelligence • Speech to text, text to speech, text/speech to sign language

Source: ITU (2013).

The Internet, in particular, not only facilitates access to information and information sharing, but also offers opportunities so that society can take part in education and training; in employment search and employment; in e-health tools; in access to government and public services; in consumer and commercial services, such as online shopping and banking services (ITU, 2013). Through the Internet, persons with disabilities can virtually “visit” sites of cultural interest that might otherwise be inaccessible. In turn, mobile devices can have a positive impact on independent living while simultaneously promoting greater interconnectedness between persons with disabilities and those in their lives. An example of this would be mobile phones, which provide a constant means of communication, either through calls or messaging services.

(...) ICT can therefore be an equalizing factor in education and employment, as well as expand opportunities for inclusion in other spheres.

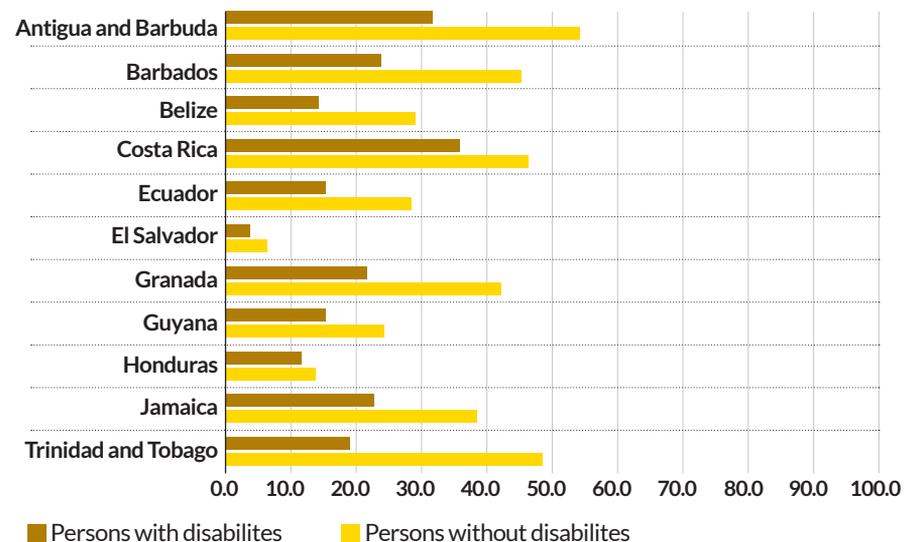
(...) across all countries re-searched, persons with disabilities report using Internet in lower proportions than persons without disabilities (...).

ICT can therefore be an equalizing factor in education and employment, as well as expand opportunities for inclusion in other spheres. However, it is important to note that ICT hold potential, not only for their instrumental value – in overcoming barriers and expanding opportunities for participation of persons with disabilities – but also for perhaps less tangible but equally important aspects of personal development and realization, such as building and maintaining relationships, identity formation, increased control of social situations, overcoming the stigma of disability and feelings of security (Chib & Jiang, 2014).

Quantifying the digital divide: access to and use of ICT among persons with disabilities

Despite the various ways in which ICT can contribute to improve the quality of life and inclusion of persons with disabilities, the extent to which this share of the population in Latin America and the Caribbean has awareness of, access to, and makes use of ICT is unclear. Two important trends can be observed from Graph 1 that presents Internet use by disability status. First, there are notable gaps in Internet usage among the countries of the region. Second, across all countries re-searched, persons with disabilities report using Internet in lower proportions than persons without disabilities, proving that the gaps between the population with and without disabilities are quite large, reaching a twofold difference in some countries.

Graph 1 - USE OF THE INTERNET BY DISABILITY STATUS IN LATIN AMERICA AND THE CARIBBEAN (%)^{7,8}
Age-standardized percentages



Source: Prepared by the authors.

⁷ Based on special tabulations of census data from: Antigua and Barbuda (2011); Barbados (2010); Belize (2010); Costa Rica (2011); Ecuador (2010); El Salvador (2007); Grenada (2011); Guyana (2012); Honduras (2013); Jamaica (2011); Trinidad and Tobago (2011).

⁸ For Honduras and El Salvador, the census inquires about having an email account. This variable is used as a proxy for using Internet. This proxy may underestimate the percentage of persons who use Internet, as those with an email account most probably use Internet, but not all those who use Internet have an email account. The same applies to Table 2 below.

There is also a clear gradient in ICT use among persons with disabilities depending on the severity level they experience. In countries that collect this information, persons with “some difficulty” report using the Internet in similar percentages as persons without disabilities, while a notable drop in use is observed among individuals with “a lot” of difficulty. And there are even lower levels of use among those who cannot do the activity at all. This suggests that efforts to expand ICT use among persons with disabilities should focus on those with more severe limitations.

In addition to the level of severity, Internet use among the population with disabilities also varies by the type of disability a person experiences. Such use tends to be highest among those with visual disabilities, followed by mobility (walking) and hearing limitations. Also, ICT use tends to be lowest among individuals with remembering/concentrating limitations and those who have disabilities associated with communication. Since the population of persons with disabilities is not homogeneous with respect to Internet use, it is therefore important to explore how other socio-demographic characteristics may influence this scenario. The population without disabilities has greater access to and usage of Internet than the population with disabilities, irrespective of sex. For both the population with and without disabilities, the gaps between men and women are more pronounced for use of Internet, rather than access. In addition, between men and women, Internet use tends to be similar or slightly higher among women, independent of disability status.

Table 2 – INTERNET ACCESS AND USE BY DISABILITY STATUS AND SEX IN LATIN AMERICA AND THE CARIBBEAN (%)^{9,10}

Age-standardized percentages

	Access to the Internet in the home				Use of the Internet			
	With disability		Without disability		With disability		Without disability	
	Male	Female	Male	Female	Female	Male	Female	Mulher
Antigua and Barbuda	30.3	33.4	44.5	46.5	25.7	38.2	51.9	57.5
Barbados	42.8	46.2	54.1	59.5	21.0	27.5	42.4	48.4
Belize	7.2	8.9	13.4	14.4	13.8	15.5	29.2	29.3
Bolivia	12.3	13.0	21.6	25.4	-	-	-	-
Costa Rica	28.6	30.4	25.5	28.7	35.9	36.8	39.0	45.8
Ecuador	8.9	9.9	41.4	45.1	15.7	15.8	23.0	26.2
El Salvador	2.3	2.8	3.8	3.9	3.9	4.0	7.5	6.0
Granada	16.0	16.9	35.2	36.2	19.0	24.4	35.7	41.8
Guyana	17.4	21.4	8.6	9.5	13.7	17.7	46.5	50.9
Honduras	6.9	8.3	8.9	9.8	10.5	13.0	13.7	14.4
Jamaica	-	-	-	-	18,6	27,0	13,3	14,1
Mexico	23.2	23.6	14.3	14.6	-	-	-	-
Dominican Republic	14.4	16.4	47.8	48.3	-	-	-	-
Trinidad and Tobago	24.7	28.4	10.4	10.8	18.2	21.2	30.1	27.9
Uruguay	28.7	31.1	14.1	14.7	-	-	-	-

Source: Prepared by the authors.

⁹ This table considers 14 countries for Internet access and 11 countries for Internet use. Based on special tabulations of census data from: Antigua and Barbuda (2011); Barbados (2010); Belize (2010); Bolivia (2012); Costa Rica (2011); Dominican Republic (2010); Ecuador (2010); El Salvador (2007); Grenada (2011); Guyana (2012); Honduras (2013); Jamaica (2011); Mexico (2010); Trinidad and Tobago (2011); Uruguay (2011).

¹⁰ The data presented correspond to the data available from official statistical sources in each country. The hyphen sign (-) in the table indicates cases where data on Internet access or use in the country was not available.

If technology is designed for those without disabilities, then the onus falls on those with disabilities to purchase additional technologies to make them accessible.

Another relevant characteristic to examine is the level of education, which may be associated with Internet access and use through two discrete mechanisms: first, education confers essential skills and abilities that are needed for individuals to benefit from the Internet; second, education is associated with higher income levels, which facilitates access to computers, mobile phones, and Internet connectivity at home. Consequently, Internet use is strongly correlated with level of education, regardless of disability status. In addition, the difference in the level of Internet use between those with and those without disabilities is lower for those with higher levels of education. Approximately 62% of persons with disabilities who achieved tertiary level education report using the Internet, whereas for the population without disabilities with this same level of education the figure is 76%, meaning a difference of 23%. In contrast to this analysis, the discrepancy in Internet use by disability status for individuals without schooling is over 400% higher.

It is also worth mentioning that if an individual is employed, that also likely influences their use of the Internet. As with education level, being employed is likely to be associated with higher income and as stated previously, this may increase the likelihood that an individual will have the financial resources to access and use computers and mobile phones. Also, some individuals may be required to use Internet while at work. And indeed, for working-aged persons with disabilities (18 to 59 years of age) Internet use and access to the Internet at home are higher for those who work, compared to those not in work

Conclusion

Identifying strategies and mechanisms to overcome the exclusion and marginalization experienced by persons with disabilities is essential in order to move towards more equitable societies. In today's digital world the ability to access and convey information and knowledge are key determinants of economic and social inclusion, therefore, ICT are an essential part of a disability-inclusive development agenda. In this sense, having documented the digital divide that affects this share of the population in Latin America and the Caribbean, a first step to devise recommendations to fully exploit the potential of ICT to advance their inclusion, is to consider the reasons why persons with disabilities are not using these technologies.

Availability and affordability are two critical issues. Evidence from the region suggests that people with disabilities are more likely to be poor, unemployed, and living in rural areas (ECLAC, 2013). This combination of circumstances means that access to ICT will be limited by the availability and cost of the device, of the electricity to power the device, and of Internet access, should that be necessary. In this regard, it is important to consider how current and emerging technologies are becoming more accessible, affordable, and relevant for persons with disabilities. However, even when technologies are available and affordable, their design may render them useless for this population. If technology is designed for those without disabilities, then the

onus falls on those with disabilities to purchase additional technologies to make them accessible (MacDonald & Clayton, 2013). There may also be a lag between rate of development of new technology and the much slower rate of development of advances in interfaces for persons with disabilities. Therefore, there is a need to incorporate universal design features in mainstream ICT, so that they incorporate accessibility and functionalities for users from their inception, in order to meet the demands of a wide range of potential users (ITU, 2013). As persons with disabilities increasingly become ICT users and consumers, they can exert pressure so that universal design features are taken into account and ICT developers are more responsive to the accessibility needs of this population (Labrada & Valenzuela, 2013).

But the use of ICT depends not only on availability, affordability, and an accessible design: motivation and skills are also necessary. In other words, there needs to be the desire and the capacity to take advantage of these tools. For persons with disabilities, a major barrier to the use of appropriate ICT tools is a lack of awareness that such tools exist. If this population doesn't know the ICT tools that can contribute to overcome specific challenges, then clearly, it will not adopt them. In this sense, it is important to raise awareness about the potential benefits of using ICT and develop skills for ICT use among persons with disabilities and those in their lives.

Conventional and digital literacy may both be required and lacking, which creates a paradox: research findings point to a continuing shortage of itinerant teachers with the specialized training needed to support persons with disabilities in the use of ICT. The rising levels of education among youth in Latin America and the Caribbean (Trucco & Ullmann, 2015), and among youth with disabilities, is promising in terms of narrowing the digital divide that affects the population with disabilities. Indeed, the statistical evidence presented in this article suggests that the digital divide between persons with and without disabilities decreases with rising levels of education. As education opportunities expand for young people with disabilities, it is also important to promote them to pursue careers in technology, so that they may be directly involved in the creation of these tools, so that these may better respond to their lived experiences and realities.

Although expanding ICT usage among persons with disabilities is a promising strategy to enhance their economic, social, and political integration into society, this article clearly reveals that much remains to be done if the potential of ICT as a vehicle and tool for greater inclusion for persons with disabilities is to be realized. As MacDonald and Clayton note (2013), while ICT have the potential to reduce barriers, they will not ultimately eliminate social exclusion for this share of the population. While these technologies could be important tools for inclusion, they could also perpetuate exclusion, marginalization, and inequalities if they are not designed for all in an accessible manner. Therefore, in order for ICT to fulfil their potential, their design, use, and dissemination must occur in a political context that is strongly committed to the rights and the equalization of opportunities for persons with disabilities. Without this foundation, ICT may well exacerbate the exclusion of this population.

(...) much remains to be done if the potential of ICT as a vehicle and tool for greater inclusion for persons with disabilities is to be realized.

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Interview II

Internet Sectoral Overview (I.S.O.)_ What is the role played by public access points, such as public libraries and telecenters, in promoting digital inclusion, beyond connectivity? How is this challenged by the context of the COVID-19 pandemic?

Dorothy Gordon (D.G.)_ Digital inclusion can be defined as the ability of individuals and groups to access and use digital technologies. UNESCO’s Information for All Programme (IFAP) has as its core mandate a focus on building inclusive and equitable knowledge societies. Recently, discussions around the theme adopted the term “meaningful connectivity”, which, as set out by the Alliance for Affordable Internet, refers to our ability to use the Internet every day using an appropriate device with enough data and a fast connection.

Public access points (PAPs) can serve as important centers of knowledge exchange and skills building. Telecenters, in particular, have been the “go-to” policy solution for delivering relatively low-cost connectivity to underserved communities, especially in remote rural areas in least developed countries (LDCs). In this way, some governments deem that obligations in the area of “right to information” have been fulfilled and progress has been made in digital inclusion. It should be noted that it is relatively rare that these facilities have high speed connections. The logic has been that anything is better than nothing.

In the area of education, PAPs provide schools with a location for children to gain basic skills – unfortunately, often limited to the use of productivity software. When these access points are made accessible in the evenings and on weekends, they also serve as a hub for the community. As a rule, special times do need to be set aside for women in these contexts; otherwise, socio-cultural constraints could interfere with their access.

Apart from larger public libraries, relatively few PAPs have trained librarians and knowledge managers. Generally, the emphasis has not usually been on providing experts who could facilitate and curate local content creation. Therefore, not enough attention or consistent encouragement has been allocated to ensure the creation and availability of locally relevant content authored by individuals and communities. There have also been gaps in providing users with adequate digital literacy skills to navigate an online environment riddled with misinformation, disinformation, hate speech and behavior modification techniques.

When social distancing started to be practiced as a response to the COVID-19 pandemic, the normal use of PAPs was clearly not in line with health protocols. Many libraries and telecenters were empty for months. While this situation is not expected to be permanent, it has revealed a significant need for policy



Dorothy Gordon
Chair of
UNESCO’s
Information for All
Programme (IFAP).

"The health crisis has also proved that community networks play a useful role in providing multi-nodal user-centric access."

adjustment if governments are to provide meaningful connectivity for their populations. In this sense, the pandemic reduced the “anything is better than nothing” logic to just nothing.

In many countries, provision of library services is a statutory right. During the lockdowns, creative librarians, and communities organized outdoor bandwidth, Wi-Fi on wheels, online social interaction, and creation of content in local languages to help people handle the pandemic better. The health crisis has also proved that community networks¹ play a useful role in providing multi-nodal user-centric access. Unfortunately, in some countries the regulatory environment poses challenges for the establishment of these types of networks.

In addition, the COVID-19 pandemic resulted in an exponential increase in the amount of time we spend on the Internet. A larger proportion of government services, including Health, adopted online and hybrid models, which is becoming the norm in both work and education. Remote working and learning models that mix virtual and face-to-face interactions are among the solid reasons why we need to think creatively about digital inclusion for all citizens. For example, failure to access critical health information can result in an increased spread of disease or deaths. In addition, the current systems cannot meet many of the educational needs.

In this scenario, PAPs will continue to have a role, but a radical rethink is needed when it comes to how much priority is given to provide meaningful connectivity to individuals and communities. Quick fixes can be implemented, such as adjusting regulatory environments to accommodate community networks, but not even this will solve our inclusion gap fast enough. A radical rethink requires a truly multi-stakeholder dialogue, including all levels of government. Municipalities and similar local bodies must become informed partners that have a deeper understanding of the opportunity cost of sub-standard access and the importance of locally relevant content. Private sector, civil society and citizens must also renew their commitment to fulfilling their obligations with respect to the rights dimension of UNESCO's Internet Universality Indicators framework² as we work towards achieving sustainable development. Giving individuals greater agency when it comes to their information ecosystems is both a right and an obligation.

I.S.O._ How does the open movement contribute to bridging the digital divides? In this sense, what has been the relevance of open software during the COVID-19 pandemic?

D.G._ As a result of the health crisis, there is an increased awareness about the importance of the free sharing of knowledge in order to find solutions to the world's pressing problems. The transboundary nature of the pandemic has called into question the old rules which largely govern the production,

¹ Find out more: <https://cetic.br/pt/publicacao/year-xiii-n-1-connecting-the-unconnected-in-times-of-crisis/>

² Find out more: <https://en.unesco.org/internet-universality-indicators/roamx-indicators>

movement, and control of information. Therefore, more attention has been given to the open movement, whose main features are free sharing and content exchange.

The model for developing and sharing content finds its origin in open source software (OSS) also known as free and open source software (FOSS), which was initiated in the late twentieth century. In OSS, the source code can be used, reused, adapted, and shared. Solutions are developed, tested, and improved through public collaboration. Globally, many aspiring software developers find that open source software allows them to build skills, understand the inner workings of technology, and subsequently adapt or localize it to the needs of their context. FOSS can accelerate a new product or its prototype by substituting FOSS functionality for another written by the developers or purchased (raising the price of the solution). This stimulates innovation. The involvement of the community means that security flaws are spotted and fixed more quickly than in proprietary solutions. The use of OSS has the potential to move those affected by the digital divide from being consumers of imported technology to being creators of technology that is designed and adapted to their needs.

From its origins in OSS, today's open movement comprises many dimensions: open education, open government, open science, open research, open design, open data, just to name a few. All the iterations of "open" operate under intellectual property regimes that allow users to access, share, re-use and collaborate with technologies and data. In this way, the power of "open" bridges knowledge divides. However, today there are major companies which place proprietary layers over free software.

Much of the Internet backend runs on Linux and other open source software. Open Educational Resources, including the move to textbooks, have made a huge difference in improving access to knowledge and in stimulating classroom innovation. Open research, in turn, makes a strong argument that in cases where research is funded by taxpayers, they should not have to pay again to have access to findings of the research – it should be shared using an open license. Open source has also proved to be of great value in disaster and emergency situations by facilitating user-generated reports to collate and map data. In accordance with the Open COVID pledge,³ launched by a group working to remove obstacles involving intellectual property in the fight against the new coronavirus: "It is a practical and moral imperative that every tool we have at our disposal be applied to develop and deploy technologies on a massive scale without impediment." This excellent initiative is not typical. Proprietary intellectual property regimes continue to operate to the detriment of the most vulnerable, and there is, therefore, room for advocacy around these issues.

The potential of the open movement and, in particular, of OSS to overcome the access, skills, and knowledge dimensions that compose digital divides is

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³ Find out more: opencovidpledge.org

"Open source has also proved to be of great value in disaster and emergency situations by facilitating user-generated reports to collate and map data."

well documented, as is its impact on local innovation systems. Local jobs and businesses are created and there can be significant multiplier effects if government procurement funded by taxpayers goes to these local companies. It offers a real opportunity to reduce dependency and to take leadership in digital transformation.

I.S.O._ Why are accessibility, openness, and diversity imperative to bridge digital divides? Are there other factors that should be considered by policymakers to potentialize the role of technology towards the development of knowledge societies?

D.G._ This question is central to IFAP's mandate. Globally, we need to increase our effort to address the deepening digital divides that have been observed since the start of the pandemic. Historic divides, linked inter alia to gender, poverty, location, literacy, language, and digital skills, have worsened and new dimensions of digital exclusion are now part of our reality. When education moved online, children in rural areas without connectivity, devices, or relevant content were affectively unable to enjoy their right to education. It may take years for them to recover. This situation reflects historic bias, fuels social exclusion, extends the scale and scope of poverty, and sets the stage for social instability. It will not be possible to achieve the Sustainable Development Goals (SDGs)⁴ unless we take concerted action to address these issues.

IFAP provides a platform for policy discussion around inclusive and equitable knowledge societies. This mandate remains even more relevant today than at its inception in 2001. If we take the case of women globally, around 52% remain unconnected, and this percentage is much higher in LDCs. Poverty and illiteracy are major factors in this scenario. Rural women experience worse connectivity levels, but even if the connectivity problem is solved, the content gap will persist, as content on the Internet is predominantly available in the English language. There are very few indigenous languages online and in a format that allows a speaker who is illiterate to access content with ease. This affects women's access to meaningful connectivity to satisfy their information needs, boost their ability to grow businesses and connect to their families and networks.

In general, women form a disproportionately small number of IT professionals. It is estimated that they make up less than 20% of professionals in the field of Artificial Intelligence (AI). AI solutions have demonstrated gender and racial bias linked to the composition of data sets used to train algorithmic models. There are documented cases where this has led to exclusion from job opportunities and stereotyping of all black people as criminals. Thus, AI is also a good example of how the control of technology and, therefore, of our digital lives is in the hands of a small group of com-

⁴ Find out more: <https://sdgs.un.org/en/goals>

panies. There is a general lack of transparency when it comes to algorithms and the bulk of AI patents come from just three countries.

The main lesson, therefore, is that digital inclusion must be at the top of our agenda. The improvement in access, openness, and diversity is important. However, given the scale of digital transformation, a holistic approach with open multi-stakeholder engagement is also required. Digital literacy efforts need to be more systematic and broad-based to improve understanding among all stakeholders. People need to take back control over their information ecosystems by understanding the implications of their digital choices in the context of current data-driven business models and the gratuitous use of behavior modification techniques.

We need good tools for monitoring the impact of technology on our lives and our economies. In this sense, IFAP promotes reflection and debate around the related ethical, legal, and societal challenges through six working groups.⁵ We also support the use of UNESCO's Internet Universality Indicators framework to help gain a better understanding of the changes that are in progress. The indicators address issues such as rights, openness, access to all, multi-stakeholder participation and cross-cutting issues such as gender and legal frameworks. In this way, IFAP supports the implementation of the SDGs and the Secretary-General's Roadmap on Digital Cooperation.⁶

In Article 2, the Universal Declaration of Human Rights⁷ states: "Everyone is entitled to all the rights and freedoms set forth in the Declaration, without distinction of any kind, such as race, color, sex, language." Our online lives should guarantee these rights. If we work together, we can make sure that no one is left behind.

"We need good tools for monitoring the impact of technology on our lives and our economies."

⁵ The six groups are: Information Preservation, Information Literacy, Information for Development, Information Access, Multilingualism online and Information Ethics.

⁶ Find out more: <https://www.un.org/en/content/digital-cooperation-roadmap/>

⁷ Find out more: <https://www.un.org/en/about-us/universal-declaration-of-human-rights>

Far beyond connectivity

The Internet must serve as a means for social and human development, contributing to the construction of an inclusive and non-discriminatory society for the benefit of the entire population. However, overcoming connectivity barriers alone is not enough to take full advantage of the opportunities offered by the Internet. Digital inequalities must also be overcome at the level of network usage, so that it can be enjoyed by all people, regardless of hardware, software, languages, location, or skills.

In the context of the COVID-19 pandemic and the adoption of social isolation measures, Internet usage has become even more vital, whether to communicate or to access essential information, services, and products. Thus, promoting access to and use of accessible, open, diverse, and plural technologies is paramount to mitigate the effects of the current health crisis and ensure access to information.



Accessibility

In face of the new coronavirus, the International Telecommunication Union (ITU) emphasizes that information about COVID-19 must be made available in multiple media, such as telephone, radio, videos, brochures, websites, and chats, broadcast in accessible formats to reach the entire population. Given the importance of the topic, the ITU has developed a toolkit that allows any interested party to carry out a self-assessment to guide the implementation of digital accessibility.¹

On the Web, the low accessibility of websites and services is also a limiting factor that prevents this content from being available to all, especially people with disabilities. To foster the development of a truly accessible Web, the

World Wide Web Consortium (W3C) has developed the Web Content Accessibility Guidelines,² which provide recommendations on how to eliminate Web navigation barriers.

In Brazil, the Web Technologies Study Center (Ceweb.br | NIC.br) carried out a study in 2020 to evaluate Web platforms used for videoconferencing and virtual meetings, focusing on aspects of technology appropriation by users and identification of problems in interaction and interface based on accessibility criteria.³ The research concluded that the available tools need to improve significantly with regard to facilities on interaction and understanding by users. It is therefore essential that companies that develop said platforms adopt Web accessibility standards.

¹ Available at: <https://www.itu.int/pub/D-PHCB-TOOLKIT.01-2021>

² Available at: <https://www.w3.org/TR/WCAG21/>

³ Available at: <https://www.ceweb.br/publicacao/estudo-acessibilidade-ferramentas-videoconferencia/>



Multilingualism and local content

Language is the first aspect for communicating information and knowledge, therefore multilingualism on the Web is important so that more people, including speakers of non-dominant languages, can create and access local content in digital environments. Being able to express oneself and obtain information in one's own language is a fundamental factor in determining who participates in knowledge societies and how intensely. Thus, in addition to the connectivity barrier, another issue to be considered for digital inclusion is access to quality content, created locally and in local languages.

Recognizing the importance of promoting multilingualism, equitable access to information and knowledge, especially in the public domain, UNESCO adopted the Recommendation concerning the Promotion and Use of Multilingualism and Universal Access to Cyberspace in 2003.⁴ The document proposes measures to promote universal access

to digital resources and services, reduce language barriers, and encourage exchanges on the Internet. By fostering the creation and consumption of cultural, scientific, and educational content in local language and digital formats, the aim is to ensure that all cultures can express themselves and navigate on the Internet in their languages. Given the relevance of accessing information in the context of the COVID-19 pandemic, it is of utmost importance that accurate information about the disease is available both online and offline in several languages, including indigenous. In this sense, indigenous knowledge and cultures must be considered when creating informative and pedagogical materials, in order to ensure access to information at the local level. To assist in this task, UNESCO has organized an online repository⁵ with various materials aimed at producing relevant content on COVID-19 in different languages, raising awareness of the importance of multilingualism.

Domain Report

Domain registration dynamics in Brazil and around the world

The Regional Center for Studies on the Development of the Information Society (Cetic.br), department of the Brazilian Network Information Center (NIC.br), carries out monthly monitoring of the number of country code top-level domains (ccTLD) registered in countries that are part of the Organisation for Economic Co-operation and Development (OECD) and the G20.¹ Considering members from both blocs, the 20 nations with highest activity sum more than 88.94 million registrations. In June 2021, domains registered under .de (Germany) reached 16.99 million, followed by China (.cn), the United Kingdom (.uk) and Netherlands (.nl), with 9.74 million, 9.70 million and 6.20 million registrations, respectively. Brazil had 4.79 million registrations under .br, occupying 6th place on the list, as shown in Table 1.²

⁴ Available at: <https://en.unesco.org/recommendation-multilingualism>

⁵ Available at: <https://en.iyl2019.org/all-resources/covid-19-pandemic-language-matters/>

¹ Group composed by the 19 largest economies in the world and the European Union. More information available at: <https://g20.org/>

² The table presents the number of ccTLD domains according to the indicated sources. The figures correspond to the record published by each country, considering members from the OECD and G20. For countries that do not provide official statistics supplied by the domain name registration authority, the figures were obtained from: <https://research.domaintools.com/statistics/tld-counts>. It is important to note that there are variations among the reference periods, although the most up-to-date data for each country is compiled. The comparative analysis for domain name performance should also consider the different management models for ccTLD registration. In addition, when observing rankings, it is important to consider the diversity of existing business models.

/Internet Sectoral Overview

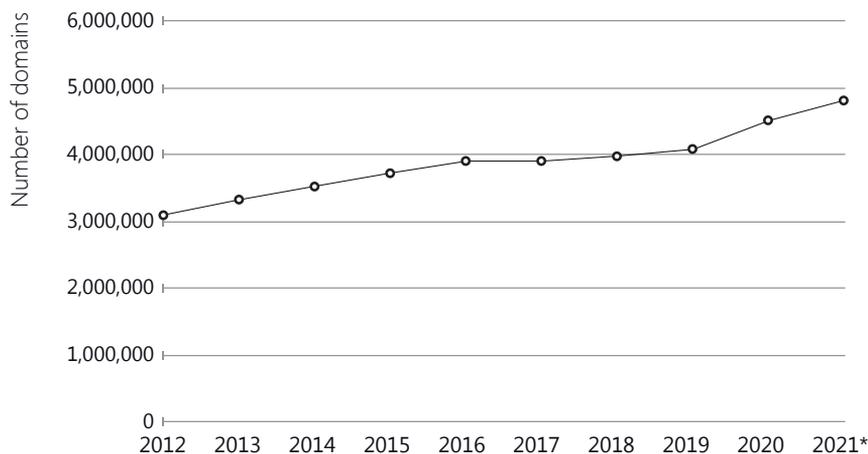
Table 1 – TOTAL REGISTRATIONS OF DOMAIN NAMES AMONG OECD AND G20 COUNTRIES

Position	Country	Number of domains	Date of reference	Source (website)
1	Germany (.de)	16,991,253	05/07/2021	https://www.denic.de
2	China (.cn)	9,749,825	05/07/2021	https://research.domaintools.com/statistics/tld-counts/
3	United Kingdom (.uk)	9,703,171	01/06/2021	https://www.nominet.uk/news/reports-statistics/uk-register-statistics-2021/
4	Netherlands (.nl)	6,200,399	05/07/2021	https://api.sidn.nl/rest/counters/domains
5	Russia (.ru)	4,967,278	05/07/2021	https://cctld.ru
6	Brazil (.br)	4,799,658	05/07/2021	https://registro.br/dominio/estatisticas/
7	France (.fr)	3,811,831	05/07/2021	https://www.afnic.fr/en/observatory-and-resources/statistics/
8	European Union(.eu)	3,640,479	05/07/2021	https://research.domaintools.com/statistics/tld-counts/
9	Italy (.it)	3,431,438	05/07/2021	http://nic.it
10	Australia (.au)	3,342,038	05/07/2021	https://www.auda.org.au/
11	Canada (.ca)	3,154,357	05/07/2021	https://www.cira.ca
12	Colombia (.co)	3,113,663	05/07/2021	https://research.domaintools.com/statistics/tld-counts/
13	Poland (.pl)	2,528,410	05/07/2021	https://research.domaintools.com/statistics/tld-counts/
14	India (.in)	2,500,751	05/07/2021	https://www.dns.pl/en/
15	Switzerland (.ch)	2,425,259	15/06/2021	https://www.nic.ch/statistics-data/domains_ch_monthly.csv
16	Spain (.es)	1,977,426	10/06/2021	https://www.dominios.es/dominios/en
17	Belgium (.be)	1,727,592	05/07/2021	https://research.domaintools.com/statistics/tld-counts/
18	United States (.us)	1,700,800	05/07/2021	https://research.domaintools.com/statistics/tld-counts/
19	Japan (.jp)	1,645,987	01/07/2021	https://jprs.co.jp/en/stat/
20	Sweden (.se)	1,533,821	05/07/2021	https://internetstiftelsen.se/en/domain-statistics/growth-se/?chart=active

Collection date: July 05, 2021.

Graph 1 shows the performance of .br since 2012.

Graph 1 – TOTAL DOMAIN REGISTRATIONS FOR .BR – 2012 to 2021*



*Collection date: July 05, 2021.

Source: Registro.br

Retrieved from: <https://registro.br/dominio/estatisticas/>

In June 2021, the five generic Top-Level Domains (gTLD) totaled more than 186.65 million registrations. With 155.85 million registrations, .com ranked first, as shown in Table 2.

Table 2 – TOTAL NUMBER OF DOMAINS AMONG MAIN gTLD

Position	gTLD	Number of domains
1	.com	155.853.026
2	.net	13.397.629
3	.org	10.466.163
4	.info	3.885.510
5	.xyz	3.048.490

Collection date: July 05, 2021.

Source: DomainTools.com

Retrieved from: research.domaintools.com/statistics/tld-counts

USE OF ICT IN THE COVID-19 PANDEMIC

In addition to the dichotomy of having or not having access to ICT, digital inequalities are also characterized by the conditions under which technologies are used. In this regard, the type of connection and device used can also influence the performance of online activities, and, therefore, the opportunities that result from such use.

Following we present data collected in third edition of the ICT Panel COVID-19¹ on the devices and types of connection used by Internet users² during the health crisis in Brazil.

Device used for Internet access

Internet users aged 16 years or older (%)

COMPUTER ONLY



INTERNET USERS (TOTAL): 1%

BY SOCIAL CLASS:

AB **2%**
C **1%**
DE **2%**

MOBILE PHONE ONLY



INTERNET USERS (TOTAL): 40%

BY SOCIAL CLASS:

AB **11%**
C **44%**
DE **74%**

BOTH



INTERNET USERS (TOTAL): 58%

BY SOCIAL CLASS:

AB **87%**
C **55%**
DE **23%**

Type of connection used for Internet access via mobile phones

Mobile phone Internet users aged 16 years or older (%)

3G OR 4G ONLY



INTERNET USERS (TOTAL): 5%

BY SOCIAL CLASS:

AB **1%**
C **5%**
DE **12%**

WI-FI ONLY



INTERNET USERS (TOTAL): 21%

BY SOCIAL CLASS:

AB **9%**
C **25%**
DE **30%**

BOTH



INTERNET USERS (TOTAL): 74%

BY SOCIAL CLASS:

AB **91%**
C **70%**
DE **57%**

¹ The objective of the ICT Panel COVID-19 is to collect information on Internet use during the novel coronavirus pandemic. Available in: <https://cetic.br/en/pesquisa/tic-covid-19/>

² Internet users are individuals who used the Internet at least once in the three months prior to the interview, according to the methodological recommendation of the International Telecommunication Union (ITU).

/Credits

TEXT

ARTICLE I

Fabio Senne (Regional Center for Studies on the Development of the Information Society – Cetic.br | NIC.br)

ARTICLE II

Heidi Ullmann, Francis Jones, Robert Williams and Deirdre Williams (Economic Commission for Latin America and the Caribbean – ECLAC)

FAR BEYOND CONNECTIVITY

Javiera F. M. Macaya and Tatiana Jereissati (Cetic.br | NIC.br)

DOMAIN REPORT

José Márcio Martins Júnior (Cetic.br | NIC.br)

GRAPHIC DESIGN AND PUBLISHING

Giuliano Galves, Klezer Uehara and Maricy Rabelo (Comunicação | NIC.br)

ENGLISH REVISION AND TRANSLATION

Letralia

PORTUGUESE PROOFREADING AND REVISION

Mariana Tavares

EDITORIAL COORDINATION

Alexandre Barbosa, Tatiana Jereissati and Javiera F. M. Macaya (Cetic.br | NIC.br)

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Fabio Senne (Cetic.br | NIC.br)
Heidi Ullmann, Francis Jones, Robert Williams and e Deirdre Williams (CEPAL)
Ana María Rodríguez Pulgarín (Alliance for Affordable Internet – A4AI)
Dorothy Gordon (UNESCO's Information for All Programme – IFAP)

* The ideas and opinions expressed in the texts of this publication are those of the respective authors and do not necessarily reflect those of NIC.br and CGI.br



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