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Brazil

Principle Addressed**Project Name****Location****Date****Partners**

Real time monitoring of public schools' connectivity

Connected Education Internet Measurement System

Brazil

2017-present

Brazilian Network Information Centre (Nic.br)

Brazilian Ministry of Education (MEC)

Cost

This system was funded by the Brazilian Network Information Centre ([NIC.br](http://nic.br)) through its Center for Studies and Research in Network Technology and Operations (Ceptro.br), in partnership with the Regional Center for Studies on the Development of the Information Society (Cetic.br). In addition, [Lemann Foundation](http://lemannfoundation.org) provided in-kind contribution by conducting the implementation of a pilot project and by training educators and educational managers to use the resources.

Situation/Challenge

Whilst 70 per cent of schools in Brazil have internet access, 58 per cent are limited to speeds of 2 mbps (*CIEB*). Of the 155,026 (*School Census 2019*, *INEP*, *Brazilian Ministry of Education*) primary and secondary schools in Brazil, 86 per cent are public schools. Of these, 29 per cent of primary schools and 61 per cent of secondary schools have internet access available for students (INEP, 2020). Despite the growth in fiber optic connections, with 26 per cent of urban schools connected that way, radio is still necessary for connection in 19 per cent of rural schools (*CIEB*), particularly those in the Amazon remote regions. The main obstacle to rural connectivity remains the fact that it is difficult to ensure high quality connectivity without the use of fiber, particularly as the use of satellite connectivity is still rare.

Brazil still faces challenges in implementing policies that foster the access to, and the use of, digital technologies in public schools, as well as measuring the effectiveness of these policies in the teaching and learning processes. Investing in ICT projects in education is a key strategy that has been adopted by the Brazilian Ministry of Education to face existing connectivity challenges and to bridge the digital gap regarding access to the Internet in public schools, as well as to promote the development of digital skills. However, the size of the primary and secondary school system represents a major challenge: Brazil has more than 34 millions students and almost 2 million teachers (*School Census 2019*).

Aim of Project

To monitor the internet quality at public schools to ensure that schools are receiving the recommended speed defined by PIEC, and to provide policymakers and education actors with real time data on the quality of internet connection offered by ISPs.

The project aims to support the universalization of high-speed internet access and encourage the pedagogical use of digital technologies in basic education policy.



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Project Details

The Connected Education Internet Measurement System was built upon the [SIMET](#) system developed by Ceptro.br, and works both as a measurement and data collection tool. The system, also called a measurement agent, can be installed simultaneously in several computers, including those used by students for pedagogical activities. The measurement agent allows evaluation of the quality of connection by focusing on four main metrics: 1) download and upload speed; 2) Round Trip Time (RTT of bidirectional latency); 3) packet loss; and 4) jitter, which is a variation of latency. The system performs automatic measurements and periodically updates a [data visualization portal](#) allowing policymakers, the educational community, researchers and society in general to access a wide range of datasets. Live data is refreshed every 30 minutes. In addition to the visualizations of monitoring data, the platform allows the georeferencing of participating schools, cross referencing information from structured administrative datasets from the INEP School Census.

Results

As of July 2020, the measurement agent had been installed in more than 22,000 public schools in 3,553 out of 5,572 municipalities, and since November 2018 there have been in the region of 8.1 million unique measurements captured (*Nic.br*).

Data collected by the system provides a complete picture of schools' connectivity for policymakers and educators at different administrative levels – federal, state or municipal. The data reveals existing inequalities of Internet access across and within Brazilian states.

The cross-reference of the connectivity data from the Connected Education Internet Measurement System with the data provided by the National School Census from INEP allows for further analysis on the spread of broadband. The concept of quality of Internet connection is traditionally related to the characteristics of the network (speed, upload and download, availability via latency and packet loss). However, it is also necessary to consider user needs and perception of quality. In this regard, future enhancements to the system could include functionalities that allow policymakers to establish relationships between connectivity data and pedagogical activities mediated by ICTs.

