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ICT in Education

SURVEY ON THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN BRAZILIAN SCHOOLS

2024

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Brazilian Network Information Center

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2024

Brazilian Internet Steering Committee
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São Paulo
2025

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Foreword

A successor to Arpanet, the Internet was maintained in its first decades by research funds, such as the National Science Foundation (NSF) in the United States, and by the institutions connected to it. Throughout this period—which lasted until the mid-1990s—the Internet was used mainly for the communication of supercomputing centers and universities, without aiming for self-sustainability. With its widespread dissemination more than three decades later, we can say that the Internet has become mature, and is made up of a very complex ecosystem structured on layers of physical infrastructure, connection protocols, and a wide range of applications.

This maturation process, in addition to the search for Internet sustainability, has involved technical challenges of scalability and security, in addition to interaction with political and regulatory bodies. It has gone through many stages and an extensive multisectoral and international effort to define Internet governance arrangements that are capable of balancing diverse interests and guaranteeing stability, interoperability, and expansion. In the Brazilian case, the establishment of multisectoral, democratic, and collaborative governance was solidified with the creation of the Brazilian Internet Steering Committee (CGI.br) and the institutionalization of the Brazilian Network Information Center (NIC.br), which includes Registro.br, responsible since 1989 for registering domain names with the "last name" .br. In this way, it was possible to guarantee not only the Internet governance framework, already defined by Standard 4 of 1995, but also self-sufficiency in the technical management of names and numbers, making it possible to reinvest in the expansion and improvement of the Internet infrastructure in Brazil.

In addition to managing the registration and publication of .br domain names, and allocating autonomous system numbers (ASN) and Internet protocol (IP) addresses in versions 4 and 6, it carries out a number of other actions, all linked to the promotion of fundamental values for the Internet, such as integrity, interoperability, and accessibility.[1] These actions include supporting research centers with funds from Registro.br, holding national and international events, and promoting actions aimed at expanding the infrastructure and protecting users on the Internet, always with the goal of making the Internet increasingly accessible and safe. Another fundamental aspect is CGI.br's role in fostering constant and careful dialogue about the use of the Internet by individuals, enterprises, and the government.

[1] More information at https://principios.cgi.br/sobre

While technological advances bring countless possibilities, it is also true that new challenges need to be faced collectively if the Internet's guiding principles are to be preserved. In recent years, for example, the growing adoption of mobile devices and Artificial Intelligence (AI) technologies by individuals and organizations has brought to the fore issues such as privacy and data protection, the proliferation of false or misleading content, and the potentially harmful excessive use of digital devices by children. Several events promoted by NIC.br in 2024 addressed these issues, enabling multisectoral reflections anchored in data. Some examples are the 15th edition of the Seminar on Privacy and Personal Data Protection,[2] the 9th Symposium on Children and Adolescents on the Internet,[3] and the seminar launching the Brazilian Artificial Intelligence Observatory (OBIA),[4] which operates under NIC.br.[5]

It is also worth highlighting the participation of CGI.br and the collaboration of NIC.br in various G20 initiatives during Brazil's presidency in 2024. To contribute to the debate on the digital economy, the Regional Center for Studies on the Development of the Information Society (Cetic.br)—a department of NIC.br dedicated to the production of indicators and analyses—has been active in the production of three reports on topics considered to be priorities by the G20 that are fundamental to the dialogue on technology and society. These publications had important international organizations as partners: the United Nations Educational, Scientific and Cultural Organization (UNESCO), the International Telecommunication Union (ITU), and the Ministries of Science, Technology and Innovation (MCTI) and Communication (MCom). The first summarizes indicators on the state of AI development in the G20 countries,[6] while the second focuses on the adoption of AI in public services.[7] The third proposes a framework for the international measurement of meaningful connectivity.[8]

Cetic.br|NIC.br is also responsible for a series of other publications that provide a detailed overview of the use of information and communication technologies (ICT) by individuals and organizations in Brazil. In addition to publishing research on ICT adoption in different segments, such as households, enterprises, governments, education, and health, the Center conducts sectoral and cross-cutting studies with a national scope on topics such as meaningful connectivity, AI in health, privacy and data protection, and electronic waste.

In 2025, Cetic.br|NIC.br celebrates two decades of work dedicated to producing reliable indicators and analysis on the use of ICT in Brazil. Over these 20 years, it has established itself as a national and international benchmark in the generation of comparable data, which provides important input for policymaking, the development of academic research,

[2] More information at https://seminarioprivacidade.cgi.br/

[3] More information at https://criancaseadolescentesnainternet.nic.br/

[4] More information at https://seminarioobia.nic.br/

[5] More information at https://obia.nic.br/

[6] More information at https://cetic.br/pt/publicacao/toolkit-para-avaliacao-da-prontidao-e-da-capacidade-em-inteligencia-artificial/

[7] More information at https://cetic.br/pt/publicacao/mapeando-o-desenvolvimento-a-implantacao-e-a-adocao-de-ia-para-aprimorar-servicos-publicos-entre-os-membros-do-g20/

[8] More information at https://cetic.br/pt/publicacao/conectividade-universal-e-significativa-um-marco-referencial-para-indicadores-e-metricas/

and strengthening the multisector debate on digital transformation. Its commitment to methodological rigor and excellence in the production of knowledge has strengthened its position with international organizations, governments, and civil society, making it an important pillar in building a more inclusive and sustainable digital environment.

The publication you have before you is part of this trajectory and reflects the conceptual and methodological knowledge of Cetic.br|NIC.br. In it, you will find essential data and evidence to understand how Brazilian society has been appropriating these technologies over the last two decades, a period marked by significant advances and complex challenges emerging from the digital age. This celebration is not only an institutional milestone, but also an invitation to reflect together on the future of ICT research and the role of data in building policies and strategies for a connected and informed society.

Enjoy your reading!

Demi Getschko
Brazilian Network Information Center - NIC.br

Presentation

Throughout 2024, the Brazilian Internet Steering Committee (CGI.br), in conjunction with the Brazilian Network Information Center (NIC.br), actively participated in national and international debates on the challenges for the governance of the digital environment, reaffirming its commitment to an inclusive and sustainable future for Brazil and the world. In particular, it is worth highlighting the NetMundial+10 Conference,[1] held in April 2024 by CGI.br. The Conference has established itself as a multisectoral platform for dialog on the challenges of Internet governance in a scenario in which digital technologies profoundly transform social, economic, cultural, informational, and political relations. The meeting culminated in the document *NetMundial+10 Multistakeholder Statement: Strengthening Internet governance and digital policy processes*,[2] which has become a reference on global agendas.

Also in 2024, during its presidency of the G20, Brazil took on a leading role in promoting sustainable development, social inclusion, and the reform of global governance. With a focus on reducing inequalities and fighting hunger and poverty, the country promoted debates on the energy transition, climate change, and key issues related to the digital economy. Brazil's chosen priorities in the G20 Digital Economy Working Group (DEWG) also reflect its commitment to a more inclusive and sustainable digital economy, including topics such as meaningful universal connectivity, advancing digital government and digital public infrastructures, promoting information integrity and a more secure digital environment, and Artificial Intelligence (AI) for sustainable development and reducing inequalities.

With the prominent and collaborative work of the Ministries of Science, Technology and Innovation (MCTI), Communications (MCom), Management and Innovation in Public Services (MGI), and the Social Communication Secretariat of the Presidency of the Republic (Secom), these priorities were considered strategically, in line with the challenges of the digital economy. NIC.br and CGI.br played an important role in several of these activities, contributing their technical expertise and commitment to multisectoral Internet governance, such as the leadership of the Regional Center for Studies on the Development of the Information Society (Cetic.br), a department of NIC.br, in three publications related to the priority themes.[3]

[1] More information at https://netmundial.br/

[2] The Statement can be accessed at https://netmundial.br/pdf/NETmundial10-MultistakeholderStatement-2024.pdf

[3] *Toolkit for Artificial Intelligence Readiness and Capacity Assessment*; *AI for enhanced public services in the G20 members: Artificial Intelligence for inclusive sustainable development and inequalities reduction*; and *Universal and meaningful connectivity: A framework for indicators and metrics*.

At the same time as the international meetings, the 5th National Conference on Science, Technology and Innovation (CNCTI) was held in Brasilia. The meeting, which was open and participatory, was attended by more than 2,500 representatives from civil society, academia, the technical community, international organizations, and the Brazilian government, representing a space for social dialogue and proposing public policies. On that occasion, the Brazilian Artificial Intelligence Plan (PBIA) was launched,[4] which, under the coordination of the MCTI, aims to realize the Brazilian project of technological autonomy, increasing the competitiveness of the national economy, and stimulating the responsible use of AI. As one of their contributions to the issue, NIC.br and CGI.br organized the 1st Seminar of the Brazilian Artificial Intelligence Observatory (OBIA),[5] an integral part of the PBIA, which plays an essential role in producing and disseminating data and studies on the adoption and use of AI-based systems in the country.

To support these debates and monitor the achievement of the commitments made, the availability of data and indicators is essential to map the socioeconomic implications of the adoption of digital technologies by different sectors of society. With two decades of regular production of reliable and internationally comparable statistical data, as well as dissemination of studies and analyses on the impacts of digital technologies on society, Cetic.br|NIC.br has many reasons to celebrate. Its commitment to excellence and methodological rigor in the production of quality data has ensured recognition and influence among public policymakers and international organizations linked to the ecosystem of indicators and statistics. In addition, Cetic.br|NIC.br maintains ongoing cooperation with civil society, the academic community, national statistical offices, and important international organizations such as the Organisation for Economic Co-operation and Development (OECD), the International Telecommunication Union (ITU), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Conference on Trade and Development (UNCTAD), the World Health Organization (WHO), the United Nations Children's Fund (UNICEF), and the United Nations Statistics Division (UNSD).

In this context, and in celebration of the 20th anniversary of Cetic.br|NIC.br, this publication offers valuable inputs for building accessible, relevant, and qualified knowledge, which is essential for informing debates and decisions on the country's digital transformation. Through the production of data and evidence as fundamental pillars, we seek not only to understand the challenges of the present, but also to pave the way for a more equitable and secure future for the next generations.

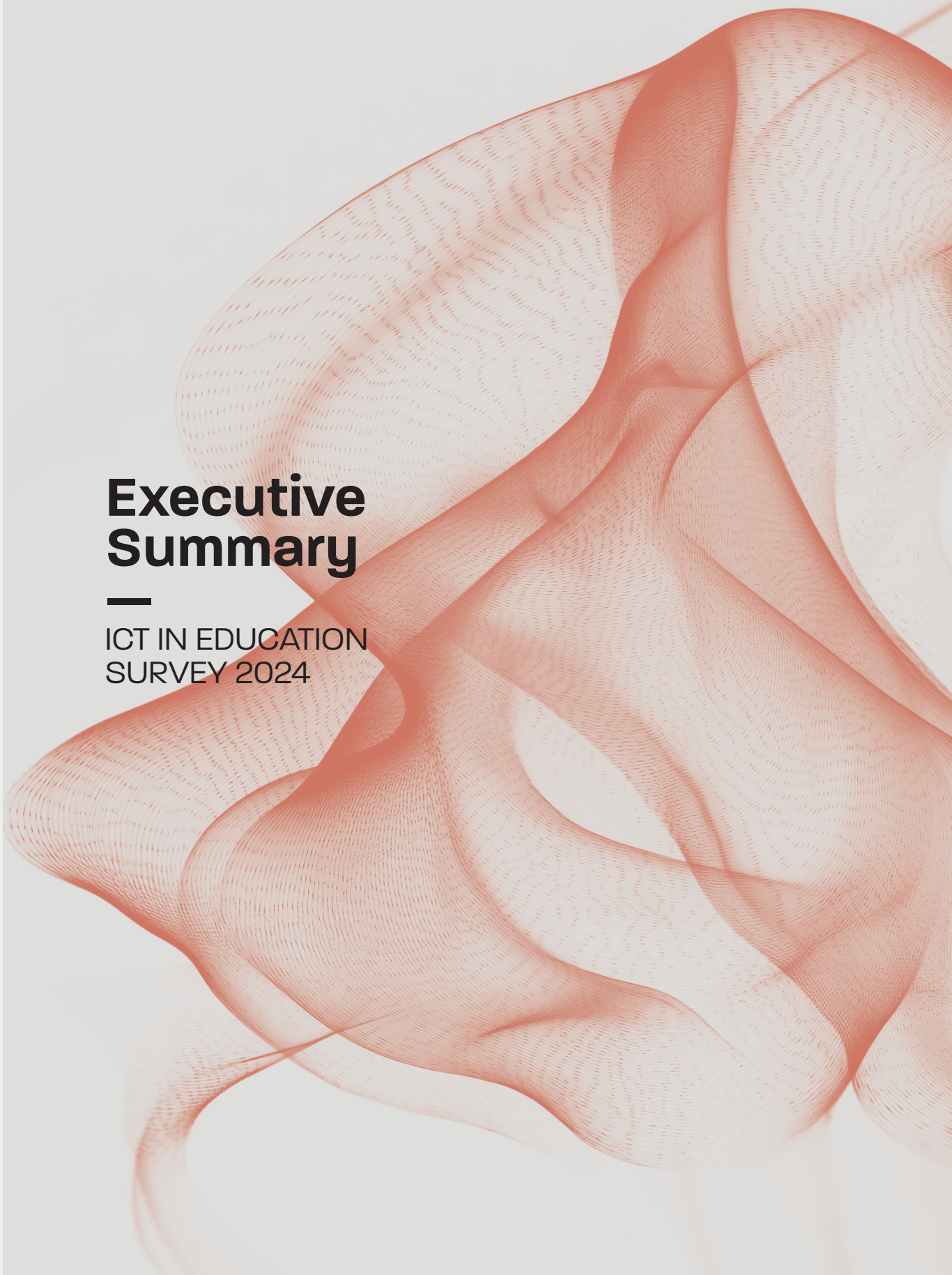
Renata Vicentini Mielli
Brazilian Internet Steering Committee – CGI.br

[4] More information about PBIA is available at https://www.gov.br/lncc/pt-br/assuntos/noticias/ultimas-noticias-1/plano-brasileiro-de-inteligencia-artificial-pbia-2024-2028

[5] OBIA can be accessed at https://obia.nic.br/

Executive Summary

ICT IN EDUCATION
SURVEY 2024



Executive Summary ICT in Education 2024

Law No. 15.100 was enacted on January 13, 2025, and CNE/CEB Resolution No. 2 was published on March 21, 2025, with the goal to offer digital education and restrict the use of personal digital devices by students in school environments. They introduced new practices related to the use of digital technologies in educational activities in Brazil. According to data from the 2024 edition of the ICT in Education survey,[1] restrictive or reduced use measures were already evident in the data on the adoption of digital resources with students before this period.

75% OF STUDENTS WHO USED THE INTERNET SAID THEY ACCESSED IT AT SCHOOL

Connectivity and use of digital technologies

According to the survey, 75% of Internet users accessed the Internet at school, and 55% of them said they used the institution's computers, including tablets (21%), desktops (38%), and laptops (42%). Among state school students, the use of school tablets grew between the 2022 and 2024 editions of the study, from 5% to 32%.

At the same time as the data indicates widespread access by students to connectivity resources, it also points to inequalities: 29% of students in the North region and 31% of those in the Northeast region accessed the Internet at school via a computer belonging to the institution, a proportion that was 54% in the Center-West, 64% in the Southeast, and 87% in the South.

Between the 2020 and 2024 editions of the survey, the proportion of schools with Internet access increased, especially in municipal schools located in the North and Northeast and in rural areas. However, a smaller proportion of institutions (62%) had digital devices for use by students in educational activities, such as in municipal schools (51%) and those located in rural areas (33%).

Of all the schools, 59% had at least one school space with Internet access and at least one computer for students to use in educational activities (Chart 1). Between the 2020 and 2024 editions, the classroom was the school space that showed the highest levels of growth in the proportion of schools with Internet access, rising from 68% to 88% of all schools.

However, while the proportion of public schools with Internet access available for students to use in the classroom showed an upward trend between the 2020 and 2024 editions of the survey, in private schools these proportions fell from 70% to 52% (Chart 2).

Mediating the use of digital devices by students

According to the 2022 edition of the ICT in Education survey, 55% of students who

[1] Data collection for the 2024 edition of the ICT in Education survey took place between August 2024 and March 2025, mainly covering the period prior to the enactment of Law No. 15.100/2025 by the Ministry of Education (MEC).

used the Internet accessed it at school via their personal mobile phones. In the 2024 edition, this proportion decreased to 45%. The greatest differences in the proportions of students using mobile devices between the two editions of the study were observed among students in municipal, private, and rural institutions.

Concerning the implementation of restrictive measures by schools, between the 2023 and 2024 editions of the survey, the proportion of institutions that did not allow students to use mobile phones increased (from 28% to 39%). The proportion of those that allowed use in certain locations and at certain times decreased (from 64% to 56%). A greater proportion of schools that did not allow the use of the device was observed among municipal and private institutions, as well as those catering to students up to primary education (Chart 3).

These findings were also reflected in the activities carried out during the lessons. Discussions promoted by teachers regarding the rules for the use of personal mobile phones on school premises were mentioned by a large number of students, especially those in lower secondary education (89%) and upper secondary education (92%).

Adoption of digital services in school surveys

The data collected from the students also showed intense use of digital resources in learning activities outside the school environment. Of all the students, 86% said they had searched for information on the Internet about a subject they did not understand well, and 84% had searched the Internet to carry out schoolwork.

Research into the resources used in these activities revealed changes in the way students access information. Although most students still used search engines (74%), video channels or apps had also come to play an important role in students' information habits (72%). Video apps were used by 76% of students in lower secondary education and 89% in the upper secondary education.

72% OF STUDENTS WHO ARE INTERNET USERS HAD ADOPTED VIDEO APPS AS SOURCES OF INFORMATION FOR SCHOOL RESEARCH

The widespread use among students of social networks, video channels or apps, and generative AI platforms as sources of information makes the provision of digital and media educational activities in schools even more relevant. In the 2024 edition of the survey, 47% of students said that their teachers had taught them to check the accuracy

BOX 1

—

ADOPTING GENERATIVE AI IN EDUCATIONAL ACTIVITIES

In addition to searching for information on Internet search engines and video applications, 37% of students also mentioned using generative Artificial Intelligence (AI) platforms to do research for educational activities. Among secondary education students, this proportion reached 70%. Of all the teachers, 43% used generative AI to prepare didactic content. However, the inclusion of topics on the critical use of these technologies in the curriculum was not yet widespread, according to the survey data. Of all the students, 33% said that their teachers had taught them how to identify errors and biases in content produced using AI systems, and 19% said that their teachers had talked to them about how to use generative AI applications in school activities — 32% among upper secondary school education students (Chart 4).

CHART 1

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Schools with computers and Internet access for student use, by area and administrative jurisdiction (2020–2024)

Total number of primary and secondary education schools (%)

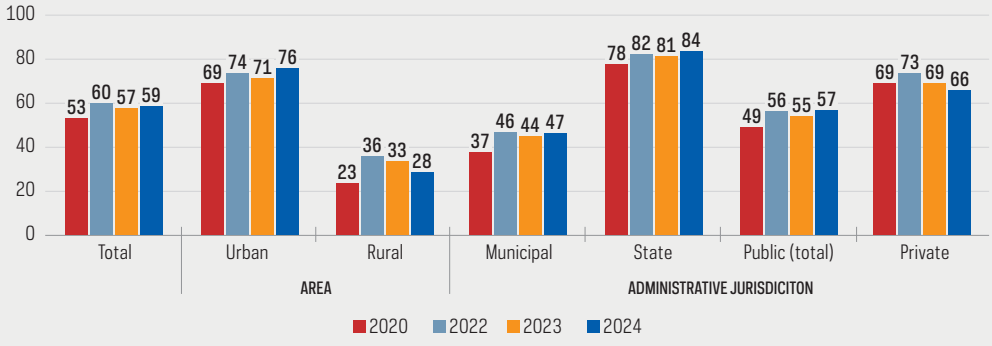

CHART 2

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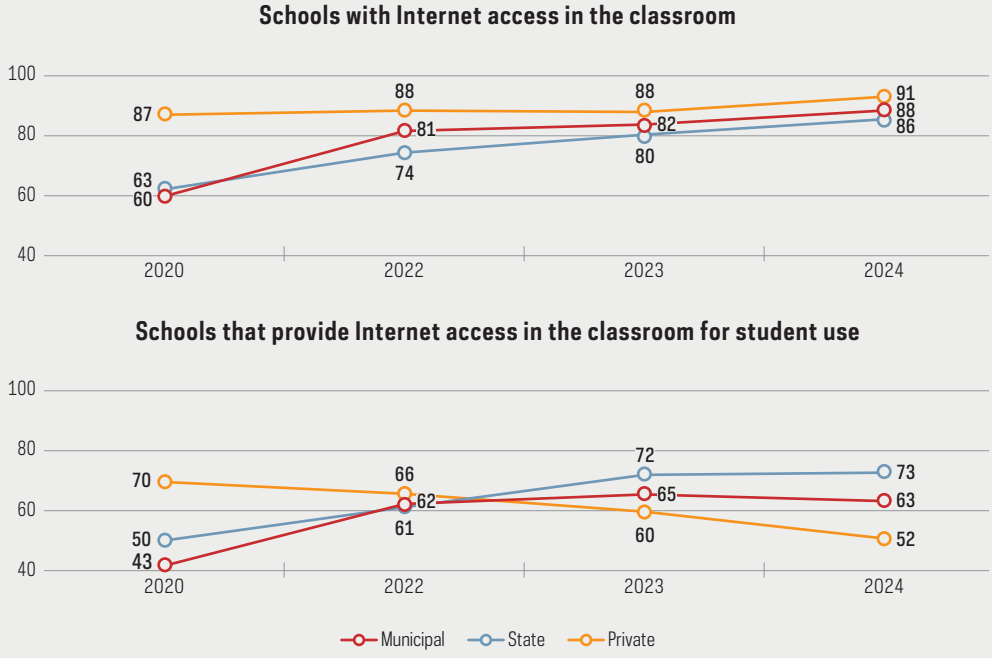
Schools with Internet access, by presence of Internet access in the classroom and availability of access for students in educational activities, and administrative jurisdiction (2020–2024)

Total number of primary and secondary education schools with Internet access (%)



of information and news on the Internet, and 35% said that their teachers had asked them to compare information on different sites.

Digital education

According to 89% of directors of studies, in the 12 months prior to the survey, the school where they worked promoted activities with students on the safe, responsible, and critical use of the Internet. The topics most mentioned by the directors of studies whose schools offered activities for students were cyberbullying, hate speech, and discrimination on the Internet (86%).

Other issues, such as physical and mental health problems caused by the use of digital technologies (77%) and Internet exposure, harassment, or dissemination of images without consent (75%), were also mentioned in relevant proportions. On the other hand, topics related to privacy, data protection, AI, and algorithms were mentioned to a lesser extent.

Also, according to the directors of studies whose schools offered digital education activities to students, 54% said that these topics were addressed in multiple subjects in the curriculum, 7% said that they were addressed in one specific subject, and 9% said they were addressed via extracurricular activities. Furthermore, 30% of the directors of studies said that these activities were carried out only when it was necessary to address these topics, such as when students had questions or when they encountered sensitive situations on the Internet.

Survey methodology and access to data

Carried out annually since 2010, the ICT in Education survey investigates access to, use of, and appropriation of information and communication technologies (ICT) by educational communities, especially students and teachers, in teaching and learning activities and in school management.

Data collection for the ICT in Education 2024 survey took place between August 2024 and March 2025 using the computer-assisted personal interviewing (CAPI) technique. A total of 10,756 interviews was carried out in 1,023 primary and secondary education schools, both public and private, located in urban and rural areas. Among the school community, 7,476 students in the 4th year of primary education to the 3rd year of secondary education, 1,462 teachers, 864 directors of studies, and 954 school managers were interviewed. The results of the ICT in Education survey, including tables of proportions, total values, and margins of error, are available on the website (https://www.cetic.br/en/). The "Methodological Report" and the "Data Collection Report" can be accessed both in the printed publication and on the website.

CHART 3

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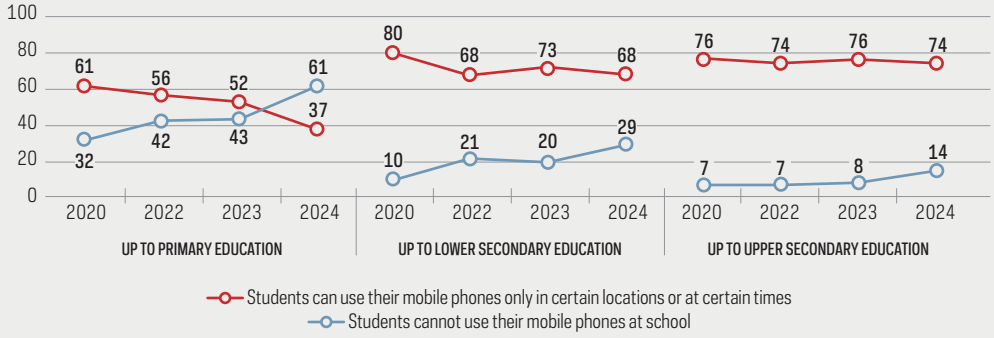
Schools by criteria for students' use of mobile phones at school and highest level of education offered (2020–2024)

Total number of primary and secondary education schools (%)



Among upper secondary school students who sought information for school research...

89%	88%	72%	70%
used video channels or apps	used search engines	searched for information on websites	adopted generative AI tools

CHART 4

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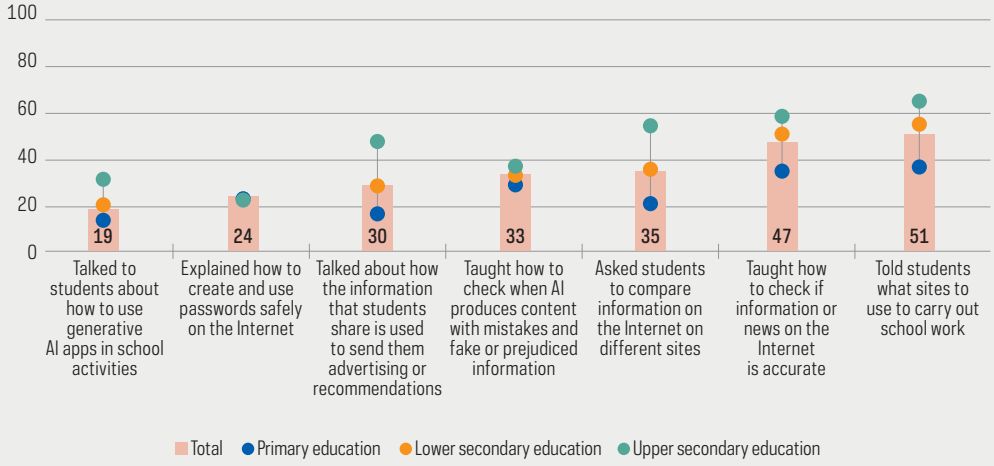
Students who received guidance and support from teachers about the use of digital technologies in the three months prior to the survey, by level of education (2024)

Total number of primary and secondary school students who are Internet users (%)



Access the full survey data

In addition to the results presented in this publication, the tables of indicators, questionnaires, information on how to access the microdata, and the presentation of the results of the launch event are available on the Cetic.br|NIC.br website, as well as other publications on the subject of the survey.

The tables of results (https://cetic.br/en/pesquisa/educacao/indicadores/), available for download in Portuguese, English, and Spanish, present the statistics produced, including information on the data collected and cross-checks for the variables investigated in the study. The information available in the tables follows the example below:

Code and indicator name

Population to which the results refer

F7 - STUDENTS BY INTERNET USE OUTSIDE CLASS HOURS TO CARRY OUT SCHOOL ACTIVITIES IN THE LAST THREE MONTHS

Total number of primary and secondary education school students who are Internet users

PERCENTAGE (%)		SEARCHED THE INTERNET TO CARRY OUT SCHOOLWORK	SEARCHED FOR INFORMATION ON THE INTERNET ABOUT A SUBJECT THEY DID NOT UNDERSTAND WELL	CARRIED OUT GROUP ASSIGNMENTS ON THE INTERNET	WATCHED VIDEO CLASSES OR TUTORIALS ON THE INTERNET	USED DIGITAL TECHNOLOGIES TO PRACTICE SOMETHING THEY ARE LEARNING
TOTAL		84	86	54	74	78
SEX	Female	87	89	57	74	83
	Male	81	82	50	73	72
AREA	Urban	85	86	55	75	78
	Rural	79	79	43	63	72
LEVEL OF EDUCATION	Primary education (4th and 5th year)	72	79	28	63	72
	Lower secondary education	89	89	64	76	78
	Upper secondary education	95	92	80	87	86
ADMINISTRATIVE JURISDICITON	Municipal	75	80	39	65	72
	State	92	90	68	80	81
	Public (Municipal, State and Federal)	83	85	53	72	77
	Private	87	88	55	79	83

Indicator responses

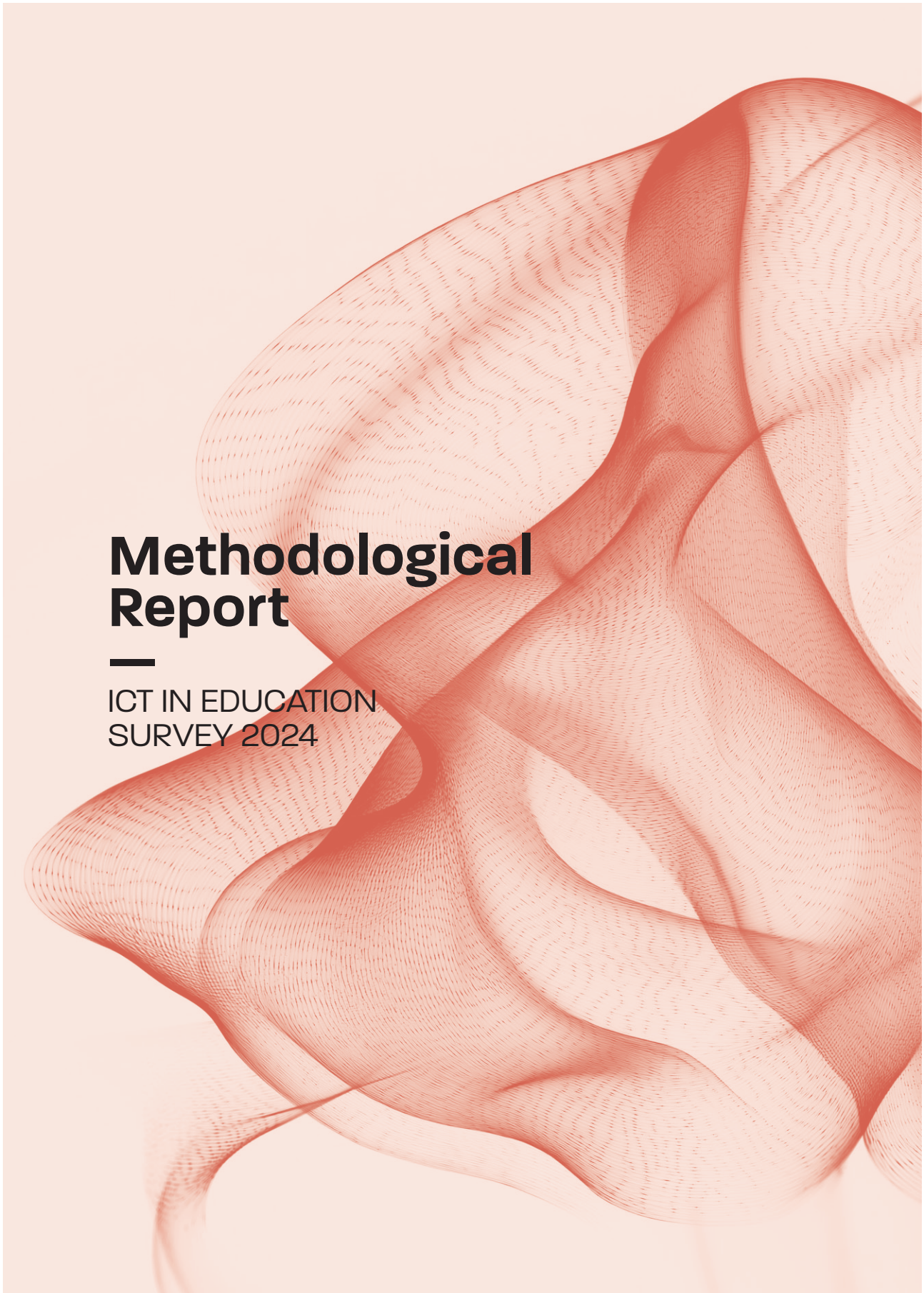
Results tabulation cut-outs: total (population as a whole) and characteristics of analysis (region, age group, etc.), different in each survey

Results: can be in % or totals

Source: Brazilian Network Information Center. (2024). *Survey on the use of information and communication technologies in Brazilian schools: ICT in Education 2024* [Tables].

How to reference the tables of indicators

This publication is also available in Portuguese on the Cetic.br|NIC.br website.



Methodological Report

ICT IN EDUCATION SURVEY 2024

Methodological Report
ICT in Education 2024

The Brazilian Internet Steering Committee (CGI.br), through the Regional Center for Studies on the Development of the Information Society (Cetic.br), a department of the Brazilian Network Information Center (NIC.br), presents the methodology of the Survey on the Use of Information and Communication Technologies in Brazilian Schools – ICT in Education.

The ICT in Education survey, which has been carried out since 2010, was prepared based on international methodological frameworks for measuring the supply and impact of digital technologies on educational processes, including the publications *Sites 2006* (*Technical Report - Second Information Technology in Education Study*) and Sites 2006 (*User Guide for the International Database*), produced by the International Association for the Evaluation of Educational Achievement – IEA (2009a, 2009b).

Throughout the history of ICT in Education, aspects pertinent to the methodology, the analysis units, and the data collection instruments have been improved in order to meet the advances in theoretical frameworks related to the fields of education and digital technologies, as well as the specificities of the Brazilian school universe and the needs of different sectors of society. In 2011, the survey sample was expanded to include not only urban public but also private schools. In 2017, schools located in rural areas became part of the survey universe, through telephone interviews with school managers.

In 2020, the methodology of the ICT in Education survey was revised once again, with the aim of expanding qualified information on access to and use of digital technologies in Brazilian schools and the appropriation of these resources by the school community, especially students and teachers, in teaching, learning, and school management activities. In addition to unifying the samples of urban and rural schools, the survey also began to consider federal schools in the universe of public educational institutions. The new survey sample was designed to favor the biennial provision of results by federative unit, with greater coverage in relation to the universe of schools participating in the survey. To this end, in the editions in odd-numbered years, telephone interviews were planned only with school managers, in order to guarantee a larger sample, with controlled results in terms of the quality of indicator estimates by federative unit. In editions carried out in even-numbered years, interviews are conducted face-to-face with students, teachers, directors of studies, and school managers.

However, in the 2020 and 2021 editions, it was not possible to implement this plan, as the survey methodology had to be adapted due to the limitations on face-to-face data collection imposed by the COVID-19 pandemic. In 2020, school managers were interviewed, and data collection focused on access to and use of digital technologies in educational institutions. In 2021, information was collected only from teachers, by telephone, and based on a questionnaire designed especially for the period of implementation of remote and hybrid educational activities.

Starting from the 2022 edition, the expanded universe of schools was once again considered and the approach planned in 2020 for the survey's target populations was resumed. Thus, since the 2022 edition, in even-numbered years, face-to-face interviews have been conducted with students, teachers, directors of studies, and school managers. In odd-numbered years, starting from the 2023 edition, interviews will be conducted only with school managers through telephone contact, aiming to provide estimates for the indicators by state.

Survey objectives

The objective of the ICT in Education survey is to investigate access to and use and appropriation of information and communication technologies (ICT) in Brazilian public and private schools that offer primary and secondary education, with a focus on the use of these digital resources by students and teachers in teaching and learning activities.

Concepts and definitions

AREA

Schools can be classified as being located in urban or rural areas, based on the data provided by educational institutions to the Basic Education School Census, conducted by the National Institute for Educational Studies and Research "Anísio Teixeira" (Inep).

LEVEL OF EDUCATION

Only schools with primary and secondary education classes were included in the survey sample. Schools with technical or professional training classes were also included, as long as they were offered in an integrated or simultaneous way with the secondary education. In compliance with methodological rigor and the literature on data collection with children, students over nine years old were interviewed. For this reason, in the primary education, only students in 4th or 5th year participated in the survey.

AREA OF KNOWLEDGE

The area of knowledge refers to the field to which the curricular component that teachers teach most often at schools is linked. The classification follows the organization proposed by the National Common Curriculum Base – BNCC (Brazilian Ministry of

Education [MEC], 2018) for each stage of education. Teachers who, during the survey, taught subjects from multiple areas of knowledge in the primary education or in multi-grade classes were grouped under "multiple subjects." Likewise, teachers who taught specific subjects in technical or vocational education courses were grouped under "technical and professional training". Teachers who said they taught subjects from other areas of knowledge at the time of data collection were grouped under "other subjects."

ADMINISTRATIVE JURISDICTION

Administrative jurisdiction refers to the school's level of administrative subordination – municipal public, state public, federal public, or private, according to the data provided by the institutions to the Basic Education School Census, carried out by Inep. The data collected from federal schools was aggregated with the data from state and municipal schools and disseminated in the proportions for the total number of public primary and secondary education institutions.

INTERNET USERS

Internet users were defined as individuals who have used the Internet at least once in the three months prior to the survey, as established by the International Telecommunication Union (ITU, 2020).

SCHOOLS WITH INTERNET ACCESS

Based on the statements of school managers regarding the presence or lack of Internet access in the schools.

SCHOOLS WITH COMPUTERS

Those that, according to their managers, owned at least one computer (desktop, portable, or tablet).

SCHOOLS WITH INTERNET ACCESS AND COMPUTERS

Those that, according to their managers, had access to the Internet and owned at least one computer (desktop, portable, or tablet).

SCHOOLS WITH INTERNET ACCESS FOR STUDENTS

Those that, according to their managers, had Internet access available for students to use when carrying out educational activities in at least one of the school sites—offices of directors of studies or principals, teachers' rooms or meeting rooms, classrooms, libraries or study rooms for students, computer labs, robotics rooms, multifunction resource rooms for specialized educational services, multimedia room or laboratory, playground or recreation area for students.

SCHOOLS WITH COMPUTERS FOR STUDENTS

Those that, according to their managers, owned at least one computer (desktop, portable, or tablet) for students to use when carrying out educational activities.

SCHOOLS WITH INTERNET ACCESS AND COMPUTERS FOR STUDENTS

Those that, according to their managers, had Internet access available for students to use in at least one of the school sites—offices of directors of studies or principals, teachers' rooms or meeting rooms, classrooms, libraries or study rooms for students, computer labs, robotics rooms, multifunction resource rooms for specialized educational services, multimedia room or laboratory, playground or recreation area for students—and owned at least one computer (desktop, portable, or tablet) for students to use when carrying out educational activities.

INTERNET ACCESS VIA MOBILE PHONE EXCLUSIVELY

Corresponds to students who reported accessing the Internet via their mobile phones, but said they did not connect to the Internet via other devices, such as portable computers, desktop computers, video games, televisions, or tablets.

SOCIOECONOMIC LEVEL INDICATOR (*INDICADOR DE NÍVEL SOCIOECONÔMICO* [INSE])

Inse is based on the questionnaire applied every two years by Inep to students in the 5th and 9th grades of primary and lower secondary education and the 3rd and 4th grades of upper secondary education or professional training under the National Basic Education Assessment System (*Sistema de Avaliação da Educação Básica* [Saeb]). In order to establish the socioeconomic level associated with each school, Inep considers three main dimensions: household structure; the possession of consumer goods; and the education level of the fathers, mothers, or legal guardians.

Target population

The target population consisted of functioning public (state, municipal, or federal) and private schools located in both urban and rural areas of Brazil that offered regular education, with primary or secondary classes. The survey's target population included students enrolled in primary (from 4th year onwards) or secondary education classes, school managers, and professionals who worked in pedagogical coordination (directors of studies) and teaching (teachers) related to the classes and levels of education in the schools considered by the survey.

REFERENCE AND ANALYSIS UNITS

The ICT in Education 2024 survey had five reference and analysis units:

- public (state, municipal, or federal) and private schools, located in both urban and rural areas that offered regular education, with primary (4th to 9th year) or secondary classes;
- school managers included in the target population;
- people in pedagogical coordination positions (directors of studies) in schools included in the target population;
- people in teaching positions (teachers) who taught primary (4th to 9th year) or secondary classes in schools included in the target population;
- students enrolled in primary (4th to 9th year) or secondary school classes, nine years old or older, in schools included in the target population.

DOMAINS OF INTEREST FOR ANALYSIS AND DISSEMINATION

The results for the reference and analysis units in this edition of the survey were reported for domains defined according to the variables and levels described below:

- **region**: Corresponds to the regional divisions of Brazil, according to the Brazilian Institute of Geography and Statistics (IBGE), into the macro-regions Center-West, Northeast, North, Southeast, and South.
- **administrative jurisdiction**: Corresponds to the administrative levels of the schools—municipal public, state public, federal public, or private. The "public" category included municipal, state, and federal jurisdictions.
- **area**: Corresponds to the definition of the school location, according to criteria defined by Inep, classified as rural or urban.
- **location**: Corresponds to the location of schools in capitals or other municipalities, here classified as non-capital cities.
- **highest level of education provided by schools**: Corresponds to the classification, according to information from the Basic Education School Census, into schools that offered up to the primary education; lower secondary education; and up to upper secondary education or professional training.
- **size**: Corresponds to the classification of the school by the number of enrollments according to the Basic Education School Census, in up to 50 enrollments; 51 to 150 enrollments; 151 to 300 enrollments; 301 to 500 enrollments; 501 to 1,000 enrollments; and more than 1,000 enrollments.

In relation to the variables for the reference and analysis units for students, teachers, director of studies, and school managers, the following characteristics were added to the domains mentioned above, and used to define subgroups that have results reported separately:

- **sex**: Corresponds to the division into male and female.
- **age group**: Corresponds to the ages of the respondents on the day of the interview, expressed in whole years.
- **color or race**: Corresponds to how individuals self-reported, as White, Black, Brown, Yellow, or Indigenous, according to the classification of IBGE.
- **level of education**: Refers to the level of education attended by the students at the time of the interview or to the level of education for which the teachers taught, and were linked according to the class selected in the survey sample: primary education (4th or 5th year), lower secondary education, and upper secondary education or professional training.
- **area of knowledge**: Corresponds to the subject that the teachers taught most in the class and level of education selected in the survey sample. The areas of knowledge were organized into: multiple subjects, languages, mathematics, natural sciences, social and human sciences, technical and professional training, and other subjects.

Data collection instruments

INFORMATION ON THE DATA COLLECTION INSTRUMENTS

Interviews were conducted using a structured questionnaire specific to the approach and collection of information with principals or persons responsible for the schools, directors of studies, teachers, and students. More information about data collection instruments is available in the survey's "Data Collection Report".

Sampling plan

The probabilistic sample was stratified by selecting schools with a probability proportional to the number of enrollments at one stage (Silva et al., 2021). The stratification of schools was defined following two stages, as described below.

SAMPLE STRATIFICATION

Initially, the universe of schools was separated into two parts: federal schools and other schools.

The federal schools were stratified by region and, within the region, by an indicator of capital vs. non-capital. In the non-capital cities, the indicator of the size of the municipality's population was used in two classes: "less than 500,000 inhabitants," and "500,000 inhabitants and over."

The other schools were subdivided into strata according to:

- region;
- capital and non-capital cities, subdivided into two classes according to the size of the municipality's population: "less than 500,000 inhabitants," and "500,000 inhabitants and over";
- situation (rural or urban);
- administrative jurisdiction.

In the strata of capital cities and large municipalities ("500,000 inhabitants and over"), schools were the primary sampling units (PSUs). In the strata of smaller municipalities ("less than 500,000 inhabitants"), within each stratum and municipality with schools, PSUs were formed by grouping up to three schools in the same municipality and stratum. This strategy was adopted to try to increase the spatial concentration of the school sample in a smaller number of municipalities.

SURVEY FRAME AND SOURCES OF INFORMATION

The survey frame used to select the schools was the Basic Education School Census, conducted by Inep. Based on the most recent Inep registry, the schools that met all the eligibility requirements for the survey population were included.

SAMPLE DESIGN CRITERIA

The sample was sized so as to obtain results for the following areas of interest in the survey that were in the school registry: region, administrative jurisdiction, and location.

Based on these domains of interest and the response rate statistics from previous surveys, the desirable sample sizes were established so that the survey could provide results with the specified margin of error. The sample size is available in the "Data Collection Report" in this edition.

SCHOOL SAMPLE SELECTION

Within each stratum, the schools or primary sampling units were selected by sampling with probability proportional to the size of the school, measured in number of enrollments. The selection process followed the Pareto sampling methodology, with the probability of selection given by:

FORMULA 1

$$P_{hi}P_{ihi} = \frac{M_{hi}}{\sum_{i=1}^{N_h} M_{hi}} \frac{M_{ihi}}{\sum_{i=1}^{N_h} M_{ihi}}$$

$P_{hi}P_{ihi}$ is the probability of selection of school i in stratum h
$M_{hi}M_{ihi}$ is the total number of enrollments in school i in stratum h
N_h is the total number of schools in stratum h

SELECTION OF SCHOOL MANAGERS, DIRECTORS OF STUDIES, TEACHERS, AND STUDENTS

For each school selected in the survey, a manager and a director of studies were automatically approached to be interviewed. In order to select the teachers and students, we identified the levels of education, classes, and teachers working at the schools for the levels of education of interest to the survey.

Based on the list of classes in the target population, one class was randomly selected for each level of education in the school. From this class, five students and one teacher were randomly selected to participate in the survey.

Field data collection

DATA COLLECTION METHOD

Data was collected through face-to-face interviews using the computer-assisted personal interviewing (CAPI) method, which consisted of programming the questionnaire into tablet software and having interviewers apply the questionnaires in face-to-face interaction with the interviewees (students, teachers, directors of studies, and school managers) in each of the schools selected in the sample. More information on field data collection is available in the "Data Collection Report" section.

It is important to note that the survey received institutional support from MEC, through the Basic Education Secretariat (SEB), the National Council of Secretaries of Education (Consed), the National Union of Municipal Education Leaders (Undime), and Inep, in contacting schools and educational networks, in order to inform them about the survey and request the support of those responsible for authorizing the interviews.

Data processing

WEIGHTING PROCEDURES

Survey weighting was based on the calculation of basic weights derived from the probability of selection in each stage, which were then adjusted for nonresponse. The weights were adjusted for the known totals in the survey's target population.

WEIGHT FOR SCHOOLS

Each school in the sample was associated with a basic sample weight, expressed as a ratio of the size of the population and the size of the sample in the corresponding final stratum. The basic weight for each school was calculated based on the inverse of the selection probability of schools being selected in each stratum, as given by the equation in Formula 2.

FORMULA 2

$$w_{hi} = \frac{\sum_{i=1}^{N_h} M_{hi}}{M_{hi} \times n_h} w_{ihi} = \frac{\sum_{i=1}^{N_h} M_{ihi}}{M_{ihi} \times n_h}$$

$w_{hi} w_{ihi}$ is the basic weight for school i in stratum h

$M_{hi} M_{ihi}$ is the total number of enrollments in school i in stratum h

N_h is the total number of schools in stratum h

n_h is the total number of schools selected in the sample of stratum h

CORRECTION FOR NONRESPONSE

To correct cases in which selected schools did not answer the survey, a nonresponse correction adjustment was made in the weights of the schools that did respond to the survey. Because each stratum may have a different number of responding schools, the adjustment was made separately within each selection stratum using Formula 3.

FORMULA 3

$$w_{hi}^r = w_{ih} \times \frac{\sum_{i=1}^{n_h} w_{hi}}{\sum_{i=1}^{n_h} w_{hi} \times I_h^r} w_{ihi}^r = w_{ih} \times \frac{\sum_{i=1}^{n_h} w_{ihi}}{\sum_{i=1}^{n_h} w_{ihi} \times I_h^r}$$

w_{ih}^r is the weight for school i in stratum h corrected for nonresponse

w_{ih} is the basic weight for the sampling design of school i in stratum h

I_h^r is an indicator that is scored 1, if school i in stratum h answered, and 0, otherwise

CALIBRATION

The weights of responding schools already adjusted for nonresponse were calibrated for the total number of schools by federative unit, administrative jurisdiction, location (capital or non-capital), situation (urban or rural), Internet access, and broadband. The totals for calibration variables were obtained from the Basic Education School Census registry, from which the samples were selected. The variables Internet and broadband were also obtained from the School Census registry and not from the results of the ICT in Education survey. Iterative proportional fitting (IPF) for marginal values was used, also known as incomplete multivariate post-stratification or raking (Silva et al., 2021). The final weight of schools was: w_{ih}^C.

WEIGHT FOR PRINCIPALS OR SCHOOL MANAGERS

The weight of the analysis unit principals or school managers was calculated following the same steps as the calculation of school weights. In this case, schools that had responses from principals or school managers were considered for nonresponse correction. Calibration used the same variables considered in the calibration of school weights. The weight of principals or school managers was given by: wd_{hi}^{Ec}.

WEIGHT FOR DIRECTORS OF STUDIES

The weight of the analysis unit directors of studies was calculated following the same steps as the calculation of school weights. In this case, schools that had responses from directors of studies were considered for nonresponse correction. Calibration used the same variables considered in the calibration of school weights. The weight of directors of studies was given by: wc^{c}_{ih}.

WEIGHT FOR TEACHERS

The weight of the analysis unit teachers was calculated separately by level of education. For each level of education, the basic weight of the teacher of a given level of education in school i in stratum h was defined by the product of two components: the weight for schools and the weight for teachers in the school.

The weight of the schools at each level of education that had a responding teacher was calculated following the same steps as those used for calculating the weights of the schools. In this case, schools that had responses from teachers at level E in stratum h were considered for nonresponse correction. This weight was calibrated to known totals of the universe of schools in the survey using the same variables used to calibrate the school weights. The weight for school i in stratum h , computed for responding teachers at a given level of education E was given by: wp^{Ec}_{hi}.

The weight for teachers in school i in stratum h for the level of education E is the same as the total P^{E}_{hi} of teachers in level of education E of school i in stratum h. According to the selection process, only one teacher was selected to answer the survey for each level of education in the school. Therefore, the basic weight for teachers for school i in stratum h in level of education E was given by Formula 4.

FORMULA 4

$$wp^{E}_{b_{hi}} = wp^{Ec}_{hi} \times P^{E}_{hi} \times wp^{E}_{b_{ihi}} = wp^{Ec}_{ihi} \times P^{E}_{ihi}$$

The basic weights for teachers were calibrated by level of education for the known totals of the survey universe:

- number of 4th and 5th year primary education teachers;
- number of teachers in the lower secondary education; and
- number of upper seconday education teachers.

These weights took into account: major Brazilian regions, situation (urban or rural), location (capital or non-capital) and administrative jurisdiction.

After calibration, the weight for teachers in school i in stratum h of level of education E was given by: $wp^{Ec}_{b_{hi}}$.

WEIGHT FOR STUDENTS

The weight of the analysis unit students was calculated separately by level of education. For each level of education, the basic weight of the student at a given level of education in school i in stratum h was defined by the product of two components: the weight for the school and the weight for students in the school.

The weight of schools at each level of education with respondent students was calculated following the same steps as the calculation of school weights. In this case, schools with student responses at level of education E in stratum h were considered for nonresponse correction. This weight was calibrated to known totals of the universe of schools in the survey using the same variables used to calibrate the school weights. The weight for school i in stratum h, for respondent students at a given level of education E was given by: wa_{hi}^{Ec}.

The weight of the student in school i in stratum h for level of education E was given by Formula 5.

FORMULA 5

$$wa_{e_{hi}}^{E} = \frac{T_{hi} \times A_{thi}}{A_{thi}^{r}} wa_{e_{ihi}}^{E} = \frac{T_{ihi} \times A_{tihi}}{A_{tihi}^{r}}$$

$wa_{e_{hi}}^{E}\ wa_{e_{ihi}}^{E}$ is the weight for students in school i in stratum h for level of education E

$T_{ih}\ T_{ihi}$ is the total number of classes in level of education E in school i in stratum h

$A_{thi}\ A_{tihi}$ is the total number of students in the class in level of education E selected in school i in stratum h

$A_{thi}^{r}\ A_{tihi}^{r}$ is the total number of respondent students in the class in level of education E selected in school i in stratum h

The basic weight for students in school i in stratum h for level of education E was given by Formula 6.

FORMULA 6

$$wa_{b_{hi}}^{E} = wa_{hi}^{Ec} \times wa_{e_{hi}}^{E}$$

The basic weights for students were calibrated by level of education for the known totals of the survey universe:

- number of enrollments in the 4th and 5th years of primary education;
- number of enrollments in the lower secondary education; and
- number of enrollments in upper secondary education.

These weights took into account: major Brazilian regions, situation (urban or rural), location (capital or non-capital) and administrative jurisdiction.

After calibration, the weight for students in school i in stratum h of level of education E was given by: $wa_{b_{hi}}^{Ec}$.

SAMPLING ERRORS

Sampling error measurements of indicators in the ICT in Education survey were calculated considering the sampling plan and the calibration and nonresponse adjustments used in the survey. The ultimate cluster method was used, which allows estimation of variances in the total estimators in multi-stage sampling plans. Proposed by Hansen et al. (1953), the method uses only the variation between information available in the primary sampling units and allows them to be selected from the strata with replacement of the population.

Based on this concept, it was possible to consider stratification and selection with unequal probabilities for both the primary units and the additional units in the sample. The premise underlying the application of this method is that unbiased estimators of the total values of the variables of interest for each of the primary aggregates selected are available. This method provides the foundation for several statistical packages specialized in calculating variances considering sampling plans.

Using the estimated variances, sampling errors were disclosed by the margins of error, which were calculated for a 95% confidence level. This means that, if the survey were repeated multiple times, in 95% of the cases the interval would contain the true population value. Other measurements derived from this variance estimate are usually presented, such as standard deviation, coefficient of variation, and confidence interval.

Margin of error is the product of standard error (square root of variance) multiplied by 1.96 (value of the normal distribution corresponding to the chosen significance level of 95%). These calculations were made for each variable in each table, which ensured that all tables had margins of error associated with each estimate presented in each table cell.

Data dissemination

The results of the ICT in Education survey are presented according to the variables described in the "Domains of interest for analysis and dissemination" section. In some results, rounding caused the sum of partial categories to be different from 100% for single-answer questions. The sum of frequencies in multiple-answer questions usually exceeds 100%. It is worth mentioning that, in the tables of results, hyphens (–) are used to represent nonresponse. Furthermore, since the results are presented without decimal places, cells with zero value mean that there was an answer to the item, but it was explicitly greater than zero and lower than one (after rounding).

The survey results are published online and available on the Cetic.br|NIC.br website, under the "Tables" tab (https://cetic.br/en/pesquisa/educacao/indicadores/). The tables of proportions, estimates and margins of error for each indicator are available for download in Portuguese, English, and Spanish. More information about the survey's documentation, metadata, and microdata bases is available on the survey's "Methodology" page (https://cetic.br/en/pesquisa/educacao/microdados/).

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Data Collection Report

ICT IN EDUCATION SURVEY 2024

Data Collection Report
ICT in Education 2024

The Brazilian Internet Steering Committee (CGI.br), through the Regional Center for Studies on the Development of the Information Society (Cetic.br), a department of the Brazilian Network Information Center (NIC.br), presents the procedures used in the data collection for the ICT in Education 2024 survey. The objective of this report is to provide information about specific characteristics of this edition of the survey, including changes made to data collection instruments, sample allocation, and response rates.

The complete survey methodology of the ICT in Education survey, including the objectives, main concepts, definitions, and characteristics of the sampling plan, are described in the "Methodological Report," available in this publication.

Survey population

The basis used to select the sample was the 2023 Basic Education School Census of the National Institute for Educational Studies and Research "Anísio Teixeira" (Inep), which was made available in the first quarter of 2024. The definition of the target population, as described in the "Methodological Report," resulted in 129,976 schools.

Sample allocation

The initial sample of schools for the ICT in Education 2024 survey followed the distribution presented in Table 1.

TABLE 1

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School sample distribution, by federative unit, administrative jurisdiction, and location

Brazilian macro-region	Federative unit	Initial sample
North region	Acre	8
	Amapá	8
	Amazonas	57
	Pará	95
	Rondônia	26
	Roraima	10
	Tocantins	15
Northeast region	Alagoas	12
	Bahia	84
	Ceará	53
	Maranhão	58
	Paraíba	34
	Pernambuco	52
	Piauí	25
	Rio Grande do Norte	24
	Sergipe	13
Southeast region	Espírito Santo	36
	Minas Gerais	77
	Rio de Janeiro	86
	São Paulo	207
South region	Paraná	99
	Rio Grande do Sul	61
	Santa Catarina	56
Center-West region	Federal District	27
	Goiás	107
	Mato Grosso	38
	Mato Grosso do Sul	28

CONTINUES ▶

Administrative jurisdiction	Initial sample
Federal	99
State	327
Municipal	650
Private	320
Location	Initial sample
Urban	1 128
Rural	268

Data collection instruments

THEMES

The ICT in Education survey focuses on four dimensions of analysis of the use of technology in education:

1. **Access to and use of digital technologies:** Production of indicators on access to digital technologies and the use of these resources among students and teachers. It also concerns indicators of the availability of connectivity in primary and secondary education schools.
2. **Digital technologies in educational processes:** Refers to indicators related to the use of digital technologies to support teaching and learning processes and the management of educational institutions.
3. **Development of digital skills:** Refers to the activities mediated by digital technologies that are carried out by students and teachers, as well as the opportunities offered to them to develop digital skills and competencies.
4. **Education for digital citizenship:** Concerns indicators of the implementation of activities for the safe, critical, and responsible use of digital technologies by students and teachers. It also addresses the inclusion in the school curriculum of debates on the social impacts of adopting digital technologies.

The survey also investigated indicators on the use of digital technologies in school management and the participation of managers in decisions relative to the technology policies implemented in schools.

Based on the dimensions mentioned, starting in 2020, the survey also began to collect data about the provision of digital technology in schools to mediate the learning of students with disabilities (indicators collected biennially and published in even-numbered editions), encompassing indicators about the use of accessible digital educational resources and about the preparation and support given to teachers to use these resources in teaching and learning activities.

The research also includes modules on the use of platforms, applications, social networks, and digital systems by schools. These resources can broaden the possibilities for students and teachers to carry out activities, involving methodologies that expand the classroom space, allowing teaching and learning to take place anywhere and at any time. These themes are also significantly relevant to analyzing the actions taken by schools in terms of data protection, privacy, and information security.

Since 2020, the survey has had indicators that aim to measure the types of data originating from schools, teachers, and students that are collected, stored, processed, and analyzed by the educational institutions themselves or through systems, platforms, and applications. The survey also seeks to understand how school actors perceive data privacy and what kind of support and awareness-raising opportunities they receive to deal with data governance in digital environments.

Therefore, the 2024 edition of the ICT in Education survey was dedicated to collecting information on the thematic modules presented in Table 2.

TABLE 2
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Thematic modules of the ICT in Education 2024 survey

Analysis units	Modules	Themes
Students	A	Sociodemographic profile
	B	Internet access
	C	Computer use
	D	Mobile phone use
	E	Internet access at school
	F	Activities carried out using digital technologies
	G	Platforms, applications, and digital resources used in school activities
	H	Mediation for the use of and sources of information on digital technologies
Teachers	A	Sociodemographic profile
	B	Profile of digital technology use
	C	Teachers' digital skills - engagement, collaboration, and professional development
	D	Teachers' digital skills - adoption of digital technologies in teaching and learning activities
	E	Teachers' digital skills - adoption of digital technologies in the assessment of student learning
	F	Development of students' digital skills - digital content creation, collaboration, and problem-solving
	G	Development of students' digital skills - education for digital citizenship

CONTINUES ▶

Teachers	H	Continuous professional development on digital technologies in education
	I	Use of connectivity resources in teaching and learning activities
	J	Use of digital educational resources
	K	Use of platforms, applications, social networks, and virtual learning environments
	L	Inclusive education and use of assistive technology resources
Directors of studies	A	Sociodemographic profile
	C	Continuous professional development on digital technologies in education
	D	Use of digital technologies in teaching and learning processes at school
	E	Digital educational resources
	F	Development of students' digital skills - education for digital citizenship
	G	Development of students' digital skills - digital content creation and computational thinking
School managers	A	Sociodemographic profile
	C	Continuous professional development on digital technologies in education
	D	School management activities
Schools	A	Internet access
	B	Use of computers and digital devices
	C	Dynamics of technology use by students at school
	D	Inclusive education, accessibility, and assistive technology resources
	E	Use of digital systems in school management
	F	Use of platforms, applications, and social networks
	G	Use of platforms and virtual learning environments
	K	Managing the implementation of digital technologies in schools

PRETESTS

Pretests were carried out on the questionnaires for all the survey respondents (students, teachers, directors of studies, and school managers) in order to identify whether the survey instrument was being well understood by the interviewees, especially in relation to the new questions included in this edition of the survey. Through the pretests, it was also possible to calculate and validate the average time taken to administer the interviews.

The pretests were carried between August 8 and 12, 2024, in three schools—two public institutions and one private—located in the state of São Paulo. A total of 14 interviews were conducted: five interviews with students from primary education (5th grade) and lower secondary education (6th and 9th grades), three with teachers, three with directors of studies, and three with school managers.

CHANGES IN THE DATA COLLECTION INSTRUMENTS

Every year, the survey's data collection instruments are reviewed and validated by experts, with the aim of expanding qualified information on access to and use of digital technologies in Brazilian schools and the appropriation of these resources by the school community.

Since 2020, the questionnaire applied to school managers has been reorganized, with the inclusion of new modules such as: privacy and data protection, use of applications, platforms, and systems in school management, digital education and digital citizenship, and availability and use of assistive technology resources.

In order to adapt the questionnaire for managers and schools to the guidelines of the Connected Education Innovation Program (Piec) (Law No. 14.180/2021) and the National Strategy for Connected Schools (Enec) (Decree No. 11.713/2023), as well as the theoretical frameworks for monitoring meaningful connectivity in the educational sphere, such as the Giga project,[1] for the 2024 edition of the survey new questions were included on the conditions of access to and use of digital technologies in educational facilities. The questions on the quality of Internet connection have been improved, with a broadening of the speed ranges investigated. New response items were also included regarding school spaces with access to the Internet, as well as new questions on the number of classrooms connected and available for educational activities.

The indicators on the use of digital devices at school by students were also deepened, with new questions on what measures are implemented by institutions in the face of the permission for or restriction of the use of digital devices in educational environments.[2]

Continuing the annual rotation of modules in the questionnaire for school managers, module H, "Privacy and data protection", was not collected in 2024, giving way to new questions on the continuous professional development of educators working in school management. New indicators were also added to the school management activities module, with the aim of deepening the data on meetings held with parents, legal guardians, and teachers on the use of digital technologies in school institutions. These indicators make it possible to investigate topics that have been receiving greater attention from the school community, such as the well-being of students in digital environments, the selection of educational resources, and the impact of digital technologies on teaching practice.

[1] The Giga project is an initiative of the United Nations Children's Fund (UNICEF) and the International Telecommunication Union (ITU), launched in 2019, with the aim of promoting meaningful connectivity in primary schools in several countries. More information at https://giga.global/

[2] As data collection for the ICT in Education survey began in August 2024 and lasted until March 2025, the data disseminated covers both the period before, when discussions were held by society, and after the enactment of the regulation restricting mobile phones in educational institutions (Law No. 15.100/2025), in January 2025.

The questionnaire for directors of studies also included new questions to understand educators' perceptions of the impact of restrictive measures on mobile phone use adopted by schools on students' well-being. In addition, until the 2022 edition, the survey investigated the presence of education initiatives for the safe, critical, responsible, and creative use of digital technologies only in the schools' pedagogical political projects or curricula. In the 2024 edition, this indicator was changed to measure the activities implemented by educational institutions in the 12 months prior to the survey. New response items were also added to those already investigated by the study, with the aim of covering topics related to information integrity, privacy, well-being, and the digital footprint. Despite these changes, the structure of the questionnaire was maintained, based, among other references, on the three dimensions relating to digital education recommended by the National Common Curricular Base (BNCC) (Brazilian Ministry of Education [MEC], 2018): computational thinking, digital world, and digital culture.

Since the changes made in the 2022 edition, the teachers' questionnaire has included questions that map educators' competencies for using digital technologies in teaching and learning activities and investigate teachers' contributions to the development of students' digital skills. These questions regarding teachers' digital skills were based on national and international theoretical and methodological frameworks, especially the *Digital Competence Framework for Educators* (DigCompEdu) (Redecker & Punie, 2017).

In the 2024 edition, in order to include new indicators related to the development of initiatives on the safe, critical, responsible, and creative use of digital technologies by teachers with students, the questions concerning teaching and learning activities using digital resources were grouped into new indicators, measured by frequency of development. In addition, a question was added to those about the types of digital devices used by teachers during classes to measure the use of these resources by students. The investigation into the challenges that hinder or restrict the use of digital technologies by students during classes, which until 2022 was applied only to teachers who did not adopt such resources in their pedagogical practice, was now carried out with the entire universe of teachers. The use of generative Artificial Intelligence (AI) resources in the planning and application of teaching and learning activities was also included in the indicators collected in the 2024 edition of the survey.

The questionnaire for students had been revised for the 2022 edition, when the first data collection was carried out with students enrolled in schools located in rural areas. The aim of the changes was to make it possible to disseminate more in-depth indicators for the topics that had been collected in urban schools since 2010, especially with regard to data on digital mediation and education initiatives for the safe, critical, responsible, and creative use of digital technologies offered to students. For the 2024 edition, new changes were made to the questionnaire to include questions relating to students' use of mobile phones in the school environment; the use of digital resources to carry out school tasks, including generative AI resources; and the use of digital technologies in learning activities in the school environment and in other spaces.

Interviewer training

The interviews were conducted by a team of professionals who were trained and accompanied by field supervisors. The data collection team had access to the survey's instruction manual, which contains a description of all the necessary procedures to collect data and details about the survey objectives and methodology, ensuring the standardization and quality of the work.

Overall, data collection was carried out involving:

- scheduling team: 14 schedulers and two supervisors.
- field team: 128 interviewers and 16 field supervisors.

Data collection procedures

DATA COLLECTION METHOD

The interviews were carried out in person at each school selected in the sample where the visit was authorized, using the computer-assisted personal interviewing (CAPI) approach. On average, administering the data collection instrument took 17 minutes for students, 38 minutes for teachers, 24 minutes for director of studies, and 37 minutes for school managers.

In most cases, a prior appointment was scheduled by telephone with the school managers or persons in charge, so that the interviewers' visits would not interfere with the schools' daily routines. In addition, we tried to arrange a date for the interviews when the school managers, directors of studies, and selected teachers would be present at the institutions. In cases where it was difficult to contact them by telephone, the interviewers went to the schools to schedule the visits and complete the listing forms on the site. In situations where access was more difficult, listings and interviews were carried out on the same day as the first contact with the schools. Thus, on the scheduled date, the interviewers went to the schools and carried out the interviews, following the procedures and questionnaires structured for each population.

It is important to note that the survey received institutional support from MEC, through the Basic Education Secretariat (SEB), the National Council of Secretaries of Education (Consed), the National Union of Municipal Education Leaders (Undime), and Inep, in contacting schools and educational networks, in order to inform them about the survey and request the support of those responsible for authorizing the interviews.

DATA COLLECTION PERIOD

Data collection for ICT in Education 2024 took place between August 2024 and March 2025 in schools in all regions of the country.

PROCEDURES AND CONTROLS

Once the sample of schools was selected, they were contacted in advance to schedule visits to collect the data. This prior contact was also useful for updating the information about whether there were teaching levels of interest in each school. Based on this information, all the existing classes at each level of education of interest were listed using a form, in order to obtain the number of existing classes at each level. This information was needed to plan the selection of reference units for the subsequent stages and to allocate appropriately sized field teams for school visits. On the date of the school visits, each interviewer checked the information on the listing form completed during the telephone call. In cases of divergent information, the most recent information obtained by the interviewer was considered.

The interviews with directors of studies, teachers, and students required the completion of a list and selection of classes. After the class selection, the listing form was used to select each of these target groups.

In order to list the teachers, during the visits to the schools, the names of those who taught in the selected classes were requested and then recorded in alphabetical order on the listing forms. The interviewees were then selected at random, with one teacher selected for each class.

For students, in order to preserve children's privacy, the listing was made by counting the number of desks of the students present at the time of the interviews in each selected class. Each student was given a number, according to the arrangement of the desks, which was written down on the listing form. Based on this numbering, the interviewers were able to select the students to be interviewed.

Regarding the interviews with directors of studies, the names of the professionals responsible for the primary education (4th and 5th years), the lower secondary education, and upper secondary education were listed in alphabetical order in each school, to select a director of studies to be interviewed.

Several actions were developed to ensure the greatest possible standardization of data collection. The standard situations adopted are described in Table 5, in addition to the number of cases recorded at the end of data collection. Every time interviewers called a number on the list of schools to try to schedule a visit, the final outcome of that call was recorded, according to the procedures explained below, which allowed for follow-up through the detailed call history.

The situations were monitored through weekly controls that contained a summary of the number of schools by situation in each stratum, in addition to information about the number of schools scheduled and completed and missing interviews.

TABLE 3

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Number of cases recorded by field situation

Situations	
Did not speak to school representatives	165
Spoke with school representatives, but was not able to schedule a visit	59
Completed schools	1 023
Definite impossibility of conducting interviews	149

In order to reduce the number of lost interviews, when the situation was "Wrong number" or "Phone number does not exist," the researchers looked for alternative phone numbers on the Internet, using the name of the school as the keyword. The same procedure was carried out with the institutions selected for the sample that did not have a registered telephone number on the listing. Furthermore, throughout the field stage, requests for support were sent to all education departments responsible for the institutions selected in the sample, in order to obtain updated schools' telephone numbers and authorization to conduct the interviews.

DATA COLLECTION RESULTS

In the ICT in Education 2024 survey, 1,023 schools located in urban and rural areas were interviewed, reaching 73% of the planned sample of 1,396 schools. In terms of the survey analysis units, the 2024 data collection process resulted in 10,756 interviews, which were distributed as follows:

- 954 schools that answered the questionnaire for school managers, totaling 954 school managers interviewed;
- 864 schools that answered the questionnaire for directors of studies, totaling 864 directors of studies interviewed;
- 989 schools that answered the questionnaire for teachers, totaling 1,462 teachers interviewed; and
- 1,015 schools that answered the questionnaire for students, totaling 7,476 students interviewed.

The distribution of response rates varied among regions and administrative jurisdictions. The results are shown in Table 4.

At the end of the data collection process, 36 schools from selection strata no responding schools were excluded. The final universe represented by the survey resulted in 129,973 schools.

TABLE 4

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School response rate by federative unit, administrative jurisdiction, and location

Brazilian macro-region	Federative unit	Response rate (%)
North region	Acre	88
	Amapá	75
	Amazonas	56
	Pará	80
	Rondônia	65
	Roraima	100
	Tocantins	100
Northeast region	Alagoas	83
	Bahia	65
	Ceará	79
	Maranhão	50
	Paraíba	71
	Pernambuco	88
	Piauí	76
	Rio Grande do Norte	71
	Sergipe	54
Southeast region	Espírito Santo	89
	Minas Gerais	79
	Rio de Janeiro	65
	São Paulo	63
South region	Paraná	83
	Rio Grande do Sul	77
	Santa Catarina	93
Center-West region	Federal District	78
	Goiás	79
	Mato Grosso	76
	Mato Grosso do Sul	57

CONTINUES ▶

Administrative jurisdiction		Response rate (%)
Federal		82
State		82
Municipal		85
Private		39
Location		Response rate (%)
Urban		73
Rural		74

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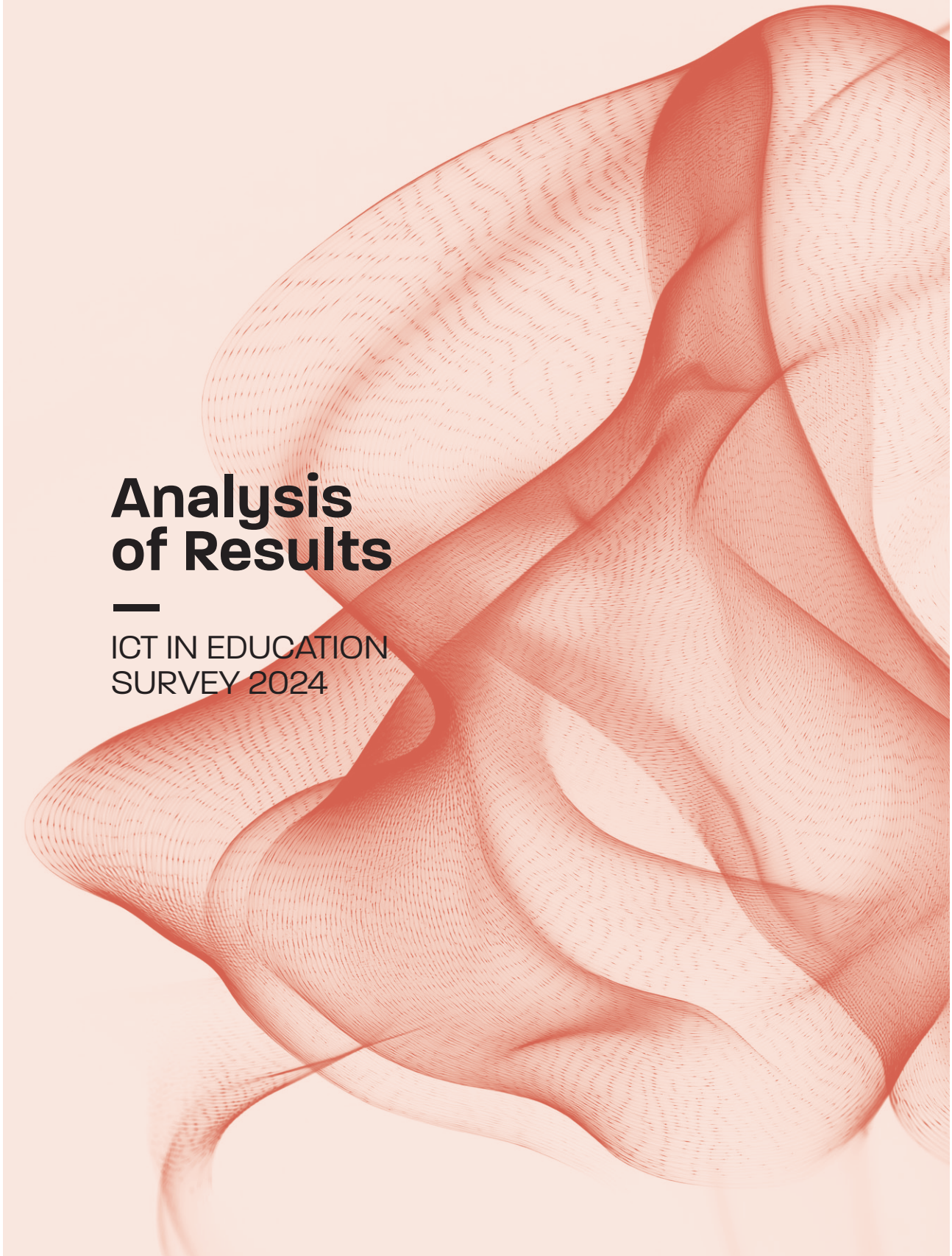
Analysis of Results

ICT IN EDUCATION SURVEY 2024



Analysis of Results
ICT in Education 2024

On January 13, 2025, Law No. 15.100, regulated by Decree No. 12.385, of February 18, 2025, came into force in Brazil, providing for the use of personal portable electronic devices by students in public and private basic education schools.

Although the debate surrounding Law No. 15.100/2025 has focused on restricting the use of cell phones by students in schools, the document *National operational guidelines on the use of digital devices in school spaces and on the curricular integration of digital and media education* (CNE/CEB Resolution No. 2, 2025) included other resources for processing, storing and transmitting information, such as computers, notebooks, tablets, robotics kits, audiovisual kits, and smart watches.

Based on these documents, only the pedagogical use of these devices, with the guidance and mediation of educators, is now permitted and encouraged, depending on the level of education to which the students are linked. Exceptions, such as the use of personal digital resources for accessibility or in cases of emergency, for example, are now assessed by educational institutions, together with families.

These documents reflected the national debate already underway in society, especially among parents, guardians, and institutions dedicated to the education and care of children, about the impacts of digital devices and services on the cognitive and psychosocial development of this population. This debate was intensified by reports of sexual exploitation and adultization[1] of children, culminating in Law No. 15.211, passed on September 17, 2025, which provides for the protection of children in digital environments, also known as the Digital Statute of the Child and Adolescent or Digital ECA.

While Law No. 15.100/2025 and Resolution No. 2 of CNE/CEB/2025 deal with measures to be adopted by education networks, educational institutions, and families, the Digital ECA addresses the responsibilities of providers of information technology products or services in taking measures to protect and guarantee the best interests of children, when they are aimed at or likely to be accessed by this population.

[1] More information at https://www12.senado.leg.br/noticias/materias/2025/09/18/adultizacao-lula-sanciona-estatuto-que-protege-crianca-e-adolescente-na-internet

The discussion about restricting the use of digital technologies reflects apprehension about the technical, social, and political transformations observed in digital media. The spread of systems based on algorithms and Artificial Intelligence (AI) is a major point of attention. Another aspect concerns the progressive centralization of information flows within specific applications (Zuboff, 2021), to keep users linked to the content and services they disseminate.

The institutions that control users' attention also monitor the data they generate and have more power in the digital sphere, in what has been called the attention economy (5Rights Foundation, 2023). In addition, the experience of users in digital spaces has been marked by the circulation of misleading content, misinformation, the dissemination of hate speech, the creation of opinion bubbles (Pariser, 2012), algorithmic profiling (Kanwal et al., 2024), and platformization (van Dijck et al., 2018), among other issues considered critical in relation to digital services.

Although it is possible to observe changes in the way society understands access to digital services, especially in the last decade, there is still recognition of the importance of Internet access, not only for guaranteeing the right to freedom of opinion and expression, but also for other human rights, according to the United Nations (UN) report published in 2011 (UN, 2011). Just over a decade later, in 2024, the commitment to ensuring that the Internet remains open, global, stable, and secure was ratified by the UN (2024) as one of the priorities set out in the Global Digital Compact.

The impacts of digital inequalities and the urgent need to disseminate digital education across the population are aspects that continue to feature in the debate on individuals' participation in digital ecosystems. In this context, schools are becoming increasingly important as spaces for promoting qualified access to information and knowledge, critically training students to act in society, caring for biopsychosocial development, and improving skills so that students from different social contexts can act as producers of sustainable, ethical, and based on the common good technologies (Hui, 2020).

However, for education, especially public education, to fulfill this role, it is still necessary to overcome the challenges of equity, inclusion, and accessibility, both in providing access and in keeping students in schools. These challenges also include the adoption of measures aimed at qualifying teaching performance and rethinking the objectives and formats for digitizing teaching, learning, and management processes, so that digital resources can be a means of promoting opportunities while preserving digital rights (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2025a).

The results of the 2024 edition of the ICT in Education survey show how these themes are embedded in schools' daily life, presenting opportunities, challenges, and areas of attention for educational policies. The data for this edition of the survey was collected between August 2024 and March 2025, through structured interviews with students, teachers, directors of studies, and managers of public and private primary and secondary education schools, located in urban and rural areas.

This analysis is organized into the following thematic sections:

- Availability of digital technologies and development of educational activities in basic education schools.

- Mediation, participation, and student well-being in digital environments.
- Adoption of digital systems and resources in teaching and learning activities.
- Digital and media education, digital citizenship, and computing in the school curriculum.
- Continuing professional development for educators.

Availability of digital technologies and development of educational activities in basic education schools

STUDENTS' USE OF THE INTERNET AND DIGITAL DEVICES IN SCHOOL SPACES

According to the 2024 edition of the ICT in Education survey, 87% of primary and secondary education students were Internet users.[2] Of these students, 75% accessed the Internet at school, with higher proportions among students in lower secondary education (83%) and secondary education (93%). Between the 2022 and 2024 editions of the survey, there were greater differences in the proportions of Internet access at school among students from schools located in rural areas (Chart 1).

CHART 1

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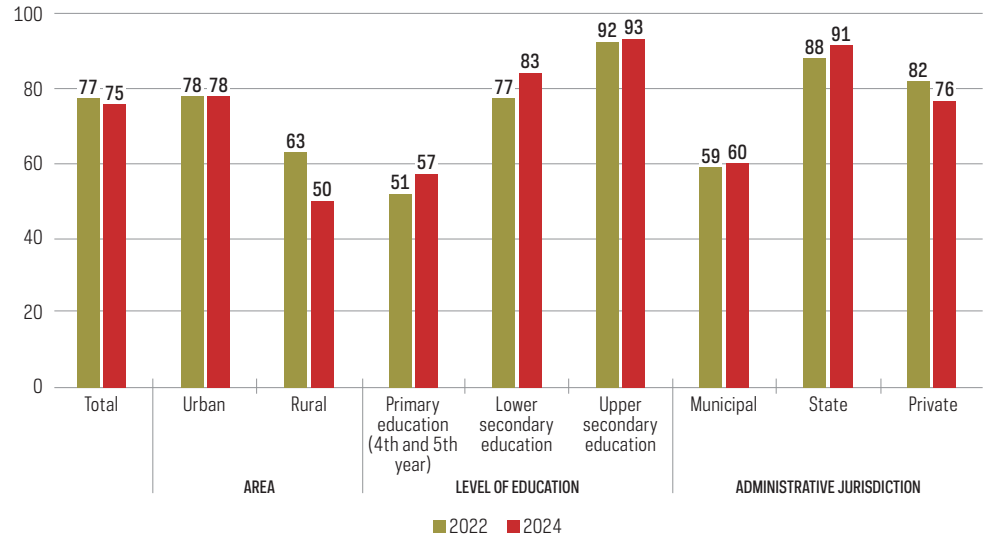
Students who accessed the Internet at school (2022 and 2024)

Total number of primary and secondary education school students who are Internet users (%)



[2] According to the International Telecommunication Union (ITU), an Internet user is anyone who has accessed the Internet in the last three months, regardless of the device used, the type of connection, or the frequency of use. More information at ITU Databank: https://databank.worldbank.org/metadataglossary/world-development-indicators/series/IT.NET.USER.ZS

Also according to the 2024 edition, to access the Internet at school, 55% of primary and secondary education students said they used the institutions' computers, such as tablets (21%), desktops, (38%) and laptops (42%). Data on Internet access via school computers among students at schools located in urban and state areas showed growth between the 2022 and 2024 editions of the study. In 2022, 5% of students in state schools used school tablets to access the Internet, a proportion that rose to 32% in the 2024 edition. Among students from schools located in urban areas, these proportions rose from 7% to 23%.

There was also an increase in the proportion of state school students who used laptops to access the Internet at school—from 30% in 2022 to 58% in 2024. The proportion of state school students using laptops was also higher than that of students in municipal schools (32%) and private schools (32%).

At the same time as the data indicated the spread of access to connectivity resources by students in certain school contexts, such as state institutions and those located in urban areas, it also pointed to the existence of inequalities: 29% of students in the North and 31% of pupils in the Northeast accessed the Internet at school via computers belonging to the institutions, a proportion that was 54% in the Center-West, 64% in the Southeast, and 87% in the South.

These inequalities were also present in the data collected from students on the reasons for not accessing the Internet at school. While 32% of students in schools located in urban areas who did not access the Internet at school said that "the school's Internet signal was weak or poor" and 31% that "the school lacked a computer", these proportions among students from schools located in rural areas reached 53% and 49%, respectively.

Data on the availability of digital devices and the Internet in schools across different education networks was reflected in students' participation in learning activities during lessons. Carrying out research on the Internet, for example, was the activity mentioned in the highest proportions by primary and secondary education students who used the Internet (51%), followed by using the Internet to carry out lessons or exercises assigned by teachers during class, mentioned by 47% of all students. However, among students studying in institutions that did not have computers and Internet access for educational use, 22% carried out research on the Internet, and 19% carried out lessons or exercises assigned by teachers.

In addition to the lack of availability and challenges regarding the quality of connectivity in schools, among the reasons for not accessing the Internet in the institutions, students also pointed to aspects related to measures restricting the use of digital devices.

Analysis of the results of the 2022 and 2024 editions of the survey shows an increase in the proportion of students who mentioned that teachers did not use the Internet for educational activities (from 64% to 86%) and restrictions on the use of mobile phones by students in schools (from 61% to 81%).

The data collected from the students highlighted relevant aspects for analyzing changes in how the impacts of digital exclusion are understood. In particular, since the pandemic, aspects related to guaranteeing digital rights and safety and preserving well-being have come to determine access to the Internet and digital services. Regarding children, in certain spaces, times, and age groups, disconnection has come to be understood as a strategy to promote their cognitive and psychosocial development.

The implementation of stricter rules on access to digital platforms, applications, and systems, such as the increase in the minimum age for children to participate in social networks[3] or the ban on the use of digital devices,[4] especially personal ones, in schools, are examples of how the Internet access universalization agenda is now determined not only by the availability and quality of connectivity but also by issues related to risk prevention.

Policies restricting access to digital technologies intensify the need for a greater understanding of the impacts of digital inequalities on children and adolescents. The lack of Internet connection among families, care networks, and spaces frequented by children can pose risks to the development and guarantee of rights for this population (Trucco & Palma, 2020; UNESCO, 2025a), such as the lack of access to information, knowledge, education, public and assistance policies, and health, among other services and means of support that are mediated by digital technologies. The dissemination of access to connectivity in schools becomes even more relevant, not least to guarantee the provision of digital education for students.

CONNECTIVITY IN BASIC EDUCATION SCHOOLS

According to the data collected between the 2020 and 2024 editions of the ICT in Education survey, the proportion of schools with Internet access grew, especially in municipal schools (from 71% to 94%), smaller schools with up to 50 enrollments (from 55% to 87%), in the North (51% to 81%) and Northeast (77% to 98%), and in rural areas (52% to 89%). In the same period, there was also an increase in the proportion of primary and secondary education schools with fiber-optic connections, from 40% to 53%. Among public schools, this proportion rose from 35% to 49%.

It is worth noting that expanding fiber-optic connections in public educational institutions is one of the goals set out in the National Strategy for Connected Schools (Enec) (Decree No. 11.173/2023). Resolution No. 2 of the Executive Committee of the National Strategy for Connected Schools (Cenec) (2024) establishes a terrestrial connection speed parameter of 50 Mbps for institutions with up to 50 students in the period with the largest number of students; 1 Mbps per student for schools with more than 51 students; and up to 1 Gbps for schools with more than 1,000 students in the period with the largest number of students. According to the speeds reported by school managers, the 2024 edition showed that almost half of state institutions (46%) and municipal institutions (45%) had speeds of more than 1 Mbps per student during the periods with the largest student numbers.

[3] In Australia, the bill approved by the Senate established 16 as the minimum age for accessing social networks. In European Union countries, the processing of data from teenagers under the age of 16 by digital services requires parental consent. France also released a report on the use of TikTok by children and adolescents and proposed 15 as the minimum age for accessing the platform.

[4] According to data released by UNESCO, by the end of 2024, 40% of the world's education systems had implemented policies restricting or banning the use of mobile phones by students in schools. More information at https://www.unesco.org/en/articles/smartphones-school-only-when-they-clearly-support-learning

Despite these advances, basic education institutions still faced challenges related to equipment capacity and maintenance. In around a third of schools in the municipal network (34%), the Internet could not always or almost always support simultaneous access for many users. In 39% of state schools, managers said that "the Internet signal did not reach the rooms farthest from the routers." For 19% of school managers in public establishments, there was always or almost always "a lack of maintenance of the school's Internet equipment". These challenges made it particularly difficult to share Internet access between school spaces.

In addition to the quality of the Internet connection, the availability of digital devices was still one of the biggest challenges to expanding connectivity in schools. Although 89% of primary and secondary education schools had at least one computer for general use, a smaller proportion of institutions (62%) had digital devices for student use in educational activities, especially in municipal schools and those located in rural areas (Chart 3).

Regarding the types of computers available for use in educational activities, the data showed an increase in the presence of laptops and tablets in schools between the 2022 and 2024 editions of the survey. The presence of tablets in municipal schools rose from 18% to 25% and in state schools from 25% to 36%. During this period, the proportion of municipal schools that had laptops rose from 28% to 38% and, in state schools, from 59% to 68%.

CONNECTIVITY FOR USE IN EDUCATIONAL ACTIVITIES

Between the 2020 and 2024 editions, classrooms were the school spaces that showed the highest levels of growth in the proportion of schools with Internet access, rising from 68% to 88% of all primary and secondary education schools. The presence of Internet access in classrooms had already been widespread among most private schools since the 2020 edition and showed significant growth among public schools (Chart 2).

However, regarding the availability of Internet access in classrooms for student use, the data showed differences between public and private schools. However, while the proportion of public schools with Internet access available for student use in classrooms showed an upward trend between the 2020 and 2024 editions of the survey, in private schools, these proportions fell from 70% to 52%.

CHART 2

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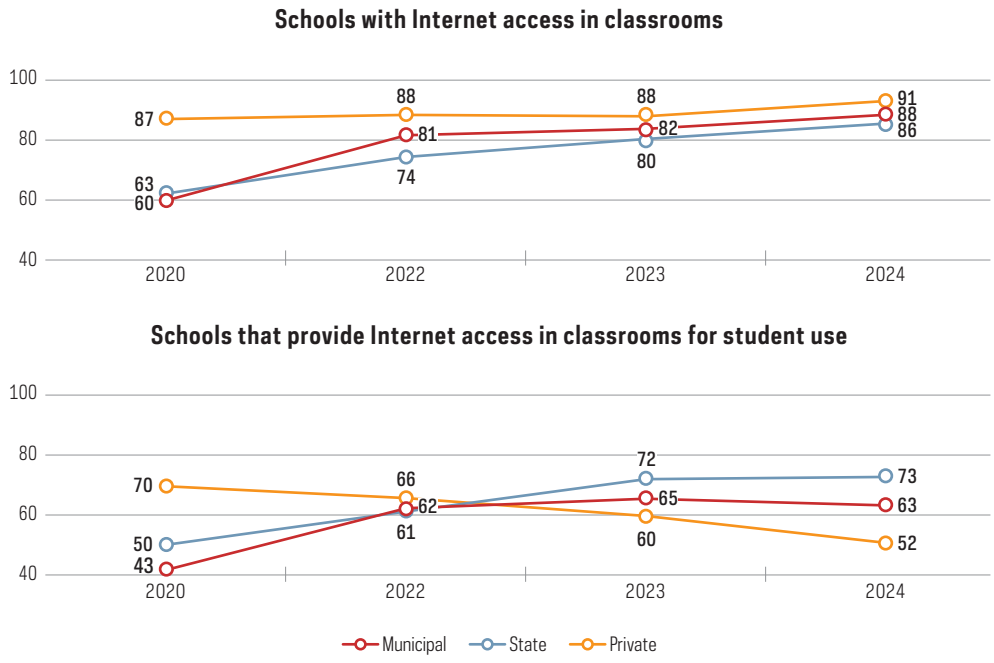
Schools with Internet access, by Internet access in classrooms and availability of access for students in educational activities and administrative jurisdiction (2020–2024)

Total number of primary and secondary education schools with Internet access (%)



The debates held in 2024 regarding the risks posed by children's use of digital devices and services, which culminated in the enactment of Law No. 15.100/2025, may have affected the results in private schools. The measures restricting the use of digital devices have introduced new practices in schools, not only with regard to the management of students' personal devices, such as mobile phones, but also with regard to digital devices and resources. This led to the reorganization of educational activities mediated by these technologies and the school spaces where they could be used.

Although these new practices apply to all stages of basic education, they have a greater impact on the daily lives of institutions serving younger students, such as preschools and primary schools. According to the CNE's National operational guidelines (CNE/CEB Resolution No. 2/2025), the use of digital technologies by students in schools should be implemented gradually, depending on the level of education. In preschool, the use of digital resources with students, even for pedagogical purposes, is not recommended, and in primary education, it should be balanced and restricted, based on educational objectives grounded in students' best interests.

Although data collection for the 2024 edition of the ICT in Education survey[5] focused on the period prior to the enactment of the new legislation (Law No. 15.100/2025), it is possible to observe trends in the results that indicate changes in the adoption of digital technologies in activities with student participation in schools.

In addition to classrooms, 43% of connected primary and secondary education schools also had Internet access available for students to use in libraries or study rooms, 33% in computer labs, 13% in multimedia rooms or labs, and 8% in robotics resource labs. Of all schools with Internet access, 80% had access available for students in at least one school space.

In addition, 59% of the institutions had at least one school space with Internet access and at least one computer for students to use in educational activities (Chart 3). While in the 2022 edition, 73% of private schools had computers and Internet access for students, in the 2024 edition, this proportion fell to 66%. The reduction in the proportion of private schools adopting digital devices is evident in the data collected from teachers. Among private school teachers, the use of computers in activities with students fell from 77% in the 2021 edition to 69% in the 2024 edition, while for teachers who taught in public schools, these proportions rose from 58% to 74%.

CHART 3

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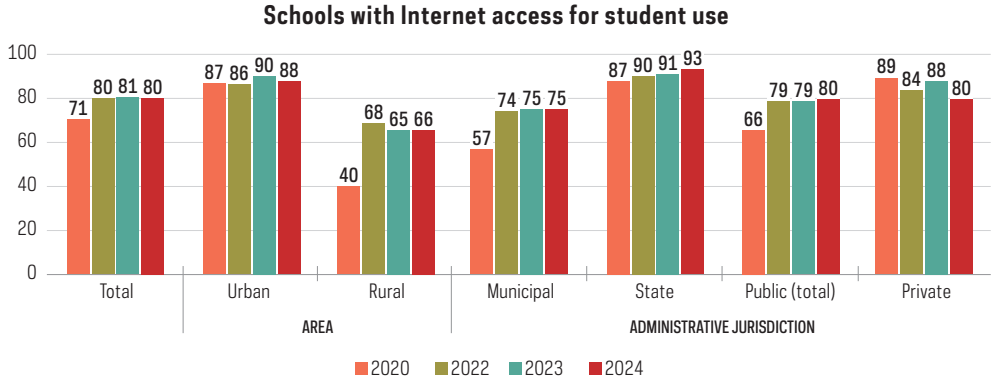
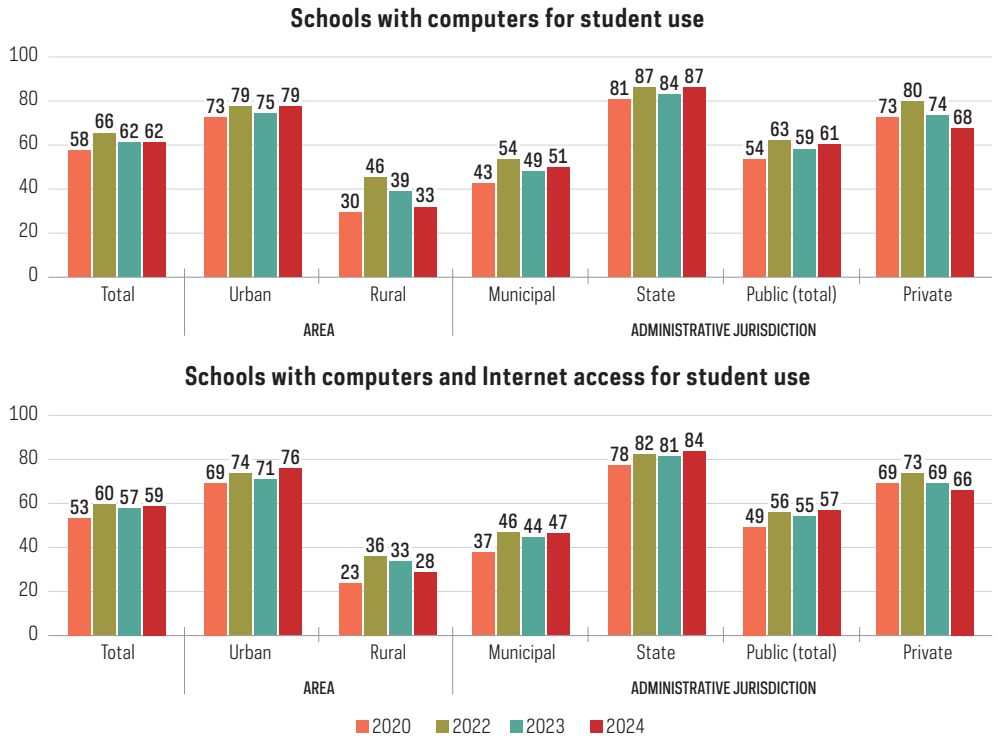
Schools with computers and Internet access for student use in educational activities (2020–2024)

Total number of primary and secondary education schools (%)



[5] Data collection for the 2024 edition of the ICT in Education survey took place between August 2024 and March 2025, mainly covering the period prior to the enactment of Law No. 15.100 by the Ministry of Education (MEC) in January 2025.



Of the total number of primary and secondary education school teachers, 55% said that the fact that students' attention is scattered when using digital technologies in the classroom was one of the difficulties they faced when adopting digital devices in educational activities. This proportion was 47% among municipal school teachers, 58% among state school teachers, and as high as 64% for private school teachers. In the case of the latter, this was the main difficulty encountered, followed by the prohibition of mobile phones in schools or classrooms (49%), also mentioned by 57% of teachers in municipal schools and 30% of those in state schools.

The impact of excessive use of digital technologies on students' attention during lessons was also highlighted by the 2023 Global Education Monitoring Report, *Technology in education: A tool on whose terms?* (UNESCO, 2023a). Based on data collected from education systems across various countries, the report concluded that the adoption of digital technologies could offer opportunities to improve learning, provided the use of these resources is guided by well-defined educational objectives, mediated by educators, and respects students' developmental stages. The report's findings have strengthened the case for implementing policies to reduce students' access to digital technologies, especially in schools.

Mediation, participation, and well-being of students in digital environments

STUDENT USE OF PERSONAL DIGITAL DEVICES AT SCHOOL

The data collected from the school community indicates that some school institutions and networks were already adopting measures to restrict the use of mobile phones and other digital devices by students, even before the enactment of Law No. 15.100/2025. Movements led especially by public institutions and civil society,[6] as well as by families,[7] have amplified the debate on the impacts of the use of digital devices and services by children (Secretariat of Digital Policies of the Social Communication Secretariat of the Presidency of the Republic [SPDIGI- Secom] & Alana Institute, 2025).

According to the 2022 edition of the ICT in Education survey, 55% of primary and secondary school students who used the Internet did so at school on their personal mobile phones. In the 2024 edition, this proportion fell by 10 percentage points to 45%. The biggest differences in the proportions of students using mobile devices between the two editions of the study were observed among students in municipal institutions (from 32% to 20%), private institutions (from 64% to 46%), and those located in rural areas (from 47% to 30%).

Concerning the implementation of restrictive measures by schools, between the 2023 and 2024 editions of the survey, the proportion of institutions that did not allow students to use mobile phones increased (from 28% to 39%). The proportion of those who allowed use in certain locations and at certain times decreased (from 64% to 56%).

Although the data on prohibiting mobile phone use varied across all strata published by the survey, especially between municipal and private institutions, the highest levels were observed among institutions that catered to younger students, i.e., those enrolled up to primary education (Chart 4).

[6] More information at https://www.gov.br/secom/pt-br/assuntos/noticias/2024/06/grupo-de-trabalho-se-reune-em-brasilia-para-avancar-na-elaboracao-de-guia-para-uso-consciente-de-telas

[7] More information at https://movimentodesconecta.com.br/

CHART 4

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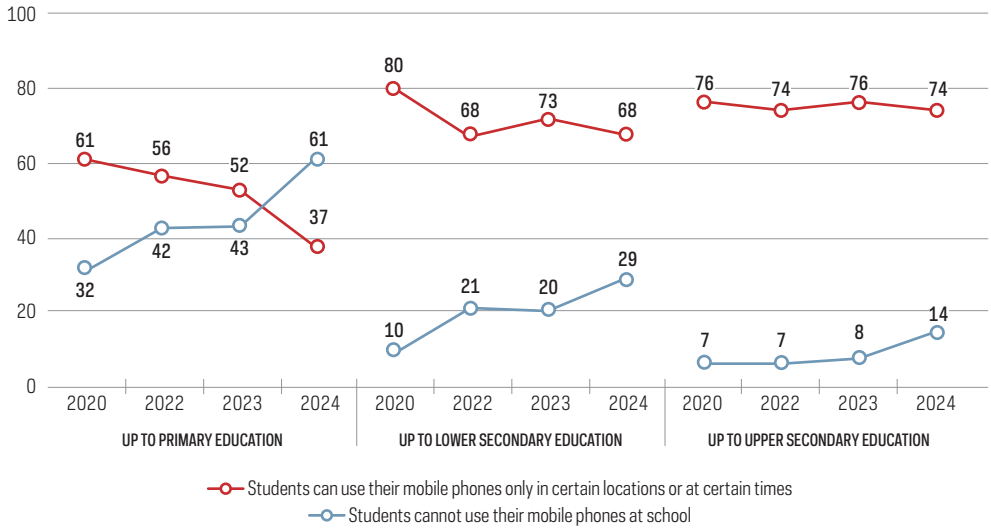
Schools by criteria for the use of mobile phones by students at school and highest level of education offered (2020–2024)

Total primary and secondary education schools (%)



The debate on the use of digital devices by students was also present in meetings with parents, legal guardians, and teachers. According to school managers, 68% of schools had carried out meetings with teachers and other staff in the 12 months prior to the survey to discuss the use of digital technologies in the institutions, and 60% held meetings with parents and legal guardians. Among the topics discussed at these meetings, the rules for the use of mobile phones by students on school premises were mentioned in the highest proportions by all school managers (70%), reaching 82% among schools that catered to students up to lower secondary education and 83% in institutions that catered to students up to upper secondary education.

In addition, the impacts of the use of digital technologies on mental health (62%) and actions in relation to sensitive situations that occur on the Internet with students in schools, such as cyberbullying, discrimination, and leaking images without consent (61%), were also addressed in meetings with parents, legal guardians, and teachers. Among the managers of schools that worked with students up to the upper secondary education level, 78% said that the actions taken in relation to sensitive situations that occurred on the Internet with the school's students had been discussed during the meetings, and 74% said that the impact of digital technologies on their mental health had been addressed.

These discussions were also reflected in the activities teachers carried out with students during class. Discussions promoted by teachers regarding the rules on the use of personal mobile phones on school premises were mentioned by a large number of students, especially those in lower secondary education and upper secondary education (Chart 5).

CHART 5

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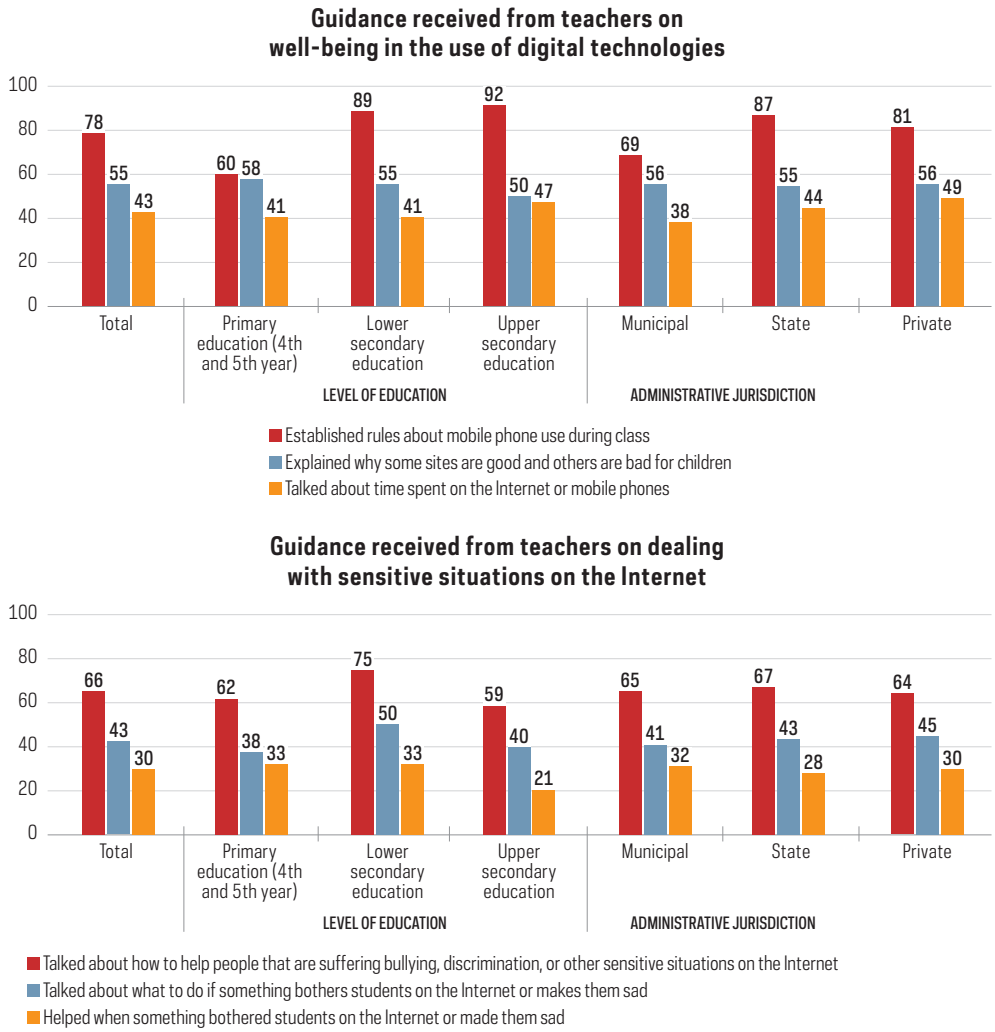
Students who received guidance and support from teachers in the three months prior to the survey on well-being and dealing with sensitive situations on the Internet (2024)

Total number of primary and secondary education school students who are Internet users (%)



On the other hand, discussions about why digital resources could pose risks to children, or how students could interact with digital environments safely, critically, responsibly, and creatively, were mentioned less frequently by students. According to 55% of students in lower secondary education, teachers explained why some sites are good and others are bad for children, and 41% said teachers discussed the time spent on digital devices.

PREVENTION, MEDIATION, AND SUPPORT FOR DEALING WITH SENSITIVE SITUATIONS WHEN INTERACTING WITH DIGITAL SERVICES

The data collected from the students also showed that topics related to dealing with sensitive situations on the Internet were present in interactions between students and teachers. According to 66% of primary and secondary school students, teachers discussed in class how to help people who were suffering from bullying, discrimination, or other sensitive situations on the Internet. In addition, 43% pointed out that teachers talked about what to do if a sensitive situation occurred. This proportion was even higher among students in lower secondary education.

Schools are part of the protection network for children, which also includes health care, social services, and public security services, child protective services, the Public Prosecutor's Office, and municipal councils for children's rights, among other entities (Jucá & Costa, 2025; Vinha et al., 2023). The importance of schools was highlighted in data collected from students: 69% of primary and secondary school students said they could count on professionals such as educators and psychologists to be present at their schools if they encountered a sensitive situation in digital environments.

However, this opportunity for support was not spread equally among students. While 80% of students in private schools mentioned having this kind of support from their schools, this proportion was lower among those in municipal schools (62%), those studying in institutions located in rural areas (57%), and those without access to the Internet and computers for student use (61%).

Teachers play an important role in supporting students, even among the youngest and those studying in institutions with the worst connectivity conditions. According to the 2024 edition of the ICT in Education survey, 30% of students said they had received help from a teacher at school when something bothered them or made them feel sad while using the Internet, a proportion that was 33% among primary education students.

In addition, 64% of all primary and secondary education school teachers said they had supported students in dealing with sensitive situations that had occurred on the Internet in the 12 months prior to the survey, a proportion that reached 72% among upper secondary education teachers, 70% among state school teachers, and 67% among private school teachers.

The sensitive situation faced by students, for which the highest proportion of teachers reported offering support, was the excessive use of digital games and technologies (Chart 6). Between the 2021 and 2024 editions of the survey, the proportion of teachers who reported supporting students on this issue rose from 32% to 54%. The highest levels of growth for this indicator were observed among teachers who taught students in lower secondary education – between 2022 and 2024, this proportion rose from 50% to 58% – and those who worked in upper secondary education (from 42% to 58%).

Excessive use of digital technologies, especially mobile devices, has been associated with various risks to the development of children, such as delays in motor skills, anxiety, and the induction of self-harm behaviors (Secretariat of Digital Policies of the Social Communication Secretariat of the Presidency of the Republic [Secom], 2024). Teachers play an important role in realizing that students need support and backing them up, guiding families in adopting healthy, responsible, and critical measures for using digital technologies

and promoting opportunities for students to reflect on the positive and negative impacts of these resources on their daily lives (ECPAT International & Eurochild, 2024; Jucá, 2024).

CHART 6

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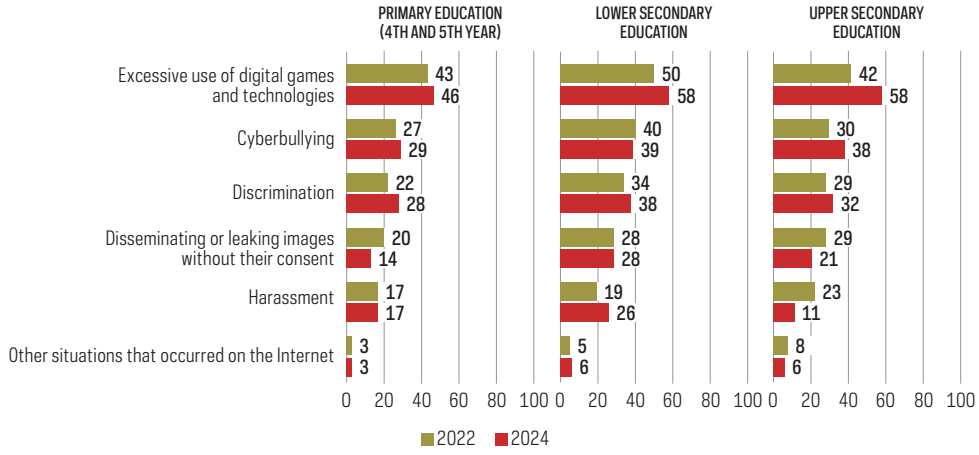
Teachers who supported students in dealing with sensitive situations that occurred on the Internet in the 12 months prior to the survey, by types of situations and highest level of education offered (2022 and 2024)

Total number of primary and secondary education school teachers (%)



In addition, 35% of teachers reported mediating offensive actions carried out by students on the Internet in the 12 months prior to the survey. In this case, 23% said they had acted with students regarding cases of discrimination against classmates on the Internet. In similar proportions, teachers also mentioned having mediated the dissemination of fake information (20%), hate speech and cyberbullying (20%), and leaking images on the Internet without consent (19%).

Another piece of data that showed the school community's concern about the impact of digital technologies on students' well-being concerned the conversations and discussions teachers have with students about the physical and mental health problems caused by the Internet (67%). These activities were mentioned by 68% of primary education teachers, 67% of lower secondary education teachers, and 66% of upper secondary education teachers. Between the 2021 and 2024 editions, this percentage rose from 55% to 86% in municipal schools.

In addition to supporting students in sensitive situations on the Internet, teachers also play an important role in guiding students in the safe, responsible, critical, and creative use of digital technologies. Topics related to cyberbullying, hate speech, and discrimination on the Internet were addressed by a large proportion of teachers—75% of all primary and secondary education school teachers—and in similar proportions among teachers at the different levels of education: 77% of those who taught primary education, 76% in lower secondary, and 71% in upper secondary education.

Adoption of digital systems and services in teaching and learning activities

DIGITAL SERVICES AND AI-BASED SYSTEMS USED BY STUDENTS IN LEARNING ACTIVITIES

In addition to schools, the places most mentioned by students for accessing the Internet were at home (99%), in other people's houses, such as friends' or relatives' (92%), and in other spaces, such as malls, churches, or cafes (68%). In addition, 60% of students connected to the Internet while on the move (60%) and 8% while working—24% among upper secondary students.[8]

A large number of students mentioned carrying out learning activities outside of school. Of the total number of primary and secondary education school students who used the Internet, 86% said they used it in other spaces outside of school to search for information about a subject or tasks they did not understand well, and 84% said they carried out research for school assignments. In addition to activities directly related to schoolwork, they also mentioned using digital technologies to delve into other subjects. These activities were mentioned by the majority of students, even among the youngest, such as those in primary education (Chart 7).

CHART 7

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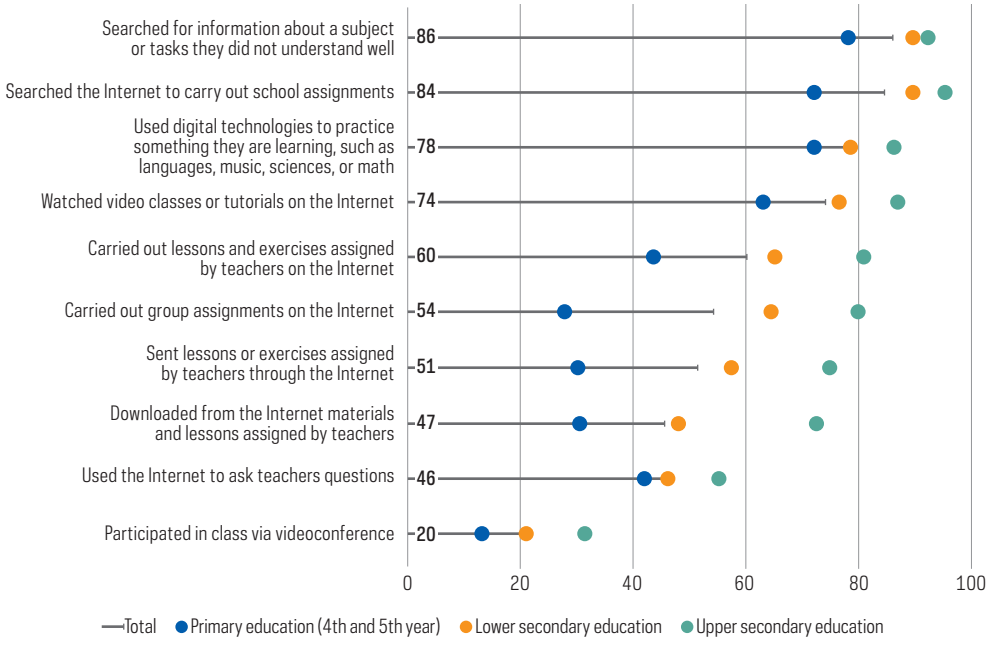
Students using the Internet outside of school hours for school activities in the three months prior to the survey and level of education (2024)

Total number of primary and secondary education school students who are Internet users (%)



[8] Among upper secondary education students, 28% were working and studying and 19% were looking for a job.

Considering the high proportion of students who said they used the Internet to carry out research for school activities, the 2024 edition of the ICT in Education survey included, for the first time, a question about the digital resources used by students to carry out this activity, as shown in Chart 8. In fairly similar proportions, students at different levels of education mentioned the use of search engines (74%) and video channels or apps (72%) as the main sources of information used in school research.

The adoption of social networking platforms also stands out in the data collected from students: 46% reported using these digital services as a source of information for school research. This proportion was higher than that of students who searched for information on a school site or platform (39%) and on a government site, portal, or platform (30%).

CHART 8

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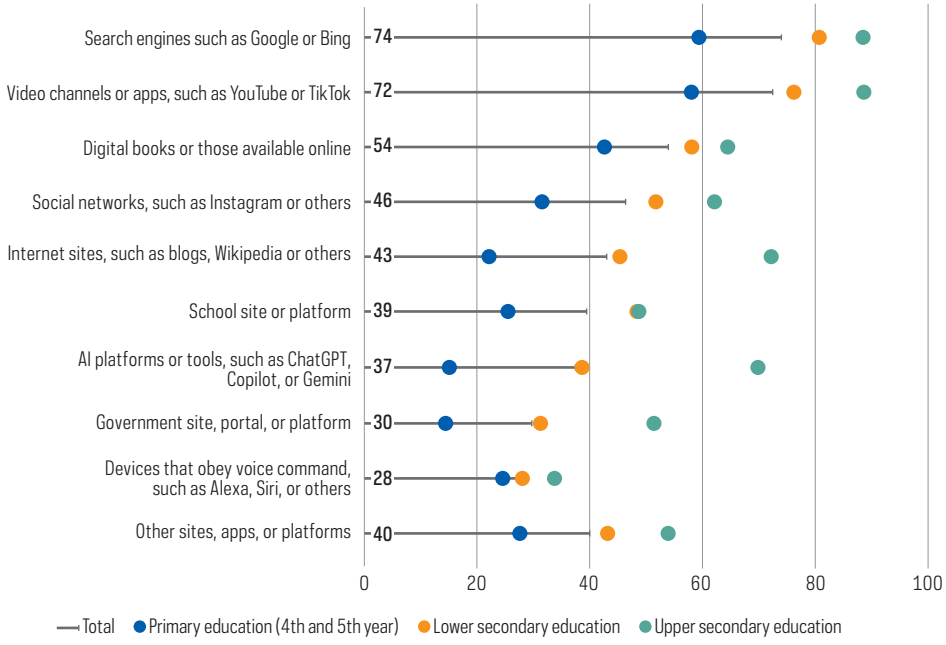
Students by digital resources used in research and school activities and level of education (2024)

Total number of primary and secondary education school students who are Internet users (%)



The intense use of platforms and applications such as social networks and video channels by students is a concern for researchers across fields, who highlight the risks of children being exposed to content in these environments (Otto, 2025; Pew Research Center, 2025; Su et al., 2021). They also draw attention to the impact of the persuasive design and dark patterns[9] used in these digital services on the cognitive and psychosocial development of young people (5Rights Foundation, 2023). Concern about these issues has been a main argument advanced by defenders of children's rights to support restricting the use of digital devices, especially personal mobile phones, in schools.

These concerns are further intensified by students' interactions with AI-based digital agents (Kuria, 2025; Stoilova et al., 2025). Of all primary and secondary education school students, 37% said they used generative AI platforms and tools to search for information for school assignments. Among upper secondary students, generative AI platforms and tools were among the most used resources for school research, mentioned by 70% of students, and at higher levels than other types of AI, such as Alexa, Siri, and other voice command devices (34%).

Focusing solely on risks can distract from the importance of young people's participation and protagonism in decisions about adopting these resources in critical areas of their development, such as education, health, social assistance, culture, security, mobility, inclusion, and accessibility (Hu, 2025). Researchers working on projects with children also emphasize the importance of identifying changes in how students access information, learn, and construct knowledge (Internetlab & Social Knowledge Network, 2025; Mann et al., 2025; Vasconcellos et al., 2025). For these researchers, as policies to protect the rights of children extend to digital environments, the means to encourage their participation should also accompany these advances (The Alan Turing Institute, 2025; UNESCO, 2025b).

AI-BASED SYSTEMS AND DIGITAL SERVICES ADOPTED BY SCHOOLS AND EDUCATORS

The survey results also highlighted the significant spread of digital platforms and services among educators and the presence of schools in digital environments. Among primary and secondary school teachers, 65% reported using at least one educational platform in the 12 months prior to the survey.

Monitoring student learning was one of the main uses teachers made of these educational platforms. Among teachers who used at least one educational platform for educational activities, access to reports on each student's performance and learning level (57%) was among the resources most mentioned by teachers.

In addition to resources for monitoring student learning, another function of educational platforms performed most frequently by teachers was the production of teaching resources for use in activities with students. Among the teachers who used at least one educational platform, 75% said they accessed didactic content and handouts available in the digital environment.

[9] Persuasive design is based on a combination of behavioral design theories and computer technology. It works by implementing reward and punishment systems to influence human behavior (Simon, 1971). In digital environments, these strategies are used to encourage users to spend more time on digital services, maximizing attention and engagement with content.

With advances in AI-based systems, educational platforms have begun offering tools to automate the creation and correction of educational content. Of all the teachers who used at least one educational platform, 78% said they used the AI resources present in these environments to generate questions, exercises, and tests and 48% used them to create gamified activities.

In addition, among the teachers who said they used at least one educational platform, 42% had used the resources present in these digital environments to carry out automatic correction of exercises and writing assignments, and 16% mentioned the use of automatic transcription of speech in class or presentations. The proportion using automatic correction of exercises and writing assignments reached 52% among upper secondary education teachers and 49% among those working in state schools.

Also according to the data from the 2024 edition of the survey, 96% of all primary and secondary education school teachers said they used digital technologies and the Internet to carry out educational activities. The adoption of digital resources in the assessment of student learning was the activity that showed the greatest growth between the 2022 and 2024 editions of the survey, rising from 54% to 69%.

Among the strategies teachers adopted to assess student learning using digital technologies, digital tools that gamified assessment activities (43%) were most frequently mentioned. For teachers who taught in public schools, the proportion using gamification tools rose from 24% to 43% between the 2022 and 2024 editions of the survey.

In addition to such resources, 24% of primary and secondary education school teachers mentioned the use of assessment systems based on AI, such as resources that provide students with automatic personalized results for their performance, and 31% said they use digital tools based on AI that allow them to adapt assessment activities to the learning needs of students.

Teachers also said they used generative AI tools, such as ChatGPT, Copilot, and Gemini, to prepare didactic content, a resource mentioned by 43% of all primary and secondary education school teachers, with higher proportions among those who taught in upper secondary education (58%), urban schools (45%), state schools (46%), and private schools (51%), as shown in Chart 9.[10]

[10] According to the *Teaching and Learning International Survey* (TALIS), conducted by the Organisation for Economic Co-operation and Development (OECD) with lower secondary teachers in more than 50 countries, 36% of teachers said they used AI systems to prepare lessons. In Brazil, this proportion reached 56%. More information: https://www.oecd.org/en/publications/results-from-talis-2024-country-notes_e127f9e2-en/brazil_1e93d3b5-en.html

CHART 9

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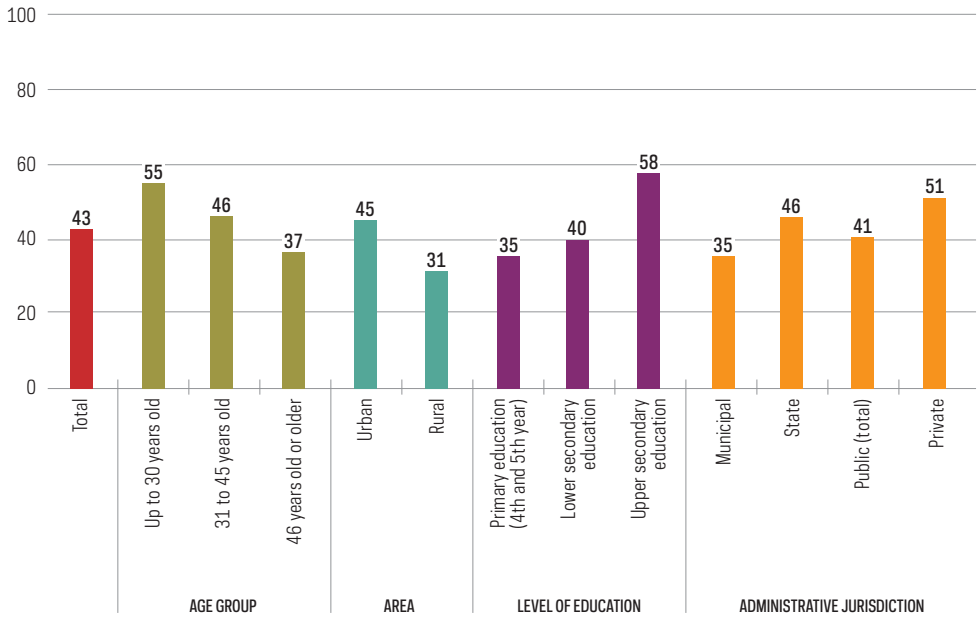
Teachers by use of generative AI tools when preparing didactic content (2024)

Total number of primary and secondary education school teachers (%)



AI tools were also present in school management processes, such as data analysis for decision-making, school security, or administrative tasks. For example, systems based on the collection of biometrics were used by schools to identify students. Of the total number of primary and secondary education schools with Internet access, 1% used fingerprint or palmprint student identification systems, and 3% used facial recognition identification systems. This proportion was 7% among institutions located in the South and 5% among those located in the Center-West.

The use of chatbots to interact with students, teachers, and family members was another way in which schools adopted AI-based resources. Of all primary and secondary education schools with Internet access, 38% had institutional applications, a proportion that reached 44% among state schools and 54% among private schools. In private schools, 22% had automated customer service using virtual assistants or chatbots in the institutional app.

Reducing the time spent on certain activities, improving educational provision, and tailoring educational activities to students' learning characteristics are among the opportunities offered by providers of such digital educational resources and services. However, the risks involved in tracking and profiling students when using digital platforms and applications raise concerns about the violation of rights related to privacy, personal data, digital identity, and the effects of platform design on student behavior (5Rights Foundation, 2023; Atabey et al., 2025; Hooper et al., 2022).

In addition, a proportion of institutions also used digital services that were not originally developed for educational use, as a means of promoting interaction with families and students, offering didactic materials to students, and disseminating the activities carried out in schools.

According to data from the 2024 edition of the survey, 74% of schools had used at least one educational platform in the 12 months prior to the survey. However, among institutions with sociodemographic and administrative backgrounds whose data showed lower connectivity capacity, lower proportions of adoption were observed. This was the case for municipal institutions (68%), those located in rural areas (61%), in the North (56%) and Northeast (68%), and smaller institutions, such as those with up to 50 enrollments (43%).

In these institutions, there was a greater emphasis on the use of social network apps and platforms. Between the 2020 and 2024 editions of the survey, the proportion of primary and secondary education schools that had profiles or pages on social networks rose from 64% to 72%. In rural schools, 29% had social network profiles or pages in the 2020 edition, a percentage that rose to 41% in 2024.

The main type of content posted on these pages or profiles was related to the dissemination of activities carried out by students, such as students' photos and videos (66%) or activities and assignments (66%). Although to a lesser extent, schools also used these digital environments to implement educational activities, such as sending newsletters to students, parents, and legal guardians (45%), receiving students' assignments and lessons (38%), and making video lessons available to students (34%). Sending newsletters to students, parents, and legal guardians was the resource most used on social network profiles or pages by schools located in rural areas (38%).

The level of use of social networks among teachers also indicated that these environments were very present in pedagogical practices. According to data from the 2024 edition of the survey, 82% of teachers mentioned using social networks in activities with students, with similar proportions among teachers by age group, teaching level, and context of the schools in which they taught.

Of all the teachers, 63% reported using digital technologies to answer students' questions. Of the resources adopted by teachers, instant messaging applications such as WhatsApp and Telegram were cited by 44% of all teachers, 58% of those who taught in schools located in the Northeast, 57% of those who taught in upper secondary education, and 55% of those who worked in schools located in rural areas.

Although educators, school administrators, and political decision-makers, among other members of the school community, play an important role in assessing the quality and risks involved in adopting digital technologies in educational activities, discussions on the subject emphasize that the online protection of children is not a responsibility to be assumed exclusively by these actors. The design of digital services that, by default, prevent and monitor risks to children has been considered one of the main strategies for ensuring the safety and protection of this population. This is the case, for example, with the joint initiative launched by UNESCO and the United Nations Children's Fund (UNICEF) (UNESCO & UNICEF, 2025), which aims to encourage the development of public learning platforms, validated according to levels of suitability for educational objectives and student-centered design.

BOX 1

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DIGITAL STATUTE OF THE CHILD AND ADOLESCENT

In Brazil, the adaptation of digital services to the best interests and protection of children is now supported by the Digital Statute of the Child and Adolescent (Law No. 15.211/2025). Based on the Statute of the Child and Adolescent (Law No. 8.069/1990) and the Brazilian Civil Rights Framework for the Internet (Law No. 12.965/2014), the Digital Statute establishes guidelines for digital products and services disseminated in digital environments.

The Digital ECA applies not only to digital technologies and services intended for use by children - such as games, educational, platforms and recreational applications - but also to all digital services likely to be used by or of interest to this population, such as "Internet applications, computer programs, software, terminal operating systems, Internet application stores and electronic games or similar connected to the Internet or other communications networks" (Law No. 15.211/2025).

According to Law No. 15.211/2025, suppliers of information technology products and services must develop systems that, by default, adopt security, privacy, and monitoring measures to preserve the rights of children. Suppliers are also responsible for moderating, removing, and reporting to the competent authorities content that is inappropriate or violates the rights of children and adolescents—such as exploitation, sexual abuse, kidnapping, and grooming. The adoption of age verification systems and ensuring that accounts or profiles of users under the age of 16 are linked to the accounts or profiles of their parents or legal guardians, as well as offering parental control tools, are also features that should be developed or improved by digital services.

The text of the Digital ECA also emphasizes the importance of parents or legal guardians, caregivers, educators, and other members of the protection network keeping an eye on the digital services used by or with children, and that they act on initiatives to prevent exposure to risks and preserve their well-being.

AVAILABILITY AND ADOPTION OF DIGITAL TECHNOLOGIES FOR STUDENTS WITH DISABILITIES

In the 2024 edition of the survey, 81% of Brazilian primary and secondary education schools said they served students with disabilities. Among schools located in urban areas, the proportion was 91%, the same as in state schools.

Regarding the availability of technological resources in primary and secondary schools for students' use, the survey found that 34% of schools had digital educational materials, such as audiobooks and games. In addition, a fifth of schools had computer accessories, such as adapted keyboards and mouses, microphones and speakers (20%), materials available in 27% of state schools, 19% of municipal schools, and 13% of private schools (Chart 10).

CHART 10

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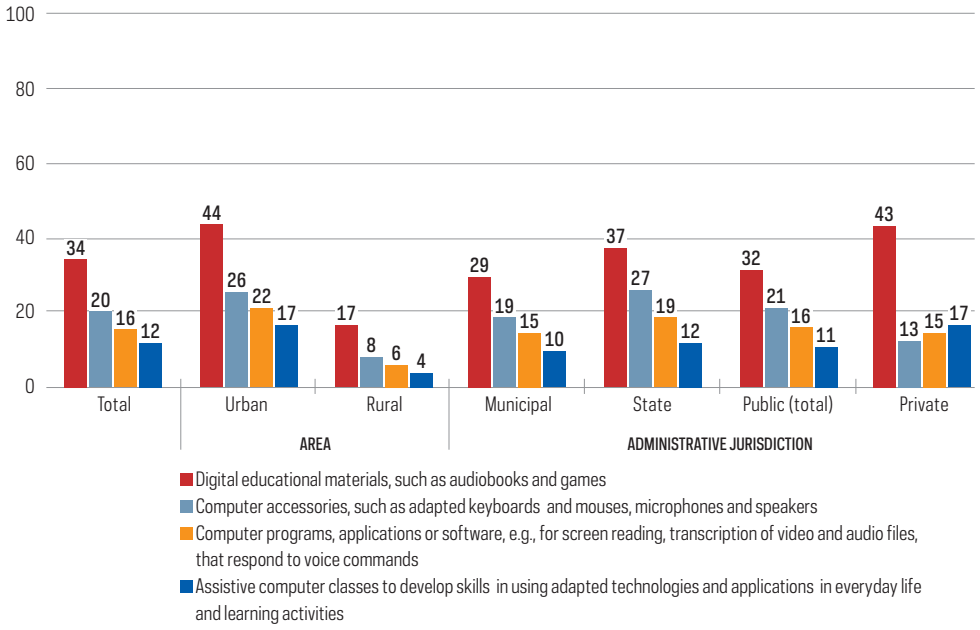
Schools by availability of technology resources for students with disabilities to use (2024)

Total primary and secondary education schools (%)



The survey revealed, however, that less than half of primary and secondary education schools had multifunction resource rooms[11] for specialized educational services (42%). This environment was present in just over half of state schools (53%), 42% of private schools, and 38% of municipal schools.

Also according to the survey, the proportion of primary and secondary education school teachers using digital educational resources in the teaching and learning activities of students with disabilities increased compared to the 2022 edition. In 2024, 42% of teachers used teaching materials or digital resources with students with disabilities, compared with 32% in 2022.

[11] Specialized educational care is made up of activities and pedagogical support for accessibility, carried out in a complementary or supplementary way to regular teaching practices. In this context, multifunction resource rooms (Normative Ordinance No. 13/2007) must be spaces equipped with devices, furniture, and specific teaching resources for specialized educational services. Should schools not have multifunction resource rooms, specialized educational services can take place in other spaces, as long as they meet the appropriate conditions, and it is important that students are able to do this in the school itself (Technical note from the Secretariat of Special Education [SEESP/GAB No. 11/2010]).

Among the teachers who had participated in continuing training in the 12 months prior to the survey (54%), 51% had taken initiatives to use technology in teaching students with disabilities. This proportion reached 52% in private schools, 47% in state schools, and 57% in municipal schools.

Digital and media education, digital citizenship, and computing in the school curriculum

DIGITAL AND MEDIA EDUCATION

The Digital ECA also highlights the importance of digital education and of providing children with opportunities to know their rights in digital environments and to understand how these digital resources work, as well as the opportunities and risks they entail (Law No. 15.211/2025).

In conjunction with the implementation of public policies and regulations that establish guidelines for guaranteeing rights and with the support of aware and qualified mediators—family members, educators, and caregivers, among others—the provision of critical digital education is also considered to be a key element in the effectiveness of students' critical, responsible, safe, and creative participation in online and offline environments.

In Brazil, digital and media education was established as a compulsory curricular element for school networks in the CNE's National operational guidelines (CNE/CEB Resolution No. 2/2025), but its guiding principles were already present in the National Digital Education Policy (Pned) (Law No. 14.533/2023) and in the Brazilian Media Education Strategy (Secom, 2023).

Between the 2022 and 2024 editions of the survey, the proportion of students who cited teachers and other educators at schools as sources of information about digital technologies increased. This trend reinforces the importance of educators and schools in the critical education of students about the opportunities, risks, and impacts of digital technologies on society and the development of the students themselves.

In 2022, 44% of students said they asked their teachers for support in finding information about digital resources, a proportion that rose to 56% in the 2024 edition. This growth was similar among the data collected from students at all levels of education—from 46% to 57% among students in primary education, from 43% to 54% among those in lower secondary education, and from 44% to 56% among those in upper secondary education—and even more pronounced among those in state schools (from 43% to 59%) and private schools (from 46% to 60%).

Also according to the students, the main topics of guidance received from their teachers were recommendations about what sites to use to carry out school work (51%) and how to check if information or news on the Internet is accurate (47%). As provided for in the guidelines for implementing digital education curricula in schools (Ministry of Education [MEC], 2025), the data showed that activities with students on these topics intensified according to the level of education (Chart 11).

The topics least addressed by teachers, according to the students, were those related to digital trails, monetization of content, algorithms, privacy, digital security, and AI. Among primary and secondary school students, 19% said their teachers talked to them about how to use generative AI apps in school activities, which is just over half the proportion who said they used these tools to search for information for educational activities outside of school (37%).

CHART 11

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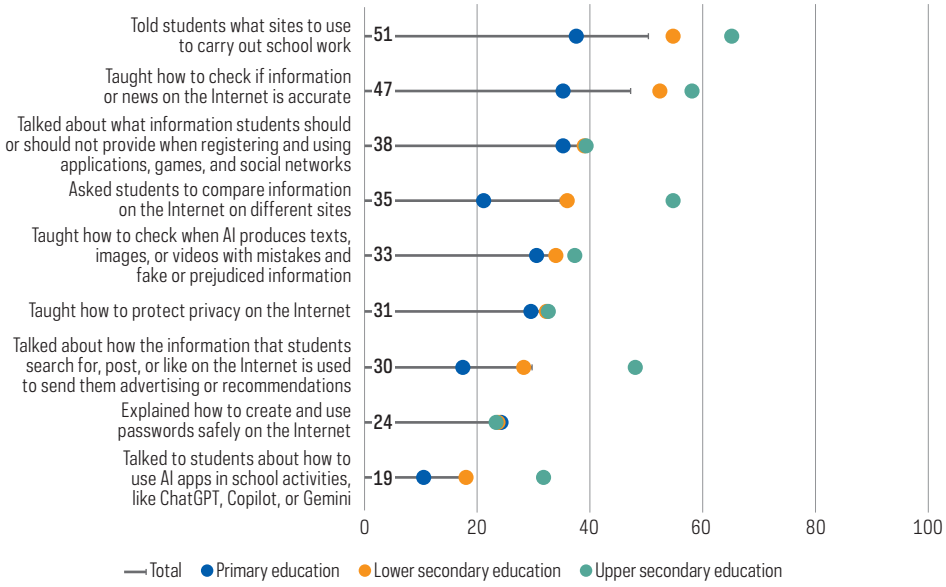
Students who received guidance and support from teachers on the use of digital technologies in the three months prior to the survey, by level of education (2024)

Total number of students in primary and secondary education schools who are Internet users (%)



Another relevant aspect of collecting data from students concerns the opportunities for them to act as producers of digital content and resources, encouraging not only safe, responsible, and critical use, but also the creative and ethical adoption of digital technologies (Frau-Meigs, 2024; Hu, 2025). The highest levels were observed among high school students—64% produced texts, presentations, charts, or spreadsheets, 29% generated or created music, videos, or images, 21% wrote texts for digital environments focused on disseminating news or authorial content, and 4% produced podcasts or content for web radio or radio online. However, the data still showed that these activities were not widespread among students (Chart 12).

CHART 12

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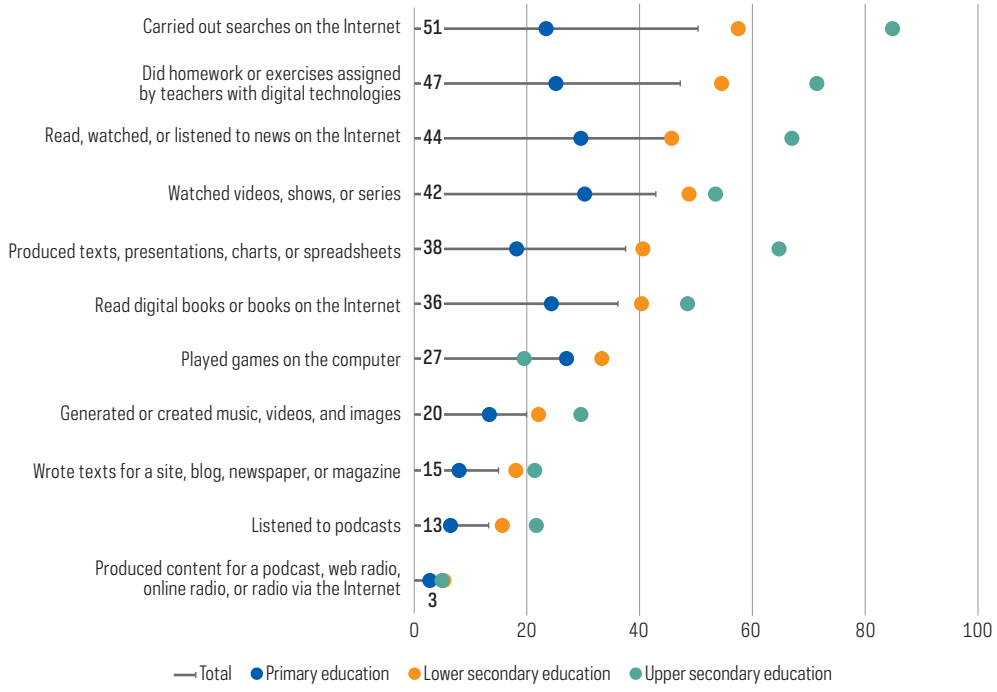
Students by use of digital technologies in learning activities at school in the three months prior to the survey and level of education (2024)

Total number of primary and secondary education school students who are Internet users (%)



The survey also indicated that a lower proportion of teachers carried out such activities. Of all primary and secondary school teachers, 22% said that they always or almost always asked students to use digital technologies to generate or create music, videos, presentations, and images, activities carried out by 25% of state school teachers and 27% of private school teachers. The use of digital resources to produce texts and reports based on the analysis of different sources of information was always or almost always requested of students by 25% of teachers—an activity implemented with students by 35% of private school teachers.

At the institutional level, according to 89% of the directors of studies, the school where they worked had carried out activities with students about the safe, responsible, and critical use of the Internet in the 12 months prior to the survey. This proportion was 83% among professionals in the municipal network, 97% in the state network, and 99% in the private network.

The topic most mentioned by the directors of studies whose schools offered activities for students was cyberbullying, hate speech, and discrimination on the Internet (86%), as shown in Chart 13. Other issues, such as physical and mental health problems caused by

the use of digital technologies (77%) and Internet exposure, harassment, or dissemination of images without consent (75%) were also mentioned in relevant proportions. Topics related to AI and algorithms were mentioned to a lesser extent.

CHART 13

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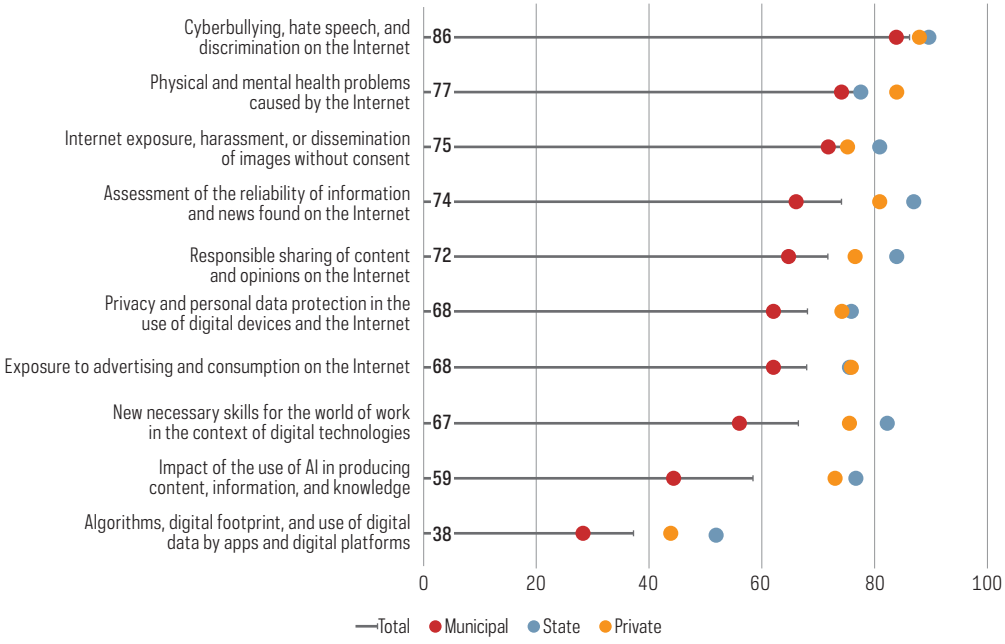
Directors of studies by topics of activities carried out by schools with students on the safe, responsible, and critical use of the Internet and administrative jurisdiction (2024)

Total number of directors of studies of primary and secondary education schools (%)



The directors of studies who worked in state and private institutions and in establishments that catered to students up to upper secondary school mentioned in greater proportions that they carried out activities on safe, responsible, and critical use of the Internet, especially on digital violence, physical and mental health problems, information integrity, and privacy.

Of the total number of directors of studies whose schools offered activities on the safe, responsible, and critical use of the Internet for students, 54% said these topics were covered across multiple subjects in the curriculum, 7% in one specific subject, and 9% through extracurricular activities. In addition, 30% of the directors said such actions occurred only when necessary, such as when students had questions or encountered sensitive situations; this proportion was 19% in state schools, 28% in private schools, and 36% in municipal schools.

Conversations and debates in classrooms (94%) and interdisciplinary projects carried out with students (78%) were the types of activities on the safe, responsible, and critical use of the Internet most cited by directors of studies. However, the frequency with which they were carried out revealed that they were not yet continuously disseminated in the curriculum of educational institutions: 18% of the directors of studies said that these topics were worked on at least once a week and 32% once a month, but 38% said that such topics were addressed with students less than once a semester, 5% once a year, and 6% less than once a year.

Even among state and private schools, for which data collected from the school community showed a more intense use of digital technologies by students or educational institutions, just over half of the directors of studies said that their schools had carried out this type of activity on a weekly or monthly basis: 56% among state school directors of studies and 54% of private schools.

COMPUTATIONAL THINKING

Digital education is also related to the development of computational thinking in schools, and its inclusion in the curriculum of education networks was instituted by the Norms on Computing in Basic Education — Complement to the National Common Curriculum Base (BNCC) (CNE/CEB Opinion No. 2/2022).

According to the 2024 edition of the survey, 12% of primary and secondary school students who were Internet users had taken part in robotics or programming classes at school in the three months prior to the survey. Students attending institutions located in the South (14%) and Southeast (18%) regions, in urban areas (12%), in the state network (16%), and in the private network (14%) mentioned taking part in this type of activity at school in proportions that are higher than average. Male students (14%), those 15 to 17 years old (18%), and those in schools located in the Center-West (17%), in urban areas (12%), and in the state system (16%) said that they had participated in robotics or programming activities in other spaces outside the school environment.

The offer of maker activities was mentioned by 27% of the directors of studies of primary and secondary schools, but this proportion reached 49% among state schools and 41% among private schools. Unplugged computing activities (24%), robotics (22%), and coding or programming (17%) were also mentioned in higher proportions among directors of studies in state schools, private schools, and schools catering to students at higher levels of education, such as upper secondary school.

Regarding the implementation of the computing curriculum, 15% of the directors of studies said the school had implemented it through a specific subject, 13% transversally across the common core subjects, and 11% via extracurricular activities. However, 59% of the directors of studies reported that the computing curriculum had not yet been integrated into the school's activities.

The directors of studies who worked in schools serving secondary education students mentioned in greater proportions that these guidelines had been integrated into the school's curriculum, but even so the topic was not widespread: 33% said that the computing curriculum had been implemented through a specific subject, 14% transversally, and 11% via extracurricular activities, while 35% said that it had not yet been implemented.

The data collected from the teachers revealed the challenges in carrying out activities with students on these topics. Among primary and secondary school teachers, 43% said they asked their students to perform activities using computers and digital devices. These were carried out to a greater extent by teachers who taught in urban schools (45%), in upper secondary education (54%), in state schools (61%), and with Internet access and computers available to students (45%).

Connectivity was still a relevant factor when it came to developing activities using digital technologies. For example, in schools in the municipal network, regarding the aspects that made it difficult for students to use digital technologies, 85% of teachers said it was the low speed of the Internet connection, and 81% said it was the insufficient number of computers per student.

In addition to connectivity availability in schools, 74% of all teachers said that the lack of digital educational resources, such as computer programs, platforms, applications, multimedia, and robotics equipment, hindered the use of technologies with students. This proportion reached 84% among teachers in municipal schools, 75% among state schools, and 53% in private schools.

Regarding whether they had equipment and materials for robotics classes, this was true for 21% of primary and secondary education schools, 13% of municipal schools, 24% of private schools, and 39% of state schools. In addition to the differences between education networks, the data also showed the existence of regional inequalities: while 3% of schools located in the North and 15% in the Northeast had such educational resources, this proportion was 25% in the Center-West, 29% in the South, and 35% in the Southeast.

These disparities were also reflected in the activities teachers carried out with students during class. According to primary and secondary school teachers, the activity using digital technologies most frequently requested of students was conducting surveys and collecting and recording data, which was carried out always or almost always by 57% (Chart 14). This task was always or almost always presented to students by 48% of teachers in municipal schools, 63% in state schools, and 61% in private schools.

CHART 14

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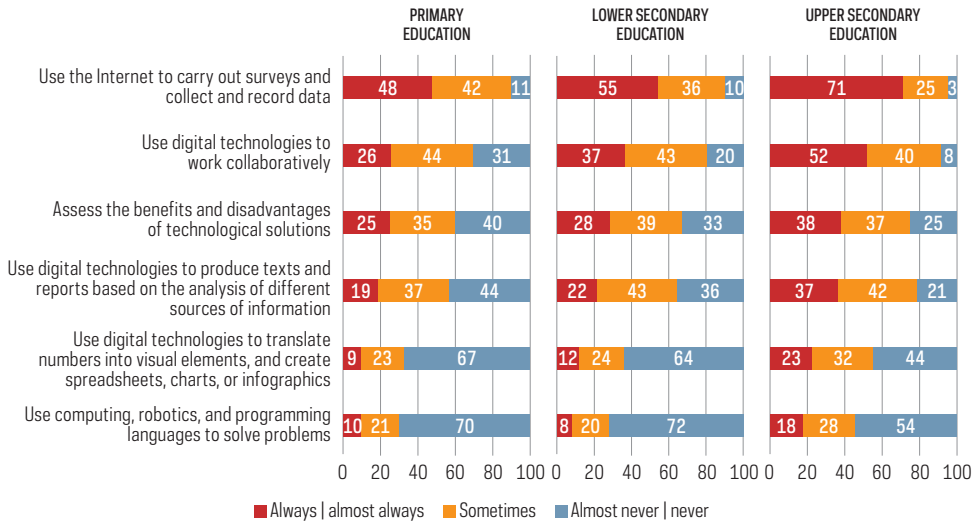
Teachers by how often they ask students to carry out activities using digital technologies and level of education (2024)

Total number of teachers in primary and secondary education schools (%)



A smaller proportion of teachers (30%) always or almost always carried out activities in which students assessed the benefits and disadvantages of technological solutions. The use of digital technologies to translate numbers into visual elements and create spreadsheets, charts, or infographics was always or almost always asked of students by 14% of teachers, and the use of computing, robotics, and programming language to solve problems by 11% of them.

Even among teachers who taught upper secondary education students, such activities were not yet widespread in pedagogical practice, as 38% always or almost always promoted activities with students in which they had to assess the benefits and disadvantages of digital technologies.

Continuing professional development for educators

As part of the actions related to the Connected Education Innovation Policy (Law No. 14.180/2021) and the National Digital Education Policy (Law No. 14.533/2023), the MEC launched the *Digital Teaching Knowledge Framework for the use of digital technologies* (MEC, 2024). The document presents ten competencies to be developed by teachers in three dimensions: teaching and learning about using digital technologies, digital citizenship, and professional development. Based on these dimensions and competencies, Table 1 presents the proportion of teachers, according to data collected in the 2024 edition of the ICT in Education survey, who possess the teaching knowledge outlined in the Framework.

TABLE 1

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Teachers by activities carried out related to the dimensions and competencies of the Digital Teaching Knowledge Framework (2024)

Total number of primary and secondary education school teachers (%)

Dimension	Digital teaching knowledge	Proportion of teachers (ICT in Education 2024)	
Teaching and learning about using digital technologies	Pedagogical practice	96%	Used the Internet to present content, receive work or lessons, ask questions, or make content available to students
		69%	Used digital technologies to assess student learning
		43%	Carried out activities with students in classrooms using digital technologies
	Curation and creation	99%	Used digital technologies to prepare lessons and activities
		96%	Produced educational content, such as presentations, images, videos or texts, using digital technologies
	Data analysis	57%	Of the teachers who have used educational platforms, they have analyzed data obtained in the digital environment on student performance and their level of learning
		42%	Of the teachers who used educational platforms, they used resources from the digital environment to analyze data on how students solved questions and carried out proposed educational activities
	Inclusive practice	42%	Used digital educational resources in teaching and learning activities with students with disabilities
Digital citizenship	Responsible use	75%	Addressed issues related to cyberbullying, hate speech and discrimination on the Internet with students
		67%	Addressed issues related to physical and mental health problems caused by digital technologies with students
		63%	Addressed issues related to online exposure, harassment or dissemination of images without consent with students
	Safe use	61%	Addressed issues related to advertising and consumption on the Internet with students
		57%	Addressed issues related to the protection of privacy and personal data in the use of digital devices and the Internet with students
		30%	Addressed topics related to algorithms, digital footprints and the use of digital data by applications and digital platforms with students

CONTINUES ►

► CONCLUSION

Dimension	Digital teaching knowledge	Proportion of teachers (ICT in Education 2024)	
Digital citizenship	Critical use	71%	Addressed issues related to assessing the reliability of information and news found on the Internet with students
		65%	Addressed topics related to responsible sharing of content and opinions with students
Professional development	Continuing education	92%	Used digital technologies to seek out professional development opportunities, such as courses, conferences and lectures
		54%	Participated in a continuing training initiative on digital technologies in their teaching practice
	Communication and collaboration	70%	Participated in a project developed with other teachers and educators via the Internet
	Use of digital resources for management	95%	Used digital technologies to carry out school administrative tasks, such as class diaries, making reports, organizing and recording grades

Analysis of the table shows the points of focus in the competencies of primary and secondary school teachers. In general, the data on the activities they carried out in the three dimensions showed that certain competencies were more widespread than others. For example, in the *teaching and learning* dimension, most teachers carried out activities related to pedagogical practice and content curation and creation, while those related to data analysis and inclusive practice remain areas of attention. In the *digital citizenship* dimension, safe and critical use also deserves more attention. In the *professional development* dimension, teachers' participation in continuing education activities remained a challenge for both teachers and educational policies.

A large proportion of primary and secondary school teachers (77%) mentioned the lack of continuing education on digital technologies as a factor that hindered the adoption of digital technologies in lessons with students. The lack of continuing professional development was mentioned by 86% of teachers in municipal schools, 78% in state schools, and 59% in private schools.

Support for educators is a critical aspect for the effectiveness of policies promoting digital and media education and for guaranteeing the protection of children's rights. This also includes opening up opportunities for students to participate in social spaces in a critical, safe, responsible, and creative way. In the survey, 54% of primary and secondary education teachers reported participating in an ongoing professional development activity related to digital technologies in the 12 months prior to the survey. This proportion has decreased compared to the 2021 edition (65%), whose data collection took place during the COVID-19 pandemic, when school networks adopted remote educational activities mediated by digital technologies as a strategy to contain the spread of the virus, and there was a greater demand for the use of digital resources by teachers.

Training initiatives on platforms, computer programs, or apps for the creation of educational content (82%) and on the use of digital technologies to adapt educational activities to each student's learning pace (79%) were the topics cited in the highest proportions by teachers who, according to the 2024 edition, took part in continuing professional development.

Also in relation to teachers who took part in training, the data showed an increase, between the 2022 and 2024 editions of the survey, in the proportion of teachers who had access to activities on the adoption of digital technologies in the creation of educational content, from 64% to 82%. Among teachers who taught at the upper secondary level and in state schools, these levels of growth were even higher: from 68% to 88% and 62% to 88%, respectively.

Although cited by a smaller proportion of teachers, initiatives related to guiding students to use digital technologies critically (69%) and to media education and the critical use of media in classrooms (68%) were among the most frequently mentioned topics in training activities. Smaller proportions of teachers mentioned topics related to the use of AI in educational activities (59%), protecting privacy and personal data when using the Internet (58%), and computing, programming, or robotics in education (39%), according to Chart 15.

CHART 15

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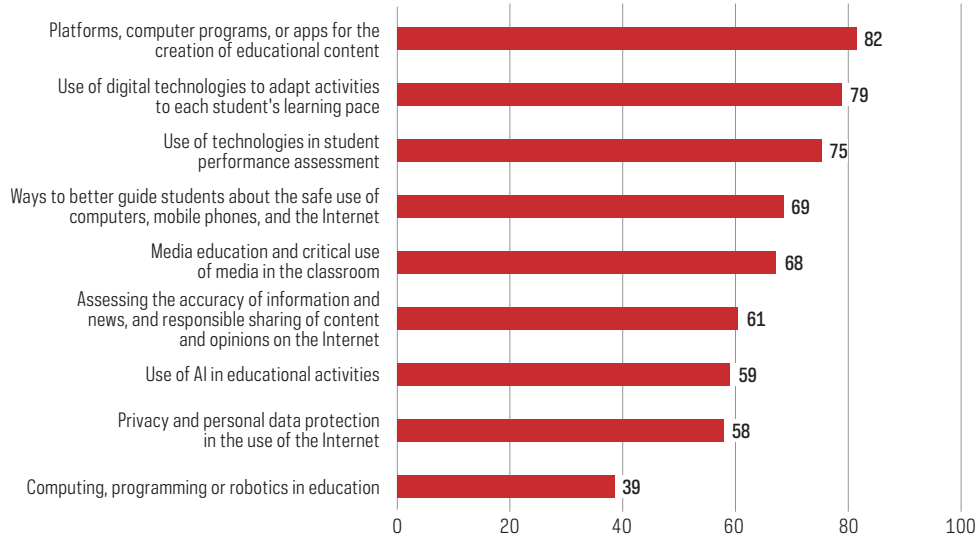
Teachers by subjects of continuing education activities they participated in during the 12 months prior to the survey (2024)

Total number of primary and secondary education school teachers who participated in continuing education in the 12 months prior to the survey (%)



The survey also assessed the types of training to which teachers had access. Most of those who took part in continuing professional development on the use of digital technologies in teaching and learning processes said the training initiatives took place remotely (83%) or in a hybrid format (43%). They also mentioned, in greater proportions, that the training was delivered through video classes (84%), with lower percentages citing workshops or training sessions (67%) and lectures with specialists (61%). Among the distance learning activities, according to the teachers, 75% were mediated by tutors or teachers, while 53% of the teachers said the training was a self-instructional course, without the mediation of teachers or tutors. In addition, 74% of teachers said they had accessed the activity at no cost via tutorials or video classes available online.

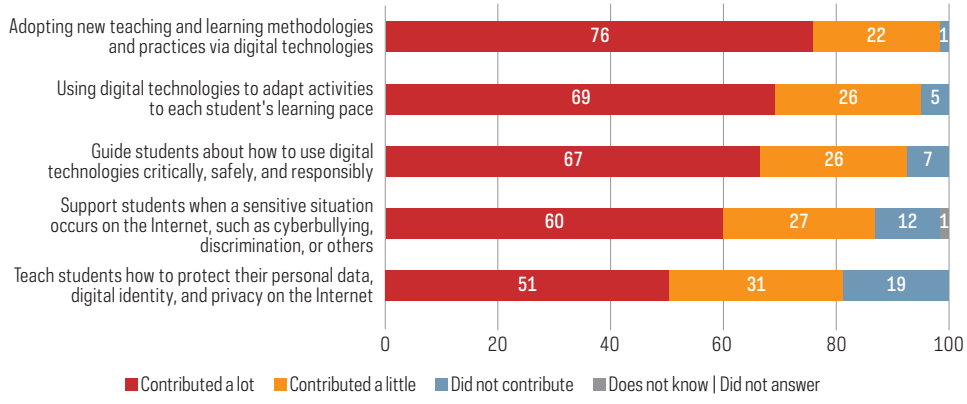
Among public school teachers who had taken part in training initiatives, 85% reported that they had been offered by government organizations, such as Secretariats of Education. 42% of teachers in municipal schools and 50% of those in state schools reported having undergone training offered by the schools themselves, a proportion that increased to 67% among teachers in private schools. Private school teachers were also the ones who most often mentioned participating in activities offered by technology enterprises (38%). Also noteworthy is the importance of civil society institutions in providing updates on digital technologies and education: In the 2021 edition, 11% of teachers said that the training initiative had been offered by a non-governmental organization (NGO), association, telecenter, or some other non-profit entity, a proportion that rose to 20% in the 2024 edition.

The data also showed the importance of continuing professional development. Among the teachers who had taken part in training initiatives, 76% said that it had contributed a lot to their adoption of new teaching and learning methodologies and practices via digital technologies, 69% said that it had contributed a lot to their use of digital technologies to adapt educational activities to each student's learning pace, and 67% said that it had contributed a lot to guiding students about how to use digital technologies critically, safely, and responsibly (Chart 16).

CHART 16

Teachers by perceptions of the level of contribution of continuing education activities to the adoption of new teaching and learning methodologies and practices mediated by digital technologies (2024)

Total number of primary and secondary education school teachers who participated in continuing training activities in the 12 months prior to the survey (%)



Smaller proportions of teachers saw the contributions of the training initiatives in supporting students when a sensitive situation occurred on the Internet (60%) and in teaching students how to protect their personal data, digital identity, and privacy on the Internet (51%). These topics are critical to the development of skills among students and are present in the guidelines for promoting the digital education curriculum in schools.

Final considerations: Agenda for public policies

According to data from the 2024 edition of the ICT in Education survey, Internet access in basic education schools has advanced over the last five years, including in regions far from large urban centers, in smaller institutions, and in those serving students in the initial years of primary education. These are the strata in which the monitoring of indicators throughout the survey's historical series have shown the greatest connectivity challenges.

Despite these advances, the results of this edition of the survey draw attention to challenges related to the quality and maintenance of the devices available in schools. Internet access is present in most public and private schools, but in some strata it is still concentrated in administrative spaces. Students and teachers in certain educational contexts report facing challenges related to access capacity and the availability of digital devices, especially for educational use.

The data obtained from teachers reinforces the need for adequate educational resources for teaching and learning activities, including enabling them to meet the guidelines set out in public policies, such as the implementation of the computing curriculum and digital education programs. Also in relation to educational resources, the results of the research show the need to promote progress in adapting the platforms and applications to be implemented in schools, in order to meet the educational objectives, rights, and best interests of students, as established by educational policies and regulations related to guaranteeing the rights of children and adolescents (Law No. 15.211/2025; UNESCO & UNICEF, 2025).

The indicators collected from teachers also show the importance of training and refresher programs in adopting strategies to guide students in relation to the dissemination of digital technologies and their impact on society. Students seek support from schools not only to deal with sensitive situations on the Internet but also to understand how to prevent them from occurring. These issues require teachers to offer students qualified and specialized mediation, for which they are often unprepared.

Expanding and improving the assignment of responsibilities for caring for students' development is another critical aspect that emerges from the data collected by the survey. Schools are considered to be one of the main entities in the child and adolescent care and protection network, as they work directly with students and, at the same time, provide support to families. However, teachers and schools need the support of institutions linked to other areas of child and youth protection, as well as the support of specialized professionals, in order to continue playing their role, especially with regard to promoting students' mental health and well-being.

The data also shows the challenges faced by the school community in integrating digital rights issues into the curriculum, such as privacy, digital security, protection of personal data, and digital identity. Networking and establishing partnerships, especially between schools and universities, can be an opportune strategy to introduce, expand, and qualify the provision of digital education through educational establishments (MEC, 2025).

Guidance documents on the rights of children and adolescents in digital environments, such as General Comment No. 25 of the UN Committee on the Rights of the Child (CRC) (2021), also highlight the importance of student participation in decisions about issues that affect their development. In this context, access to digital education opportunities, through the development of critical and creative skills, can be a determining factor in encouraging students to act as producers of digital content and solutions.

At the same time as the data reveals progress towards universal Internet access in basic education schools, it also points to a trend towards adopting strategies to disconnect and restrict the use of digital technologies as a way of dealing with the impacts of information disorder, persuasive and manipulative design, increased surveillance, and inappropriate data processing in digital environments.

The adoption of measures such as restricting access and the choice of parental control systems, for example, can be relevant for spreading awareness of the risks related to digital technologies and the operating models of digital services. In addition to these initiatives, researchers and experts working on projects to defend digital rights also stress the importance of implementing collective actions that involve sharing responsibilities between all social sectors. Involving different social groups would make it possible to broaden the scope of initiatives and ensure that children and adolescents in particular can enjoy online and offline environments that are more ethical, sustainable, and suited to their well-being.

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Articles

Digital education beyond mobile phones: Diversifying languages for digital emancipation—from multiple childhoods to adolescences

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The discussion about the use of mobile phones in schools continues to be intense in Brazil and in many countries around the world. There are different opinions about the types and quantities of restrictive measures, but there is broad agreement on the seriousness of the damage that passive and excessive use can cause to mental health, learning, socialization, and overall development of children and adolescents.

In a frenetically fast-paced world, the current situation could be conducive to a pause, putting on the brakes as a starting point for rethinking the presence of smartphones in schools, moving towards the effectively pedagogical, critical, and safe use provided for in the National Curriculum Guidelines (DCN, as per its acronym in Portuguese). New restrictions could work as triggers for a fine-tuned analysis, in each school context, to map out what uses are made and take stock of the benefits and harms

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generated in the constitution of knowledge and values, as well as in social coexistence, remembering that opportunities are not automatically converted into benefits, just as not all dangers cause harm.

Federal Law No. 15.100/2025 established a ban on the use of personal portable electronic devices during classes, recess, or breaks between classes, for students of all stages of Basic Education. Regulated by Presidential Decree No. 12.385/2025 and the Resolution no. 2/2025 of the National Education Council, the new law favors the implementation of restrictions nationwide.

The restriction of personal devices demands even more investment in training educators and in suitable equipment for much-needed digital education. Our approach suggests emphasizing the active participation of students in the processes of producing and sharing knowledge that occur in interactions with their teachers and with the teaching resources they use. Oral and interactive languages stand out here, along with written, printed, audiovisual, and digital languages, that allow for the constitution of ethical, political, and aesthetic knowledge and values. The educational process is always much better than the mechanical and passive learning of received content.

We emphasize working with multiple languages to escape mechanistic pedagogical proposals that often ignore the diversity of students and teachers in their contexts. We insistently use the term "languages" here, rather than simply "technologies," to reinforce this dimension of production that occurs with the new technological artifacts in use and with the other languages and pedagogical resources available in schools. The new possibilities for interaction create new forms of communication, with their own vocabularies, and change the pedagogical process as much as they change the people themselves. Digital languages, so plastic, flexible, and attractive, also carry and transform values that guide our social relationships and interaction with the world around us (Bakhtin, 1992; Rio de Janeiro Municipal Secretary of Education [SME-RJ], 1996; Vygotsky, 2003).

Meaningful connectivity in education: Expanding students' digital repertoire

The ICT in Education 2023 survey (Brazilian Internet Steering Committee [CGI.br], 2024) showed that 92% of primary and secondary education schools in Brazil already had some kind of restriction on the use of mobile devices in the school environment, but it was still very difficult for students and teachers to practice self-control, in addition to the challenges of operationalizing the management of ongoing restrictions. It seems to us that visible damage requires a course adjustment so that we can regain focus on the pedagogical use of mobile devices in the school environment.[4]

[4] In a note published in October 2025 and updated in February 2025, the Alana Institute suggested a set of practical recommendations for the implementation of Law No. 15.100/2025, highlighting student participation and presenting support materials for critical digital education activities. Available at https://linktr.ee/protecao_criancas_digital?lt_utm_source=lt_share_link#425434808

Even though students are intensely connected to the Internet, using it on a daily basis, this use does not necessarily generate critical knowledge, skills, and values. In the ICT Kids Online Brazil 2024 survey, for example, it is notable that 45% of users 11 to 17 years old considered that the first post they see on social networks is the last one that was posted, 52% of them thought that everyone finds the same information when they search for things on the Internet, and 50% agreed that the first result of an Internet search is always the best source of information (CGI.br, 2025).

Children certainly have a lot of skills, but this data pointed out that basic aspects related to knowledge and values about how digital systems work, such as the influence of the algorithm system and the business model based on sponsored ads, are not sufficiently known. Developing critical skills requires pedagogical mediation and intergenerational dialogue, central aspects in the school environment, and requires teaching expertise so that multiple languages are creatively appropriated in the processes of producing and sharing knowledge.

Internet use exclusively on mobile phones can be limited to a very small number of passive applications, if we consider the spectrum of experiences needed to enjoy meaningful connectivity. Digital culture, as provided for in General Competence 5 of the National Common Curriculum Base (BNCC, as per its acronym in Portuguese) (Brazilian Ministry of Education [MEC], 2018) and in the complement for Computing in Basic Education, Standards on Computing in Basic Education, a complement to the BNCC (Resolution No. 1/2022; MEC, 2022), involves the development of digital skills and knowledge with a view to training citizens capable of thinking, analyzing, planning, testing, evaluating, creating, and applying digital technologies in an ethical and responsible manner, contributing to the protagonism of the individual and the nation.

We venture to ask whether the use of mobile phones, predominantly concentrated on platforms designed to commercially exploit students' attention and data, has effectively contributed to ensuring the much-needed meaningful connectivity in schools, as also provided for in the National Strategy of Connected Schools (Enec, as per its acronym in Portuguese) (Decree No. 11.713/2023) and in the Digital Teaching Knowledge Framework published by MEC (2024). Digital education cannot depend exclusively on students' personal mobile phones. We cannot run the risk of reducing access to digital technologies and languages in education to the use of mobile phones, nor can we consider this to be sufficient to undertake the journey of equitable digital, media, and information education that is so urgently needed to guarantee the full exercise of citizenship in the contemporary world with multiple digital, audiovisual, and print languages.

Considering that the use of mobile devices is also intense outside of school, digital education activities should be carried out on other technological devices, such as computers, and even in unplugged activities that bring the students' digital experience to the center of their attention, rather than their mobile phones. We are talking about a change of course that helps us realize that the time and quality of screen use are related to the (un)availability of equipment for practicing sports, arts, and sciences in schools and outdoor spaces (Haidt, 2024) for living, playing, and learning with and in nature.

Data from the 2023 School Census (National Institute for Educational Studies and Research "Anísio Teixeira" [Inep], 2024) showed that few students had the opportunity to access the Internet on computers (30%) or use technological resources such as digital whiteboards and innovation or robotics labs that would allow them to expand their media and digital repertoire. We have very few green areas, sports courts, science labs, and libraries, and even fewer schoolyards than necessary for students in many schools in Brazil.

The discussion about the use of mobile phones by students needs to be in tune with a reflection on the range of equipment available so that schools and cities can provide healthy living spaces for multiple activities that are essential to the right to education and comprehensive development. Urban violence, the climate crisis, and the lack of public leisure spaces are inseparable variables in the discussion about the excessive use of screens, both inside and outside schools.

It is also worth remembering that the increase in episodes of discrimination in messaging groups, public humiliation on social media, and recruitment to hate groups in gaming communities points to the urgency of a systematic agenda for psychosocial care within schools to help establish a culture of peace. The very conflict of opinions on banning the use of mobile phones in schools highlights the need to seek collective responses and conflict mediation flows, activating school councils with the participation of students and families in decision-making that affects school communities, respecting school and teacher autonomy.

Impact of manipulative design on students

The analysis of the United Nations Educational, Scientific and Cultural Organization (UNESCO) *Global Education Monitoring Report, 2023: Technology in education: A tool on whose terms?* (UNESCO, 2023), profoundly mobilized the field of education by highlighting the fragility of the evidence about the positive effects of many technologies applied to education and the danger of bias in research on their impacts. Even if we recognize that certain uses of technology and digital languages can support certain educational processes in some contexts, we cannot ignore side effects such as the distraction of students, the commercial exploitation of data, excessive use, damage to interactions during class breaks, and the escalation of online violence.

The implementation of restrictions on mobile phone use in schools has proven that progress is possible, while acknowledging infrastructure inequalities. 2025 was marked by important advances in this field. The resolution of the National Education Council (Resolution CNE/CEB No. 2/2025) provided guidelines for digital education, and MEC published a set of guidelines and support materials for teachers and administrators. In addition, the approval of the Digital Statute of the Children and Adolescent or Digital ECA (Law No. 15.211/2025) consolidated a substantial advance in the regulation of digital platforms with regard to access by children, which will result in significant gains for basic education.

Knowing that more technology in schools is not necessarily synonymous with improvements in the quality of education, we need to evaluate the implications of the use of mobile phones in the school context and the balance that this effectively produces in digital education in each school, in cities, and in broader public policies.

One aspect of the problem that is often ignored is the manipulative design of the platforms most used by students (5 Rights, 2023), which makes this population even more vulnerable. The format of some social networks makes self-control impossible and encourages engagement with violent and extremist content. Students need help to develop self-control around Internet use, especially at a stage of life when not all their mechanisms for emotional and impulse self-regulation are mature enough to dispense with the mediation of responsible adults (United Nations Children's Fund [UNICEF], 2017), making them more vulnerable to the harmful effects of social media in particular (Abrams, 2022).

The age of first access to the Internet has been getting earlier and earlier, occurring up to the age of 6 for 23% of 9 to 17 years old users (CGI.br, 2025), and research has shown that Internet use in early childhood impairs speech and socialization (Rocha et al., 2021). The ICT Kids Online Brazil 2024 survey found that having their own profiles on digital platforms is common for 60% of children 9 to 10 years old who use the Internet in Brazil and for 70% of those 11 and 12, even though access to these networks is only allowed for those over 13, provided they have the authorization and supervision of their parents or legal guardians.

In 2024, ICT Kids Online Brazil revealed that 57% of adolescents aged 11 to 17 reported at least one situation of excessive Internet use, with 22% admitting to having spent less time than they should with family or friends or doing homework because they spent too much time on the Internet, a similar proportion to the 24% who tried to spend less time on the Internet but were unable to do so (CGI.br, 2025). In the Datafolha survey carried out at the request of the Alana Institute in 2024 (Pesquisa Datafolha, 2024), 75% of the Brazilian population 16 years old or older thought that children and adolescents spend a lot of time on social media, and more than 90% believed that it is very difficult for them to defend themselves against violence and inappropriate content on social media.[5]

Platform regulation, digital education, and the right to disconnect

Because they are designed to capture attention and commercially exploit user data, social networks are among the platforms that will be subject to the new regulation established in Brazil by the ECA Digital (Law No. 15.211/2025). Far from being merely restrictive, well-designed regulation can create incentives for innovative educational technologies to consider the safety and health of students in their design and development, meeting pedagogical demands and not just the sales plans of manufacturers and distributors.

We can take advantage of this moment of rethinking the place of technologies in childhood to effectively include enterprises among those who share responsibility for also protecting the rights of children and adolescents, as already provided for in Article 227 of the Federal Constitution, in the digital environment. Listening to and considering

[5] Data published in an article in *Folha de S.Paulo* on September 11, 2024, by Patrícia Campos Mello. Available at https://www1.folha.uol.com.br/cotidiano/2024/09/familias-acham-que-filhos-com-menos-de-14-anos-nao-devem-ter-celular-nem-acessar-rede-social.shtml

the perspectives of students and education professionals is vital to the national and global debate about how to prevent and mitigate the impact that the current business model of digital platforms has on the rights and well-being of children and adolescents. Each digital education model brings with it approaches to digital culture, which also operates as one of the ways of socially regulating uses, especially on the public policy agenda.

In a daily life so saturated by the presence of mobile phones mediating the relationships of children and adolescents with information, their families, their cities, and other people (Livingstone & Sefton-Green, 2016), it is worth rethinking their use by students in schools to encourage other mediations and contact with languages that are vital for their all-around development. The Brazilian Society of Pediatrics (SBP) and the Alana Institute (2019), following recommendations from other institutions dedicated to childhood, have warned that most of the harm occurs when children replace activities that are essential to their development with screen time.

The essentiality of offline and outdoor life provokes reflection on the right of children and adolescents to disconnect as a fundamental factor in their development, well-being, and belonging to the territories in which they live. The set of opportunities and the whole range of violence that children and adolescents already encounter in their use of the digital environment can be worked on in educational activities in schools, even without the need to use the students' personal devices. Mobile phones are not school materials. When digital devices need to be used to support learning, schools need to provide them as part of their infrastructure and essential equipment, in order to offer meaningful experiences for an integral education. The Enec and the National Digital Education Policy (Pned, as per its acronym in Portuguese) provide for the acquisition of digital devices that are appropriate for Basic Education schools.

Digital competencies need to be developed along with the general competencies set out in the BNCC and be related to the commitment to prepare students for the full exercise of citizenship. The school environment allows contact and interaction with multiple languages and their technologies, from Portuguese to mathematics, from the natural sciences to art, always with the involvement of ethical, political, and aesthetic values.

The right to education is also related to other policies on access to cities, culture, sports, the environment, health, and the entire family protection network. Therefore, digital education is one of the many education vectors closely linked to the commitment to promote a culture of peace in schools, as provided for in the Brazilian National Education Guideline and Framework Law ([LDB], Law No. 9.394/1996).

We need to ensure the quality of both online environments—which need to be ethically designed for children and adolescents and used with pedagogical intent at school—and school environments and their surroundings, guaranteeing safe, greener, well-kept cities, that provide rich opportunities for playing, meeting people, learning, moving, resting, and socializing.

Social pact for a journey of digital emancipation

Usage habits concentrated on social networks that feature short videos can have repercussions on the naturalization of hyper-accelerated communication models with immediate rewards (Su et al., 2021), restricting the repertoire of media and languages.

More recently, the presence of students' personal mobile phones in schools has also increased access to online casino gambling, with the danger of debt and compulsive use. It is also worth mentioning that the same patterns of manipulative design, commercial exploitation of data, and practices of vigilantism can be found in digital educational products and platforms that have been massively adopted in Brazilian public education. This situation has been mapped by the Observatório Educação Vigiada (Watched Education Observatory)[6] and pointed out in the technical note by the Campanha Nacional pelo Direito à Educação (National Campaign for the Right to Education) and in the Open Education Initiative, with concerns about sovereignty and human rights in the Connected Schools program in force in Brazil (Campanha Nacional pelo Direito à Educação, 2024).

General Comment No. 25 of the United Nations Committee on the Rights of the Child (CRC, 2021) and Resolution No. 245/2024 of the National Council for the Rights of Children and Adolescents (Conanda, 2024) have made progress in indicating an agenda for the promotion and protection of rights in the digital environment that contemplate current and forthcoming technologies. It does not make much sense to restrict the use of mobile phones and, for example, allow Artificial Intelligence (AI) to enter classrooms by monitoring emotional reactions through facial recognition, assessing political leanings in essays, and keeping an eye on which pages of books teachers have left out.

Another dangerous path would be to introduce, without due diligence, artificial tutors that consume absurd amounts of energy and water (Li et al., 2025) to customize the learning process, without considering the risk of reproducing biases that could reinforce exclusions and discrimination that are built into their databases or into the decisions of the developers (Gonsales & Kaufman, 2023).

Ethical issues (UNESCO, 2022) in the application of technologies in education take on even greater priority with the speed and scale of AI. While the erosion of democracies caused by the social media business model has proven the fallacy of techno-solutionism, there is no denying the potential opportunities of the digital in education and society. What we need most is regulation that provides incentives for access to technologies that help convert opportunities into benefits, and risk assessments that make it possible to anticipate their harmful impacts inside and outside schools.

If restrictions on smartphone use are the starting point for a journey of digital emancipation, we will have made good use of the opportunity. Promoting the desired meaningful connectivity involves developing critical skills, knowledge, and values through pedagogical mediation and the intergenerational dialogue that is unique to the school environment, diversifying the range of access possibilities beyond mobile phones. It is not a question of interrupting the creative uses that are already taking place, albeit exceptionally, but of making them a point of reference for building a new pact for the use of technologies in schools. The first step could be to map the creative and innovative examples that already exist and, based on them, create new pacts for this journey of digital emancipation with the broad participation of students.

[6] The Observatório Educação Vigiada (Watched Education Observatory) is a scientific dissemination initiative by academic researchers and social organizations that aims to collect and disseminate information about the platformization of public education in Brazil and South America and encourage a debate in society about its social and educational impacts. It is an action of the Open Education Initiative. https://educacaovigiada.org.br/en/about.html

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AI in the classroom: Building models for children's participation in the selection of EdTech services in Brazil

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Drafting innovative research methodologies that can unfold into more meaningful participation of children in the Internet governance field is key. Bearing that in mind, the project "AI in the classroom: participation models for the school community" was conducted throughout 2023 with the innovative goal of proposing models for substantial student participation in the public procurement and purchase processes for educational technologies in the context of Brazilian Basic Education.

This article discusses the methodology developed for the project to conduct participatory research with children,[4] as well as the recommendations that resulted from the research itself for how education policymakers and teachers can include students in the processes of selecting educational technology (EdTech) products and services that they will use.

The context in which the project was developed involves the increasing datafication of the Brazilian social, political, and economic spheres. Specifically in the field of education, the pandemic particularly affected the continuity of educational activities and consequently favored growth in the adoption of EdTech solutions. According to the ICT in Education 2020 survey, conducted by the Brazilian Internet Steering Committee (CGI.br), through the Regional Center for Studies on the Development of the Information Society (Cetic.br), in the first year of the pandemic, 65% of Brazilian schools adopted videoconferencing platforms, and 58% used virtual learning environments (CGI.br, 2021).

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[4] This article refers to children as all individuals between 0 and 18 years old, despite the Brazilian context using the terminology children (from 0 to 12 years old) and adolescents (from 12 to 18 years old), according to Law No. 8.069/1990 (Statute of the Child and Adolescent [ECA]).

It is worth highlighting that this adoption of technologies by schools typically did not involve the school community. When the pandemic broke out, big tech companies pursued educational secretariats across the country to offer their solutions as free donations, so that their deployment did not have to go through procurement procedures (Coelho & Spagnuolo, 2023). School units, teachers, and students, as a rule, were not involved in the debates that decided which technologies were the most suitable for use, which led to some problems.

The first problem was that the EdTech solutions did not reach all students and, in fact, many were unable to continue studying during the pandemic simply for lack of access to proper Internet connections or devices. The second issue had to do with the peculiar stages of the development of children. Artificial Intelligence (AI) is part of many EdTech solutions and, as the United Nations Children's Fund (UNICEF) underscored, AI technologies are generally not designed with children in mind, and their potential effects on children remain largely unknown (UNICEF, 2021). Furthermore, global policies and implementation efforts that are dedicated to making AI serve societal well-being do not typically include children, much less in an active role (UNICEF, 2020).

Added to the mix is the fact that the rapid increase in the adoption of EdTech that uses AI systems in Brazil has been taking place within a complex regulatory landscape. There is no current legal framework (Data Privacy Brasil, 2024) to address their adoption or the risks they pose to the many groups they potentially affect.

This complex scenario led to both the problem and an opportunity to conduct the project described in this article. The research project focused on the question: How can we create guidelines and paths that allow for the meaningful participation of children in the processes conducted by public procurement or by schools themselves for selecting educational technologies?

In order to respond to this question, the authors of this article—or the research team—dove into participatory research methods and drew up a specific methodology that revolved around meaningful consultation with children. This article will present the key findings and methodological contributions we identified from the aforementioned question, which were also used in the development of one of our products, the booklet *IA na sala de aula: modelos de participação para a comunidade escolar* (*AI in the classroom: Participation models for the school community*) (Data Privacy Brasil, 2024).

The importance of children's participation in Internet governance

Children are individuals who are going through a singular phase of physical, cognitive, psychological, social, and emotional development (Asociación por los Derechos Civiles [ADC] et al., 2022). Considering that, the Brazilian Federal Constitution has established that they are subjects of rights, entitled to full protection, with absolute priority, as described in its Article 227. This means that children are subject to all human rights afforded to any individual and, furthermore, that they are entitled to specific additional rights due to their developmental process. It also implies that these rights must be

ensured with the highest level of priority, taking precedence over any other interests. The responsibility to protect and promote these rights is constitutionally shared between the family, the State, and society as a whole.

This protection must also take into account the progressive autonomy of children, meaning the gradual development of their abilities as they grow. Fostering them with gradual independence is therefore essential, and the processes and channels created to recognize and listen to their voices, needs, and opinions (or, in other words, their right to be heard) should be tailored according to their age and stage of development.

Children's right to be heard was initially established in the United Nations (UN) Convention on the Rights of the Child (UNICEF, 1989) and later reinforced in its General Comment No. 25 (Committee on the Rights of the Child [CRC], 2021) on children's rights in relation to the digital environment:

> States parties should promote awareness of, and access to, digital means for children to express their views and offer training and support for children to participate on an equal basis with adults, anonymously where needed, so that they can be effective advocates for their rights, individually and as a group. (p. 3)

Regarding the development of legislation and other decision-making frameworks, the document places even more emphasis on the participation of children:

> When developing legislation, policies, programmes, services and training on children's rights in relation to the digital environment, States parties should involve all children, listen to their needs and give due weight to their views. They should ensure that digital service providers actively engage with children, applying appropriate safeguards, and give their views due consideration when developing products and services. (p. 3)

Involving children in discussions about technology is a way to gradually promote their autonomy and digital literacy, preparing them to be active and critical citizens in an increasingly digital and data-driven world.

THE IMPORTANCE OF RECOGNIZING STUDENTS' VOICES ABOUT EDTECH PICKS UNDER THE DEMOCRATIC MANAGEMENT PRINCIPLE IN EDUCATION

It is no coincidence that the Brazilian National Education Guideline and Framework Law ([LDB], Law No. 9.394/1996) establishes the democratic management of education as one of its guiding principles. This concept is fundamentally based on three pillars: participation, transparency, and autonomy. They enable coordinated actions that allow the entire school community (teachers, students, families, administration, pedagogical staff, and other employees) to participate in decisions regarding the educational environment through the exercise of citizenship.

Listening to the school community in order to comprehend its needs is, therefore, a central factor in the effective exercise of democratic management. Creating spaces and opportunities for meaningful listening to and recognition of students' voices in selecting educational technologies significantly benefits all the parties involved, including not only the school community but also the developers of these technologies.

The first benefit is the maximization of the pedagogical potential of the technologies. By providing a safe environment for students to express their perceptions, education departments, schools, and teachers not only demonstrate respect for the role of the younger generation as protagonists in the learning process but also ensure that technological tools and resources meet their needs and preferences, thereby enhancing their engagement with such resources and the quality of education.

The second is strengthening students' sense of autonomy and belonging. When asked about the importance of being heard in the choice of technological resources during our research team's fieldwork, children's responses were unanimous: Yes! They would like to be heard.

By sharing their opinions, children can offer insights into their preferences, with consultation processes also serving to establish trust between children and adults. Through these bonds, communication channels can be established for students to report difficulties and seek support in the face of technology-related risks, such as cyberbullying, online scams, and the non-consensual dissemination of intimate images.

Third, including children in these EdTech debates not only improves the quality of education but also allows educational institutions to select and implement technologies that promote diversity and inclusion. This includes necessary adaptations for neurodivergent children, for example, or any other group that requires specialized support, enabling everyone to fully benefit from the available tools.

Incentives for accountability and the development of more protective technologies are another benefit. When children's voices are recognized in EdTech selection processes, not only students but also the entire school community becomes more aware of the available technologies and how they can be used. This promotes the development of a collective sense of participation in technology applications, leading to more questioning about their functionalities and potential risks, such as system bugs or possible violations of personal data protection.

Such inquiries help the technology ecosystem evolve broadly. They progressively refine technology choices with the collective construction of criteria that can move beyond pedagogical-educational factors. Consequently, an engaged school community will hold EdTech developers accountable periodically for their products' pedagogical potential, functionality, usability, and risks. This will stimulate them to continually improve these aspects to ensure market competitiveness. Additionally, their products will become more suitable for and protective of the younger generation.

Ultimately, involving students and considering their opinions before acquiring EdTech optimizes the use of public resources. By addressing the actual needs of students and the school community through listening to their voices, technologies that will genuinely have practical effectiveness and can be implemented in daily school life will primarily be chosen. This assists in the optimization of the use of public resources, avoiding the creation of "warehouses of technological resources," whether in physical or digital form, with the expenditure of resources and accumulation of products that would not be properly utilized.

Research about and with children: The participatory research methodology

The purpose of the research was to identify paths for including children's voices in EdTech discussions. Naturally, children's voices had to be the central focus of the research itself, so a methodological framework was developed to ensure the meaningful participation of students through direct engagement with them. With an exploratory approach, we conducted focus groups[5] with over 40 children during October 2023.

The research was conducted in the city of Santa Maria, in the state of Rio Grande do Sul, through a partnership with Santa Maria's Secretariat of Education and its Center for Educational Technology (NTEM). The agreed-upon empirical work involved three primary activities (in sequential order): (1) two types of workshops on digital security, privacy, and data protection organized by the research team, which were attended by 40 students 11 to 17 years old (divided into four groups) and 30 computer lab teachers (divided into two groups) from Santa Maria's municipal schools; (2) conducting focus groups with children to understand their views on educational technologies and their potential role in technology selection; and (3) a group interview with four civil servants from the NTEM, focusing on how students could be included in the processes related to selecting educational technologies.

We followed Edgar Morin's (1992) method of complexity for carrying out such in-person field activities and interpreting the data gathered from them. This means that the study embraced a unit of meaning shaped by a flexible methodology, integrating dialectical, deductive, and inductive methods. Additionally, we adopted a multi-referential approach, as described by Macedo et al. (2009) and Ardoino (1998), aligned with the study's interdisciplinary and transdisciplinary scope.

Ultimately, the research was also guided by the ethnographic action-research approach outlined by Macedo et al. (2009), which emphasizes the social implications of the study. This means that the ethnographic, bibliographic, and documentary research bridged theory and empirical work from a pluralistic and socially impactful perspective.

The pre-field phase of the research required defining several fundamental procedures. First, we developed and signed a Cooperation Agreement with the municipality of Santa Maria to ensure that all formal and ethical research aspects were observed. Next, consent forms were drafted (for parents to agree to allow their children to participate) and assent forms (for children to agree to participate), thereby ensuring adherence to ethical standards for research involving this population. Finally, the necessary signatures were collected.

[5] This is a qualitative research technique derived from group interviews, with the aim of collecting information through participant interaction (Morgan, 1997, as cited in Trad, 2009). This technique is based on recording communication and interactions within a group and serves as a powerful tool for collecting data that provides deeper insights into participants' perceptions, beliefs, and attitudes regarding the topic under discussion (Kitzinger, 2000, as cited in Trad, 2009).

An educational consultant was also hired, justified by the complexity of the project and the research team's lack of experience in conducting focus groups with children. According to the scientific literature, sensitive listening is essential in situations such as this, as it allows for a deep understanding of participants' verbal and nonverbal expressions, ensuring more effective and targeted activities (Barbier, 1998). During the data collection phase in the field, adopting the focus group technique was central for obtaining qualitative information.

In the field, we adopted a pedagogical strategy to gradually introduce the research team to the children through informal presentations during workshops on digital security, privacy, and data protection attended by the students, which were conducted immediately before the focus groups. In addition, before the workshops began, the research team engaged in casual conversations with the children in the presence of their teachers and/or school administrators, discussing trivial topics to foster a safe and welcoming environment for them.

The script of the focus groups was carefully structured to promote collaboration and participation among the students. It began with an introduction in which the objectives of the research were outlined and the rules for group dynamics were presented, emphasizing the importance of each participant's contributions and the guarantee of confidentiality.

The field research concluded with a group interview with education policymakers connected to the NTEM. Concluding this phase with the voices of those directly involved in educational practice was of great significance to the project. This final interaction allowed us to gain a deeper understanding of the local context, especially in relation to the development of a municipal technology center in a regional community. Through an active listening process on which we based conducting the interview, we identified the concrete organizational challenges they face and collected their suggestions on how to include students in the selection of EdTech services and products.

In the following section, we will present some of the findings that were systematically organized during the data interpretation phase.

WHAT STUDENTS HAD TO SAY ABOUT THE RECOGNITION OF THEIR VOICES IN THE SELECTION PROCESSES FOR EDUCATIONAL TECHNOLOGIES

As highlighted in this article, Brazil is going through a crucial phase in education due to increasing digitization and incorporation of information and communication technologies (ICT), including in pedagogical practices. This involves a redefinition of the education process, in which decisions about the use of specific resources play a fundamental role in knowledge construction and in the individual and collective development of students. Therefore, it becomes essential to recognize their perspectives, from the preliminary stages to the acquisition of specific technology.

Based on the script for the focus groups previously mentioned, some of the most important statements and responses given by the students during the focus groups will be shown here. One of the central questions in our focus groups was: "Would you like to participate in a process that involves choosing the technologies that will be used in your

school, or do you prefer that others, such as school administrators, teachers, and your family members, represent you in these processes? Please comment on the reason(s) for your preference." The unanimous response from participating children emphasized how important it was for them to be heard. One voice resonated significantly:

> "I think we can choose because I don't think it's mandatory to play a game that we don't like."

> "It's easier for us to choose because if others were to choose, we wouldn't have our opinion, and it would be more their way. For example, 'oh, let's use this platform,' but I don't agree. So, it would be easier both for us to learn and for them to explain."

Throughout the focus groups, children expressed their desire for more opportunities to gather and discuss topics of interest related to technologies, emphasizing the need to include a greater diversity of voices in such discussions.

In contrast, when addressing the suitability of the current educational platforms they used, they reported facing challenges related to the adoption of these resources in specific curricular content. As a solution, they emphasized the importance of being present when such products are chosen so that the most appropriate technology can be defined to overcome their difficulties and maximize their learning interests.

> "I think we should choose because I know which subject I have difficulty with. So I think I should choose something about the subject, about things I can't learn."

> "I also believe it's truly important for students to have the right to make their own choices because there are students who may struggle more with certain things, while others may find it difficult to learn different subjects. That's why I think it's always good to hear the opinions of students in these matters."

Providing safe environments for children to express their perceptions recognizes the crucial role they play as protagonists in their own learning processes. Their views can not only inspire but also contribute to the development of pedagogical strategies that meet their needs and preferences.

In addition, the analysis of the opinions gathered in the focus groups revealed that children not only want to be heard, but they are also self-aware and realize that they are beings in development. They recognize that their capacities are evolving and that their views should not be the only factor considered for decision-making.

In our direct interaction with them, it was noticeable that participation in the selection of educational technologies also fosters a sense of belonging and responsibility, with an understanding that their involvement not only shapes their own future learning but also that of their peers, creating a significant sense of responsibility.

The acknowledgment of the "weight" of responsibility is accompanied by a sincere self-perception regarding the notion of development and maturity—or what we referred to before as progressive autonomy. Many expressed in their statements that not all peers have the same maturity for decision-making. Some might choose options that are "more fun" rather than necessarily the most suitable for the educational process:

> "But there's a sense that is not just about us choosing games randomly. Because if we were to choose, we wouldn't be selecting games suitable for us to learn things."
>
> "If they let kids choose freely, they would want Roblox or Minecraft."

Nevertheless, this recognition did not lead to a choice not to participate or an understanding that such participatory processes would be unfeasible. On the contrary, starting from the perspective that there are inherent limitations that arise from their developmental processes as children, they themselves proposed different solutions, particularly suggesting that the participatory process should also include the input of teachers, school administrators, and their parents. That is, the participatory process should not be an imposition but a constructive dynamic in which their voices and the expertise of educators and specialists are shared to ensure inclusive decisions.

> "People need to know how to listen to opinions. Not only children in the meeting, we need someone responsible. Mix students, teachers, and people knowledgeable about the subject."
>
> "The teacher would be the bridge. The teacher takes what the students think to the person who would be responsible."
>
> "It's important to be responsible when giving opinions because by combining opinions, there would be a collective responsibility in the future after these meetings."

One of the children mentioned that the best way to be heard about the choice of technologies would be "seeking to talk to the school, to teachers during or at the end of class, and to the administration" and the others agreed. Another expressed concern about the inexperience of teachers and administrators regarding technologies but emphasized that "all people are important: students, teachers, and technical opinions." In the same way, another spoke about the importance of "sharing doubts and needs in dialogue with friends and teachers."

Regarding concrete ways to enable student participation, the children brought forward specific suggestions that inspired the proposed models presented in the research team's booklet (Data Privacy Brasil, 2024). Their main ideas emerged when we posed the following question in the focus groups: "In which ways would you like your opinion and the opinions of students in general to be heard if it was possible to choose the technologies that will be used by your school for your learning? Why?"

The majority of the students' proposals highlighted the importance of promoting voting, allowing all participants to express their opinions. One child pointed out that they would like a group choice through a voting process. Another mentioned that a collective meeting or conversation among peers and teachers would be the best approach. They also brought up the perspective of using a class leader dynamic, in which someone is responsible for "listening to students' opinions about choices" and then conveying them to the teachers.

An additional perspective was to use the figure of a "teacher advisor" to collect the students' opinions, which is usual under the Brazilian democratic educational management framework. Finally, one student suggested that "the best solution would be to talk to the teachers during or at the end of class, and then talk to the administration," suggesting the involvement of school administrators in the children's participatory listening.

Regarding the way children wanted to be heard and participate in the choosing of technologies for their education, although some suggested the possibility of consultations being held online, in the end, it was unanimous that they considered face-to-face discussion more suitable. This was mostly related to the difficulties students experienced during the pandemic. They also expressed sensitivity to the fact that not all students have access to the Internet or to proper mobile devices.

> "Like we're talking now, in a meeting, just like that, stating our opinion on how we can improve or know which problems we can solve, but mainly paying attention to certain students who sometimes have more difficulty and increasing the conversation, but mainly in a meeting like this without fear or shame. (...) Everything mixed. Take the opinions of students and teachers."

> "I think not online, because some don't have very good Internet, and also because in person, sometimes it has more impact."

These were some of the key children's opinions found during the field research. They highlight the importance of recognizing children's voices in decision-making processes that involve their rights, specifically regarding the choice of educational technologies. As mentioned, all this data was essential for the development of one of the products derived from our project, the booklet *AI in the classroom: Participation models for the school community* (Data Privacy Brasil, 2024), in which three models for the recognition of children's voices in the process of choosing educational technologies are developed.

Guidelines for the meaningful inclusion of children in EdTech selection processes

Drawing mainly from the focus groups conducted with the students, but also from the other field activities our project carried out in Santa Maria, as well as from a bibliography review, we developed five general guidelines for the creation of participatory processes in the selection of educational technologies.

The first guideline is the need to strengthen digital education. To ensure that students' consultations are conducted consistently and that their opinions are increasingly robust and technical, it is important that the entire school community reinforce its commitment to the Brazilian National Digital Education Policy (Pned), as outlined in Law No. 14.533/2023. Promoting digital and informational literacy and other digital competencies will foster an ecosystem of empowered individuals in the digital realm. This has the potential not only to make consultations more consistent, but also to support students in their daily lives in the short, medium, and long term.

The second guideline is consideration of the local contexts in which the students to be consulted are inserted. It is important to bear in mind the diversity among children across Brazil and the world, which is influenced by various social markers such as gender, race, class, and region. The findings of this research are based on listening to and understanding individuals from urban and rural schools in the municipality of Santa Maria, which means that its content presents suggestions that need to be adapted to each local reality.

The third guideline is the consideration of the progressive autonomy of children—as recognized by themselves. Just as the self-determination of children in the exercise of their rights and actions in community life tends to grow according to their development, the expression of their opinions on educational technologies should also be considered and vary according to their age group. In other words, the way the opinions of a 5-year-old and a 16-year-old are heard and considered should be different. This does not mean that listening to the older child is more important. But the *how* and *what to ask* should be distinct.

The fourth guideline is the need for engagement of the entire school community. Students are the main users of educational technologies, but they are not the only ones affected by them. Teachers are and should be essential parts of EdTech selection processes, providing valuable insights from considerations such as each technology's alignment with pedagogical proposals. It is also interesting to understand the perspective of school administrators, who have a broader overall view regarding the school's pedagogical and political plan. Additionally, it is beneficial for families, as caregivers of children, to be at least informed throughout the process.

Our research project focused on how to include children's voices in these processes because we understand that what they have to say is still too little recognized and that involving them in such processes is particularly challenging. However, this does not mean that their voices should be heard in isolation.

Last but not least, the fifth guideline is the consideration of other factors relevant to the creation of participatory processes in the selection of educational technologies. Although students' voices are of great importance, they are not the only factor to be considered for choosing one specific EdTech product or service. While this research was intended to highlight the advantages of participatory processes, it does not advocate stating that students' opinions must necessarily be fully accepted. In reality, what is being proposed is that their voices be recognized and taken into account in decision-making regarding technologies in education, because children tend to be excluded from deliberative spaces, even though they are among the main individuals affected by these choices.

Closing remarks

This action-research project provides valuable contributions by emphasizing that children should be included in discussions related to Internet governance and the selection of educational technologies. Students, as the individuals most directly impacted by these technologies, have historically been excluded from decision-making processes. However, their voices must be acknowledged and considered, particularly in the selection of EdTech services in Brazil.

The project "AI in the classroom: Participation models for the school community" allowed us to develop innovative participatory methodologies that explore how to effectively engage children in these discussions. The findings offer key recommendations for education policymakers and teachers on how to meaningfully involve students in decision-making regarding the selection of EdTech services that directly affect their learning experiences.

This article aims to present these innovative methodological contributions that recognize children's voices, establishing guidelines and pathways for their meaningful participation in processes led by public procurement or schools themselves when selecting EdTech for their education and hopefully inspiring more participatory research to be conducted in the field with children.

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Open schooling and links between universities, Basic Education, technology, and society for sustainable development

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The United Nations Educational, Scientific and Cultural Organization (UNESCO) Regional Science Office for Latin America and the Caribbean, with technical support from the Regional Center for Studies on the Development of the Information Society (Cetic.br), created a document entitled *ICT for sustainable development: Recommendations for public policies that guarantee rights* (UNESCO & Cetic.br, 2019). It provides input to the formulation of public policies that ensure that information and communication technologies (ICT) promote sustainability, inclusion, and social justice, in line with the Sustainable Development Goals (SDG) of the United Nations (UN) 2030 Agenda (UNESCO, 2017). In this regard, it presents three fundamental arguments for integrating ICT into the 2030 Agenda. First, ICT is an important part of guaranteeing the right of access to information. Second, incorporating ICT into education can contribute to consolidating and guaranteeing the actions and rights set out in the 2030 Agenda. Third, ICT is crucial for monitoring, following up on, and strengthening accountability in relation to the targets set, guaranteeing transparency and responsibility in meeting the goals.

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This article discusses the coordination experience between universities and Basic Education schools, considering the intersection between the SDG, general competences, digital competences, and civic engagement. The experience was the project Scientific and Digital Literacy for Civic Engagement in Favor of the Sustainable Development Goals in Basic Education, which is part of the Open Schooling with Digital Technologies Program: Bringing the Curriculum, Schools, and Society Closer Together, approved and funded by the Brazilian National Council for Scientific and Technological Development (CNPq/MCTI/FNDCT) under call for proposals No. 18/2021, valid from 2022 to 2025.

This initiative involves actions by a group of researchers from Brazilian institutions—Federal University of Rio de Janeiro (UFRJ), Fluminense Federal University (UFF), PUC-SP, Federal University of Santa Catarina (UFSC), Pontifical Catholic University of Paraná (PUC-PR), Bahia State University (Uneb), Federal University of Cariri (UFCA), and Federal University of Ceará (UFC)—and an international institution—the Responsible Research and Innovation (RRI) Data Network of the Open University, UK. The researchers in this group work together to help bring schools and society closer together, promote student retention in Basic Education, and strengthen the development of digital and scientific culture in schools through the perspective of open schooling (OS) and other contemporary themes that adhere to the emerging expectations and needs in schools and in the SDG. It is worth noting that each institution in this network has a sub-project designed and developed by the research group to which it is linked, which has been submitted to its Research Ethics Committee (REC) (Almeida, 2024).

For the group of researchers who make up this initiative, the concept of OS is based on the development and dissemination of scientific knowledge. An approach introduced by the European Commission, OS aims to promote teaching actions in various areas of knowledge, with a focus on developing responsible citizenship (European Commission, 2015). Its aim is to support schools in preparing students to be active participants in projects related to real problems, in collaboration with their teachers, specialists, researchers, families, other educators, and local communities, in order to collectively build a better future. Open schooling is designed to integrate formal and informal learning using student-centered methods such as project-based learning, community engagement, problem-solving, and participatory action research, always addressing relevant global issues (European Commission, 2015; Okada et al., 2020; Santos & Almeida, 2020). In addition, teachers play a fundamental role as the creators and managers of these learning environments, encouraging student autonomy. It facilitates the learning process by promoting "learning by doing" and reflection on doing, enabling students to understand global and local issues and seek to intervene in them. This role is realized through collaborative authorial projects and initiatives committed to the community.

In this scenario, the reflections presented here are related to the actions developed by the team of researchers from the new technologies in education line of research of the Graduate Program in the Education: Curriculum Program at PUC-SP. These actions have made it possible to build knowledge about the integration between schools, universities, and society, arousing students' interest in developing scientific research projects and strengthening their desire to continue their studies. From an OS perspective, it was possible to give students and teachers a voice through authentic projects, with the collaboration of specialists from different areas of knowledge and members of the

community, according to the interests, needs, and problems implicit in the students' projects. These projects connect socio-scientific issues with knowledge of reality and scientific foundations that may or may not be included in the curriculum, strengthening digital and scientific cultures in schools.

The methodological approach was based on collaborative action research that was carried out in a municipal school located in an area of social vulnerability in the northern region of São Paulo. Based on these participatory design spaces, action priorities were identified and defined, with the central element being the Collaborative Authorship Works (TCA) developed by the students in the 9th grade of primary education over the course of the school year.

As a pedagogical practice developed in São Paulo's municipal schools, TCA aim is to promote students' authorship and protagonism in the learning process. Based on the City Curriculum's Knowledge Matrix, it seeks to mobilize the knowledge and skills acquired throughout the school cycle. It challenges students to propose solutions to contemporary issues and real problems in their communities, focusing on interdisciplinarity and encouraging the development of skills such as critical thinking, problem solving, and creativity, which are fundamental aspects of citizen education (São Paulo Municipal Secretariat of Education [SME], 2017).

In addition, the TCA stands out for promoting collaborative learning, in which students work in teams, integrating their different perspectives to build authorial projects and the practical application of the skills acquired throughout primary education. According to SME Normative Instruction No. 46/2019, TCA activities are guided by fundamental principles, such as promoting student reflection on their relationships with themselves, with others, and with society, and their leading role in building their life project. This process encourages students to make decisions, develop criticality and leadership skills, and work toward innovative and contextualized solutions, reinforcing the importance of an education geared toward citizenship and social transformation.

In this regard, throughout the activities carried out between schools, universities, and communities through the TCA, it was possible to observe synergy between the topics covered and the SDG, as shown in the analysis below.

Analysis

In order to discuss the link between universities and Basic Education based on an experience report, it should be noted that the activities were carried out in collaboration with teachers and students from a school in the city of São Paulo, as well as professors, post-doctoral researchers, and graduate students in the Education: Curriculum Program.

The relationship between the participants was built around real problems, with central themes and generative projects developed by the students, always with the support and guidance of teachers. These, in turn, were advised by researchers from the Program to guide the students in finding solutions to relevant issues in their context, using and creating emerging technologies with social and educational significance.

The project's activities were carried out in a school linked to the Freguesia/Brasilândia Regional Directorate of Education (DRE), which has a history of progress in its educational performance indicators. According to SME data, in November 2023 the school had 637 students enrolled and 14 classrooms in operation. In the Basic Education Development Index (Ideb) for 2021, this school obtained a score of 6.01 for the initial years, which represents an increase compared to 2011, with fluctuations over the last 10 years. In 2011, the Ideb was 5.14, rising to 6.02 in 2015, falling to 5.39 in 2019, and reaching 6.01 in 2021. The goal for 2023 was 6.8.

Each action research activity was preceded by preparatory actions that included identifying strategic partners and holding alignment meetings focused on the school's educational objectives and emerging demands. The development of a collaborative agenda was essential to guarantee the feasibility of the actions. Subsequently, a careful evaluation of the results and developments was conducted to ensure that the objectives were achieved. A researcher from the PUC-SP research team was assigned to mediate the whole process.

Within this context, the TCA became a bridge between teachers, researchers, and students in the search for solutions to real problems that address educational needs and the objectives of action research, such as the development of scientific literacy, the critical use of digital technologies, and students' civic engagement. Furthermore, the analysis of the TCA made it possible to identify the purposes recorded in the SDG.

The Talk to a Scientist initiative, developed by the group of researchers, was created to contribute to the reflections that were being developed. This initiative promoted seminars in which experts contributed on topics related to the projects being developed by the students, also serving the interests and needs of the school, creating a space for dialogue between scientists, students, and the school. The main issues included:

- Conflicts between teenagers and their families, a topic conducted with guidance and dialogue by a psychologist—an external partner of the action-research project—and a teacher, offering emotional support and strategies for dealing with family challenges.
- Dictatorship in the periphery, an issue addressed with the participation of a researcher who experienced protests in the dictatorship period at the factory gates of ABC Paulista, enriching students' historical understanding.
- Racial and religious prejudice, discussed in conversation with a researcher specializing in curriculum, culture, race, and Afro religions, promoting reflection on discrimination and diversity.

In addition to this action, regular meetings were held with the TCA's supervising teachers, who were responsible for monitoring and directing the students' projects. The aim of these meetings was not only to contribute to pedagogical planning but also to support teachers in guiding students to design and develop projects that were in line with current issues, such as the SDG and the school curriculum.

To expand the repertoire of digital tools, podcast and open educational resources (OER) workshops were offered, giving teachers and students the opportunity to acquire new skills. In these workshops, students developed practical skills, such as creating and editing

videos and audios, among other multimedia resources, promoting the dissemination of knowledge among school communities. One example was the podcast *Pod das Patroas*, created by students with the theme "Machismo in teenage dating," in which students addressed situations related to machismo present in the context of teenage relationships.

Video production was also one of the initiatives carried out by the researchers, who offered workshops so that the students could acquire the necessary resources to do it. In the workshops, they promoted discussions on social media and the culture of participation, accompanied by the creation of themed videos. The production process fostered debates on the conscious use of digital media and the involvement of students in social and educational issues, as well as contributing to the expansion of digital and scientific literacy.

The activities contributed to digital literacy, as the students learned how to use digital technologies and critically evaluate the information available through interaction and communication activities in digital environments. Digital literacy includes the use of technologies to navigate different platforms, interpret multiple text formats, and understand the multi-literacies present in digital culture (Heinsfeld & Pischetola, 2017; Rojo, 2017). In addition to digital literacy, these activities contributed to scientific literacy, understood as the ability to "read the world" and apply scientific knowledge in everyday situations (Chassot, 2016).

The students' actions, guided by the TCA advisors with assistance from the researchers, stood out in relation to several SDG, with an emphasis on the ones mentioned below.

SDG 4 – Quality Education, which aims to ensure inclusive and equitable education, promoting lifelong learning opportunities (this SDG is directly related to the TCA Freedom in School Space – Minecraft). In this project, the students used the Minecraft game as a teaching tool to create a "dream school," reflecting on the importance of inclusive, accessible, and welcoming educational spaces.

SDG 5 – Gender Equality, which seeks to achieve gender equality and the empowerment of women. This project encouraged equal participation of girls and boys in scientific and digital literacy activities, challenging gender stereotypes and promoting inclusion. An example was the production of educational videos on gender equality, in which students conducted interviews with women leaders in the community and role-played about the importance of gender equality.

SDG 10 – Reduced Inequalities, which seeks to reduce inequalities within and between countries. In relation to this SDG, some TCA initiatives proved essential. The Combating Racism at School TCA tackled structural racism, promoting the creation of interactive murals that map situations of prejudice within the school. Complementing this action, the students produced photographic posters depicting the costumes and make-up of African peoples, broadening the discussion on identity and cultural diversity. Also noteworthy was the "Prejudice against religions of African origin" activity, in which the students developed a game and organized discussions on religious discrimination, recording the school community's reflections on posters. The Xenophobia in Schools TCA brought the issue of xenophobia to the fore, with students dramatizing and discussing migration and immigration and their impact on social relations. This project highlighted the importance of empathy and respect for cultural and linguistic differences in the school environment.

All of these initiatives demonstrate how the project has integrated the SDG guidelines into the educational context, directly involving students in the search for solutions to global challenges while at the same time carrying out research that enabled them to broaden their scientific and digital literacy, as well as their civic engagement.

Final considerations

The actions carried out under the project Scientific and Digital Literacy for Civic Engagement in Favor of the Sustainable Development Goals in Basic Education demonstrated the potential of fostering links between universities, schools, and society to promote education that goes beyond school walls, directly involving students in the search for solutions to contemporary challenges that have the potential to be aligned with the SDG. In this process, the students carried out scientific investigations with an emphasis on topics from reality that were chosen as the focus of the TCA, and they had the opportunity to relate them to topics in the school curriculum under the guidance of the teacher and to talk to scientists.

The results show the importance of the association between schools, universities, and communities in integrating the various learning contexts with global issues and the active participation of students in the social transformation of their communities. To this end, teachers were needed who engaged their students and listened with sensitivity so they could develop projects that mobilized not only the students but also the community.

The project not only contributed to the students' learning but also strengthened scientific and digital literacy in the school, developing research and digital production skills to disseminate the results. It also strengthened their civic engagement, which involves exposing themselves to mobilizing issues and questioning and creating actions to change their environment, with a view to addressing ethical and citizenship issues. Therefore, collaboration between the various actors in society, deepening concepts, and contributing to a more inclusive and equitable education, not only prepares students for the challenges of the 21st century but also contributes to achieving the goals of the 2030 Agenda.

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The importance of assistive technologies in inclusive education: Building an accessible future

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Inclusive education has gained increasing prominence in contemporary society as a fundamental educational model that ensures that all people, regardless of their differences and limitations, have access to education. In an increasingly globalized and diverse world, inclusion is not only a matter of social justice but also a central element for human development. In this context, inclusive education extends beyond the simple presence of students with disabilities in classrooms. It represents a commitment to equity in which every student is valued and encouraged to reach their full potential.[2]

According to Neder (2022, 2023), in a society that is diversifying every day, inclusive education aims to ensure that all students have access to, participate in, and learn equally, regardless of cultural, social, economic, or special needs differences. This perspective is strengthened by the application of assistive technologies, which play a crucial role in facilitating learning and promoting the active participation of students with disabilities in the school environment. This study explored the intersection between inclusive education and assistive technologies, highlighting their importance in creating a more accessible and equitable educational environment. It also presents Nussbaum's capabilities approach as a theoretical framework for understanding the relevance of inclusive education in human development.

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[2] This research's methodology was predominantly based on a literature review and document analysis, which explored the relationship between inclusive education and assistive technologies. Initially, a systematic review of the academic literature was carried out, focusing on articles, books, and recent studies on inclusive education and the role of assistive technologies in the school context. It provided an in-depth understanding of theoretical concepts, existing practices, and the challenges of implementing inclusive policies. In parallel, a comprehensive documentary analysis of relevant educational policies and guidelines was conducted, including official documents, institutional reports, and legislation such as the National Education Plan (PNE), the Statute of the Child and Adolescent (ECA) in Brazil, and the International Convention on the Rights of Persons with Disabilities. The combination of these methodological approaches offered a detailed overview of current policies and practices, allowing for a critical assessment of the conditions needed to promote more accessible and equitable education.

The historical and social context of inclusive education

The history of people with disabilities has been marked by centuries of marginalization and social exclusion (Neder, 2024). For much of history, these people were seen as incapable of contributing to society and were relegated to a position of inferiority and dependence. This negative perception, coupled with stigmas and prejudices, has resulted in the segregation and isolation of people with disabilities both socially and educationally. However, in recent decades, social movements to defend the rights of people with disabilities have been committed to transforming this reality, promoting a paradigm shift that places inclusion and valuing diversity at the heart of public policies and educational practices (Neder, 2024).

Inclusive education has emerged as a response to this history of exclusion, based on the premise that all students have the right to learn in environments that respect their individualities and promote their active participation. According to the Salamanca Declaration (United Nations Educational, Scientific and Cultural Organization [UNESCO], 1994), inclusion is a non-negotiable right, and schools must adapt to meet the specific needs of all students, especially those with disabilities. This international document, which establishes guidelines for inclusive education, reinforces the need to create educational systems capable of welcoming all students, regardless of their individual characteristics.

In Brazil, inclusive education is also supported by a robust legal framework that includes the Federal Constitution of 1988 (1988), the ECA (Law No. 8.069/1990), the International Convention on the Rights of Persons with Disabilities (Decree No. 6.949/2009). These legal instruments ensure that all children have access to education, guaranteeing equal opportunities and respect for differences. Based on these legal frameworks, inclusive education in Brazil has become understood not just as an integration policy but also as a transformative approach that aims to profoundly change school culture and teaching practices.

Inclusive education and Nussbaum's capabilities theory

To understand the importance of inclusive education in human development, it is essential to introduce Nussbaum's (2020) capabilities approach. It offers a comprehensive vision of what it means to live a full human life, emphasizing the need to create conditions such that all individuals can develop their essential capacities.

Nussbaum (2020) argued that human development should be measured not only by economic indicators but also by people's ability to live dignified and fulfilling lives, exercise their abilities, and actively participate in society. Capability theory proposes that social justice should be measured by people's ability to carry out activities and functions that they consider valuable and that public policies should aim to increase this.

According to Nussbaum (2020), capacities include life, ensuring longevity and quality of life; bodily health, with access to nutrition and medical care; bodily integrity, ensuring freedom from violence and the possibility of mobility; senses, imagination, and thought,

promoting access to education and freedom of expression; emotions, allowing bonds and emotional experiences without fear of reprisal; practical reason, encouraging freedom to form a conception of the good and plan one's own life; affiliation, both in terms of social interaction and dignity and mutual respect; relationship with other species, recognizing the connection with nature; play, guaranteeing the right to leisure; and control over one's environment, encompassing political participation and economic rights. These capacities form the basis for inclusive policies that prioritize human dignity, recognizing that development is not limited to economic metrics but involves creating the conditions for each individual to flourish in all dimensions of their existence.

In the context of inclusive education, this theory reinforces the importance of creating educational environments that not only integrate students with disabilities but also provide the necessary conditions for everyone to fully develop their abilities. The author also stresses that education, given its importance, is considered the "key" to all other capacities. This implies a commitment to equity, where the focus is not only on equal access but also on equal opportunities for human development.

Assistive technologies as tools for inclusion and expanding capabilities

Assistive technologies refer to devices, equipment, and services that help people with disabilities carry out routine activities, facilitating their social and educational inclusion (Special Secretariat for Human Rights, 2009). One of the main benefits of these technologies is their ability to personalize learning (Bersch, 2017).

The use of assistive technologies in inclusive education is fundamental for several reasons (Hirata, 2011). First, these technologies increase accessibility to educational content, allowing students with different disabilities to access information and actively participate in school activities. This is essential to ensure fair access to learning and full inclusion of these students in the educational environment.

Moreover, assistive technologies make it possible to personalize learning. Each student has different learning needs and rhythms, and assistive technologies allow teaching to be adapted to meet their specific needs. This results in a more individualized and effective approach, in which resources and tools are used to maximize each student's potential, regardless of their limitations.

Another crucial aspect of assistive technology is the promotion of autonomy. By using them, students develop skills that promote their independence, which is essential for their formation as full citizens.

Various assistive technologies can be implemented in schools to promote inclusion. One of the most effective is screen readers, which are software that allows visually impaired students to access digital content by reading aloud the text displayed on the monitor. These readers are key to ensuring that students can interact independently and efficiently with digital materials.

Accessibility devices are also essential for inclusion. Equipment such as adapted keyboards, special mice, and adjustable desks ensure that all students can participate in classroom activities. These devices are designed to meet the specific needs of students with physical disabilities, allowing them to perform tasks that might otherwise be challenging (Rodrigues & Alves, 2013).

Finally, educational apps are another valuable tool. Several apps offer interactive activities adapted for students with different needs, facilitating learning in a playful and accessible way. These apps can reinforce the content learned in the classroom, offering an engaging and personalized way of learning.

There are also adapted teaching materials that can be used by all students. For those with some limitations, these materials are essential for understanding the content, allowing them to be fully included in activities.

Despite their many benefits, implementing assistive technologies in schools faces several challenges. One of the main obstacles is the lack of resources. Many schools, especially in disadvantaged areas, do not have sufficient funds to purchase these technologies and keep them up-to-date. Financial constraints prevent educational institutions from investing in the equipment and software that are essential for the inclusion of students with disabilities.

Another challenge is the need for teacher training. For assistive technologies to be effectively integrated into teaching practices, it is essential that educators receive adequate training. The lack of specific training can result in the underutilization of these resources, compromising their potential to transform the educational experiences of students with special needs. Well-trained teachers can better adapt technologies to the needs of their students, thereby promoting a more inclusive learning environment.

According to the 2024 edition of the ICT in Education survey, 71% of primary and secondary school teachers taught students with disabilities. However, among the teachers that had undergone continuing training in the 12 months prior to the survey (54%), 51% participated in initiatives on the use of technologies with students with disabilities. In addition, according to only 32% of teachers, the schools where they worked had specialized professionals to support teachers in choosing and adapting the educational resources used with students with disabilities.

Cultural resistance also is a significant challenge. The change in mentality regarding inclusion and use of assistive technologies is a gradual process. It is often necessary to promote a culture of inclusion that values diversity and the use of technological resources. The acceptance of new educational approaches and tools can be met with resistance by both teachers and other members of the school community.

Public policies and the role of assistive technologies in inclusive education

Public policies play a crucial role in promoting inclusive education and implementing assistive technologies. The PNE establishes clear targets for the inclusion of students with disabilities, highlighting the need to guarantee access to technological resources.

In addition, initiatives such as Specialized Educational Assistance (AEE) are essential to identifying students' specific needs and offering the right support so they can fully benefit from inclusive education.

Specialized Education Assistance, which must be complemented by the use of assistive technologies, is a fundamental strategy for ensuring that all students with disabilities have access to the tools necessary for their inclusion in mainstream classrooms. When effectively implemented, these technologies have the potential to transform students' educational experiences, enhancing their capabilities and promoting their autonomy.

An ongoing commitment to equity and social justice is needed to ensure that public policies effectively promote inclusive education. This implies adequate investment in infrastructure, teacher training, and the acquisition of assistive technologies, as well as constant monitoring of the policies implemented to ensure that they are really meeting the needs of students with disabilities. Furthermore, it is crucial that these policies be formulated on the basis of scientific evidence and international best practices, ensuring that Brazil is at the forefront of educational inclusion.

Inclusive education as a tool for social transformation

When effectively implemented, inclusive education has the potential to be a powerful instrument for social transformation. By promoting the inclusion of all students, regardless of their individual characteristics, schools become a space for coexistence and mutual learning, where diversity is valued and celebrated. This contributes to the formation of a more just and equitable society, where all individuals have the opportunity to develop their abilities and actively participate in building the collective future.

In this context, Nussbaum's capability approach offers a valuable framework for understanding the role of inclusive education in human development. By focusing on expanding the capabilities of individuals, this approach reminds us that true inclusion is not limited just to physical access to classrooms, but also involves creating the conditions for everyone to reach their full potential and live dignified and meaningful lives.

Conclusion

Inclusive education is a fundamental right and an essential condition for human development. Using Martha Nussbaum's capabilities approach allows us to understand that inclusion is not only a question of social justice but also a necessity to ensure that all individuals can live full and dignified lives.

Assistive technologies play a central role in this process, offering the necessary tools for students with disabilities to develop their abilities and participate fully in school and social life. However, for inclusive education to be effectively implemented, existing challenges such as lack of resources, the need for teacher training, and cultural resistance must be tackled through effective public policies and an ongoing commitment to equity and social justice.

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List of Abbreviations

AEE — Specialized Educational Assistance

ADC — *Asociación por los Derechos Civiles*

AI — Artificial Intelligence

BNCC — National Common Curriculum Base

CEB — Basic Education Chamber

Cenec — Executive Committee of the National Strategy for Connected Schools

Cetic.br — Regional Center for Studies on the Development of the Information Society

CGI.br — Brazilian Internet Steering Committee

CNE — National Education Council

CNPq — Brazilian National Council for Scientific and Technological Development

Conanda — National Council for the Rights of Children and Adolescents

CRC — UN Committee on the Rights of the Child

DCN — National Curriculum Guidelines

DigCompEdu — Digital Competence Framework for Educators

DRE — Regional Directorate of Education

ECA — Statute of the Child and Adolescent

EdTech — educational technology

Enec — National Strategy for Connected Schools

FNDCT — National Fund for Scientific and Technological Development

ICT — information and communication technologies

Ideb — Basic Education Development Index

Inep — National Institute for Educational Studies and Research "Anísio Teixeira"

ITU — International Telecommunication Union

LDB — Brazilian National Education Guideline and Framework Law

MCTI — Ministry of Science, Technology and Innovation

MEC — Ministry of Education

NGO — non-governmental organization

NIC.br — Brazilian Network Information Center

NTEM — Center for Educational Technology

OBIA — Brazilian Artificial Intelligence Observatory

OER — open educational resources

OS — open schooling

Piec — Connected Education Innovation Program

PNE — National Education Plan

PUC-PR — Pontifical Catholic University of Paraná

PUC-SP — Pontifical Catholic University of São Paulo

REC — Research Ethics Committee

SDG — Sustainable Development Goals

Secom — Social Communication Secretariat of the Presidency of the Republic

SEESP — Secretariat of Special Education

SPDIGI-Secom — Secretariat of Digital Policies of the Social Communication Secretariat of the Presidency of the Republic

TCA — Collaborative Authorship Works

UFC — Federal University of Ceará

UFCA — Federal University of Cariri

UFF — Fluminense Federal University

UFRJ — Federal University of Rio de Janeiro

UFSC — Federal University of Santa Catarina

UN — United Nations

Uneb — Bahia State University

UNESCO — United Nations Educational, Scientific and Cultural Organization

UNICEF — United Nations Children's Fund

unesco

Centre
under the auspices
of UNESCO

cetic.br

Regional Center for
Studies on the
Development of the
Information Society

nic.br

Brazilian Network
Information Center

cgi.br

Brazilian Internet
Steering Committee