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Information and Communication Technology supporting the inclusion of children with disabilities in education

Key messages

- Information and Communication Technology (ICT) supports the inclusion in education of children with disabilities by enabling them to overcome some of the barriers causing their exclusion. ICT complements other face-to-face methods and tools, such as teacher training and inclusive pedagogy.

- The closure of schools due to the COVID-19 pandemic prompted innovations in distance education through ICT. But not everyone was able to benefit from them. Children with disabilities, especially girls - already more likely to be excluded from advances in digitalisation - were largely left behind, exacerbating existing inequalities.

- Ensuring access to inclusive and equitable education by 2030 will require us to rethink the means we use and accelerate the access to and affordability of digital technology in low- and middle-income countries.

- A disability-inclusive and gender-responsive approach to ICT development must be adopted in the education sector to address differences in access to connectivity and digital learning and reduce the digital divide in order to enable all learners to reach their full potential.

- Achieving optimal use of ICT in inclusive education requires the development of partnerships, the implementation of effective coordination between stakeholders and a strong political commitment to fostering innovation.

About this factsheet

This factsheet draws on study carried out by Humanity & Inclusion (HI) with the support of the AFD (Agence Française de Développement) and Norad (Norwegian Agency for Development Cooperation) as part of our regional inclusive education projects. The objectives of this study, entitled "Les Technologies de l'Information et de la Communication (TIC) et l'Éducation Inclusive [Information and Communication Technologies (ICT) and Inclusive Education]", were to: (i) draw up an inventory of existing ICT that could help support inclusive education for children with disabilities; ii) identify the challenges involved in implementing these ICT tools in the classrooms of some of the French-speaking countries in which HI is working, namely Benin, Burkina Faso, Madagascar, Mali, Morocco, Niger, Senegal and Togo[1].

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[1] The study was based on secondary research, interviews with experts and interviews with potential users of ICT in the intervention countries, namely teachers, parents of schoolchildren and schoolchildren with disabilities in Benin, Niger and Senegal. It comprises two separate documents: a report outlining the process of the study, the creation of the ICT inventory and the main lessons learned, and a document listing the ICT identified and evaluated during the research, according to the type of difficulty they help to overcome and based on criteria such as usefulness, scope, feasibility and cost-effectiveness.

The education crisis is a crisis of inequalities: the importance of ICT as a driver of inclusive education

While access to education has improved since 2000, the number of children and young people excluded from education systems is still a major issue. One in eleven children of primary school age is deprived of formal education, the majority of them living in sub-Saharan Africa[2]. Socio-economic status and the sex of the child are determining factors, but disability is the main factor of exclusion[3]. In fact, the combination (intersectionality) of several factors exacerbates educational exclusion for millions of children with disabilities (especially girls) whose multiple barriers to education often go unaddressed in education policies and programmes. Moreover, their being in school does not necessarily mean they have effective access to learning. Children with disabilities attending school are often educated in separate environments and/or with resources that are inadequate and/or poorly adapted to ensuring their educational success.

- Girls and boys with disabilities are 10 times less likely to attend school than other children[4].

- Children with disabilities in low- and middle-income countries are 19% less likely to acquire basic reading skills than their peers without disabilities[5].

- Girls aged 15-19 are less likely to use the internet and to own a mobile phone[10]. They also have a fewer ICT skills than boys[11], even in households where eLearning is an option[12]. For example, in Ghana, 16% of teenage boys have ICT skills, against only 7% of teenage girls[13].

- During the COVID-19 pandemic, only 18% of parents of children with disabilities found radio and television learning resources accessible, and 29% found computer use accessible and useful for their children[14].

Education systems are currently endeavouring to address the consequences of the COVID-19 pandemic and prepare themselves for similar situations in the future. In doing so, it is essential for them to put in place the kind of tools that will enable all children and young people to continue learning. More than ever, there is a need to provide appropriate devices and software, tailored to the needs of each learner, based on an individualised education plan[15].

RWANDA - Youth centre Mahama-camp, HI project
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Most countries closed their schools at some point during the COVID-19 pandemic, exacerbating the global learning crisis. But not all children were impacted by these closures in the same way. Indeed, because of the digital divide, recourse to distance learning during these periods deepened existing educational disparities. While more than 90% of countries offered forms of distance learning[6], at least 31% of school children worldwide were unable to benefit from it[7]. Due to limited access to the internet[8], the inaccessibility of the tools used or lack of access to the tools themselves, many children - including those most at risk of being marginalised – had no opportunities to continue learning.

Nevertheless, ICT development is expanding rapidly in low- and middle-income countries. For example, almost two thirds of the population in Mali or Senegal have a mobile phone and mobile internet penetration is increasing all the time. But this should not disguise the fact that the digital divide is still very wide, especially for certain categories of the population. Women, girls and persons with disabilities (especially those living in low- and middle-income countries) benefit least from connectivity, ICT innovations and the digital transformation.

A 2019 study[9] found that 36% of Kenyans with visual impairments consider that their mobile phone has helped them "a lot" to access education, a figure that rises to 71% for those owning a smartphone, as this device gives them access to many assistive technologies that are essential for studying, such as screen readers, for example.

In international policy frameworks, ICT is considered essential to creating inclusive and equitable societies

A number of policy frameworks and international human rights instruments seek to ensure equitable access to ICT for all, including girls and persons with disabilities. In particular:

- Article 9 of the Convention on the Rights of Persons with Disabilities requires State Parties to promote access to ICT and the internet for persons with disabilities by encouraging the design, development, production and dissemination of accessible ICT and systems.

- SDG 4 calls for a significant increase in access to ICT and the provision of universal and affordable access to the internet in least developed countries by 2030 (target 9.c). It also aims to increase the use of ICT to empower women through technology (target 5.b).

- The Committee on the Rights of the Child's General Comment No. 25 (2021) on children's rights in relation to the digital environment calls on State Parties to promote technology that meets the needs of children with disabilities and to ensure that it is universally accessible so that all children can use it, without exception.
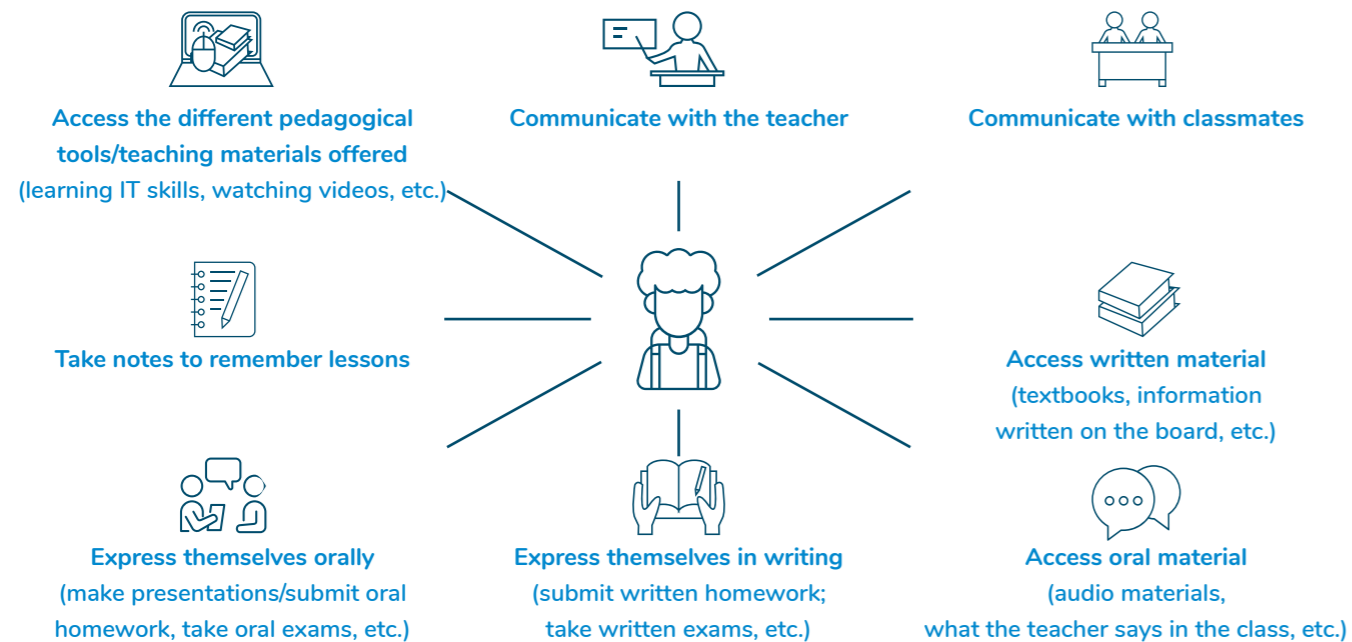
2   UNESCO-UIS (2018). Fact Sheet N°48: One in five children, adolescents and youth is out of school.
3   UNICEF (2021). Combatting the Costs of Exclusion for Children with Disabilities and their Families.
4   Plan International (2019). Plan International agit pour l'éducation des enfants handicapés, on https://www.plan-international.fr/news/2019-12-03-plan-international-agit-pour-leducation-des-enfants-handicapes
5   UNESCO (2020). Global Education Monitoring Report.
6   UNICEF (2020). Covid-19: Are children able to continue learning during school closures? A global analysis of the potential reach of remote learning policies using data from 100 countries.
7   Ibid.
8   While more than 90% of countries have implemented forms of distance learning, at least 31% of schoolchildren worldwide have not been able to access it [source: UNICEF (2020). Covid-19: Are children able to continue learning during school closures? A global analysis of the potential reach of remote learning policies using data from 100 countries] with the largest gaps in African countries, where 89% of learners do not have computers at home and 82% do not have access to the Internet [source: UNESCO (2020). Startling Digital Divides in Distance Learning Emerge, press release].
9   Altai Consulting & GSMA (2019). Understanding the mobile disability gap : Insights on mobile phone access and usage by persons with disabilities in Kenya and Bangladesh.

10 UNICEF East Asia & Pacific (2021). What we know about the gender digital divide for girls: A literature review.
11 Gender norms, including the perception that "technology is for boys", and concerns about girls' online safety may prevent them from acquiring ICT skills.
12 D. Amaro, L. Pandolfelli, I. Sanchez-Tapia, et M. Brossard (2020). COVID-19 and education: The digital gender divide among adolescents in sub-Saharan Africa. UNICEF blog.
13 Ibid.
14 World Bank, Inclusive Education Initiative (2020). Pivoting to Inclusion: Leveraging Lessons from the COVID-19 Crisis for Learners with Disabilities. Participants in another survey noted that educational platforms often lack features such as transcripts and closed captions, screen readers, and print magnifiers [source : Inter-agency Network for Education in Emergencies (2021). No education, no protection. What school closures under COVID-19 mean for children and young people in crisis-affected contexts].
15 International Disability Alliance (2020). What an inclusive, equitable, quality education means to us.

ICT supporting inclusive education

Inclusive education systems are about addressing the different needs of all children and young people so that they can learn, grow and develop together.

Image 1: *The essential educational components of an inclusive school*

An inclusive school adapts to all children and enables them to access the different contents and pedagogical activities

Access the different pedagogical tools/teaching materials offered
(learning IT skills, watching videos, etc.)

Communicate with the teacher

Communicate with classmates

Take notes to remember lessons

Access written material
(textbooks, information written on the board, etc.)

Express themselves orally
(make presentations/submit oral homework, take oral exams, etc.)

Express themselves in writing
(submit written homework; take written exams, etc.)

Access oral material
(audio materials, what the teacher says in the class, etc.)

ICT has a key role to play in making schools places of knowledge, skills and attitudes free of any form of discrimination or segregation by providing teachers with a wide range of educational content and activities accessible to all their pupils. ICT can help learners to overcome difficulties in seeing, hearing, communicating, remembering/concentrating/learning or moving their upper limbs (a capacity often needed for writing or other school activities).

ICT can be divided into three main categories:

- **The educational content and activities per se:** digital media whose purpose is to transmit lessons/skills to the student (e.g. an audio book, an educational video with sign language interpretation, etc.).

- **The hardware that serves as an intermediary** to make certain educational content/activities accessible (e.g. a computer to view the sign language interpretation of an audio document; alternative communication software to facilitate communication with teachers).

- **Accessibility features** that make the hardware accessible to all (e.g. a screen reader that allows a student who is blind or visually impaired to use a computer to access content on the internet).

Below are some examples:

The smartphone + keyboard combination allows children who are visually impaired or blind to access written material (using the smartphone's screen reader), but also to express themselves in writing (take notes, submit homework, etc.) using the keyboard.
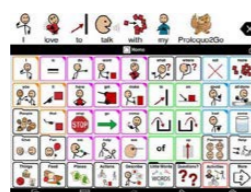
Proloquo2Go is an application that allows students with cognitive and/or speech difficulties to express themselves. The student selects images/symbols representing what he/she wants to express and the application oralises it.

"I think that this technology could be used everywhere in Niger to promote the inclusion of all children with disabilities in school, because it helps them to study well and also to have fun through games, as well as to communicate with friends and family"

(Sadat, boy, 12 years old, student with a physical disability, Niger)

HI's study took several criteria into consideration when assessing the usability of different types of ICT in inclusive education:

- Usefulness/scope to measure the pedagogical value of an ICT tool and its versatility, i.e. the number of pedagogical contents or activities that it makes accessible to the learner;

- Feasibility to assess how realistic it is to consider using this ICT in a school setting in certain contexts (e.g. its availability locally, the material conditions and skills required to use it, connectivity);

- The cost of the object or resource, taking into account the potential impact/price ratio.

However, it should be remembered that while ICT has great potential to support the educational inclusion of children with disabilities, it cannot replace other face-to-face methods and tools, nor can it replace training teachers in inclusive pedagogy, both face-to-face and online.

NEPAL - Nirmala Khendo © Prasiit Sthapit

ICT is most effective when the learners' specific needs have been properly considered. HI has produced a document listing the ICT tools identified and evaluated during the research according to the type of challenge they help to overcome and criteria such as usefulness, scope, feasibility and cost effectiveness.

Conditions required for the optimal use of ICT in inclusive education

The study conducted by HI in a number of countries in Africa showed that in most cases a number of conditions must be met to enable the optimal use of ICT in inclusive education[16]. There are already many examples of significant progress towards meeting these conditions in low- and middle-income countries and they confirm the vital importance of establishing partnerships and coordination between key players (including governments, the private sector, institutional donors, UN agencies, schools and universities) and of seeking innovative solutions.

Condition 1 : School infrastructure

Most ICT requires access to electricity to be charged or used. Many schools, especially in rural areas, are not connected to the electricity grid or have limited access to quality electricity (i.e. electricity that does not damage the equipment). In Benin, only 42% of the population has access to electricity, and 26% in Madagascar[17]. Some ICT (especially the more advanced tools) also require an internet connection, but in most low-income countries fixed internet is still very limited and mobile internet is too expensive. For example, in Burkina Faso, only 16% of the population uses fixed internet[18], but 65% of the population is covered by 3G[19].

Good practice – Uganda: Pilot project on the usability of assistive technology for inclusive education[20]

UNICEF, in partnership with the Ugandan Ministry of Education and Sports, has launched a pilot project aimed at using ICT to support inclusive education. The project aims to develop accessible learning materials and provide equipment to access these materials in the classroom. To ensure the sustainability of the project, solar panels producing electricity have been provided to schools not connected to the grid.

16 The study « Barriers and levers for the use of telerehabilitation through experimentation in three countries », also conducted by Humanity & Inclusion, outlines similar barriers to be lifted and conditions to be in place (training of professionals, sustainable economic model, increased ICT skills, robust policy framework, and collaboration among stakeholders).
17 World Bank (2018).
18 World Bank (2017).
19 GSMA Intelligence,2020 forecasts.
20 Morgado Ramirez, Dafne, Holloway, Catherine and Austin, Victoria, Report on the Usability of Assistive Technology in Ugandan Schools with Children with Visual and/or Hearing Disabilities. A report from the Global Disability Innovation Hub for UNICEF, May 2019.

Condition 2 : Procurement of good quality equipment

Cost is one of the main barriers to using ICT in schools. Commercially-available screen reading or symbol generating software can make a real difference to the lives of learners with disabilities, but it is often too expensive[21]. Furthermore, some of the ICT found in schools in the countries covered by HI's study do not correspond to the learners' needs and, lastly, the availability of ICT in local languages is extremely rare.

Good practice – Lebanon and Palestinian Territories : distance learning using tablets[22]

HI has supplied tablets to thirty or so schools in Lebanon. The teachers have created customisable content for online lessons and this content has been rendered accessible. The use of tablets was essential for accessing education during the COVID-19 pandemic. Therefore, in the Palestinian Territories, a similar model was implemented via a YouTube channel with courses incorporating sign language interpretation.

Condition 3 : Digital skills

Most teachers, students and parents in the study's target countries have had very little exposure to ICT and have very few digital skills. This is a major barrier to the use of ICT in the classroom and for distance learning. A certain level of literacy is also an essential prerequisite for learning how to use certain ICT. Because of low literacy rates among family members or carers, the home support that can be given to these children in learning and developing the necessary digital skills is limited.

Good practice – Kenya: tools and training to enable students with visual impairments to pursue their studies[23]

In Kenya, thanks to a partnership between a school and two universities, an assessment of the needs of students with visual impairments was carried out with a view to addressing the difficulties they encounter when attempting to go on to higher education. In the wake of this needs assessment, iPads with the iOS operating system (which includes the VoiceOver screen reader) and keyboards were distributed to the students who were then trained in how to use the screen reader. This programme has enabled learners with visual impairments to access the learning materials of universities/higher education institutes without assistance.

Condition 4 : Medical and rehabilitation support

Determining the necessary services and tools requires the support of a multidisciplinary team[24]. Limited access to health and rehabilitation professionals (physiotherapists, occupational therapists, speech therapists, etc.) remains a barrier to diagnosing a disability and identifying the kind of ICT suited to the child's needs, as well as to making the necessary adaptations to the child's home and school environment (e.g. through space planning and furniture adapted for ICT use).

«A big barrier for inclusive education is the medical file, the diagnosis, the assessment, the coordination between the medical, paramedical and educational team»

(A.B., Moroccan Ministry of Education)

Condition 5 : Coordination to ensure the correct use and maintenance of ICT

Some pilot programmes[25] have noted the absence of any clear protocol between the different stakeholders (such as the Ministry of Education, regional authorities, non-governmental organisations, maintenance technicians, teachers, pupils, parents, etc.) defining their specific roles and responsibilities. There are also some outstanding issues on reconciling ICT and ethics in inclusive education. For example, with some ICT tools, the children using them to do their exercises are separated from the rest of the class. It is therefore essential to address ethical issues in a participatory way before implementing an educational programme that includes the use of ICT tools.

«The risk with technology is that some of it is only for use by children with disabilities. So when you use it in the classroom, you create a kind of bubble, which can isolate these children from the rest of the class.»

(Giulia Barbariesqui, Global Disability Innovation Hub)

Putting ICT in support of inclusive education on the political agenda

It is still quite rare for Ministries of Education to include the use of ICT in support of inclusive education in their national strategies, or at least in any detail, although some promising commitments have been made that must now be transformed into action and replicated.

At the Global Education Summit in 2021, several low- and middle-income countries made clear their commitment to incorporating ICT into education. Senegal, for example, has committed to strengthening connectivity and digital development at all levels, including by equipping and connecting education and training facilities[26].

Sierra Leone has committed to mobilising data, technology and innovation in order to create, test and roll out innovative tools to improve education services. The country's "National Policy on Radical Inclusion" places the inclusion of gender and disability issues at the heart of its approach to education[27].

Recommendations

To increase equitable and effective access to ICT and improve the use of ICT in support of inclusive education, we are urging…

…National governments to:

INTEGRATE ICT into their education sector plans and existing and future education strategies, and set aside specific budgets for its implementation. As governments rethink their budgets in the wake of COVID-19, investments in inclusive education are vital so that children with disabilities are no longer left behind, whether during or outside of health crises:

- Give priority in their infrastructure development projects to connecting schools to electricity and the internet.

- Provide digital training for teachers, parents, carers and students, with particular attention to girls and children with disabilities. For teachers, this training should include modules on ICT use and basic settings and maintenance management.

- Seek formal agreements with suppliers (computer/tablet/phone manufacturers, software developers, mobile operators, technology service companies, etc.), especially at the local level, to find solutions to keep the cost of ICT at affordable levels and support free access to connectivity or electricity in certain exceptional conditions (e.g. for distance learning during a major crisis).

21 The Education Commission (2016). How technology can be a game changer for inclusive education.
22 Case study carried out by Julia Mills following an interview with Henriette Chidiac, Humanity & Inclusion's inclusion specialist.
23 Toolkit on Disability for Africa – Inclusive Education, Division for Social Policy Development (DSPO) and Department of Economic and Social Affairs (DESA), United Nations.
24 International Disability Alliance (2020). What an inclusive, equitable, quality education means to us.

25 See Morgado Ramirez Dafne, Holloway Catherine and Austin Victoria (2019). Report on the Usability of Assistive Technology in Ugandan Schools with Children with Visual and/or Hearing Disabilities. A report from the Global Disability Innovation Hub for UNICEF.
26 Senegal - Engagement pour le financement national 2021 - 2025, on https://www.globalpartnership.org/content/senegal-engage-ment-pour-le-financement-national-2021-2025
27 Sierra Leone - Domestic financing commitment 2021-2025, on https://www.globalpartnership.org/content/sierra-leone-domestic-financ-ing-commitment-2021-2025

ENSURE that the Ministry of Education is systematically empowered to lead collaboration with other ministries and sectors through the creation and facilitation of multi-stakeholder platforms (school representatives, NGOs, international organisations involved, the private sector, etc.) and multi-sectoral platforms (education, health, rehabilitation, infrastructure, technology, energy, gender equality).

SEIZE every opportunity to integrate the use of ICT in education into their policy agendas for digitalisation, infrastructure development and social inclusion.

... Institutional donors to:

GIVE PRIORITY to inclusive education in their aid programming, particularly in response to the pandemic, given its catastrophic impact on access to education for children with disabilities.

INCREASE funding to support the transformation towards inclusive, quality education systems that maximise the potential of ICT tools to facilitate the inclusion of children with disabilities and marginalised learners.

- Invest in and support innovation, research and the development of accessible and affordable ICT to meet the challenges of inclusive education, including distance and/or online education.

- As part of support to improve infrastructure, especially access to electricity and the internet, prioritise initiatives that bridge the digital divide in order to help the most marginalised learners.

... Civil society actors (Organisations of Persons with Disabilities, NGOs, local associations, etc.) to:

PROMOTE partnerships and **RAISE AWARENESS** among stakeholders, especially:

- Governments, by facilitating dialogue, sharing relevant resources and data on the educational situation of children with disabilities and the potential of ICT, and supporting efforts to move towards more inclusive education systems.

- Major global technology players, by stressing their key role in making their products accessible to a maximum number of people through the application of Universal Design principles, especially in low- and middle-income countries. To this end, remind them that the Marrakesh[28] Treaty facilitates the production and international transfer of books specially adapted for people who are blind or visually impaired by establishing a set of limitations and exceptions to traditional copyright.

... All stakeholders to:

IDENTIFY good practices, support their implementation and promote their replicability for an optimal and broader use of ICT in learning in support of more inclusive education.

ENSURE the meaningful participation of the people concerned (persons with disabilities, children, parents, teachers...) and their representative organisations at all stages in the implementation of inclusive education programmes, including in relation to the use of ICT.

ADOPT a gender-sensitive approach by addressing differences in access to connectivity and digital learning and promoting opportunities to put these skills into practice, with a particular focus on girls with disabilities.

COLLECT, analyse and share data on educational exclusion, learning needs and access to ICT, disaggregated by age, gender and disability. We recommend using the Washington Group questions and the Child Functioning Module to help identify the functional limitations of children with disabilities.

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28 The Marrakesh Treaty was adopted on 27 June 2013 in Marrakesh and forms part of the international copyright treaties administered by WIPO.

HI is an independent and impartial aid organisation working in situations of poverty and exclusion, conflict and disaster. We work alongside people with disabilities and vulnerable populations, taking action and bearing witness in order to respond to their essential needs, improve their living conditions and promote respect for their dignity and fundamental rights.