

ICT FOR INCLUSION: REACHING MORE STUDENTS MORE EFFECTIVELY

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CONTEXT AND OUTLINE OF THE PROBLEM

The World Bank estimates that between 10 and 12 per cent of the world's population has a disability.¹ Based on this, the numbers of children under the age of 16 with disabilities is estimated at between 140 to 165 million. Sixty two million children of primary school age worldwide have a disability. They face significant and complex barriers in accessing education; as a result their school attendance and completion rates are much lower than those of their peers. Of the 75 million children out of school worldwide, one third are children with disabilities. In total an estimated 186 million children with disabilities have not completed primary school education.² In developing countries, exclusion from education is "particularly more serious among persons with disabilities, of whom approximately 97 per cent do not have reading and writing skills."³

There is a close link between poverty and disability. The World Bank estimates that 20 per cent of the world's poorest people have some kind of disability.⁴ The global literacy rate for adults with disabilities is as low as three per cent. Unemployment among persons with disabilities is as high as 80 per cent in some countries. The cost of excluding a large proportion of the workforce comes at a high price for any economy, a price that is set to rise as the ratio of older people to persons of working age increases over the next four decades. The combined impact on Gross Domestic Product of excluding persons with disabilities from the workforce and increasing their dependency on state aid is predicted to be as high as 35.8 per cent in more developed countries to less than 10 per cent in less developed regions.

Types and benefits of ICTs for education

ICTs play three main roles in education:

- Compensation uses – technical assistance that enables active participation in traditional educational activities, such as reading or writing.
- Didactic uses – the general process of using ICTs to transform approaches to education. Many ICTs that can be used as a didactical tool to enable a more inclusive learning environment.
- Communication uses – technologies that can enable communication – often referred to as alternative and augmentative communication devices and strategies.

The main types of ICTs that can in turn fulfill these roles for students with disabilities are:

- mainstream technologies – such as computers that contain in-built accessibility features;
- accessible formats, also known as alternate formats – such as accessible HTML (Hypertext Markup Language), DAISY (Digital Accessible Information System) books but also include ‘low-tech’ formats, such as Braille;
- assistive technologies – such as hearing aids, screen readers, adaptive keyboards, etc. Assistive technology (AT) is a “piece of equipment, product system, hardware, software or service that is used to increase, maintain or improve functional capabilities of individuals with disabilities.”

Categories of ATs include standalone devices such as mobility aids (e.g., wheelchairs), alternative augmentative communication devices and hardware and software that enable access to a computer (e.g., adaptive keyboard, screen reader). The high-tech ATs that have emerged over the last two decades have had a particularly dramatic impact on access to education.

Other ICTs for learning include educational software and Virtual Learning Environments (VLEs). These ICTs have a broader application to all students. It is therefore imperative that educational authorities ensure these technologies are universally designed in accordance with requirements under the UN Convention the Rights of People with Disabilities.

A meta-study on the benefits of accessible ICTs in education identified a wide range of benefits to all stakeholders. The benefits reported varied from enabling basic participation and communication in mainstream classrooms, to enhancing learning autonomy to enabling tasks to be tailored to suit individual skills and abilities⁵.

CRITIQUE OF POLICY OPTIONS

Access to education through the use of ICTs for persons with disabilities does not just have a social, moral and economic imperative for all countries; it is now a matter of binding international human rights law.

International law

The UN Convention on the Rights of Persons with Disabilities is the primary piece of international law informing national policy on disability affairs around the world. The Convention was adopted by the UN General Assembly in 2006 and became an enforceable legal instrument in 2008. As of September 2010, 146 countries have signed the Convention, of which 90 have subsequently ratified it.

The Convention moves towards a view of disability resulting from barriers within society (such as steps at the entrance of a school building for a wheelchair user) and away from the view that disability results exclusively from a person's medical condition. Article 24 contains specific obligations for the provision of inclusive education. These include the provision of "reasonable accommodations" for students with disabilities that may include, as appropriate, access to, training in and the use of accessible ICTs, including AT and educational materials in an accessible format.

Article 24 also contains an important requirement on the provision to professionals and staff who work in all areas of education of "disability awareness training and [training in] the use of appropriate augmentative and alternative modes, means and formats of communication, educational techniques and materials to support persons with disabilities".

Article 4 'General Obligations' also contains a specific recommendation that all new technology developments be "universally designed" and hence reduce the cost of including accessibility features by incorporating them at the earliest possible stage during the product development cycle. This also holds true for ICTs used in education.

Other relevant international texts containing policy recommendations and goals include:

- The World Summit on the information Society (WSIS) Principles and Plan of Action⁶ contain many commitments on the development of an Information Society that enables equal access for all. Target 7 of the Action Plan aims to “adapt all primary and secondary school curricula to meet the challenges of the information society, taking into account national circumstances.”
- United Nations Educational, Scientific and Cultural Organization (UNESCO) leads the global *Education for All* movement, aiming to meet the learning needs of all children, youth and adults by 2015.⁷ UNESCO promotes the ultimate goal of inclusive education which it views as a means to ensuring a quality education for all and to achieving wider social inclusion goals. UNESCO has developed and facilitated the key policy documents and agreements:
 - Guidelines for Inclusion: Ensuring Access to Education for All;
 - Policy Guidelines on Inclusion in Education 2009;
 - Salamanca Declaration (1994) . The Declaration sets out that AT is an essential part of inclusive education and should be used “to enhance success in the school curriculum and to aid communication, mobility and learning.” The declaration goes on to recommend “that assistive technology can be provided in a more economical and effective way where it is provided from a central pool in each locality.”⁸ This central resource centre should have expertise in matching assistive technology to individual needs, training and on-going support in its use and ensure its maintenance and upkeep.
- UN Millennium Development Goals have set a target of full enrolment and completion of primary school for all children by 2015.⁹

The corpus of international laws and texts contains significant human rights obligations and some development targets on the provision of accessible ICTs. However policy makers are left with little guidance on policy development and implementation.

Current national policy approaches

Many countries have general anti-discrimination legislation in which the denial of access to a service, such as education, is outlawed across a variety of grounds including disability. These generally include some concept of 'reasonable accommodation' or 'adjustment in anticipation' through which the special requirements of persons with disabilities are to be considered and met. In addition to this, many countries have implemented specific legislation on the provision of education to persons with disabilities.

Regardless of the level of maturity, current policy approaches in all countries struggle to deal with the complex proposition that is the provision of affordable, usable and effective ICTs and formats for the education of persons with disabilities.

In well resourced countries, the central policy issue has been identified as the lack of comprehensive support structures available to teachers, support staff, pupils and their parents which are underpinned by specific policies at national regional and school level.

In developing countries, the issues are more profound. The lack of IT infrastructure in most school systems, coupled with the low rates of inclusion of persons with disabilities in formal educational systems preclude the vast majority of persons with disabilities in developing countries from receiving the opportunity to use ICTs to access any form of education.

At the 48th UNESCO International Conference on Education (Geneva, 2008) 116 countries submitted National Reports on the Development of Education.¹⁰ The reports show a mix of modest progress and interesting innovations being made by countries in the use of ICTs for inclusive education. However explicit reference to the provision or use of accessible ICTs, and in particular the provision of learning materials in alternate formats, was present in only a small number of reports showing that the use of ICTs as a means to inclusion for persons with disabilities in mainstream learning environments is still not considered a matter of strategic importance in national educational policies. However, reports on the progress that countries are making towards the Millennium Development Goals have pointed out that traditional educational delivery mechanisms are unlikely to enable countries to reach their targets and that new approaches must be considered.

The common challenges that all countries continue to grapple with include:

- The high cost and/or availability of suitable ICTs, in particular the availability of affordable high-tech assistive technologies such as screen readers in the language of the student.
- Levels of AT abandonment are high and reasons for this include poor needs assessment, the provision of unsuitable technology or poor training and follow up support.
- Attitudes of teachers towards the perceived value and potential of the use of ICTs by persons with disabilities.
- Poor support for teachers and students for ICTs to be implemented as a pedagogical tool and not just as an add-on to traditional teaching methods.

The following policy recommendations aim to overcome the shortfalls identified in current policy approaches. They recognize that ICTs for education are implemented in the context of competing policy and strategic government priorities. The recommendations are cognizant, therefore, of other areas of governance such as telecommunications and e-government and developmental priorities such as innovation and technological development.

POLICY RECOMMENDATIONS

Policy development for the use of ICTs in schools is recognized as a “complex proposition based on the principle that technology is not only a tool [but requires] a shift the focus from technology provision to the design of learning environments”. Trends in policy development have moved from an exclusive focus on the provision of hardware and software to the effective use of ICTs in different educational contexts. In line with a shift in educational policy in general, the emphasis is being placed on the aims and goals of using ICT rather than on the means of use.

Irrespective of the state of policy, law and implementation, policy development will likely target the three main strategic areas for development of *infrastructure, support for practice* and *curriculum*.

Key stages for policy development

The following four stages for policy development are recommended for the successful integration of accessible ICTs in an educational environment. These include the design and development of the accessible ICTs, their implementation and improvement and the assessment of their benefits (Fig. 1).



Figure 1. Stages for policy development

Source: UNESCO Institute for Information Technologies in Education, 2006

Main areas for policy interventions

In conjunction with the four stages of policy development, a national policy framework should cover the three main areas of strategic importance: infrastructure, curriculum and support and training for teachers and students. A number of other overarching factors that will impact on each of these areas include funding strategies and technology development. Implementation of the various policy reforms must be monitored to decide whether they provide the support required to achieve the stated goals and to analyze and interpret the results and inform further policy intervention.

Infrastructure

This includes both the technical infrastructure required to support the use of ICTs and the wider AT infrastructure.

While many countries have programmes in place for the use of ICTs in education for persons with disabilities, two problems persist. The first is the availability and affordability of robust AT solutions. The second challenge is getting “the right product, via the right person, and with the right instructions and training to the disabled end-user”.¹¹ This has been identified as a major barrier in the European context but is likely to exist in other regions. A policy recommendation proffered by a 2009 report funded by the European Commission is for the establishment of an **AT industry federation**. This federating body would help address the significant marketing and distribution problems encountered by AT companies in dealing with the myriad of different service provider systems that are used in different companies to get AT ICT products to end users.

National agencies for special education and/or ICT in education are in existence in many countries. While these vary in form and function, all should have a clear statement of intent and help coordinate policy development and implementation of a national infrastructure for ICTs in education for persons with disabilities.

An emerging priority is the **sustainability of funding models** for the provision of hardware and software. In particular for developing countries, reviews of ICT education programmes funded by international aid and multinational ICT companies are showing that after the initial donation of technology, educational and training centers are struggling to maintain and upkeep the technology and programmes.

Countries such as the USA and Canada have long standing **public procurement** policies that require all public funded goods and services to be accessible to persons with disabilities. This has had a positive impact on the built-in accessibility features and interoperability with ATs of ICTs used for education. A key consideration for the provision of high tech ATs for computer access is the choice between proprietary and open source licensing models.

In countries where a relatively mature policy for ICT in education for persons with disabilities is in existence, educational authorities are involved in **international cooperation** on research into the needs and experiences of both learners and teachers, sharing of experiences and expertise and research into the development of new and better AT solutions and service delivery models.

ATs also lag behind new developments in mainstream software such as browsers and office applications. This leads to a degradation of functionality of the AT overtime resulting in the need for frequent upgrading. This often has a cost implication.

Technology developments that policy makers should monitor include the possible use of cloud computing for the provision of ubiquitous accessible computing and the use of mobile learning. While the latter is particularly interesting for developing countries in which Internet access is limited, accessibility considerations for this mode of distributed learning are still being addressed.

Support for practice

Closely related to infrastructure, this relates to the range of supports available to teachers and students. Support required range from national agencies for accessible ICT in education to support services that work directly with children and teachers, to in-school supports and access to specialist resource centers and online resources of information. A key area for policy development should be the instruction of teachers during initial and in-service training on the use of ICTs in teaching children with disabilities. According to the European Agency for Development in Special Needs Education, “if the real potential of ICT for pupils’ learning is to be reached, teachers will first have to be convinced of the value of using ICT.”

Systems of **needs assessment** for persons with a disability may already be in place and underpinned by existing policy. These policies need to explicitly require the development of a clear statement of needs that incorporates the ATs and related supports required to enable a child to receive education in an inclusive school environment.

Curriculum development

National educational policy should require educational systems to adopt the use of ICT in all areas of curriculum development. ICTs can help transform static curriculum resources into flexible digital media. Standards and procedures for the production and/or provision of learning resources should be implemented to ensure they are provided in the required formats in a timely manner.¹²

The four key curriculum areas that educational policy should address and through which ICTs skills and literacy can be improved are:

- ICT literacy – ICT skills are taught and learned as a separate subject;
- Application of ICTs in subject areas – ICT skills are developed within separate subjects;
- Infusing ICTs across the curriculum – ICTs are integrated or embedded across all subjects of the curriculum;
- ICT specialization – ICTs are taught and learned as an applied subject to train for a profession.

Other policy measures that will improve access to curriculum for students with disabilities using ICTs is a requirement for Open Educational Resources to be made available in accessible formats. Similarly national policies and initiatives that require publicly funded websites to be accessible will help improve access to educational resources published online.

A key development in curriculum design is universal design for learning (UDL). UDL is an emerging and transformative idea which has at its core the development of curriculum that is designed for the outset to meet the greatest number of users, reducing the need for costly and time consuming retrofitting.

By definition UDL embraces the use of ICTs, particularly by persons with disabilities, to access and engage with the curriculum. UDL is finding its way into legislation in some countries and is likely to become a policy priority according as educators and policy makers become familiar with its principles and concepts.

Stakeholders and consultation

In every policy area under review, effective consultation with relevant stakeholders will help ensure the policy interventions are implementable and engage properly with the regulatory environment they seek to influence.

Stakeholders will include:

- persons with disabilities, their families, carers and advocates;
- national and regional educational authorities, including agencies with a particular remit in this area;
- school boards, teachers and accessible ICT specialists and support staff;
- private and public operators, from Internet service providers to specialist assistive technology practitioners and vendors, mainstream ICT providers (local, national or multinational);
- disability service providers;
- Disabled Persons Organizations.


Research in support of evidence-based policy

In support of evidence-based policy, a small number of research studies are likely to significantly impact on the efficacy of any policy interventions. In general these research studies should aim to establish the current installed bases of ICTs in schools at present, the state of current services that could support schools and the attitudes and experiences of teachers and students in the use of ICTs for education. In particular the research should establish:

- national demographics on persons with disabilities and number of students likely to benefit from provision of accessible ICTs;
- current ICT infrastructure within the school including number of computers and school connectivity to the Internet;
- types and numbers of accessible ICTs required;
- affordability and availability in country of required accessible ICTs;
- efficacy and sustainability of current funding strategies for provision and support of ICTs;
- attitudes, knowledge of students, parents teachers towards accessible ICTs;
- preparedness of teachers to incorporate accessible ICTs into their pedagogical practices;
- availability of support dedicated networks for teachers and students;
- availability of services such as community based rehabilitation services that could potentially support students and teachers in the use of high and low tech ATs for use in learning environment.

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http://ec.europa.eu/information_society/newsroom/cf/itemdetail.cfm?item_id=4897
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http://aim.cast.org/learn/policy/federal/what_is_nimas



Persons with disabilities have traditionally been excluded from receiving an equitable education as the result of attitudinal, physical and infrastructural barriers within educational systems and throughout wider society. Information and Communication Technologies (ICTs) can enable persons with disabilities to receive an equitable education and facilitate them to reach their full potential as productive and integrated members within society. This policy guide provides policy makers with advice on the development of systematic and comprehensive policies that will contribute to the integration of persons with disabilities into the national educational systems through the use of ICTs.

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