

Disability and Bridging the Digital Divide

ICT Accessibility and Assistive Technology

FOR PEOPLE OF ALL ABILITIES



Nabil Eid

2016

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Table of Contents

- ❖ [Foreword-Debra Ruh](#)
- ❖ [Introduction](#)
- ❖ [Teleworking for employment of persons with disabilities](#)
- ❖ [Accessible banking to persons with disabilities](#)
- ❖ [Accessibility and the future of the Internet of Things](#)
- ❖ [Telecare, Assistive technology and ICT accessibility for persons with dementia](#)
- ❖ [Accessible e-learning platforms, hopes and challenges!](#)
- ❖ [ICT accessibility and employment of persons with disabilities](#)
- ❖ [Tourism destinations and accessibility for persons with disabilities](#)
- ❖ [Applying accessible telecentre for refugees with disabilities](#)
- ❖ [Library services and accessibility of eBooks for persons with disabilities](#)
- ❖ [Accessibility to strengthen arts and culture for persons with disabilities](#)
- ❖ [ICT accessibility in the education of children with Down syndrome](#)
- ❖ [Disability-Friendly environments in the age of 5G, Softwarization is coming!](#)
- ❖ [Where innovation and accessibility meet?](#)
- ❖ [Persons with disabilities in accessing and using the Internet, challenges and good practices](#)
- ❖ [How can baby with down syndrome learn, and what can learn in the womb?](#)

FOREWORD



I have had the pleasure to work with Nabil Eid on programs to support individuals with disabilities all over the world. I met him on social-media during our weekly AXSChat community.

His contributions to the chat have added value to many people. He lives in Syria and despite all the problems in his country he has dedicated his life to help assure people with disabilities are meaningfully included in education, employment and society.

Most of his efforts have been focused in Arabic speaking countries in the Middle East.

Society's role is to assure full access to education, secondary education, and employment. We also need to assure that our houses, transportation and internet, communications and technology (ICT) are accessible for everyone.

Society benefits when all members can participate to achieve their goals. Persons with Disabilities want to be part of the workforce and to become tax payers. Employers benefit by including persons with disabilities in their workforce. A more diverse workforce fosters innovation and cooperation.

Technology innovations are also creating unlimited possibilities to allow individuals with disabilities to contribute in significant ways to allow each person to follow their life path. There are so many examples but here are a few of the inventions that can change the lives for everyone including persons with disabilities.

Inclusion of individuals with disabilities has many moving parts and the efforts must be blended into every aspect of society from education, employment, transportation, housing, and socialization. Inclusion of PwD is a civil rights issue and we must also consider accessibility and Universal access.

Universal accessibility in the Information, Communication and Technology (ICT) sector holds unparalleled promise and opportunity for people with disabilities never before seen in our history.

Many people are surprised to learn just how much of the world's population is affected by a disability, and how valuable accessible design of ICT is to the global marketplace. According to World Health Organization 1 in 7 people have a disability which equates to over 1 billion people. It is also important to note that disabilities are a normal part of life. Persons with disabilities are not broken, they just might navigate the world in a different way. We all can add value when given the opportunity to tap into our unique innate abilities. Accessible ICT is an important part of that equalizing equation.

To understand the impact one has to look no further than the World Health Organization which indicates that people with disabilities are the world's largest and fastest growing minority group. With the population of the United States aging and the likelihood of developing a disability or other mobility limitation increasing with age, the growth in the number of people with disabilities continue to an be expected to rise dramatically.

This is an exciting time, of great promise and opportunity for people of all abilities. This is a new era for global citizens, one where emerging new technologies and mobile computing devices are serving as enablers for people of all ages and all levels of education. Designing and delivering ICT to be fully accessible ensures all individuals can enjoy the benefits and advantages of technology to enrich their lives and fulfill their dreams.

An inclusive, accessible and universal design approach to technology is critical to both public and private industry wishing to anticipate future needs of this growing population. By recognizing the importance of the protection and promotion of the rights and dignity of persons with disabilities through assistive technology and accessible ICT, the world continues to strengthen policies, strategies, and programs along with an increase in awareness of the public at large of the importance of the full inclusion of individuals with disabilities, accessible ICT and assistive technology.

Experts report that the most obvious and cost effective solutions are often ignored or overlooked, a mistake that organizations and governmental bodies can no longer make when serving all citizens in equal fashion. Making technology usable for all has become imperative for unleashing the potential of all persons and is critical for any public and private institution that hopes to fully participate and remain relevant in the 21st century.

Think about what you can do to better reach people with disabilities, and find creative ways to make it happen through accessible technology. Move beyond general steps to protect and promote the rights of people with disabilities, ensure that accessibility is addressed in all policies and programs, promote training on the human rights of persons with disabilities, stop any practice that breach the rights of people with disabilities, and involve people with disabilities in the development of legislation and policies.

Nabil has written on the many topics impacting persons with disabilities. His writing maps out the steps needed to fully include PwD in all aspects of society and implement the United Nations Convention on the Rights of Persons with Disabilities (CRPD).

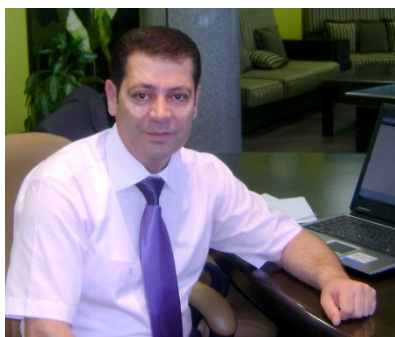
I believe that Nabil Eid is one of the greatest minds in our industry. Hope his writing inspires you as much as he has inspired me.

Debra Ruh

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INTRODUCTION



Information and Communication Technology (ICT) is of course an enabling technology and we should not lose sight of this fact. If it is not properly planned, managed and implemented it might put us into social gaps or to the 'Digital Divide'. I strongly believe that all of us are here because we all agree that none of us should be left out in isolation in this highly useful and challenging digital world. And this is why ICT accessibility is very important to all of us, especially, the persons with disabilities.

15 per cent of the world's population lives with a disability. This represents about 1 billion people globally. (ICTs) and assistive technologies are a unique infrastructure that expand access to key public services, promoting digital inclusion. Throughout the world, persons living with disabilities are already benefitting from the advantages of ICT-enabled applications and AT services. To extend the benefits of ICTs to all, ICTs have to be made accessible to persons living with disabilities, so these technologies constitute an opportunity and not a barrier.

This book gives an overview on disability and bridging the digital divide for people of all abilities. The focus is upon the use of e-accessibility, Assistive Technology and accessible ICTs to support persons with disabilities.

An accessible ICT product or service is one that can be used by all of its intended users, taking into account their differing capabilities. Accessible ICTs have the potential to provide persons with disabilities unprecedented levels of access to education, skills training and employment, as well as the opportunity to participate in the economic, cultural and social life of their community.

Accessible ICTs from the access to ICTs gap perspective is often seen as universal access, and may be regarded as the first important steps of addressing accessible ICTs.

Therefore, due to the importance such studies, I share you a free my book that includes extensive articles and studies of how persons with disabilities have used ICT accessibility and assistive technology in access and Inclusion through technology.

Finally, I am completely convinced, together we can make ICT accessibility a reality around the world. Together we can set the stage for effective multi-stakeholder engagement in promoting accessible ICTs, an essential enabler of the rights of persons with disabilities in information society and our digital world, enjoyment of all other rights, such as education, employment, recreation, access to public information, etc. are inextricably interwoven with access to electronics and information and communication technologies (ICTs).

Nabil Eid

December, 2016



Teleworking for employment of persons with disabilities

Working at home, sometimes called remote working, teleworking or telecommuting, is an important option for many persons with disabilities because it allows for more flexibility and may be only employment possibility to produce better results than working in a conventional workplace. It seeks to find jobs and working hours from home for making money online. It is a possible form of employment for persons with disabilities provided care is taken over selection of workers, identification of work that is suited to the telework format and management of telework units by employers.

Teleworking can be much simpler to deal with all persons with disabilities, with (visible or invisible), whatever accessible workplace, attitudes at an office or other place of work. [A new survey around telecommuting](#) indicates that 81% of professionals with disabilities would like to teleworking, at least part time.

Today's ICT innovation is changing the world, world of Assistive Technology (AT) and high-speed Internet access mean new choices and good paying options for people who want the flexibility and convenience of careers that don't require commuting to an office, or working for someone else. New technologies and the very innovations in ICT accessibility help to create solutions for accessible workplace with increasing productivity, flexibility and creative thinking.

Technological advancements helped in increasing telework options, these advancements can also result in expanded options and opportunities for persons with disabilities.

The recent studies indicated that home-based telework is a very flexible form of employment. It may involve working from a home base for part of each week and from a conventional office for the rest of the week; or working from home on specific elements of a broader workload which are suited to the telework format; or working at home for most of the time, with occasional visits to the company offices. The feasibility of home-based telework for persons with disabilities in a variety of forms has been demonstrated in many studies taking into consideration a number of conditions needed to be realized in the management of telework arrangements by the employing organization, responsibility for maintaining contact with the teleworker and for monitoring the performance of work.

Accordingly, persons with disabilities as teleworkers should be qualified to do the work, they need for training approach, induction training may be necessary where they are new employees of the employing organization. The period of induction serves two purposes: besides familiarizing the teleworker with the type of service provided by the organization, it also enables him/her to get to know other employees of the organization and make links which are essential to prevent feelings of isolation from developing, when the teleworking arrangements becomes operative.

What are the benefits of teleworking for people with disabilities?

Employment of persons with disabilities to work from home is a growing trend. Companies and workers are recognizing the benefits of providing opportunities for certain employees to skip the commute to the office and work from home.

The following are some of the benefits of teleworking:

- For complex needs and some persons with disabilities, working at home may be their only employment possibility.
- It brings many employment opportunities for persons with disabilities, saves significant time that would otherwise be used commuting, especially for those who need accessible transportation services.
- Reasonable accommodation at the lowest cost for employers and employees with disabilities and allow employers to attract and retain valuable workers by boosting employee morale and productivity.

- Ability to work outside of standard hours, working hours are often flexible and employer teleworking policies vary, some require a virtual presence between specific hours, while others have no concern about when work is completed.
- Arrangements can be quite flexible, ranging from examples in which work is performed mainly from home to those which combine home-based activity with varying degrees of conventional office-based activity.
- Easier to manage their disabilities at home and flexibility to change position due and better access to attendant services also, allows them to produce better results than working in a conventional workplace.
- Teleworking is a possible form of employment for persons with disabilities provided care is taken over selection of workers, identification of work that is suited to the telework format and management of telework units by employers.

ICT accessibility and Teleworking

For persons with disabilities, gaining access to ICT accessibility ensures that they will be successful in their teleworking position. The most important factor for them in teleworking positions is the understanding that in order to fully participate in the workforce, persons with disabilities must have access to, and use of information and data that is comparable to the access and use by applicants and employees without disabilities.

This is especially true with regard to recruiting individuals with disabilities for teleworking positions. If persons with disabilities are not provided with accessible ICT, they are limited in their ability to develop skills needed to be productive team members and advance in employment. A commitment to accessible and usable ICT is as essential to facilitating meaningful and effective teleworking opportunities.

Successful teleworking strategies especially for employees with disabilities cannot adequately occur also without proper training and job supports. Training should be implemented for both employers and employees with disabilities. In order to work effectively in teleworking positions, employees need to use effective customer service skills, problem solving techniques, computer skills, as well as communication skills. Next, training on how to use these skills will allow employees with disabilities to better assess their own skills needed for teleworking, and evaluate their need for assistive technology and ICT accessibility in completing job tasks in a telework

position.

In this context, persons with disabilities should have the same opportunity to teleworking as persons without disabilities. Teleworking policies are inclusive when they do not include barriers to employees and candidates with disabilities. Working from home is ideal for many them, making it easier to work around the effects of a disability and create new opportunities for people with severe disabilities, as well as enabling others who become disabled during employment to retain their jobs. Many companies have an almost untapped talent pool waiting in the wings for jobs. But these individuals are largely ignored because they can't or are less able to commute to the office.

A good teleworking policy lays the groundwork for successful telework arrangements for persons with and without disabilities.

If your organization doesn't have an established teleworking policy, it's time to develop one. If your organization already has a teleworking policy, you can devote more of your attention to the planning required for the successful implementation of individual telework requests.



Is Banking Accessible to Persons with Disabilities?

Accessible banking to persons with disabilities

“Technology is important in the lives of persons with disabilities, we should not lose sight of the fact that more Accessible means more Inclusion, provide persons with disabilities with appropriate technology, support their wellbeing, and continue to build and embed an inclusive culture and enable them to realise their potential”.

According to WHO and World Bank, about 15.3 percent of the world’s population or one billion persons live with some form of disability. Persons with disabilities tend to be acutely vulnerable to exclusion.

Yes! 1 billion in number around the world are a significant percentage of the world’s population. Unfortunately, many of them are not provided with equal opportunities in financial inclusion, in financial products and services as their peers and are denied their rights of being an integral part of the financial inclusion community.

Full financial inclusion to them needs access to a suite of financial services; persons with disabilities would like to be treated as “normal” able and capable to access financial services.

Financial Institutions working with PwDs should accept and respect this fact and should make their decision to provide financial.

We admit that the regulation of financial services is complex, and making sense of financial inclusion policy and regulation requires a great deal of creativity, especially given all of the

different factors that supervisors have to consider beyond prudential supervision, but that is not impossible! It is the responsibility of all Member States to achieve social justice through the protection of the equal rights of their citizens, including persons with disabilities, to education, science, culture, communication and financial inclusion using various technological solutions.

The Convention on the Rights of Persons with Disabilities-CRPD

The Convention on the Rights of Persons with Disabilities has paved the way in promoting accessibility in all public services including financial services. CRPD contains a number of provisions that refer to a person with disabilities and accessibility to banking services.

- Article 9 deals with Accessibility and clause 2.b affirms that the state should ensure that private entities that offer facilities and services, which are open or provided to the public, take into account all aspects of accessibility for persons with disabilities.
- Article 12 affirms the right of persons with disabilities to have equal recognition before the law. Clause 5 addresses the right of persons with disabilities to control their own financial affairs and have equal access to financial credit and loans.
- With the Government trying to make people with disabilities more independent by promoting better education and employment for them, it is important that they are able to manage their own financial affairs and take an important step towards living an independent life.

Limited Access to Financial Services

In several countries and specifically developing countries, persons with different types of disabilities are not allowed to independently open and operate bank accounts, access loans, or use electronic and online banking facilities. They have limited access to financial services, including traditional and alternative banking, online payment services and financial transactions, and mobile banking, many of them have faced challenges in accessing and using financial services from policy barriers to inaccessibility of financial institutions.

This is primarily based on assumptions about what persons with disabilities can and cannot do their capacity to read and write, and their ability to make important financial decisions independently; also many policies within financial institutions do not promote access to all persons. Policies around authentication, lack of enforcement and governance continue to

challenge many organizations including financial organization in their ability and resilience to be accessible and inclusive.

Access to financial services for all is a necessity in today's world not simply at the community or household level, but at an individual level, to open doors to banking services, credit services, stocks and shares, insurance, and other markets. Access to and inclusion in financial services is crucial to poverty reduction and participation in economic prosperity and growth and development.

ICT accessibility to enable financial services

Technology advances and ICT accessibility have changed the way of financial services, publicized, offered, used and other issues. The growing availability and use of Internet banking, phone, and mobile banking are generating greater expectations of receiving services “anywhere, anytime” and driving perceptions that everyone can now access banking services through a plurality of devices and digital solutions.

Persons with disabilities are demanding now for better and easier access to the entire range of financial services through ICT accessibility, ensuring and increasing an inclusive workplace for employees, maximizing on technology advances and diversity inclusion for all. There are a large number of persons in the world with different levels of disability, who will benefit from technology-based banking services with many receiving independent access for the first time.

The increasing nature of services now available through technology has triggered growing demand among persons, who remained marginalized from traditional paper-based banking services, there is increased evidence that integrating accessibility in the design of products and services from the start results in cost savings and more streamlined and efficient processes that enhance customer experience. By offering an online experience through any device personalized to individual needs, preferences and abilities, organizations can ensure they are reaching the broadest base of the population, especially the “unbanked” and “under-banked,” to enhance interactions and improve sales opportunities.

For example, some technology-enabled financial services, such as SMS based mobile money services for rural areas, services such as e-banking, mobile banking, and phone based banking offer a significant opportunity for persons with disabilities and diverse abilities to access various

services through multiple mediums. On the other hand, if technology enabled services are poorly designed they will create a larger digital divide and further exclude persons with diverse abilities from critical and necessary access to financial services.

eAccessibility to banking services

'eAccessibility' concerns the design and supply of Information and Communication

Technology (ICT) products and services with particular regard to ensuring that they can be used by people with disabilities and others for whom the technical features of ICTs can pose barriers to their usage.

The full spectrum of ICTs needs to be eAccessible if everyone is to have equal opportunities for participation in everyday social and economic life in the Information Society. This includes ICT products such as computers, telephones and the wide range of other ICT devices now part of everyday life, ICT-based network services such as telephony and TV, the many web-based and phone-based services that are in everyday use today such as online government and shopping, call centres and so on and other ICT-based modes of service delivery such as financial services by mobile banking, Internet banking and self-service terminals like ATMs and ticket machines. Focus on persons with different types of disabilities in order to promote accessibility for the E-Banking services such as:

Telephone banking solutions

Telephone banking could be very useful, if the proper tools are made available to persons with disabilities. For instance hearing, speech, and even dexterity impairments may face several barriers in successfully using telephone banking services. In some cases, getting in touch with a person on the other end can be quite difficult if not completely unavailable.

- **Providing text transmitter equipment:** Calls using text transmitter equipment. Deaf or hearing impaired customers, or those with speech disabilities, may contact customer Line with questions about access to bank and request about products and services.
- **Telephone transfer service:** For customers who are not able to visit a branch or those who are not presently using online banking services, maybe bank offered a telephone transfer service through which certain transactions can be made, including funds transfers

among bank accounts, balance inquiries, certain stop payments, etc. ([*Apple Bank for saving*](#)).

- **Interactive Voice Response (IVR):** Employ (IVR) technology or touch-tone features of the user's phone and ensuring that IVR systems can work well with TTY or providing standalone TTY numbers for telephone banking. For example, if a person with a hearing or speech impairment is unable to use the IVR system, they should be provided with alternative options to provide input includes touch-tone dialing or requesting an operator.
- **Video relay services:** Use video relay services to facilitate telephone banking for consumers using sign language.
- **Manual operators:** Provide manual operators and signal their availability to callers early on in the call.
- **Mobile banking services:** Telephone banking can be combined with mobile banking services such as SMS to facilitate ease of access for the customer.

Internet banking solutions

Internet banking could provide the best solutions. Accessible Internet banking has the potential to make a very big difference to many people with disabilities in addition to the advantages it provides for the population as a whole.

Internet banking has the potential to provide people that have accessibility problems with other means of banking (such as access to a "walk-in" branch or telephone banking) a means to remain independent and more in control of their own financial requirements.

The Internet banking standard includes:

- Transactions such as online service registration, balance enquiry, statement viewing, transfer between accounts, bill pay, third party funds transfer, reviewing and updating investments and portfolios, online loan applications and interactive financial calculations performed online.
- Email associated with the delivery of Internet banking services.
- Dependencies that can impact the effective accessibility and usability of online services for the financial institution, web development tools, user's minimum hardware and software expectations, reliance on scripting and applet technologies. In addition for the

customer, level of experience, platforms and operating systems, assistive technology brand and version, firewalls, connections, etc.

The biggest obstacle that comes with developing internet banking options which are accessible to all is the wide diversity in the persons who are trying to access the banks' websites with or without assistive technologies or aids, and it is here that universal design comes into play, also one of the main barriers to web accessibility is because designers and web developers are often unaware of accessibility practices. This means that many websites may not work with assistive technologies, thus preventing disabled users from accessing services or functions. The goal of universal design is to have each web page accessible by all persons; Web site for banking should be Accessibility standards WCAG2.0. This is of concern when we talk about banks and financial institutions which are run by various governments and which need to be in compliance of these standards and guidelines, as they cater to a large population of customers with disabilities.

Internet banking could provide the best solution, banks can make websites more accessible and follow the prescribed guidelines such as WCAG2.0 and usability principles, to ensure a better banking experience with adequate security not just for their customers with disabilities, but for all customers.

Internet banking offerings can be made accessible through the following:

- Ensuring accessibility guidelines in developing mobile applications, website interfaces, and mobile content such (WCAG2.0)
- Ensuring access without the use of a mouse, and through assistive technology such as screen readers and voice recognition software.
- Ensure documentation, including available statements in print or pen formats as well as digital formats such as HTML or RTF also offer accessible and alternative formats such as audio, large size fonts, accessible e-text or DAISY formats, and printable in Braille.
- Conduct thorough accessibility testing of the websites prior to deployment, and provide accessible means to receive consumer feedback on any accessibility barriers.
- Offer alternatives to CAPTCHA such as audio codes or math questions to ensure independent login processes.
- Offer real time access to customer service representatives through instant chat, video conferencing with captions, or video relay services that enable real time sign language

interpretation and provide a hotline service to assist customers with navigation and use of Internet banking facilities.

Automatic Teller Machines (ATMs) Solutions

(ATM) - a wall-mounted, stand-alone or semi-secure electronic terminal that is customer activated and designed to perform basic transactions such as cash withdrawal and balance inquiry, and advanced transactions such as cheque deposit, bill payment, and transfer between accounts.

Deployment and operation of ATM solutions by using standard to cover issues of physical and technology accessibility for ATMs, define accessibility requirements for ATMs and ATM sites, to make the product or environment more usable, there may be some people with disabilities who have requirements unable to be met within the standard.

Focus into how accessibility can be mainstreamed into ATM design.

- **Accessible physical access:** ATMs height and reach should be appropriate for different users, including those who use wheelchairs.
- **Visibility and lighting:** ATMs should be physically accessible, have proper lighting, and signage in appropriate formats, including Braille, large print and tactile signs.
- **Talking ATMs:** Employ speech output capabilities to provide accessibility to blind and visually impaired customers, feature voice instructions accessible through headphones inserted into an ATM jack.
- **Universal keyboard layout and Braille decals:** To assist blind or visually impaired persons, feature ATM keyboards as a universal layout with a dimple for the "5" key and special raised symbols for locating the ATM's cancel, enter and clear keys. In addition, Braille decals identify the major components on the ATM face, including the receipt printer, deposit and dispenser slots.

Banking accessibility and ATMs, examples of the barriers

Here are below results of Disabled People's Association ([DPA](#)) survey about Access to Banking Services in 2013. The survey aimed to assess barriers and/or difficulties people with disabilities may experience whilst accessing banking services.

- Many banks do not allow blind customers to operate individual accounts and insist that they operate joint accounts with family members instead.

- Banks rely on signatures for some transactions. For the blind, signatures are often not a good means of verification as blind people tend to have less consistent signatures.
- While the general banking services, apart from phone banking are generally accessible to the hearing impaired, the main barrier experienced by the hearing impaired is the lack of non-auditory means for emergency/helpline communications.
- Choose bank based on accessibility features rather than on favorable terms or conditions or banking solutions that suit their needs.
- Generation of people with hearing impairment are illiterate and unable to use internet banking.
- ATMs are not accessible for the blind as information feedback is largely visual through the ATM display. Touchscreen/dynamic displays while providing more functions to the sighted users are completely inaccessible to the blind.
- Displays on ATMs are too small to cater for people with impaired vision and strong sunlight can cause glare on the ATM display which makes the ATM inaccessible to a user with impaired vision.
- Software upgrades for online and mobile banking often render the system inaccessible.
- Replacement of ATM cards needs telephone intervention

Also more information about an understanding of the barriers by inaccessible financial services to persons with different disabilities, the report is available in [G3ict](#) , “Inclusive financial services for seniors and persons with disabilities: Global Trends in Accessibility Requirements”.

Accessibility training and awareness staff about banking and financial services

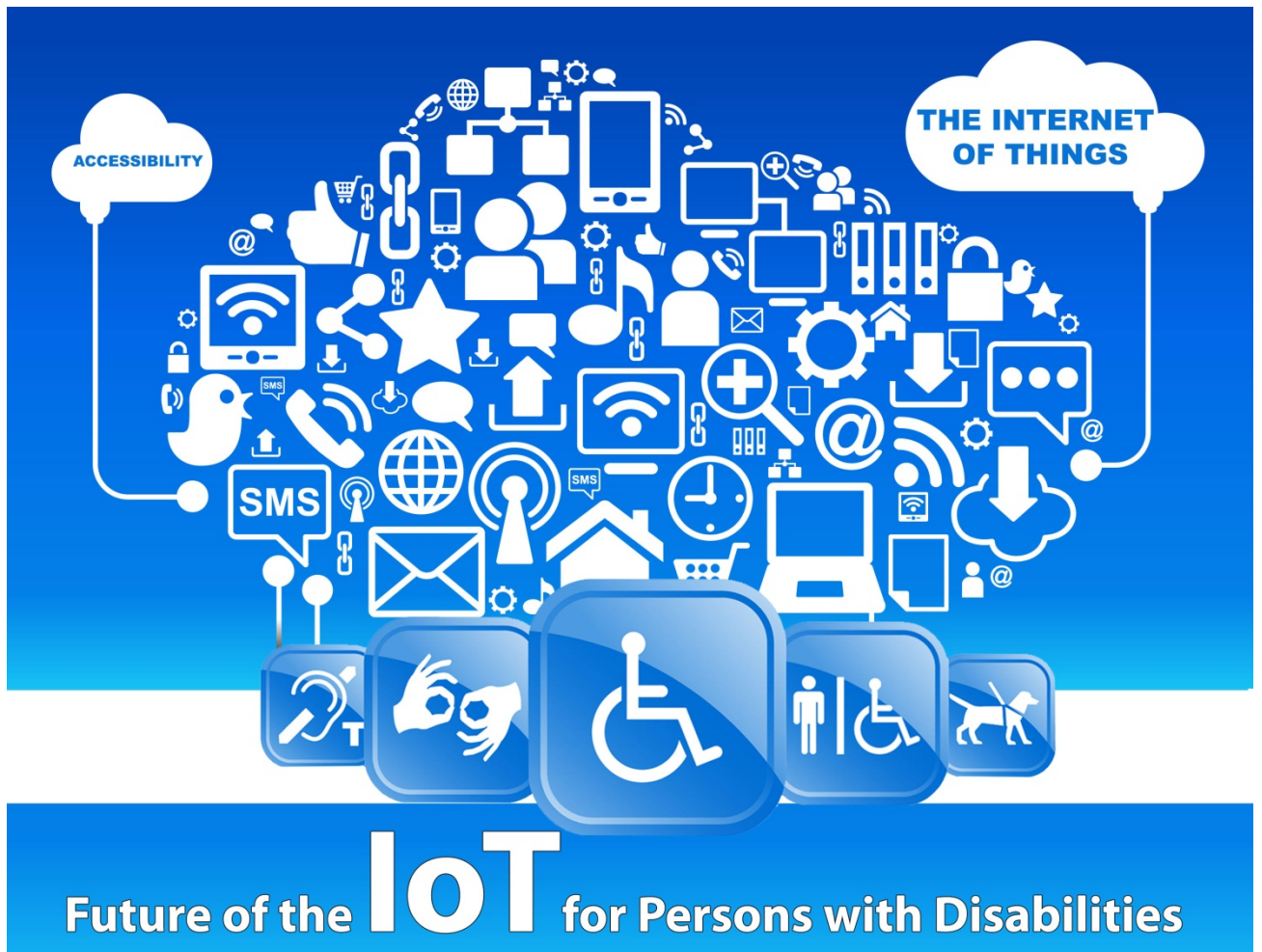
Accessibility training for all customer-facing employees to educate them about Accessibility services, and on properly serving all customers, including those with disabilities, the training will be provided to staff and contract workers whose duties involve interaction with the public or third parties.

Training will include:

- Accessibility standards related to ATMs, Net Banking, Assistive technology aids and all several aspects of banking accessibility.
- The fundamental principle of an Accessible ATM for development and Industry Standards for ATMs.

- Standards document on Accessible ATMs for customers with disabilities.
- Standards for financial inclusion.
- Policies and standards that promote better access to financial services.
- WCAG2.0 standards for websites accessibility.
- How to interact and communicate with persons with various types of disability who use an assistive device or require the assistance

Training must also be provided on an ongoing basis in connection with changes to the policies, practices and procedures of banking.



Accessibility and the future of the Internet of Things

Smart phones, cloud computing, and the Internet of Things (IoT) are being harnessed in increasingly innovative ways to enhance the quality of life for people, expand their access to the Internet, and enhance their participation in the Internet governance ecosystem.

Internet-connected devices offer a similar potential to transform quality of life for many people, particularly for persons with disabilities and elderly. these connected devices, known as the Internet of Things (IoT).

(IoT) is a phrase for when everyday objects are connected to the internet and participating together on a system, though it also means the convergence of conventional connected devices and smart appliances. This has a very useful applications for persons with disabilities where all applications such as smart mobile Apps, smart home applications, smart transportation, remote health care and smart environment, in addition more objects at the home such as smart mirror,

Smart window air conditioner, chairs, books, keys, cups, egg minder, smart sensors mother etc., may be connected to the Internet and interact with other objects and with people exchanging information through the Internet. This has a very useful devices and applications for persons with disabilities, connect objects to objects, and people to objects.

The various applications that manage the many devices in the IOT make a decision about which form of command and control is best for the conditions and provide the necessary information. However, the Internet of Things is happening now. It promises to offer a revolutionary, fully connected “smart” world as the relationships between objects, their environment, and people become more tightly intertwined. Yet the issues and challenges associated with IoT need to be considered and addressed in order for the potential benefits for individuals, society, and the economy to be realized. [An Overview Understanding the Issues and challenges of a more connected world.](#)

The emergence of the Internet of Things is an exciting development for everyone, and we are particularly excited to see how innovators can use this new technological revolution to empower people with disabilities and open new opportunities, giving them an unprecedented control on their environment.

Accessibility requirements for IoT

From the accessibility point of view, the ideal setting would be a unique global infrastructure for the Internet of Things, controlled by the mentioned central body, with several service providers which could be accessed from different platforms. These platforms would be responsible for the implementation of accessibility needed to ensure universal access.

Accessibility requirements for IoT devices offer new challenges arising from the introduction of new kinds of IoT devices, while remaining compatible with existing accessibility standards and guidelines.

The precise form and function of how IoT can break the accessibility barriers are not known yet. What is known is that inclusive design needs to be a fundamental element in the creation of IoT-enabled smart environments.

Adopting a philosophy of creating an enabling environment through IoT, which embodies inclusiveness rather than just a smart environment, will go a long way towards ensuring inclusion in our technological futures.

Most of the enabling technologies for the IoT already exist (some not having optimal form or function yet, but able to contribute to the IoT). Based on this, the key driver for the adoption of IoT lies in the applications and new ways of solving existing challenges.

Not all aspects of IoT have been resolved to the point of seamless integration. Some challenges remain. Most significant of these are aspects related to privacy, trust and security. Some of these aspects have been partially answered by some applications of the Internet of People, such as the Social Web, but the introduction of objects to this Internet adds the complexity of resource sharing, attribution and usage management. In the IoT world the question of who can see and act on what remains unanswered.

important aspect to be taken into account is the interface through which the information is obtained on objects of the Internet of Things. Data must be available through various communication channels and must be adapted to the functional diversity of the person using it and having access to the information. For example, in the case of a deaf person, data can be made available through a written text but they should not reach that person through an audio with synthesized text. On the contrary, in the case of a blind person, ideally the channel should be just the opposite, it is preferable to get data through an audio channel rather than through a written text. See [How would you envisage the "governance" of such an. "Internet of Things" \(IoT\)](#).

Interoperability and accessibility are key principles that must be part of the IoT governance principles and governance authorities responsible for these services need to be involved in IoT governance mechanisms, also a multi-stakeholder platform may be able to address IoT governance issues.

In relation to the implementation of the IoT governance framework, we need 'hard approaches' to deal with enforcement of accessibility features as well as soft approaches that can be responsive to industry requirements in a fast moving environment.

An integrated solution which addresses four of the technological gaps, see [Inclusion Through the Internet of Things](#).

- How to make the environment aware of its own state.
- How to model the context in a virtual system.
- How to provide intelligent services based on learning and reasoning.
- How to computationally manage this connected and integrated environment.

The IoT could have immeasurable impact on people with disabilities and help create dramatic improvements in quality of life. As connected devices become even more pervasive, the potential on people with disabilities becomes even greater and Developers of apps would have to spend considerable time on the user interface (UI).

The potential of the Internet of Things can aid as an enabler of assistive technologies and increase the accessibility support and services for people with disabilities in domains such as service provision, health care, job integration, education and learning, independent and assisted living, as well as navigation and mobility support in public spaces including public transport, cultural places, and shopping for goods.

The future holds the promise of greater inclusion through the upfront integration of IoT services and technologies.

By raising awareness of the societal needs now, we can live in a more inclusive world tomorrow.



Telecare, Assistive technology and ICT accessibility for persons with Dementia

"Don't forget the elderly people, they need lots of hands, love and support"

The proportion of elderly people in our society is growing at an unprecedented rate and with life expectancy also increasing; more and more people are likely to also be affected.

The number of persons with dementia will double in the next 40 years, and the number of those 85+ with dementia will treble.

One of the key responses to this emerging challenge has been the development of assistive technologies, designed to support persons with dementia to live independently and safely for longer, as well as reducing the pressure on their carers.

It's important to note that assistive technology is not about the technology. Instead, it is about enhancing a person's quality of life through improved outcomes in safeguarding, living standards, social interaction and greater independence.

Assistive technology aims for supporting persons with dementia and their carers at home. Major benefits can be gained from introducing technology into residential facilities. Persons with

dementia and staff benefit as jobs are made safer, easier and more supportive of person-centred care.

Assistive technology ranges from simple things like walking sticks to sophisticated equipment like satellite-based navigation systems to find people who have walked away from facilities. It includes kitchen technologies designed for residential care, nursing aids and new administrative software. Technology is useful at many levels.

Using Assistive Technology

Assistive technology can help and enable persons with dementia to live more independently. It may not be the answer for everybody, but for many people, there are products that can be of great use.

Using assistive technology depends on a person's needs and environmental factors. Personal factors include: Level and stage of cognitive impairment, ability to carry out activities of daily living, emotional factors like anxiety or depression, wanting to walk away from a facility. Environmental factors include: Capacity of building structures, design of new facilities, relevance of technologies, staff training, family members' understanding of the benefits of technology, management commitment to long-term benefits, despite high initial costs.

Benefits of assistive technology

There are a range of products available and assistive technologies help persons with dementia to communication, to remind and to assist with safety in their home.

Assistive technologies successful in domestic settings are useful in facilities.

For example:

- Improve quality of life.
- Increased choice, safety, independence and let persons with dementia make more decisions for themselves.
- Offer safer and more secure living.
- Give people more privacy and dignity.
- Reassure family members about the level and quality of care and reduced burden placed on carers.
- Offset the need for some personal care.

- Improve support for people with long-term health conditions.

Assistive Technology Tools for Persons with Dementia

Assistive technologies include more tools such as: computers, smart wiring, alarms, automated door openers, smart stove-tops and Smart toilets.

Other technologies include hidden switches and control lockouts, electric strikes and reed switches on outside doors giving people freedom of movement without staff supervision. In addition sensors are another safety-related technology they can detect extreme temperatures, scalding baths, gas, falls, absences from bed or chair, night-time disturbances.

Assistive technology for everyday living for automatic lighting control, stove-top monitors and automatic shut-offs, automatic taps that turn off if users forget, time-orientation support, place and time reminder.

ICT accessibility and Dementia

ICT accessibility and advances in computer technology make it easier for persons with impairments to use better access. These include:

- Larger keys or keyboards, different key displays and onscreen keyboards.
- Touch screens rather than a mouse or keyboard.
- Screen enlargers and screen magnifiers.
- Speech and voice recognition programs rather than a mouse or keyboard.
- Screen readers that read out everything on the screen, including text, graphics, control buttons and menus.
- Software programs that use speech synthesizers for auditory feedback about what is being typed.

ICT and multimedia can promote more meaningful contact between staff and persons with dementia. For example, people can look at databases of video clips, music, songs and photographs together. Users have a limited number of choices using a touch screen and pick the media format they want.

Multimedia technology can help with cognitive issues. For example, it can create reminiscences, support enjoyable experiences, and give options for success and mastery.

Additional ICT accessibility tools include: Wireless nurse-call systems, wireless laptops, palm pilots to collect and send data and emergency call systems and computers wired from unit to unit in cluster-designed facilities.

Technological innovations for persons with Dementia

List of the top tech innovations on the market today for persons with dementia and their caregivers:

Reminder Messages

Reminders can help keep properties and loved ones safe when the caregiver can't. These messages are recorded on a device in the home and then played back out loud at the appropriate time. For example, a caregiver may record a message to play that reminds a person to take a medication at the correct time. Some devices can play messages depending on the person's activity. For example, if a person with dementia leaves their home, a reminder message could tell them to lock the front door. This technology can also remind both caregiver and patient of appointments. Other reminder messages can also let those who have dementia know not to open the door, to go back to bed and to provide reassurance when the caregiver is not present.

Clocks

Clocks specifically designed for those with Alzheimer's and dementia can help ease anxiety associated with a diagnosis. Someone who has dementia may confuse night and day and an easy to read clock can help them distinguish the time. This can also help caregivers who are trying to set a routine by showing their loved one that it actually is the time they say it is.

Medication Management

Medication management technology can be as simple as a pillbox marked with days of the week, or as high tech as automated pill dispensers which beep and open to remind caregivers and those with dementia to take their medication. Some medication reminders are also as simple as a vibrating alarm on a watch. This technology serves the busy caregiver well by allowing them to trust the device for a medication reminder.

GPS Location and Tracking Devices

Location tracking devices are a great option for those who have dementia and may wander. Tracking devices can be worn or attached to the person in some way and many have alert systems

that let a caregiver know if their loved one has left a certain area. This type of technology can also alert emergency personnel to ensure a speedy and safe recovery.

Picture Phones

Specifically designed for people who cannot remember phone numbers and may need to contact someone quickly. These phones have large numbers and are pre-programmable with frequently called phone numbers. Some of the phones come with clear buttons where photos can be placed so that the person can just push the button associated with the photos to call their loved one quickly.

Electrical Use Monitoring

This new piece of technology is specifically designed for caregivers who do not live with their loved ones. It monitors their use of electrical appliances by plugging into a wall outlet or power strip and will alert caregivers if their commonly used appliances have not been turned on or off.

Telecare for Persons with Dementia

Telecare is the remote or enhanced delivery of health and social services to people in their own home by means of telecommunications and computerized systems.

Telecare usually refers to equipment and detectors that provide continuous, automatic and remote monitoring of care needs emergencies and lifestyle changes, using information and communication technology (ICT) to trigger human responses, or shut down equipment to prevent hazards.

ICT accessibility and Telecare for Persons with Dementia

The role of telecare is supporting someone living with dementia varies greatly. Telecare provides assistive technology ranges from simple, standalone devices right through to complex, integrated systems that help a person to remain independent for as long as possible. Some of the areas where telecare may help include everyday living, monitoring, safety, communication, as well as prompts and reminders.

Safety: Assistive technology for persons with dementia is primarily designed to support security and safety, while providing a less intrusive living environment. For example, motion sensor technology can be used to silently alert staff when those residents with a high risk of falling move away from their chair or bed, in order to reduce the likelihood of falls and injuries.

Everyday living: Telecare can also be employed to assist with a person's daily needs. AT gadgets may include temperature sensors for automatic climate control, lamp and light activation, automated ovens, dishwashers and washing machines, automatic window and curtain controls, floor cleaning robots, garden sensors for automated watering, and electronic showers, taps and toilets. Point-of-care technologies also enable remote monitoring of a person's daily health condition such as blood sugar, blood pressure and heart rate. This data can be automatically transmitted to the appropriate health professional, who can monitor vital signs and make appropriate decisions about necessary interventions.

Monitoring: In instances where a person with dementia is prone to wandering and disorientation, telecare provides assistive technology such as virtual door and exit sensors that detect entry and exit can be implemented to alert family members, loved ones and carers, while GPS tracking devices can securely monitor the person's exact location to within metres.

Communication: communication enables carers to be on-hand and assist when necessary, instead of providing round-the-clock, one-on-one supervision. As an example, video conferencing is now being used to facilitate communication with health professionals and service providers, which is particularly important where an elderly person may reside at a significant distance from the health clinic. In this context, assistive technology has the potential to relieve the pressure on carers and support their efforts in delivering care in a way that supports the independence of the resident or service user.

Also, online communication can help to address social isolation, for example enabling older people to communicate with friends and relatives or participate in major family events via networked computers with internet capabilities. Access to internet applications, and online browsing, research, learning and games can also help broaden a person's interests.

Prompts and reminders: incorporates personal solutions that can positively impact confidence, health and wellbeing. Examples of these include automatic medication dispensers that help dementia sufferers to maintain medication compliance, while orientation clocks can help with confusion about the time, day of the week, month or year, and locator devices help to find lost items of property.



Accessible e-learning platforms, hopes and challenges!

There is some empirical research on online learning for students with disabilities, but it is not sufficient, leaving educators with many questions but no consensus about how best to serve such students in accessible content and an online environment.

[UNESCO Global Report, 2013](#) indicates that people with disabilities face a wide range of barriers, including access to information, education and a lack of job opportunities. However Information and Communication Technologies (ICT) can be a powerful tool in supporting education and inclusion for persons with disabilities.

e-Learning that is accessible to learners with disabilities. In fact, following accessibility best practices will also help to create more usable courses for all learners. There are requirements for making electronic resources and information technology accessible to students with disabilities. These standards are based on guidelines originally developed by the Web Accessibility Initiative and known as [WCAG2.0](#) and [Authoring Tool Accessibility Guidelines](#) (ATAG) 2.0.

In this context, how disability is activated differently online and the impact of this on learning and teaching through the internet and the accessibility of two of the most popular learning management systems.

Accessibility problems are not just about online teaching platforms. As Guglielman (2010, 1) observed, e-Learning needs to address accessibility and inclusion from both the perspective of technology and pedagogy. This is particularly true for students with disabilities. Accessible content is effectively used by people in the following disability groups: Blind or visually-impaired, deaf, mobility impairments and learning with disabilities students. Good accessible design makes e-Learning more accessible for everyone, conversely, poor design can make content hard to access for all students with disabilities. There are a number of areas in which e-Learning can work to the advantage of students with disabilities when studying in education context. These revolve around the three areas of accessibility, flexibility, and disclosure (Kent 2015, para 11). Online information can be made available in a variety of formats to best suit the person accessing it, whether this is visual through a screen displaying images or text, audio as spoken words and sound, or touch devices. For specific information on accessibility features and more about a usable and accessible platforms see examples [Blackboard](#), [Microsoft Lync](#), [Second Life](#)

According to the [Americans with Disabilities Act](#), online courses should be made accessible to students with disabilities. But since the ADA has not provided any specific accommodation standards, it's up to each school to decide to what extent it will serve its students with disabilities. In a perfect world, online courses should be created using the concept of universal design, the idea that all course material should be accessible in different ways, be it through audio or video or text, says “Vickie S. Cook”, director of the Center for Online Learning, Research and Service at [University of Illinois—Springfield](#).

e-Learning holds many possibilities for inclusion for people with disabilities, however the online platforms utilized must provide access for all students.

Given this, making e-Learning accessible should be a priority for schools and universities. The current rising rates of online learning in education.

Many choices for accessibility in the e-Learning we need to make to design courses that meet popular accessibility standards, such as [Section 508](#) and Web Content Accessibility Guidelines.

There are a set of questions should be in consideration:

What are Section 508 and WCAG? How do they different?

What tools can you use to make your e-Learning courses follow accessibility best practices and adhere to the law?

Have you ever thought about how someone with a disability experiences the online courses you create?

What if your target audience includes people who are deaf or hard of hearing, color blind, visually impaired (partially or totally), or have limited mobility? Shouldn't they be afforded the same learning opportunities and access to your courses?

For example, courses should be design in navigating with keyboards, include in alt text, images and text on screen for clarity, create highly-usable course navigation, considerations when including audio and video in courses and ensure screencasts are totally accessible.

Accessibility of e-Learning and free courses, introduces the challenges for students with disabilities who may use computers in different ways when taking part in e-Learning or may need alternative teaching methods. It covers the technology and techniques used by students with disabilities, the adjustments to teaching methods that might be reasonable, design decisions which affect the accessibility of e-Learning tools and strategies for evaluation. Many online courses are not designed with accessibility in mind (Roberts, Crittenden & Crittenden 2011). This means that students who do not disclose that they have a disability maybe disadvantaged. It also means that when students do request accommodation to access the learning environment it requires a process of design-redesign to accommodate the students, adding additional costs, so we need to understand the main challenges facing students with disabilities in eLearning and understanding of the types of technology used by students with disabilities.

Courses should be designed to be accessible from the beginning and implementing universal design principles at the outset avoided costs caused by the need to engage in a digital retrofit, also, design learning platform includes multiple learning modalities could very well be superior to in-person education for students with disabilities.

Here are six basic principles to consider when making an e-Learning course accessible:

- Ensure that courses should be access using a screen reader and keyboard;
- Use HTML heading tags correctly;
- Provide transcripts or captions for video and audio content;
- Ensure that content has good colour contrast;
- Create ALT tags to describe each image or diagram;
- Use inclusive language.

In addition, it is important to understand basic principles of accessibility

- All contents should be understandable in more than one perception stream.
- Users should maintain controls on video speeds and simulations.
- Information in imagery should not purely be conveyed in color.
- Simulations and videos should also avoid “strobe effects” which may trigger seizures in some people
- Information structures should be made clear to those using text readers
- Sites have to be understandable even if a user has shut down all imagery.
- Live online events and conferences would benefit from live captioning (if available).
- Tables should be created in a way that is easy to understand.

Most available e-Learning systems for learners with disabilities are limited to deliver accessible learning contents. However, the learners with disabilities need the whole accessible.

Online education can seem like a promising alternative for students with disabilities, but even the most accessible online programs can still pose challenges for them, since not all online programs are equal when it comes to their resources for students with disabilities.



ICT accessibility and employment of persons with disabilities

Unemployment is one of the biggest issues facing us today specifically, the disability community. Entering and influence disability employment provides increased confidence, expanding their social network and social skills as well as opportunities to develop a career by gaining new work skills and knowledge. Recent years have seen major developments towards achieving workplace equality for all persons with disabilities.

Persons with disabilities who are of working age, the rapid progress in (ICT) and assistive technology offer ever-increasing opportunities to participate in the world of work. The estimated 1 billion people with disabilities worldwide represent some 15 per cent of the global population and are at higher risk of poverty than others. People with disabilities find it difficult to get jobs because of the inaccessibility of buildings, public transport, information and ICT accessibility and mistaken assumptions about their capacity to work. In all countries, unemployment among women and men with disabilities is higher than those for persons without disabilities.

We know that there are challenges ahead facing people living with disabilities regarding employment, but the key question is: “How can hiring people with disabilities and facilitate their employment, provide them financial independence, a better standard of living and improve their skills”?

“How can help job seekers with disabilities by using new technologies, assistive technology tools and ICT accessibility”?

ICT Accessible and information technology is technology that can be used by people with a wide range of abilities and disabilities. It incorporates the principles of universal design. Each user is able to interact with the technology in ways that work best for him or her. Accessible technology is either directly accessible -in other words, it is usable without assistive technology -or it is compatible with standard assistive technology. Just as buildings that have ramps and elevators are accessible to wheelchair users, products that adhere to accessible design principles are usable by people with a wide range of abilities and disabilities.

The UN Convention on the Rights of People with Disabilities ([UNCRPD](#)) recognizes in Article 27 “the right of persons with disabilities to work, on an equal basis with others; this includes the right to the opportunity to gain a living by work freely chosen or accepted in a labour market and work environment that is open, inclusive and accessible to persons with disabilities”. This includes prohibition of discrimination, protection of rights, access to education, employment in the public and private sector, possibilities for self-employment and support in order to maintain employment on equal terms with others.

Data on persons with disabilities are hard to come by in almost every country. Specific data on their employment situation are even harder to find. Yet persons with disabilities face the same predicament everywhere.

According to International Labour Organization ([ILO](#)), an estimated 386 million of the world's working-age people have some kind of disability; the Unemployment among the persons with disabilities is as high as 80 per cent in some countries. Often employers assume that persons with disabilities are unable to work.

The role of ICT in disability and employment

Persons with disabilities have ability to participate in the workplace like all employees, they can bring a range of skills, talents and abilities to the workplace and there is a range of supports to help them find and keep employment.

ICT plays a vital role in the workplace, active workplace measures and promote the adoption of these technologies and can improve the standard of living of people with disabilities and promote the inclusiveness of the workplace and increase the supply of labour for society as a whole.

United Nation published fact sheets on [employment of persons with disabilities](#) are summarized in the following:

- **Employing persons with disabilities: Fears and realities**

Persons with disabilities are frequently not considered potential members of the workforce. Perception, fear, myth and prejudice continue to limit understanding and acceptance of disability in workplaces everywhere. Myths abound, including that persons with disabilities are unable to work and that accommodating a person with a disability in the workplace is expensive. Contrary to these notions, many companies have found that persons with disabilities are more than capable.

- **Why hire persons with disabilities?**

- Just like others, the majority of persons with disabilities want a dignified and productive life.
- Employment provides not only income but also opportunities for social participation. This is especially important for persons with disabilities.
- Spending on systems and facilities for persons with disabilities is not for the privilege of a small minority, but an investment for everyone.
- Diverse work groups develop better solutions to business challenges.
- Many companies have found that by employing persons with disabilities they have been better able to understand and serve their customers with disabilities. Adapting services to meet the diverse needs of persons with disabilities allows business to develop greater flexibility, builds reputation and reaches out to a sizeable market.

However, employment outcomes for people with disabilities increasingly continue, where new technologies can enable workers with disabilities to be competitive in the workplace, and enable those who were economically inactive in the past to enter the workplace and earn a living.

Recently pursue towards ICT accessibility holds the promise to contribute to the development of persons with disabilities as well as their economic independence and, in the process, promotes inclusive societies and sustainable development.

Technological change has led to automation of tasks that were previously carried out on a labour intensive basis, and some have lost their jobs as a result, it has been on the whole positive for people with disabilities - particularly in information technology and assistive devices that enable them to live more independently than in the past.

The development of information technology has also enabled women and men with disabilities to work with the kind of flexibility they require.

[Telecentre](#) and Distance Learning options have now opened up, offering people with limited mobility the possibility of working and training from home or in a central location.

Barriers for persons with disabilities regarding employment

Persons with disabilities face plenty of barriers that impede or even prevent them to involved and participate in the workplace, most important barriers for them in key elements of employment that can be diminished or even eliminated through technology.

Synthesis report of the [ICT Opportunity for a Disability-Inclusive Development Framework](#) addressed the main challenges for more issues related on ICT accessibility including enabling access to job opportunities for persons with disabilities.

The report indicates that there are many challenges to promote the employment of persons with disabilities are concerned; attitudinal barriers are still highly prevalent in the workplace. In addition, cost of assistive technology, lack of policies which foster widespread availability of accessible ICTs and lack of policy implementation and/or lack of effective implementation mechanisms.

Persons with disabilities are perceived as unable to perform highly-skilled jobs. This barrier creates a situation where the only jobs available for persons with disabilities are low-skilled labour.

Furthermore, Organisation for Economic Co-operation and Development ([OECD](#)) research has shown that persons with disabilities are twice as likely to be unemployed all over the OECD and that, when employed, persons with disabilities work part-time or at reduced hours more often than others. Consequently, the purchasing power of persons with disabilities is comparatively

lower than that of other groups, which in turn aggravates the issue of affordability of accessible ICTs.

ICT accessibility to increase access to work opportunities

ICT is one of the central drivers of productivity and success in today's workplace, for all workers. But when workplace technology is not accessible to those with disabilities, it excludes and becomes a barrier to success and career advancement. It limits opportunities for people with disabilities to get hired, or to excel in a position when they are unable to perform their job duties because they can't access basic workplace tools.

ICT accessibility is really the next frontier of the accessibility movement, and a gateway to a more productive and inclusive workforce.

Some have global reach and have been harmonized across national boundaries to help ICT companies make their accessibility work more efficiently. Standards and guidelines usually cover specific technologies; the most well-known is the family of guidelines for web technologies, produced by the World Wide Web Consortium's (W3C) Web Accessibility Initiative ([WAI](#)). All technologies should be usable by many people as possible to advance the employment of people with disabilities by promoting the development and adoption of accessible workplace technology and can be used effectively by all disabled employees.

There are many assistive technology solutions that can assist in a variety of occupations and workplaces! Application programs such as screen readers can enable persons with blind and visual impairments to access job vacancies. People with motor disabilities can use assistive technologies such as special keyboards or eye-tracking software, voice recognition, used instead of a mouse or keyboard; alternative input devices that enable control of computers through means other than a standard keyboard or mouse (e.g., head-operated pointing devices and "sip and puff" systems controlled by breathing). Other new technologies replacing physical activity with automated production of goods or performance of demanding tasks have opened up many employment opportunities for women and men with disabilities and other new assistive devices help persons with disabilities perform jobs that were previously out of reach.

Indirectly, assistive devices also include those which facilitate them getting ready for working in good environment.

A 2013 report by the Global Initiative for Inclusive ICTs (G3ict) on measuring progress based on ICT accessibility in compliance with the UN Convention on the Rights of Persons with Disabilities (CRPD) showed a deficit in making essential services accessible to persons with disabilities in countries that have ratified CRPD.

Persons with disabilities; capability and value-added workplace

People with disabilities have skills, abilities and experience that can add value in the workplace. Make workplaces accessible and search for talented employees with disabilities and find the right person for the job.

An accessible workplace will maximize productivity, by eliminating barriers that can prevent people with disabilities from working to their potential.

ICT adjustments include any information communication technology changes that have been made to make sure you have equal access to participate in the workplace. Accessibility features can provide benefits to everyone, not just those with a disability.

Below are just a few examples of assistive technology and programs for creating accessible workplaces:

- Computer-based screen magnifiers and ZoomText
- Voice recognition software
- Screen readers for phones
- Text-to-Speech (TTS)
- Dictation software
- Alternative keyboards
- CCTV systems and video magnifiers
- Optical low vision aids
- Braille production system, Braille reader, Braille typewriters
- DAISY books and applications to create DAISY documents
- A telephone typewriter (TTY) and captioned telephone
- Permanent microphone stand , earpiece holder, wired microphone and a wireless microphone to operate the computer
- The Microsoft accessibility tool Sticky Keys

- Listening devices, audio format and tools, teleconferences and voice mail
- keyboard stands, accessible desk, document holders to make typing easier and office printers
- An environmental control unit, with programmable infrared control for operating devices using infrared remotes to use the voice recognition software for computer to operate by voice command.
- Communication devices such as hands-free telephones
- Adjust the height of shared items such as photocopiers, printer and fax machines to promote ease of access and reach.

The Partnership on Employment & Accessible Technology ([PEAT](#)) pointed out some guidelines to help employers work with their (ICT) vendors and internal developers, standards, laws, and regulations also, common accessibility standards and most important technical [standards to consider for workplaces](#).

Also, Australian Government Initiative, National Disability Coordination Officer ([NDCO](#)), released in 2014 [booklet](#) provides information about technology that can be used in the workplace by people with a disability.

Finally:

Equal Access to Employment for all: Persons with disabilities have an important role to play to make a positive contribution in the workplace. It is generally found that a person with a disability develops into a well-adjusted, productive worker in an atmosphere of acceptance, co-operation and goodwill. It is often found that workers with disabilities are more productive than their co-workers and that they are less absent from work and shows great loyalty towards their company. Employment is for all persons in working age a key element towards combating poverty and to achieve social inclusion and participation on society.

The low employment levels among people with disabilities specifically in developing countries are a major factor in the economic and social disparities.

Many issues affect the capacity of persons with disabilities to obtain employment and to be able to progress in their employment.

Barriers to education, lack of reasonable accommodation, lack of accessibility to infrastructures and to information, limitations related to legal capacity, as well as attitudinal barriers in society

are some of the areas that have a significant impact on the employment of persons with disabilities but with advent of ICT and technological advances removed many obstacles for persons with disabilities in their aspirations to pursue the careers of their choice.



Tourism Destinations and Accessibility For Persons with Disabilities

Tourism destinations and accessibility for persons with disabilities

Studies about the tourism experience of persons with disabilities first arose in the late 1970 and even in the late 1980 and early 1990, researchers only “toyed with this subject” (McKercher et al., 2003). Nowadays, there are growing numbers of studies concentrating on the tourist experience of persons with disabilities. Recent studies highlight the need for further investigation into the travel experiences of persons with disabilities and also there are other studies highlighted the accessibility issues.

Accessible tourism is largely encouraged to make it easy for all persons to enjoy tourism experiences (Darcy & Dickson, 2009). The fundamental principle is captured within the view of human rights, the United Nations Convention on the Rights of People with Disabilities, 2006 is steered by the following principles: dignity, independence, full and effective participation, reverence and recognition of disability as part of human variety and parity of opportunity.

Tourism for persons with disabilities mean the use of general and basic mainstreaming framework for ensuring that persons with disabilities have access to the physical environment, the transportation system, information and communications channels, as well as to a wide range of public facilities and services.

Tourism destinations should be made disability friendly through regulations, monitoring and supervision with regard to accessibility, structures and environment. Tourism today is an integral part of the lifestyle of much of society.

Research has found that the participation of persons with disabilities in tourism is limited due to many factors such as the inaccessible tourism environment, the nature of transport services, the language barrier and the lack of tourism awareness towards persons with disabilities.

Accessible tourism is a very big market. And, as the population ages, it will get even bigger. By 2020, on some estimates, 25 % of travel and leisure spending will come from people who have some form of disability. There is also a multiplier effect here: people who are elderly or who have a disability often take other people along when they are travelling. Accessible tourism is a very big market, brings growth and jobs. Investing in it can open up a market of millions people with disabilities across world. “[Accessible Tourism in Europe](#)”

Accordingly, tourism should be accessible to all travellers and accessible tourism that ensure tourist destinations, products and services are accessible to all people, regardless of their physical limitations, disabilities or age. Facilitating travel for people with disabilities is a basic, cross-cutting and integral element of any responsible and sustainable tourism policy. The tourism industry will recognize that people with disabilities have equal rights to tourism services and opportunities: independent travel, accessible facilities, trained staff, reliable information and inclusive marketing. See “[Recommendations on Accessible Tourism](#)”, World Tourism Organization (UNWTO).

In this context, accessible tourism for all is not only about providing access to people with disabilities, but also it addresses the creation of universally designed environments that can support people that may have temporary disabilities.

[UNWTO](#) indicated to recommendations of the appropriate measures in order to ensure that persons with disabilities have access, on an equal basis with others, to the physical environment, transportation, information and communications, including computer systems and information

and communications technology, and other services and facilities open to the public or for public use, in urban areas as well as rural and coastal zones.

Accessibility must be present throughout the tourism chain, the links between all sites, services and activities must be well planned and tested. Elements of the tourism chain include: Tourism destination management, tourism information and advertising, urban and architectural environments, modes of transport and stations, accommodation, food service and conventions, cultural activities and other tourism activities and events.

In an increasingly globalized world today, an awareness of the need to factor accessible tourism into decision making and policies needs significant attention. It is important that government and other stakeholders are encouraged to make it a priority to the sectors positive effect and find ways to mitigate the detrimental impacts. Therefore, there is urgent need to inform for policy makers towards appropriate intervention to accessible tourism for persons with disabilities. For example Australia, [Tourism Victoria's Accessible Tourism Plan](#) outlines strategies and actions to help industry meet these obligations and then go further to cater for all people with access requirements by:

- Increasing industry awareness and understanding of the accessibility needs of tourists
- Encouraging new and existing product to capitalise on the benefits of providing accessible tourism.
- Disseminating information on accessible tourism products and attractions.

Persons with disability have a right to enjoy travel leisure experiences, accessibility and participation in tourism will enhance social inclusion, their travel experiences are still characterized by transportation constraints, inaccessible accommodation and tourism sites, and inadequate customer services. If professionals of tourism industry are to succeed in accessing these potential new markets, they must understand the needs involved and learn how to respond to these challenges for the benefit of both the tourism industry and people with disabilities.

The studies of the UN-ESCAP [Barrier-Free Tourism for People with Disabilities in the Asian and Pacific Region](#), have shown the major issues about challenges such as travel planning and information for people with disabilities, one issue is the need for shared understanding of what constitutes access and disability by the stakeholders (people with disabilities; operators; tourism sectors; intermediaries), also transport barriers, transport options are not available for easy use by people with disabilities in addition the lack of accessible accommodation, one travel planning

information issue is obtaining information about barrier-free accommodation. Many accommodation operators do not understand what accessible or barrier-free accommodation entails. They are often unable to provide accurate or detailed information about the features of their rooms. In many cases, this involves accommodation operators representing their rooms as accessible or barrier-free, but people with disabilities find that the rooms are not suitable.

Many elderly people, families and people with disabilities are keen to travel, but wide variation in the level of access within destinations, combined with poor information and negative experiences discourage potential customers.

The demand for Universal Accessible tourism products needs to be addressed urgently. It would be prudent for the tourism service providers to consider the merits of accelerating measures to address the needs of this sector of the market, based on the predicted demand which far exceeds the current availability of Universal Accessible accommodation, services and facilities. Improved accessibility will not only result in economic benefit to the tourism industry but will also assist in overall social integration. Universal Accessibility would be greatly enhanced by up-scaling service delivery in all the critical touch points such as the following: Access to information, accessibility in the Web, ICT accessibility has a major part to play in barrier-free tourism., communication, accommodation, training in accessibility, staff training is vital to the promotion of truly accessible tourism and Design for All.

Also, there are other factors conditioning the tourists accessibility of one destination that can be resumed as: Barrier-free destination “infrastructures and facilities”, transport by “air, land and sea, suitable for all users”, high quality services and marketing.

The improvement of accessibility of tourist products and services, using global solutions based especially on the principle of "Design for All" will be a requirement of the present and future tourist towards the tourist sector and cooperation between the public and private sectors must be at the heart of accessible tourism.



Applying accessible telecentre for refugees with disabilities

“Let us brave forward to give this new idea its place in our hearts and minds”.

Refugees and displaced persons living with disabilities are amongst the most isolated, socially excluded and marginalized of all displaced populations.

Some refugees and displaced persons may have lived their whole lives with a disability and others may have become disabled during the conflict or natural disaster which led to their flight. They are "Too often invisible and forgotten".

For refugees with disabilities and their families who have fled the conflict in their country, living with physical and mental disabilities poses huge day-to-day challenges, but we can look out to a brighter future for support them.

“Conflict have the right to psychological recovery and social integration. Therefore, psychosocial programs for children in war affected areas that fail to reach disabled children, fail. This should

be the prerogative of organizations and institutions when they plan, monitor and evaluate psychosocial interventions” (United Nations, 2006).

All persons with disabilities who live in conflict affected areas have the same rights support, as enshrined in the Convention on the Rights of Persons with Disabilities ([CRPD](#)). However, persons with disabilities are often overlooked in psychosocial programs. See more about ([UN-Rights of Refugees with Disabilities](#))

In refugee situations, persons with disabilities are particularly vulnerable. Without independent mobility, families fleeing danger may be forced to abandon them, exposing persons with disabilities to more health and safety risks and reducing their chances of survival. For those who may manage to reach refugee camps, the situation in the camps gives rise to an increase in causes of impairment through poor nutrition and health conditions, injuries relating to conflict, accidents, burns, torture, and trauma.

Recommends that States and [UNHCR](#), as applicable, ensure that refugees status determination and all other relevant procedures are accessible and designed to enable persons with disabilities to fully and fairly represent their claims with the necessary support. See more ([the UNHCR guidance on Working with Persons with disabilities in Forced Displacement , 2011](#))

Emergency arrangements typically fail to address the specific needs of persons with disabilities, either in buildings or provision of essential social assistance. Their existence and needs are rarely acknowledged. In the daily running of the refugee camps, they are often the last to receive care and access to fundamental services, lack of education, personal care needs and communication difficulties add to their problems.

Many refugees with disabilities may need accessibility materials and other facilities services include rehabilitation care and counseling, general public awareness campaigns, and promotion activities for mainstreaming disability issues into all sectors in the camps. Specifically, women and children with disabilities are often exposed to sexual violence in refugee camps and physical assault, exploitation and neglect. They are excluded from education and not provided with the support to help them develop to their full capacity.

“Building the capacity of communities in this way has a positive impact in terms of the inclusion of disability issues in the refugee camps”.

Telecentre to support refugees with disabilities

Together, we can create a welcoming environment, fortify capacity and compassionately for refugees and displaced persons and their families who have fled the conflict in their country. We can providing them protection, advocacy, education, health and other services Really, there are big challenges for persons with disabilities in refugee camps include:

- **Lack of visibility:** In general, refugees with disabilities are rarely acknowledged. They are not given a chance to be heard. Their existence is rarely acknowledged, and for them to benefit from education, communications, awareness, health and nutrition programs, these programs need to address the needs of persons with disabilities.
- **Disability awareness:** There is little knowledge, skills, and awareness about disability among those who manage the refugee situations. Therefore camps/buildings are designed without taken into account Universal Design (UD) and accessibility services . Also personal care in terms of mobility and communication gadgets, aids, and adaptations are not taken into account either.
- **Communication:** Supervisors and educators in communications skills at the refugees camps are not educated for empowered to communicate in sign language or Braille and find it extremely hard to interact with people with disabilities.

Refugees with disabilities lack of awareness on their rights, many of them are not aware of their rights and are therefore unable to demand these rights.

What can we do to help?

Providing accessible access to services, facilities and accessible educational programs for refugees with disabilities may be eligible for accommodations that can help them for teaching and promoting their communications skills.

In general, the research found that accessible inclusive could be a good entry point for refugees with disabilities. For example, through early intervention programs, refugees children and women with disabilities could be referred to appropriate health services, and parent support groups were a positive starting point to provide psychosocial support to parents of them.

Today there is a need to organize training sessions on accessibility issues such as awareness sessions, encourage the members of the communities in the camps to take care of persons with disabilities, there is a need to raise the awareness of other NGOs to organization's work, and also

to enable them to include disability in their projects for example, building accessible telecentres in refugees camps.

Another important part in the telecentres is supplying refugees with disabilities with assistive devices, such as walking, toileting and standing aids. Also train families to use these specific devices, including different approaches to environmental issues.

The fact that refugees are settled in emergency situations means that little thought is given to refugees with disabilities in the camps.

Benefits of ICT Accessibility in Refugees Camps

- ICT accessibility has become an essential tool for humanitarian aid work, and its role in both education and healthcare, particularly its use in educating large groups of refugees with disabilities, from diverse backgrounds and with varying levels of basic education and literacy.
- Accessibility finds innovative use ICT in education, particularly within the harsh and volatile environment of humanitarian work.
- ICT accessibility provides a learning opportunity for refugees with disabilities.
- ICTs provide an important space to help refugees with disabilities regain autonomy and lead as normal a life as possible while in displacement.
- The use of ICT accessibility and portable devices has allowed refugees with disabilities to obtain skills education in a safe and secure environment.
- Persons with disabilities and children with disabilities need to be considered as a key target group across all intervention processes from identification, assessment and planning, delivery of support programs, monitoring and evaluation.

What do we need, and how could the plan work?

- Advocate for change globally with donor, policy maker and humanitarian workers to inform advocacy campaigns focused on improving access to services for persons with disabilities in crisis-affected areas throughout the world.
- Support the voice of refugees with disabilities. Refugees and displaced persons with disabilities and seek to facilitate their participation and voice in all activities. Examples of such approaches include facilitating activities with refugees themselves to formulate ideas

for change which they can then present to organizations and stakeholders in workshops, bridging the gap between persons with disabilities and the implementers of refugee programs.

To increase the participation of refugees with disabilities:

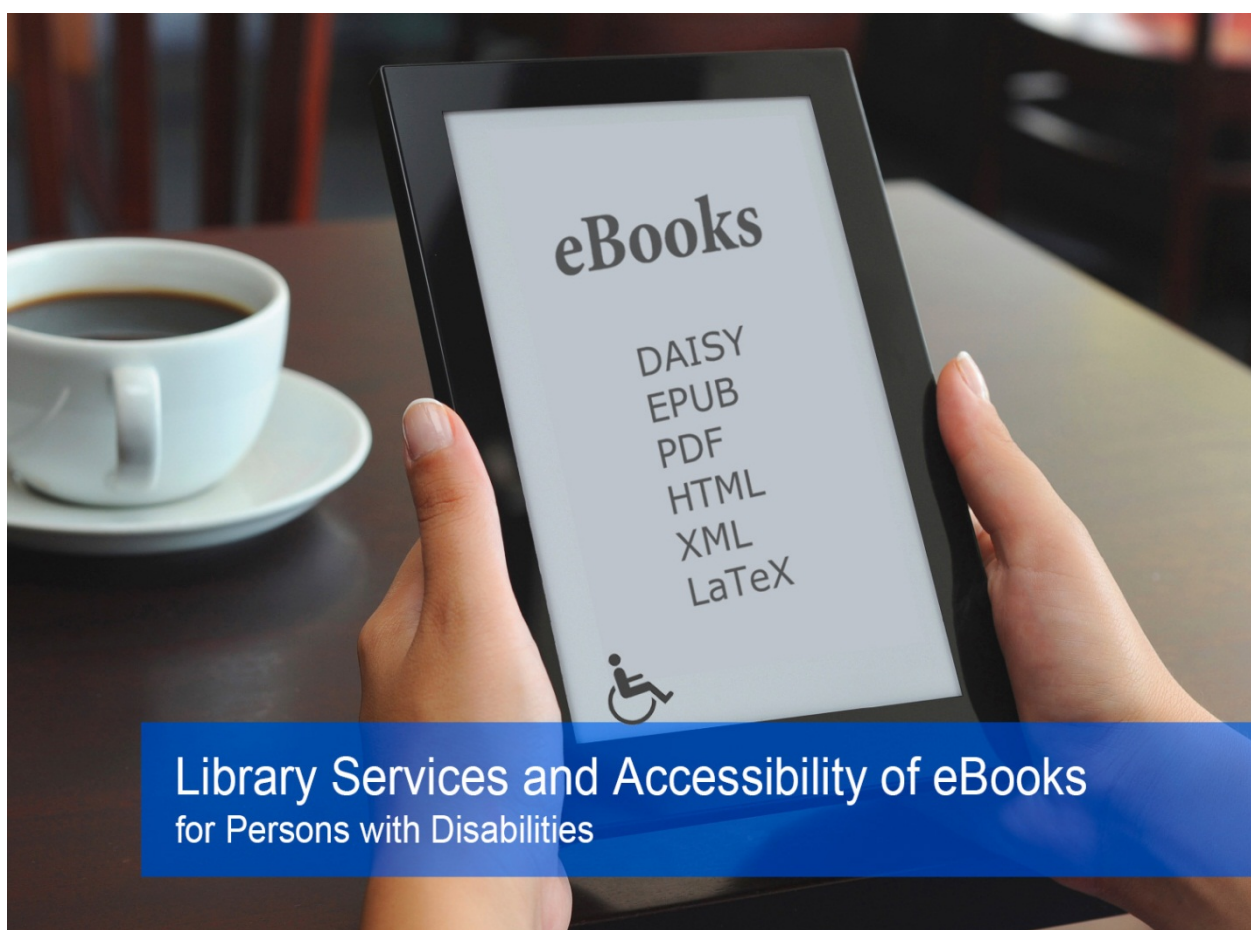
- Ensure on the importance of pedagogical support that is usually missing in ICT intensive training in developing country contexts. a low tech ICT approach is appropriate using local knowledge constructions in refugee camp environments for the effective dissemination of education, health and environmental knowledge.
- Ensure that refugees with disabilities are included in accessibility programs during, or after, conflict situations; and minimize the stress on the person with disability and his or her relatives.

There are two recommendations listed below:

Local organizations of persons with disabilities, and parents of children with disabilities, together with non-governmental organizations (NGOs) working in the field of disability should be involved and consulted by humanitarian agencies to ensure the needs of persons with disabilities are recognized.

Action and care is needed by humanitarian aid agencies to pro-actively seek out persons with disabilities to ensure they are registered and supported in a humanitarian situation, as they are often hidden away and/or not easy to identify.

Refugees with disabilities are "forgotten", "vulnerable" and "invisible". It's time today to work together for supporting them!.



Library Services and Accessibility of eBooks for Persons with Disabilities

Library services and accessibility of eBooks for persons with disabilities

“Make more books accessible for your library; you do not have to be an expert about technology or accessibility to make a very useful contribution in your library and to readers with disabilities”.

To make a library accessible you need social and economic resources. Many improvements can be implemented with very small amounts of money – or possibly without any costs. The solution can often be found through a change of staff attitude and thinking in new ways. Everyone and every person with a disability have the right of access to library services and materials to meet his needs for information, inspiration, education and recreation. Every a person with a disability has the right to be treated with the same dignity, consistency, and consideration as any member of the general public who receives library service.

By using assistive technology, network technologies and ICT accessibility, library plays an increasingly important role in ensuring access for all Persons with Disabilities to Internet and other information resources.

We need emphasized the principle of normalization, inclusion and integration of Persons with Disabilities into mainstream community life.

Assure library standards for Persons with Disabilities by collection development, promotion and delivery of services, computer applications and adaptive technology for making electronic resources accessible.

Principles of universal design should be employed; principles should be incorporated into every library policy in relation to library services for Persons with Disabilities. Library policies will be applied in a way that considers the needs of persons with disabilities and respects the principles of dignity, independence and integration.

Addressing library services for persons with disabilities

All library materials should ideally be accessible for all persons with disabilities. There are various ways to achieve this goal.

Libraries should acquire talking (books, newspapers, periodicals), video/DVD books with subtitles and/or sign language, Braille books, large print books, accessible e-books, easy-to-read books, tactile picture books or other non-print materials.

- Improve and facilitate access to alternative-format library materials for Persons with Disabilities
- Collections of alternative-format library materials for readers with disabilities
- Exploring ways to create and improve library services and resources for people with print disabilities.
- Facilitate information exchange, resource-sharing among libraries serving Persons with Disabilities and meet their changing needs.
- Providing information and expertise to the general community and organizations about the provision of library services to Persons with Disabilities.

Library services for people with print disabilities

The library needs of people with print disabilities are generally the same as those of sighted people. However, by definition, people with print disabilities cannot use conventional print materials. They must depend upon large type, audio (spoken word), tactile devices (such as Braille) and/or mechanical or optical aids - or a combination of these.

Collections for people with print disabilities should include:

- Talking books, audio magazines and newspapers;
- Audio tape, CD/DVD, or in DAISY format;
- Large-print books;
- Computer files of text;
- Braille and other tactile materials;
- Audio-descriptive videos.

People with print disabilities will benefit most from provision of equipment to facilitate the use of both 'special-format' and standard-print materials.

Libraries should consider acquiring or facilitating access to the following:

- Illuminated CCTVs (magnifiers using a television screen to display print of varying sizes and contrasts).
- Microfiche enlargers (magnifiers using a television screen to display enlarged microfiche).

Other equipment which could be considered for inclusion in libraries includes such as: Voice-output devices, Optical Character Recognition (OCR) devices, Braille-output devices, Braille printers with voice output, large print, Versabrailles and Typewriters.

Library services for people with deaf or hearing impaired

Basic collection of materials in formats that are readily accessible to deaf and hearing impaired, so we need to develop services to assist them, the primary goal of any specialized program to the deaf and hearing impaired must be to provide equal access to all programs and services that are enjoyed by the library's hearing clientele.

- Books and pamphlets on sign language, dictionaries of signs;
- High-interest/low-vocabulary reading materials;
- DVDs contain sub-titles as a standard feature and illustrated materials;
- Films and videos including closing caption video;

- Loop system, audio loop and counter loop;
- Telecommunication devices (TDD/TTY).

Library services for cognitive disabilities

People who are cognitively delayed may need types of support. Planning for libraries can often include individuals with cognitive disabilities because many function at a fairly high level. They have preferences and can articulate them, and they can give insight into the problems they have in using a library. Every library should provide a basic collection covering a broad range of information as an integral part of the library collection. People with cognitive and intellectual disabilities will benefit from access to:

- Books in enlarged print;
- High-interest, low-vocabulary materials and books;
- Books on tape-and-text kits;
- Illustrated materials (Picture books), audio materials and music collections;
- Spoken-word collections;
- Audio and video tape in Daisy format.

Library services for persons with physical disabilities

Persons with physical disabilities may need assistance in doing some of the physical tasks that are involved in using the library.

They need access computers for reading at the library with the following Software:

- Voice recognition;
- Word prediction;
- Screen enlargement;
- Software for converting print documents;
- Scan and read programs;
- Text highlighting and advanced reading in different formats.

Electronic Books

E-books are an extremely popular topic these days. E-books are an especially exciting development for readers with disabilities because their properties make them ideal for finding alternative forms of access.

When an e-book is presented in an accessible format on an accessible e-book reader, the user can choose to read the book using text-to-speech, Braille, or magnification. Furthermore, accessible e-books in an open market benefit everyone.

For persons with disabilities their need can be fulfilled very simply, with large print or an existing PDF version whereas others find a fully navigable structured file such as a DAISY file, an EPUB 3 file or an HTML based e-book that they can use with text to speech software essential. Other readers with blind prefer Braille by using a standard embossed Braille edition or by accessing an electronic publication through a refreshable Braille device.

Creating files with different formats

It is worth noting that even the most “accessible” formats can be misused to create books that are wholly inaccessible. The potential for accessibility is built into the format, but must be correctly and sensitively used to produce an accessible product. This is the case with all formats and built-in accessibility cannot be assumed. It is hugely beneficial to conduct user testing “accessible” content, so can sure that these files have been correctly produced.

There are many different file formats being used in the publishing industry and these vary in the degree to which they can be seen as being “accessible”.

No file format is automatically accessible; it is entirely possible to produce inaccessible publications in any format for most purposes.

Here are below different formats to get started with understanding eBook accessibility.

Microsoft Word Document Format (DOC)

Microsoft Word: for many print-impaired readers particularly in the education sector, this file format offers the easiest route to accessible information as the text content of the file is easily mutable and it can contain all three elements of structure, content and appearance. Creating a useful file in Word may mean creating a new Word file at the end of production process.

Portable Document Format (PDF)

- **Print ready PDFs:** These are often the least accessible of all file formats as these particular PDFs contain content and appearance, but only minimally reflect structure; there is no reading order and no structural or semantic tagging. This particularly applies to image based PDFs (e.g. scans of text, or graphically rich books) as they contain no textual content at all. If PDFs are used, they should be edited in Adobe Acrobat to ensure the underlying text is present, and to add tagging.
- **PDFs optimised for digital use:** These files tend to be more navigable and include structure so for some users they may provide a reasonable option as they can include a reading order, ALT tags etc. These files have all three elements of structure, content and appearance. However, they tend not to be as customisable for individual reader needs as some other formats, and should not be seen as the format of choice in most circumstances.

Digital Accessible Information Systems (DAISY) Format

This has become the foremost specialist standard format for use in the creation of accessible versions for the print impaired. It can be the most accessible file format available. It is essentially an XML based e-book format created by the [DAISY Consortium](#), an organisation which represents libraries for people with print disabilities.

A DAISY book can be explained as a package of digital files that may include: one or more digital audio files containing a human or pre-recorded synthesised narration of part or all of the source text; a marked-up file containing some or all of the text; a synchronization file to relate markings in the text file with time points in the audio file; and a navigation control file which enables the user to move smoothly between files while synchronization between text and audio is maintained. Specialist DAISY players can play the audio, read the text using Text to Speech and navigate through the book in a flexible way. The DAISY Standard allows the producer full flexibility regarding the mix of text and audio ranging from audio-only, to full text and audio, to text-only. The DAISY Consortium offers an open suite of software tools “The DAISY Pipeline” designed to assist in the creation of DAISY files which also has increasing support for conversion to EPUB 3.

Electronic Publication (EPUB) Format

This is rapidly becoming the universal “e-book” format for commercial publishers, and as version EPUB 3 becomes more widely available is increasingly seen as the format that is most suitable for both commercial exploitation and meeting accessibility needs.

[EPUB](#) is an open standard for e-book creation and distribution and is the most common file format for commercially-available e-books. It can be “read” on almost all e-reader devices (with the exception of Amazon’s Kindle – and even there, most [Amazon Kindle books](#) start life as EPUBs and are converted to the Kindle format prior to distribution).

The latest version, EPUB 3, combines the ease of creation and expressive capability of HTML, with a host of accessibility options, and it has been adopted by the DAISY Consortium as its next generation digital standard delivery format, to replace the specialist DAISY format. For publishers, this means that the same file format used to deliver mainstream commercial e-books can also deliver optimum accessibility to print-impaired readers. It is constructed using ordinary HTML5 and CSS (cascading style sheets), so publishers are familiar with the basic technology, and a rich set of authoring and production tools is available. On top of this, EPUB 3 defines a range of features that improve navigation and accessibility, such as detailed structural markup and the ability to include pre-recorded speech synchronised with the text (called ‘media overlays’). EPUB 3 also allows accessible video, mathematical and technical content (via MathML), and interactivity.

Using EPUB 3, publishers can make their mainstream commercial products highly accessible.

Hyper Text Markup Language (HTML) Format

These files can be among the most accessible on the market. By using the predominant Web technology and we can ensure that customers with disabilities will be well-practiced in using the file type with their assistive technology. Customization within Web browsers is simple and well-known. As these books are played in Web browsers, work on these files make the files highly flexible will benefit a wide audience, including users without disabilities. Also, customizations that users have already set up to access the Web will likely carry over this type of eBook directly. Some versions of HTML e-books can incorporate MathML, providing access to maths and sciences to persons with disabilities.

Extensible Markup Language (XML) Format

More specifically all types of XML files that logically tag book files (using a proprietary or a standard DTD (document type definition) or schema, such as DOCBOOK) have the potential to be extremely accessible. They contain structure and content but not appearance. However, end users (and those who support them) are unlikely to have the specialised XML skills needed to make use of them, so these files are likely only to be suitable when dealing with people with an unusually advanced technical capability, with technically skilled commercial organisations, or intermediary organisations that support Persons with Disabilities.

Normally, these XML files are transformed into a distribution format, such as EPUB 3 or DAISY.

Layout Application Files

These files can contain structure, content and appearance, in a mutable form and, in contrast to Word files, they represent the “final version” of a publication, as no editing takes place afterwards; they could be useful for provision of content in a “professional” or mediated context, such as providing publisher content to an e-book distributor like CourseSmart as eTextbooks. However, typical print-impaired readers have no access to, or skill in the use of applications such as Adobe InDesign, Adobe Illustrator or QuarkXPress; in general, application files are not suitable for provision to those seeking accessible formats. However, that InDesign V 6’s already has an export option to EPUB 3; Adobe has indicated that [InDesign V 7’s “Export to EPUB”](#) be further improved.

LaTeX Files

LaTeX is a high-quality typesetting system; it includes features designed for the production of technical and scientific documentation. [LaTeX](#) files can sometimes be a suitable choice, particularly for mathematical and technical material.

Publishers who receive manuscripts in TeX or LaTeX, or who use these formats in their typesetting process, may be able to supply the files in this format for accessibility purposes. However, they are suitable only for those print impaired readers who have the necessary technical skills (or have access to them).

Library staff and training to support persons with disabilities

Accessibility to the library should be a clearly defined management responsibility. It is important that all staff be knowledgeable about various types of disabilities and how to give them best assist. A designated employee should act as liaison person with disability reader.

How to train staff?

Examples of appropriate staff training include:

- Staff training and raising awareness about disabilities issues.
- Staff need to be aware of current terminology relating to disabilities and understand that the person comes before their disability.
- Staff need to be educated about the abilities and realistic limitations of Persons with Disabilities.
- Invite persons with disabilities to staff meetings to talk about their needs as library users.
- Distribute emails and/or other information to staff on a regular basis about library services to specific groups of disabilities.
- Assisting staff in the development of appropriate communication and provide them with the necessary collection development skills.

Finally:

Libraries play a vital role in the lives of persons with disabilities by facilitating their full participation in society.

Libraries should use strategies based upon the principles of universal design to ensure that library policy, resources and services meet the needs of all people.

We need to plan technological solutions and access points for example ([telecentre](#)), based on the concepts of universal design, are essential for effective use of information and other library services by all people. Libraries should work with Persons with Disabilities, local communities, organizations and vendors to integrate assistive technology into their facilities and services to meet the needs of people with a broad range of disabilities, including learning, mobility, sensory and developmental disabilities.

Library staff should be aware of how available technologies address disabilities and know how to assist all users with library technology.



ACCESSIBILITY to strengthen
Arts and Culture for
Persons with Disabilities

Accessibility to strengthen arts and culture for persons with disabilities

Art is a visual language that provides another means of communication, since the earliest civilisations, art had become an integral part of society and today, art continues to play a major role in society.

Art provides opportunities to problem solve, to observe, and strengthen aesthetic awareness and critical thinking (likes and dislikes). Try to imagine society without the humanising influence of the arts, and you will have to strip out most of what is pleasurable in life, as well as much that is educationally critical and socially essential. Life without the collective resources of our libraries, museums, theatres and galleries, or without the personal expression of literature, music and art, would be static and sterile – no creative arguments about the past, no diverse and stimulating present and no dreams of the future.

Art seeks to please people with beauty. In a broken world, sometimes it is important to allow persons with disabilities to realize that there is still beauty. Hence, art can function to refresh people and remind people of better things or transcendent realities.

One way to provide empowerment to all of persons with disabilities is through educating ourselves to learn how to provide and model best practices of accommodating and improving accessibility to learning and participating in the rich visual language of art.

The openness of art instruction (many solutions, not single answers) naturally allows the expressions or voices of multiple learners. There is need to increase and learn that persons with disabilities have the opportunity to be self-expressive and successful in an artistic medium can often diffuse or transcend the sense of isolation and frustration they may feel when working with their disability in daily life.

Persons with disabilities have the possibility to expression and successfully communicate their thoughts via paintings, sculptures, songs, and other art forms. Many of them struggle to communicate their thoughts and feelings. They may have trouble finding the words or using language effectively. The visual arts, such as painting, drawing, music, and computer graphics, can give them a non-verbal way to express themselves and interact with other people for example, graphics and design inspiration programs by using ICT tools and accessibility in particular can provide alternative avenues for creative expression.

They are learning to express themselves through art and often feel that the essence of who they are is trapped inside their bodies. Persons with disabilities with art are able to express important values within that society to people in ways that are memorable, art can be used to reinforce values and even bring people together with private and public sectors to seek innovative ways to employ the arts for persons with disabilities to improve and strengthen communities, interest in assessing the impact of their art works, arts advocates and researchers could make a variety of ambitious claims about how the arts impact communities..

Accordingly, we are required to raise awareness among the public, across the cultural, educational and political sectors, and among those who influence investment in both the public and private sectors, we will in time articulate a new language of cultural value that will help persons with disabilities to understand the essential of arts and make their lives in full color.

Accessibility and the arts for inspiring creativity

Today's technologies offer multiple ways to assist persons with disabilities with the expression of their ideas, aspirations and creativity through art.

How can someone paint a picture if she cannot hold a paintbrush?

How can someone create in clay when he cannot touch it?

How can someone draw when the drawing tools are inaccessible due to size or shape?

For persons with disabilities, ICT accessibility has ability to help them to create as independently as possible for translating their thoughts by art.

With art specialists they are able to creatively adapt art, they can participate in meaningful art making with their peers. Improve the accessibility of arts and ICT accessibility can make the arts accessible to them.

Accessibility, ICT accessibility and Assistive Technology work to achieve goals, such as: Providing technical assistance to open existing programs and make the arts fully accessible to persons with disabilities.

We all looking forward to diversity and inclusion, We want diversity which includes disability. Inclusive access will enable persons with disabilities to participate fully at all levels in the arts, and this is vital have an arts and cultural environment which reflects the full diversity of life.

I'M NOT A DOWN SYNDROME CHILD
I'M A CHILD

My teacher told me:
I can learn anything and trying to do to the best of my ability
Marah Ashour

ICT Accessibility in the education of children with Down syndrome

ICT accessibility in the education of children with Down syndrome

Down syndrome (Trisomy 21) is the world's most common chromosomal disorder and cause of intellectual disability. It is not an illness or disease, and occurs at conception. It occurs in one of every 1,000 to 1 in 1,100 live births worldwide, and that each year, approximately 3,000 to 5,000 children are born with this chromosome disorder" ([WHO](#)).

Down syndrome affects, but does not determine, development. Persons with Down syndrome are each unique, with their own talents, abilities, thoughts and interests.

Everyone with Down syndrome will experience some delay in all areas of their development, and some degree of learning disability. This will however vary significantly from individual to individual. What happens after birth will be far more important in shaping the outlook for any individual with Down syndrome than the presence of an extra chromosome.

Research provided a clear picture of the specific profile of learning needs of children with Down syndrome specifically when targeted early intervention.

Research suggested that children with Down syndrome do better, across a range of academic and other measures, in inclusive mainstream settings rather than segregated settings, irrespective of their level of learning ability.

Research has shown that children and young people with Down syndrome not only take longer to learn new skills, but also learn differently in some key areas, benefiting from some teaching strategies that are different to those typically used in education. These include approaches to number skills, to reading, and to speech and language skills.

Children with Down syndrome can do better, in spite of progress slowly in various areas of development including gross and fine motor skills, personal and social development, communication, cognition and self-help. The impact of the syndrome on development varies across developmental areas. This is described as a specific profile associated with the condition or a pattern of strengths and weaknesses.

The extent of delays are not the same across all areas, and there are significant differences between individuals. The development of individuals with Down syndrome is influenced by family, environment, cultural and social factors, in much the same way as for everyone else. Every learner with Down syndrome will demonstrate individual abilities, strengths and weaknesses and have their own learning characteristics. For this reason, while we can outline a range of characteristics associated with learners who have Down syndrome, this material should act only as background information when dealing with individual students. The temptation to generalize on the basis of the label 'Down syndrome' should be resisted.

Member States acknowledged last year's High-level General Assembly Meeting on Disability and Development, and is in line with the UN Convention on the Rights of Persons with Disabilities, which reaffirms that such persons, including those with Down syndrome, are entitled to human rights on an equal basis with others.

"The emerging post-2015 global development agenda offers a vital opportunity to build a life of dignity for all".

Training for children with Down syndrome

Children with Down's syndrome learn best from what they see and do, and the most important period for learning must be the early years. Breaking down skills at this point to gain reading, numeracy and social skills means breaking down even the pre-reading and pre-number skills and presenting tasks that will help develop the problems with short term memory. Training should include information about:

- The learning profile and the speech, language and communication profile associated with Down syndrome;
- Inclusion issues and effective deployment of additional support, including Teaching Assistants;
- Differentiation and curriculum mapping, including levels where relevant to children with DS;
- Behaviour management, including functional behaviour analysis;
- Speech, language and communication skills, and strategies to promote the development of teaching reading using visual (whole word recognition) as well as phonic approaches and understanding how to use literacy to develop spoken language; in additional number skills development including implementation of visual resources.

The research base supports recommended approaches, and an overview of changing attitudes towards and opportunities for people with Down syndrome.

Benefits of ICT to support learning

Use ICT accessibility, specialist IT programs as tools and promoting learning skills to achieve training for children with Down syndrome.

ICT plays a vital role in early intervention and education services in define specific needs of children and young people with Down syndrome, can develop good skills in ICT and these technologies can support individuals to overcome challenges faced when using other digital media. Throughout their education, trainers should take part in targeted learning activities developing skills in using assistive technology and IT programs, taking into account individual learning needs and practical application of these skills in everyday life, currently and in adulthood. Schools will require appropriate software for the individual, following individual assessment.

The lack of full and equal participation of those with Down syndrome affects not only individuals and their families, but society at large.

Children with DS need relevant software to support their learning, and they will need daily access to computers which are situated in the institution or classroom and accessible, with seating and work station appropriate for the individual. Allocation of a laptop to the individual may be necessary.

Computer assisted learning and specialist on ICT should be taking into account the specific learning profile for hearing, short term auditory, empathetic and social, working memory, speech and language, strong visual learning skills, visual difficulties and short concentration span.

- ICT can be integrated into teaching situations at home and at school and support early cognitive development
- Use ICT helps children with DS achieve a greater level of independence in their lives, a greater autonomy at home and leisure
- Use ICT improves their opportunities for socializing
- ICT helps to improve behaviour through combating boredom, decreasing frustration and promoting success
- ICT can offer the opportunity for repeated success and errorless learning
- ICT plays a vital role in breaking barriers and isolation, young with DS can involve in community activities if they are using appropriate social media for example.

Computer based learning

Computer learning works best when teachers or parents are involved, monitoring progress, discussing activities and teaching children how to properly use ICT accessibility and software. Computer-assisted learning offers particular benefits for children with Down syndrome such as visual presentation, self-paced learning, highly motivating graphics and sound, immediate feedback and the opportunity to be in control of their own learning.

Computer based learning is particularly suitable for children and young with Down syndrome, for a number of reasons:

- Suits visual learners
- Allows for non-verbal and non-written responding
- Allows learners to be in control and move at own pace
- Provides immediate feedback
- Allows for practice and repetition of basic skills in a fun way
- Provides fun and enjoyment, very motivating
- Errorless learning – learners does not fail, but is supported to succeed
- Assistive technology can be used to adapt computer and/or activity for almost any level of ability

(Based on M. Wood (2004) Supporting Learning and Development with ICT), [Down syndrome Ireland](#)

A number of benefits of computer-assisted learning for people with Down syndrome have been suggested by a variety of authors ([Down syndrome Education Online](#))

Improving motivation: the learning experience is enhanced with pictures, sounds and animation which may increase a child's interest and attention.

Multi-sensory experience: computers provide both visual and auditory input. Children with Down syndrome are 'visual learners' who learn best when information is presented visually and find learning from listening more difficult. ICT is particularly well suited to this learning style.

Non-verbal mode of response: Children are able to give non-verbal responses, enabling them to demonstrate their understanding without having to produce a spoken response, which may be particularly difficult for them due to troubles with articulation, word finding and intelligibility.

Being in control: Children begin to understand that they can have an effect on their surroundings through 'cause and effect' software; this sense of being in control develops further as children start to use familiar programs unassisted; self-esteem develops as they become more independent in their learning and presentation improves.

Immediate feedback: Children are rewarded for their success immediately, e.g. with pictures, sound effects or music, or prompted if they need to try again. The computer never gets impatient or frustrated by repeated errors; feedback is non-threatening and non-judgmental.

Errorless learning: Software can be designed in such a way that the child is supported in order to achieve repeated success. The child is supported at each step as necessary, before they make a mistake. This allows the child to learn a sequence of steps to achieve success every time.

Opportunities for practice: Children with Down syndrome need much more practice to acquire new skills and ICT can provide as many opportunities as necessary to repeat the same objective in exactly the same way.

Self-paced learning: The child is able to proceed as fast or as slow as he or she wishes; the computer will 'wait' for the child to respond without prompting them before they have had time to fully process the information and construct their response.

Clutter free working environment: Computer programs can provide a highly organized and predictable working environment which focuses the child on specific targets.

Assistive technology: Both hardware and software can be modified and customized to meet the requirements of children with individual needs.

Differentiation: A vast range of software can be purchased or downloaded from the Internet in order to produce differentiated activities to meet individual requirements.

Assistive technology, tools and programs

There are lots of tools to enable the children with DS to access computers in the full range of social settings and therefore it is important that the child use of the mouse and keyboard if possible for learning, communication and personal development. It was noted previously, that children with profound and multiple disabilities or more complex and additional needs may not be able to use the mouse and keyboard, but there is a full range of assistive technology that should allow all children to access ICT.

Support learning for children with special educational needs hardware tools such as:

- Touch screen facilities which may be used as bridges to the more commonly used input devices.
- Smart Screen as a flexible in lesson delivery and learning styles
- Mobile ready learning and tablets
- Digital cameras, scanners and printers can be used in conjunction with computers to develop personalized resources and enhance activities
- There is also a range of devices such as joysticks, trackballs, and overlay keyboards
- Augmentative AT tools include: Special keyboards, alternative mice, switch buttons for alternative access to the computer, portable devices and communication devices that create speech output.

Software: There is a large range of software and virtual reality programs to promote development in this area, including programs which focus on:

- Speech sounds and phonological awareness
- Sentence comprehension and storytelling
- Teaching reading to teach talking to support speech and language development
- Visual learning environment where audio feedback can be supported with text
- Bridge packages of speaking with support video-clips

- Software packages to provide visual reminders of the items that the children with DS may be attempting to manipulate
- Programs for appealing graphics, animations and music to increase interest and prolong attention
- Word-processing to help a child with editing and presenting neat and accurate written work where the difficulties of handwriting produce frustration, hostility and resentment

Listen, Look, Think then Answer!

Teaching a child with Down Syndrome and learning difficulties

“Listen, Look, Think then Answer” that is my software program designed to teach children with Down syndrome and students with learning difficulties.

The program was developed in Arabic environment, suitable for local environments especially in the Arab communities and tailor made to meet the needs of children with DS for prompting learning skills and communication system.

The program designed in collaboration with specialists when we noted previously traditional methods in educational tutorials were very primitive with low attractiveness and most teachers were developed mainly lessons in Microsoft Power Point with low quality of statistic images and few interactions.

The program is divided in ten main sections: Listening, Identifying, Naming skills, Matching, Auditory Processing, Memory Enhancement, Reading and Vocabulary, Placement, and Direction. Memory enhancement drills, a variety of basic vocabulary (common objects, colors, shapes, animals, arithmetic, etc.) exercises, computer use training and speech-based activities.

Listen, Look, Think then Answer method offers a variety of ways of overcoming some of the problems associated with differentiation, allowing teachers to produce individual work sheets, tasks to explore topics and exercises to drill and practice without all the associated boredom. Studies suggest that the processing and recall of spoken information is improved when it is supported by relevant picture material. This information has led to educators stressing the importance of using visual supports including pictures, signs and print when teaching children with Down syndrome as this approach makes full use of their stronger visual memory skills.

“The program applied in [Syria](#) and the [Sultanate of Oman](#)



Disability-Friendly environments in the age of 5G, Softwarization is coming!

Standardization between advancing accessibility, 5G technologies and Softwarization will remove all barriers for persons with disabilities.

Are we ready to remove all the barriers for persons with disabilities?

In the near future, robots, smart things, Internet of Things (IoT) and machines will become the new “tools” directly controlled through the 5G and Softwarization for helping persons with disabilities in daily lives, in their education, transport and emergency services and employment, in the smart cities and at home, in social protection, participation equality and external action. Persons with disabilities will be in an inclusive environment with suitable, accessible and quality services. This environment promises to deliver critically important applications and services to benefit humanity.

The smart environment connected to the digitized individual and promises to deliver critically important applications and services to benefit humanity. Software Defined Networking (SDN) and Network Function Virtualisation (NFV) should offer more agile networks that can deliver everything from telemedicine to television, mobile banking to educational services in new and compelling ways across the globe.

The advent of 5G technologies and ICT networks signify the coming next wave of a globally connected digital society and create a friendly and inclusive environment that empowers persons with disabilities to meet their needs as well as their access to public facilities.

"Softwarization" is a global systemic trend, appearing under the form of several technologies and models, such as Cloud Computing, Edge-Fog Computing, (SDN) and (NFV), which are sharing the same common denominator: "any transactions, functions and services can be seen as applications executed on (virtual/logical resources hosted in) low cost distributed hardware". So, "Softwarization" is paving the way towards the 5G.

This wave of innovation will draw a new future for persons with disabilities, increasing their impacts and overcome the various environmental, social, and system barriers to seize opportunities and achieve their aspirations. New technologies involve providing a smarter, more inclusive environment, persons with disabilities will be able to participate and become more involved, rather than being left out.

Cloud and Fog Computing, (SDN) and (NFV) are just different facets of this same evolutionary trend which is called Softwarisation of infrastructures. No way to look at them separately. And this trend will change dramatically the nature of telecommunications infrastructures by automating operations processes by increasing flexibility and programmability, which is reflected directly on the lives of persons with disabilities and their families.

For example, mobile access to the internet, cloud-based services and big data analytics is allowing persons with disabilities in anywhere to leverage, new kind of globally connected and shared knowledge base.

5G controlled robots is another excellent example of potential future ecosystem also it will allow the development and provision of cognition services for Persons with disabilities.

Smart cities bring together mix traffic of machines and humans generated by various city wide infrastructures, smart cities will becoming an inclusive, "Disability-Friendly Environments" in the near future.

5G technologies and Softwarization will make a massive difference to billion persons with disabilities in the world's. The global race is on to develop 5G, the fifth generation of mobile network. While 5G will follow in the footsteps of 4G and 3G, this time scientists are more excited. They say 5G will be different - very different.

How emerging 5G technologies will interact in future networks to benefit of persons with disabilities?

How advancing accessibility and ICT accessibility experts plan for this new generation?

The new trend cannot be achieved unless an all-inclusive and accessible environment is created based on globally approved standards, and improvements of infrastructure, systems and technologies, to achieve the initiative's vision "disability friendly".



WHERE INNOVATION AND ACCESSIBILITY MEET

Where innovation and accessibility meet?

Innovations enable people with disabilities to achieve a more independent and worthwhile quality of life, empowering them to accept their right to social inclusion.

Innovation of accessibility is working in collaboration with all other agencies with industry organizations and innovators to encourage and work with innovation and partnerships to enhance service users lifestyles.

Accessibility and innovation is innovative design to inclusive design, accessible design generally benefits all users when it is integrated into the design process from the start.

Digital technologies and networks that connect people make it possible to create adaptable products and services that fit our human differences. Inclusive design can be seen as accessibility that benefits everyone and doesn't require one-size-fits-all and providing people access to IT and knowledge regardless of their abilities or disabilities.

Innovators and designers can't be experts in everyone's requirements. Digital tools and networks can democratize design, development and production. This means that we can become experts in our own unique needs and participate in designing a system that will fit us. Inclusive design engages a diversity of perspectives including the end user of the design.

How can virtual worlds, geographic location apps, augmented reality, and the 3D Web possibly be adapted to users with disabilities, and how do we design for them?

How can able gain skills in a range areas of policy design, interface design, software application specifications, rapid prototyping tools, 3D printers and software development to make virtual world is reality for people with disabilities.

How can technology help improve our quality of life?. See [Dr. Chieko Asakawa](#) shows off some new technology that's helping blind people explore the world ever more independently. New technologies can promote greater independence for all.

IT companies are working on this issue for the broad range of individual human needs so everyone has equal access to digital knowledge through products and integrated accessibility. See case studies and [IBM Accessibility research projects](#), examples of IBM compliant product portfolio, which are capable when used in accordance with IBM's associated documentation – of satisfying the applicable requirements of Section 508 of the Rehabilitation Act. Also, for development community Microsoft promoted innovation of accessibility and worked with industry organizations to encourage innovation by reducing complexity of accessible development and engaging in research and development. See more [Microsoft Commitment to Accessibility](#)

The key element “Where Innovation and Accessibility Meet “ and “What are the required research to support accessibility as a component of innovation”?

Many people with disabilities now have better and more independent access to information and communication. New technology developments can make this access easier, and also break barriers. These barriers can often be removed by considering the needs of disabled users when designing and implementing innovative design to inclusive design.

Innovation is key to driving change across digital properties, for an innovative accessibility to help identify, prototype, and deliver innovative ideas . From augmented reality through audio and touch technologies, to partnering on driverless cars and digital guides.

We need to include accessibility in innovation, initiatives to promote collaborative problem-solving among stakeholders to ensure that people with disabilities reap the full benefits of communications technology. Through workshops, field events, facilitated dialogues, and online tools, the Initiative fosters affordable technology solutions.

Technologies are advancing at a rapid pace, accessibility is often play a vital role with assistive tools in latest innovations.

Innovation in Accessibility usually built in the mode of action through develop products , and the standards and regulations . It is a responsibility every industrial companies for helping all people to contribute equally and the right thing to do. The positive impact of accessibility in technology products benefits all walks of life.

For example, CISCO tested products against U.S. standards that include Section 508 of the Rehabilitation Act, Section 255 of the Telecommunications Act, and the Americans with Disabilities Act. Cisco adheres to guidelines by the World Wide Web Consortium ([W3C](#)). also contributed to accessibility standards and guidelines created by the International Telecommunications Union ([ITU](#)), the Internet Engineering Task Force ([IETF](#)), and the Telecommunications Industry Association ([TIA](#)). See [Cisco, Accessibility: Our Responsibility](#)

However, commitment to accessibility regulations and standards. It's an important part of providing a solution that meets people with disabilities needs, also commitment to work with accessibility experts and people with disabilities to design and build products that are usable by all people. Designing accessible products, hardware, software, and services that are now an essential part of business, education, government, and home communications.



Persons with disabilities in accessing and using the Internet, challenges and good practices

Accessing to Internet offers an opportunity for inclusiveness, to view the global community of its users as one while recognising its rich diversity. Internet technologies have the potential to give persons with disabilities the means to live on a more equitable basis within the global community in a manner that previously was not possible.

Internet empowers persons with disabilities to become more independent and participating in everyday activities such as employment, education, civic responsibilities and social connection.

Regardless of the challenges they may face, persons with disabilities can contribute to society like any other member of the community when barriers are removed. Increasing accessibility to the Internet can help to make that happen. Governments, industry and other key stakeholders need to make accessibility a priority in their ongoing work, individually and collaboratively.

There is considerable discussion about the fact that the internet and other online services are new technologies that open up windows of opportunity for everyone to participate in the new information age, and that there are particular benefits and potentialities for persons with disabilities. This emphasis may reflect the broader goal of providing “independent life”.

But there are also barriers and different challenges facing persons with disabilities in accessing the Internet.

The different challenges are facing persons with disabilities in accessing internet specifically in developing countries can be identified in:

- Lack of awareness and interest in accessing internet to persons with disabilities, specifically in rural areas in developing countries.
- Lack of necessary ICT accessibility tools and applications
- High cost for broadband connectivity and high cost of ICT accessibility and assistive equipment.
- Lack of on-going support and training on ICT accessibility. In addition limited of complementary Internet services, e.g. assistive technology, ICT accessibility tools software, limited of accessibility features at mainstream ICT training facilities.
- For Persons with disability the potential benefit to be gained from access to the internet is critically dependent on reliable high speed connectivity at affordable prices. For example for persons with hearing impairment and who needs to use high quality video conferencing services for communication, the internet connection needs to be reliable and capable of maintaining high quality real-time synchronised data speed.
- For Persons with a physical disabilities who needs to telework in order to maintain ongoing employment, affordable and reliable connectivity is a pre-requisite.

In this sense, the above identified barriers can be seen as bottlenecks in the path towards using and accessing internet.

Challenges and good practices

- Encourage web developers, they should be work to include accessibility in design of the apps with technology, e.g. VoiceOver, record use of audio description etc.
- Screen readers, enable users with disabilities to hear the contents of a web page rather than read them, a screen reader can only read text, not images or animations. Therefore, it is important that images and animations have text descriptions associated with them that the screen reader can read. This text is called alternative text, or “alt” text.
- A touch screen, allows an individual to navigate the web page using hands without the fine motor control required by the mouse.

- Smartphones and tablets industry can develop use of touch screen devices with audio output specifically for visual media, In these cases, it is very important that essential components of the page work without a mouse.
- Develop mobile web design, developing a web accessibility to achieve social, technical, financial, legal benefits of web.
- Look to successful professional accessibility software developers and ask them how they learnt and how can build of accessibility skills.
- An initiative, before begin, decide how can we build and will make a world of difference in the quality of resulting accessibility.
- How can remove the lack of conformance to W3C guidelines and the poor websites design, websites should be accessible and designed to comply with level AAA of the W3C, AAA success criteria defined in the Guidelines.
- Applying legislative process to adopting a web accessibility policy, websites entire online and resources, need to balance and clear accessible standards.
- Making website accessible is useful for all persons with disabilities and older so we need to be compatible with alternate input devices, Assistive technology and software and we should not forget the native languages.
- Build a group of qualified people and persons with disabilities within the online services company who can manage oversee accessibility projects, e.g. recently a new Chief Microsoft's Accessibility Officer.
- Need to address the skills gap that currently prevents many persons with disabilities from using internet.
- There is a need to implement innovative approaches to training and preparing persons with disabilities for using ICT accessibility and accessing to internet.
- Efforts and cooperation to develop ICT skills programs to help persons with disabilities to develop their skills in using social media platforms.

In fact there are few concrete programs that truly provide the opportunity for equal access to persons with disabilities.

Identification and adoption of accessibility standards to determine which standards apply to organizations and adopting those standards across the organizations, also establishment of an approach to select tools and techniques to meet the needs and experience in the organizations.

Finally, there is a need to an initiative to expand accessing Internet to persons with disabilities includes, a principle, provisions to ensure not only affordability, but also accessibility and usability, for persons with disabilities through to increase participation, education and employment through deploying our efforts for achieving that specifically, in developing countries. We should look at the economic benefits of assimilating marginalized segments of society as a means of integration.

How Can Baby with Down Syndrome Learn, What Can Learn in The WOMB?

What training and technical assistance provided, and is it helpful?

The ability of ICT to offer specific software in these areas is still outstanding.

How can baby with down syndrome learn, and what can learn in the womb?

The ability of ICT to offer specific software in these areas is still outstanding.

Down's syndrome can be diagnosed before birth (prenatally). During pregnancy, there are two types of tests that can be done to look for Down's syndrome, a screening test and a diagnostic test.

To screened for Down syndrome, the dating scan and the nuchal translucency scan can be carried out at the same time, between 11 weeks and 13 weeks.

When fetal reaches 23 weeks the recent research indicates that a variety of stimulation while babies are in the womb is the start to building and promoting cognitive development. From playing music to reading to physical interaction in utero, stimulated babies are able to begin life with an advantage, being born with what some researchers consider more confidence in themselves and the ability to learn more easily. In addition to stimulating and purposefully interacting with the baby, staying relaxed and keeping stress levels at a minimum for the mother are also necessary for promoting fetal brain development.

The key question. Can these experiments also applied on fetuses with down syndrome?

Does baby with Down syndrome ready to learn anything in the womb?

The test of learning can certainly help baby natural cognitive development by interacting with his/her mother, and this includes singing and talking. By reading stories, playing music, or even just talking to baby, and the experience is a simple form of learning in the womb, according to a number of studies.

However, some experts say that we can't rule out the possibility that learning happens after birth, rather than before it. Also, even if teaching unborn baby is possible, there's little proof that it has any long-lasting, beneficial effect.

How can baby with down syndrome learn, and what can learn in the womb?

Is this training program early intervention before birth (prenatally) and during pregnancy offer helps babies and toddlers with developmental delays or disabilities.

What training and technical assistance provided, and is it helpful?

We know a child with Down syndrome has many problems in attention, concentration, learning, thinking, memory, perception, reading and writing.

So what are the appropriate programs and software that is available and which would be of particular benefit to pregnant mothers in the last three months of pregnancy?

There are three main ways that babies are thought to learn in the womb:

Learning by experiences: Babies recognise familiar voices and music they heard in the womb, and are soothed by them after birth.

For example, communicating exploring and thinking programs.

Learning by repetition: For example, training by repetition, communication, language and reading stories via computer programs.

Learning by association: baby maybe learn to connect certain experiences to the way by feeling at the time.

However, The ability of ICT to offer specific software in these areas is still outstanding.

And I mention again what the experts say: Baby will probably be able to remember certain sounds and tastes from the womb after born. When play music to baby in the womb, his/her heart rate may increase and may move more.

In the same way, baby may also show recalls and is comforted by other noises heard while in the womb. These could be the theme tune of favourite TV programme or a story frequently read out loud. see ([Will my baby learn anything in the womb?](#))

Sensory and brain mechanisms for hearing are developed at 30 weeks of gestational age, and the new study shows that unborn babies are listening to their mothers talk during the last 10 weeks of pregnancy and at birth can demonstrate what they've heard and there's no evidence that experiences can increase development skills to baby with down syndrome. However, hearing voice may help baby to recognise and bond with mother after birth.

“The mother has first dibs on influencing the child’s brain,” said [Patricia Kuhl](#), co-author and co-director of the [Institute for Learning & Brain Sciences](#) at the University of Washington. “The vowel sounds in her speech are the loudest units and the fetus locks onto them.”

Through the deep search, I couldn't find and reach to any information on this study about cognitive development for fetuses with down syndrome, but just a suggestion to many developmental experts, researchers, and pediatricians, maybe they find possible solutions for this idea!

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