International Telecommunication Union

ITU-D   STUDY GROUP 1   4th STUDY PERIOD (2006-2010)

QUESTION 20/1:

Access to telecommunication services for people with disabilities

THE STUDY GROUPS OF ITU-D

In accordance with Resolution 2 (Doha, 2006), WTDC-06 maintained two study groups and determined the Questions to be studied by them. The working procedures to be followed by the study groups are defined in Resolution 1 (Doha, 2006) adopted by WTDC-06. For the period 2006-2010, Study Group 1 was entrusted with the study of nine Questions in the field of telecommunication development strategies and policies. Study Group 2 was entrusted with the study of ten Questions in the field of development and management of telecommunication services and networks and ICT applications.

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ITU

ABSTRACT

The document contains the Final Report on Question 20/1 and deals with ICT accessibility for persons with disabilities.

This Report examines the work carried out by the Rapporteur's Group for Question 20/1 in the study period 2006-2010.

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QUESTION 20/1

Report on ICT accessibility for persons with disabilities

Introduction

ICTs have been acknowledged as essential for social, cultural, economic, political and democratic development, as well as for exercising several fundamental rights. Within the World Summit on the Information Society ("WSIS"), both the Declaration of Principles[1] and the Tunis Commitment[2] emphasized the immense impact that ICT has in almost every aspect of life, and are considered an instrument for productivity, economic growth, employment generation, good government, dialogue between persons and nations, as well as for improving the quality of life. It is also expressly stated that the right to participate in the Information Society is only possible through effective access to ICTs. Through ICT access, a person obtains information to exercise his/her civil rights, the communities become socially integrated, and a region may benefit because ICTs are an input for any activity.

ICTs face two main challenges, how to be both accessible and affordable by the population in general. The lack of access to ICTs on equal terms is not only an obstacle for development, but also a factor that increases the social, education and economic divide. Telecommunication infrastructure in a given country does not necessarily mean effective accessibility, since (1) there remain many underserved or unserved areas, and (2) ICTs are unavailable either because the price is unaffordable or the services are not accessible for a person with disability. In addition, the liberalization of the ICT sector in most countries has not provided accessible ICTs for persons with disabilities.

WSIS also acknowledged that special attention should be given to the needs of the elderly as well as persons with disabilities: (1) when elaborating national cyberstrategies, including educational, administrative and legislative measures, (2) for using ICT in education and human resources development, (3) in order that equipment and services offer easy and affordable access, under the principles of universal design and assistive technology, (4) to promote telework and to increase employment opportunities for persons with disabilities, (5) for creation of content that is pertinent to persons with disabilities, and (6) to create the required abilities for the use of ICT by persons with disabilities.[3]

Given the need to establish public policies for promoting and implementing services and solutions which provide access to ICT services for persons with disabilities, the World Telecommunications Development Conference held in Doha, Qatar in 2006 ("WTDC-06"), resolved to create a new study question for the "analysis of strategies and policies for the promotion and development of systems that allow access to telecommunication services to persons with disabilities"[4]. The rationale behind such strategies and policies is to stop discrimination in the use of ICTs, and to ensure that persons with disabilities are entitled to and enjoy an equal access to ICTs as the rest of the population. In the telecommunications domain, accessibility is defined as "the usability of a product, service, environment or facility by the widest possible range of users and especially users with disabilities"[5]. The WTDC-06 also requested the Telecommunication Development Bureau to support training and capacity building in all its programme activities and to promote more participation of persons with disabilities, among other underserved groups[6]. In recognition of this fact, the ITU

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[1] World Summit on the Information Society, *Declaration of Principles, Building the Information Society: a global challenge in the new Millennium, http://www.itu.int/wsis/docs/geneva/official/dop.html*, Dec. 12, 2003 (access date: Nov. 12, 2007).

[2] World Summit on the Information Society, *Tunis Commitment, http://www.itu.int/wsis/docs2/tunis/off/7.html*, Nov. 18, 2005 (access date: Nov. 12, 2007).

[3] Cfr. UIT, *World Summit on the Information Society*: (1) Declaration of Principles, numbers 13 and 30; (2) Action Plan of May 12, 2004, numbers 9 e) and f), 19 and 23; (3) Tunis Commitment numbers 18 and 20; and (4) Tunis Action Program number 90 c) and e).

[4] WTDC-06, Resolution 56.

[5] ITU-T, *Recommendation F.790 Telecommunications accessibility guidelines for older persons and persons with disabilities*, approved under the World Telecommunication Standardization Assembly Resolution 1 procedure on 17 November 2000, section 3.7.

[6] WTDC-06, number 3.4, section II, subsection a), number 12.

Council agreed that the theme for the World Telecommunications and Information Society Day (May 17) of 2008 should be "Connecting Persons with Disabilities: ICT Opportunities for All". The report of Study Question 20/1 should include all relevant information and will be updated as and when it is deemed appropriate.

I   Population with disabilities and ICTs

1   General

There are different types of disabilities which vary in nature and extent (i.e., hard of hearing and deaf, blind and low vision, physical and mental disabilities). In general, a person with disability is: (1) a person who has a physical, mental, intellectual or sensorial impairment, (2) that such impairment is permanent or long term, and (3) that it limits his or her capacity to perform one or more essential activities of daily life or that hinders his or her full, effective and equal participation in society, due to or aggravated by the social and economic context.[7] Each type of disability may require special consideration when designing an ICT public policy.

2   Statistics

Statistics is one of the main challenges for the design and implementation of public policy for making ICTs accessible to persons with disabilities. The World Health Organization estimates that 10% of the world´s population has some type of disability. However, overall, each country´s statistics either tend not to reflect the actual number of people who have a disability or the available data is too generic and does not distinguish between each type of disability nor if a person has more than one disability (for example, a blind person who is also deaf). Moreover, within the research there appears to be few statistics that reflect access or use of ICTs, although in 2005, an EU report did state that "Persons with disabilities constitute about 15% of the European population and many of them encounter barriers when using ICT products and services"[8]..

ITU included in its indicators questionnaire for 2007 some questions aimed at initiating the collection of data on the number of persons with disabilities who have access to ICTs. The objective of including such questions is to start developing suitable indicators which would contribute to placing ICT accessibility on the public agenda, generate awareness and monitor progress. Although the data collected by the indicators questionnaire for 2007 was very limited due to the few responses received, and no meaningful analysis may yet be carried out, it is, nonetheless, extremely important that ITU continues to request and collect such data so that in the near future relevant statistics may be developed.

Within the work performed by ITU-D Study Question 20/1, a questionnaire with pertinent questions regarding ICT accessibility by persons with disabilities was sent to ITU Member States. However, only 14 countries responded the questionnaire. Absence of a significant response to such questionnaires may be due to several factors, ranging from a lack of understanding of, or data on, the information requested, to Member States simply not having enough time or resources to consider the importance of this issue.

However, in signing the Convention on the Rights of Persons with Disabilities, many Member States have undertaken to collect information (including statistics) for formulating and implementing the Convention´s policies. Such information must be disaggregated and is essential in order to identify and address barriers faced by persons with disabilities in exercising their rights [9].

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[7]   Cfr. article 1, second paragraph Convention on the Rights of Persons with Disabilities, and article 2, section XI, of the General Law for Persons with Disabilities (Mexico).

[8]   UE, *eAccessibility*, Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee, and the Committee of Regions, COM(2005) 425, Bruxelles, September 13, 2005.

[9]   Cfr. Article 31 CRPD.

II Legal instruments and standards

1 Convention on the Rights of Persons with Disabilities

On 13 December 2006, the United Nations General Assembly approved the Convention on the Rights of Persons with Disabilities (hereinafter the "CRPD"), and it is the first human rights treaty of the XXI century. The CRPD was opened for signature on 30 March 2007, and as of January 2010, 144 countries had signed it, while 87 had signed the Optional Protocol. Out of these, 76 had ratified the Convention and 48 the Optional Protocol. Depending on each country´s internal legal system, the CRPD may require signature and further ratification by the legislative branch or other formal process, before it is mandatory for that country. Nonetheless, the CRPD establishes basic principles and obligations to ensure equal access to ICTs including Internet by persons with disabilities.

The CRPD considers that discrimination exists on the basis of disability if there is a denial of reasonable accommodation. Reasonable accommodation implies that appropriate modification or adjustments must be made, which are not disproportionate or cause undue burden, and which ensure that persons with disabilities enjoy or exercise all human rights and fundamental freedoms (for example, freedom of speech, access to information)[10].

Pursuant to the CRPD, the signatory States shall take appropriate measures to: (1) ensure ICT and emergency service access to persons with disabilities on an equal basis[11], (2) promote access to new ICTs, including Internet[12], (3) promote design, production and distribution of accessible ICT at an early stage[13], (4) ensure that persons with disabilities can exercise the right to freedom of expression and opinion[14], (5) provide information in accessible formats and technologies appropriate to different kinds of disabilities in a timely manner and without additional cost[15], (6) urge private entities that render services to the public to provide information and services in accessible and usable formats[16], and (7) encourage mass media (including information providers through Internet) to make their services accessible[17].

2 National legal systems

Challenges for ICT accessibility from a legal standpoint include the following: (1) in many countries there no are specific legal provisions for ICT accessibility, and any legal stance would, for example, be the result of interpreting anti-discrimination laws, disabilities law or telecommunications laws; (2) that some of the legal provisions have been enacted considering disability issues from a medical standpoint that considers disability as a "defect" rather than addressing disability with emphasis on ability and integration; and (3) the effectiveness of legal and regulatory provisions, that is, turning good accessibility provisions into reality.

Several countries have recognized in their Constitutions that no person may be discriminated against for any reason, including due to a disability. Some countries have enacted legal provisions prohibiting discrimination and special laws addressing the rights of persons with disabilities. There are also countries that have included certain provisions in their telecommunications laws that relate to making services and equipment accessible to persons with disabilities. The degree of effectiveness of such provisions may vary. The following are some examples of legal provisions in a national context.

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[10] Article 2 CRPD.

[11] Article 9, section 1, paragraph b) of the CRPD.

[12] Article 9, section 2 of the CRPD.

[13] Article 9, section 2, paragraph h) of the CRPD.

[14] Article 21 of the CRPD.

[15] Article 21, paragraph a) of the CRPD.

[16] Article 21, paragraph c) of the CRPD.

[17] Article 21, paragraph d) of the CRPD.

The Bolivarian Republic of Venezuela Constitution expressly recognizes that all persons with disabilities have right to full and autonomous exercise of its capacities. The Constitution also mandates television broadcasters to incorporate subtitles and translation in sign language. This obligation is also included in the Radio and Television Social Responsibility Law. On 18 December 2007, the Venezuelan National Assembly passed a new Law for Persons with Disabilities that will guarantee medical assistance to persons with disabilities and will ensure they are adequately represented in the work place. The law includes physical, hearing, mental and visual disabilities[18]. There is a proposed regulation that would mandate television broadcasters to include a sign language interpreter and closed captioning in information programs and emergency messages.

In Brazil, the Law on Accessibility (L. 10.098) enacted in 2000 requires accessibility and removal of barriers for communication and expressly guarantees the right of persons with disabilities to ICTs. There are several laws, decrees and plans that address ICT accessibility by persons with disabilities[19]. In 2004, Decree 5.296 provided more detailed provisions for implementation and requires all governmental websites to be accessible to persons with disabilities[20]. Public telephones must have a dot on key number 5, must be at certain height, and some must be also adapted with a keyboard to allow persons with a hearing disability to communicate. Plans for universal access and service must: (1) include a provision that at least 2% of public telephones must be accessible, (2) establish that persons with disabilities are entitled to request that a public telephone be adapted in a term of 7 days, and (3) provide since 2007 that the universal service fund be used to provide fixed telephones that are accessible to persons with hearing disabilities in non profit institutions.

The Democratic Republic of Congo estimates that there are around 2 million Congolese with disabilities due to war, old age, disease and accidents. The Democratic Republic of Congo Constitution provides that the authorities shall protect persons with disabilities. The Telecommunications Act has provisions for allocating revenue from the telecommunications sector for telecommunication development. In addition, the Democratic Republic of Congo recommended the establishment of ICT learning and access centres within centres for persons with disabilities, as well as full exemption of any tax on import of telecommunication equipment for persons with disabilities.

The European Union Universal Service Directive[21] sets forth the obligation for its Member States to "take specific measures for disabled end-users in order to ensure access to and affordability of publicly available telephone services, including access to emergency services, directory enquiry services and directories, equivalent to that enjoyed by other end-users"[22]. Member States may also take measures which allow users with disabilities to take advantage of the choices that are available to other end users[23]. The quality of service for users with disabilities may have additional quality of service standards for assessing its performance[24]. Public phones must be accessible to users with disabilities[25].

France has regulation regarding accessibility to persons with disabilities to mobile services. The regulation was to complement the obligations that the mobile operators imposed on themselves (see below section VI), and it provides that each operator must publish annually a report to describe the advances made in the accessibility in mobile services, both regarding the equipment/devices and the services.

The Mexico Constitution prohibits discrimination against any person on the basis of a disability. Mexico ratified the CRPD which implies that its provisions are fully enforceable in Mexico, and the Mexican State is obliged to comply with them. There is also a Law on the Rights of Persons with Disabilities that deals with different types of accessibility issues, but since the CRPD recognizes more rights of persons with disabilities

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[18]   See *http://www.venezuelanalysis.com/news/2067*.

[19]   Cfr. ITU-D, Document 1/166 from ANATEL (Brazil) to the Third Meeting of ITU-D Study Group 1, Geneva, September 9-12, 2008.

[20]   Waddell, Cynthia D. "Worldwide Accessibility Laws and Policies" in *Web Accessibility: Web Standards and Regulatory Compliance*, Apress 2006

[21]   EU, Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive).

[22]   EU, Article 7, paragraph 1 of the Universal Service Directive.

[23]   EU, Article 7, paragraph 2 of the Universal Service Directive.

[24]   EU, Article 11, paragraph 2 of the Universal Service Directive.

[25]   EU, Article 6, paragraph 1 of the Universal Service Directive.

and duties of States and private parties, the CRPD is therefore deemed to have superseded that law. However, as of the date of this Report no regulation or measure to make effective the CRPD has been enacted.

In Sri Lanka, the Protection of Rights of Persons with Disabilities Act No. 28 of 1996 is the legal ground for providing accessible facilities for persons with disabilities. Licenses granted to fixed access and cellular service providers have obligations to ensure the provision of telecommunication facilities to persons with disabilities.

In the United States of America, Section 508 of the Rehabilitation Act of 1973, as amended and the regulations issued by the US Access Board contains the Electronic and Information Technology Accessibility Standards which are broad in scope (i.e., software, operating systems, Internet/Intranet applications, hardware, telecommunications, televisions, phones, fax machines, text telephones or TTY, multimedia and closed systems). This law is having significant international impact and is identified as an example of best practice. Accessible telecommunication services were mandated with the Americans with Disabilities Act of 1990. The Communications Act mandates that, if readily achievable (easily accomplishable and able to be carried out without much difficulty or expense), (1) the manufacturer of telecommunications equipment must ensure that they are designed so as to be usable by PwD, and (2) the service providers must ensure that their services are accessible to persons with disabilities[26]. Federal departments and agencies must have electronic and information technology that allows: (1) their employees with disabilities to have access to information that is comparatively equal to those to which employees without disabilities have, and (2) persons with disabilities from the public to have access to information and services in a comparable manner to the access by persons without disabilities[27]. There is an obligation to guarantee that persons with hearing disabilities may use their assistive devices with telephones[28].

In the US, relay services are also used (see section IV hereunder) through TTY, Internet and video. Users of these relay services pay the same tariffs for the telecommunication services as any other user (i.e., same long distance rate). All common carriers that provide interstate telecommunication services must provide relay services themselves or through third parties. Among the relay services there are: text-to-voice for users with hearing disabilities, hearing carry over for speech disabilities, voice carry over for a person with hearing disabilities that prefers to use his/her voice to communicate, and speech-to-speech for persons with language disabilities.[29] In 2007, the Federal Communication Commission recognized that migration to VoIP services needs to ensure that disability access provisions are also implemented in interconnected VoIP services. In this regard, interconnected VoIP providers have to contribute to the Interstate Telecommunication Relay Services Fund and provide abbreviated dialling to 711 (number for accessing the relay services)[30].

All advertisement produced or financed by the US government that will be transmitted by television must include subtitles of the verbally expressed content[31]. Pursuant to a calendar set forth by the Federal Communications Commission, television programs must have closed captioning[32]. Regarding emergency information, radio and television stations (both broadcast or subscription) are obliged to include subtitles in television and distinctive sounds that alert a person with disabilities that there is an emergency situation.

3   Accessibility standards

Accessibility standards are essential insofar as it makes it possible for equipment and services (1) to be usable for the broadest range of people, (2) to be interoperable, and (3) to provide the necessary quality of service.

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[26]   USA, section 255 [47 U.S.C. 255] of the Communications Act, in connection with section 301(9) [42 U.S.C. 12181(9)] of the Americans with Disabilities Act of 1990.

[27]   USA, section 508 [29 U.S.C. 798] of the Rehabilitation Act.

[28]   USA, Section 710 [47 U.S.C. 610] of the Communications Act.

[29]   Cfr. USA, 47 C.F.R. § 64.601 - 64.605, Regulations for the Provision of Telecommunications Relay Services (TRS) of the Federal Communications Commission.

[30]   USA, Federal Communications Commission, Report and Order 07-110, released on June 15, 2007, http://fjallfoss.fcc.gov/edocs_public/attachmatch/FCC-07-110A1.doc.

[31]   USA, Section 711 [47 U.S.C. 611] of the Communications Act.

[32]   USA, Section 713 [47 U.S.C. 613] of the Communications Act, in connection with 47 C.F.R. Part 79.1.

The ITU Telecommunication Standardization Sector (ITU-T) has prepared several recommendations and documents that provide information on a wide range of accessibility standards.

The general principles which ensure and improve telecommunications accessibility mandate that developers of telecommunications equipment and services: (1) make *inclusive design* which considers the needs of the elderly and persons with disabilities so that they may use such equipment and services as much as possible, (2) provide accessibility through optional equipment or assistive technology[33] that is functionally equivalent to the original service, when the standard configuration is not adequately accessible, (3) ensure the safety and information security of users, and (4) make equipment and services operable and usable without excessive load on cognitive or memory capabilities.[34]

ITU-T has also published a Telecommunications Accessibility Checklist[35] for standardization activities to be applied from the beginning of the standardization process through to its end. It is important to incorporate accessibility criteria on development of new technology or on the evolution of current technology otherwise, new technologies may present new barriers for persons with disabilities.

Information Technology Standards JTC 1 of the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) established a Special Working Group on Accessibility[36]. This group´s terms of reference include collection of user requirements, publishing an inventory of all known accessibility standards, and tracking laws and policies to ensure that necessary standards are available.

Lack of accessibility standards may lead to severe interoperability problems that may prevent communication between and with persons with disabilities. This problem has already been identified in the European Union where users cannot communicate through text telephones among its Member States.

The World Telecommunication Standardization Assembly held in Johannesburg in 2008 adopted Resolution 70 whereby, *inter alia*, it invited ITU Member States and Sector Members to develop national guidelines and mechanisms for accessibility, compatibility and usability of ICT services, products and terminals, as well as inviting them to consider introducing telecommunication relay services to enable persons with hearing and speech disabilities to use telecommunication services.

4   Declarations on ICT accessibility

As of the date of this Report, there have been three Declarations on ICT accessibility and one directly dealing with emergency situations (tsunami). The Cairo Declaration (November 2007)[37] and the Lusaka Declaration (July 2008)[38] on Supporting Access to Information and Communication Technology Services for Persons with Disabilities were the result of regional BDT workshops. These Declarations acknowledged the importance of ICT accessibility for e-learning, suitable jobs, and tele-health, among others. In addition, they expressly recognized that ICT accessibility should be achieved through cooperation of government, non governmental organizations, civil society and the private sector, and that concerned United Nations bodies should coordinate and exchange information.

The Phuket Declaration on Tsunami Preparedness for Persons with Disabilities (March 2007)[39] highlighted the importance of infrastructure construction for a timely warning of a disaster, and that infrastructure must be disability friendly.

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[33]   "assistive technology: Piece of equipment, product system, hardware, software or service that is used to enable, maintain or improve functional capabilities of individuals with disabilities." ITU-T, Recommendation F.790 Telecommunications accessibility guidelines for older persons and persons with disabilities, approved under the World Telecommunication Standardization Assembly Resolution 1 procedure on 17 November 2000, section 3.8.

[34]   Cfr. ITU-T, Recommendation F.790 Telecommunications accessibility guidelines for older persons and persons with disabilities, approved under the World Telecommunication Standardization Assembly Resolution 1 procedure on 17 November 2000, section 6.

[35]   ITU-T, FSTP-TACL Telecommunications Accessibility Checklist, http://www.itu.int/publ/T-TUT-FSTP-2006-TACL/en.

[36]   JTC 1 Special Working Group on Accessibility, http://www.jtc1access.org/swga_home.htm.

[37]   Available on http://www.ituarabic.org/2007/Disabilities/Cairo%20Declaration%20English%20Final.doc.

[38]   Available on http://www.itu.int/ITU-D/sis/PwDs/Seminars/Zambia/index.html.

[39]   Available on http://www.dinf.ne.jp/doc/english/prompt/ws070112_2.html.

The Hyderabad Declaration on IGF [Internet Governance Forum] Accessibility for Persons with Disabilities (December 2008)[40] noted that "the disability perspective has not been fully integrated into the proceedings of the Internet Governance Forum partly due to both physical and programmatic barriers to participation by persons with disabilities". Additionally, it requests that IGF programs, funding or assistance "be made disability-inclusive, both through mainstreaming and disability-specific approaches", and to promote equal involvement of persons with disabilities in IGF projects. Finally, the Declaration urges the IGF Secretariat and host countries for the IGF to tackle the problems faced by persons with disabilities "in their participation at IGF meetings and in their access to the IGF website and remote access hubs".

5   Stakeholders participation

Stakeholders of ICT accessibility for persons with disabilities should be involved in the process of elaborating legal/regulatory provisions, public policy and standards. As simple as this appears to be, in practice, it can present several challenges. These can be:

•   Having an unorganized or passive civil society, especially in connection with civil society organizations of or for persons with disabilities. This challenge will depend on each country´s civil society and the support or encouragement of governments to the formation of non governmental organizations.

•   Lack of knowledge by policy makers of how to effectively communicate with individuals or groups of persons with disabilities.

•   Lack of interest of politicians and governments to make consultations with persons with disabilities before implementing policies or enacting legal provisions.

•   Holding consultations, seminars, meetings or forums that are not accessible for persons with disabilities.

6   Other participating entities

a.   ITU-Joint Coordinating Activity on Accessibility and Human Factors

The ITU-T Joint Coordinating Activity on Accessibility and Human Factors[41] (JCA-AHF) was created in December 2007 (TSAG TD/482) to increase awareness on the need of access to the information society by people with varied capabilities, including persons with disabilities through reporting to ITU-T Study Groups. The JCA-AHF provides advice concerning the accessibility to ITU facilities, services and events to the Director of the Telecommunications Standardization Bureau, and has a mandate to act as a single point of contact within the ITU.

b.   Dynamic Coalition on Accessibility and Disability (DCAD)

The Internet Governance Forum (IGF) formed the Dynamic Coalition on Accessibility and Disability[42] (DCAD) where all the ITU sectors (ITU-D, ITU-T and ITU-R) participate, along with other international organizations, nongovernmental organizations, and individuals. ITU-T maintains a secretariat and the DCAD websites. DCAD aims to ensure that ICT accessibility is included in debates within the IGF. DCAD membership is open for both individuals and institutions willing to contribute in achieving the DCAD goals.

III   Principles of ICT accessibility

The principles that govern ICT accessibility are meant to enable full and effective participation and inclusion of persons with disabilities in society. The main principles are[43]:

•   *Equal access* so that persons with disabilities have the same opportunities and possibilities as the rest of the population to use ICTs, and, hence, there is no discrimination against them.

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[40]   Available on http://www.itu.int/dms_pub/itu-t/oth/36/05/T36050000010001MSWE.doc.

[41]   http://www.itu.int/ITU-T/jca/ahf/.

[42]   http://www.itu.int/themes/accessibility/dc/index.html.

[43]   Cfr. Article 3 of the CRPD, and article 5 of the General Law of Persons with Disabilities (Mexico).

- *Functional equivalent,* that is, if there is an alternative means of communication different from the original communication, then this alternative must meet the objective and conditions and in similar terms as the original way of communicating (i.e., real time communication).

- *Accessibility* (in *strict sense*) that allows a person with disabilities to use his or her own capabilities to access ICTs in the same manner as other users. This implies that a person with disabilities does not have to rely on a specific capability or sense (for example, the hearing sense).

- *Affordability* so that the prices of services, equipment and assistive technology are reasonable, considering the specific circumstances of the region or country.

- *Universal design* or *design for all* requires that when a service, equipment or technologies are being developed, these may be used by any person without further adaptation or special design. Therefore, when a service, equipment or technology does not comply with the principle of universal design, then reasonable adaptations must be made to guarantee that persons with disabilities may enjoy its use in a similar way to the rest of the population.

The ITU-T has set forth as basic policy that the developers of ICT equipment or services should incorporate a human-centred approach for accessibility by promoting an active involvement of a broad range of users (including persons with disabilities), by making user friendly interfaces, and multidisciplinary design[44]. ITU-T has also created the concept of total conversation that enables a person to communicate through voice, text and/or video. The total conversation service is "An audiovisual conversation service providing bidirectional symmetric real-time transfer of motion video, text and voice between users in two or more locations"[45]. Finally, it is worth mentioning that ICT accessibility by persons with disabilities can be achieved directly, by standard options, accessories, compatible third party devices and by modifications to the services or equipment.

IV   Assistive technologies[46]

Assistive technologies are those aimed to overcome or reduce the gap between standard ICT generally available and those that address the needs of persons with disabilities. Assistive technologies enable persons with disabilities to access and use ICTs.

1   Challenges for assistive technologies.

Assistive technologies face many technological, social and economic challenges.

- Customer base for assistive technology is small compared to mainstream technology, in part because persons with disabilities needs vary considerably depending on the type and extent of the disability[47].

- Due to a limited market of assistive technology, production of assistive technology does not benefit from economies of scale, and there are no competing developers/manufacturers as in other telecommunication areas. Moreover, if market-driven competition is encouraged then transfer of technology will be costly or non-existent and collaboration between researchers and the disability communities will be discouraged.

- Assistive technology may be proprietary software solutions, which renders it more costly or prevents further research and development by third parties.

- When ICTs are updated, upgraded or a new version appears, assistive technology has to be also updated otherwise the "technology gap" would widen. When the updated, upgraded or new version

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[44] ITU-T, Recommendation F.790 Telecommunications accessibility guidelines for older persons and persons with disabilities, approved under the World Telecommunication Standardization Assembly Resolution 1 procedure on 17 November 2000, section 7.1.

[45] ITU-T, Recommendation F.703 Multimedia conversational services, prepared by ITU-T Study Group 16 (2001-2004) and approved under the World Telecommunication Standardization Assembly Resolution 1 procedure on November 17, 2000, section 3.2.7.

[46] This Chapter summarizes section of Chapter 10 of the e-Accessibility Toolkit for Policy Makers, G3ict Initiative and ITU, http://www.g3ict.com/resource_center/toolkit.

[47] Cfr. e-Accessibility Toolkit for Policy Makers, G3ict Initiative and ITU, http://www.g3ict.com/resource_center/toolkit, Chapter 10. Customer base is currently mainly in North America, Australia, Western Europe and South Asia.

relies on proprietary technology, hardware or software, assistive technology will increase costs with workarounds and these will be borne by the small customer base.

• A lack of generally available or comprehensible (e.g., due to language) information of the existing ICT assistive devices (e.g., equipment, software, hardware) for access by persons with disabilities.

• Certain languages and, specially, native languages are unsupported[48]

• Socio-economic factors which will render assistive technology unaffordable for most users with disabilities. The cost of certain assistive technology may represent more than the average yearly income of an individual in different countries.

• Assistive technology research and development capacity is non-existent in the vast majority of countries.

The cost of assistive technology could be tackled by: (a) adopting the principle of universal design or design for all from the beginning, instead of developing assistive technology afterwards, (b) enacting legislative obligations that make ICTs accessible, (c) government subsidies for assistive technology, and (d) encouraging open source software and hardware, and open access for academic research.

2   Examples of assistive technologies

There are different types of assistive devices and the following listing does not pretend to be exhaustive, but it does present certain examples of it.

• Low or no-tech options for computer access. These types of assistive technology may go from adjustable chairs to mouth stick or head/chin pointer to type on a keyboard for persons that cannot use their hands/arms, but who can use their neck or upper torso.

• Visual displays. Provide higher contrast or screen colours that generate greater visibility, enlarges icons or magnifying portions of the screen, and display fonts are changed for better visibility.

• Alternative displays. Screen readers that speak text displayed on the screen; voice output synthesizers that read computer information; or Braille displays[49] which translate text to Braille.

• Auditory displays. Alert sounds of the computer are transformed to visual cues, which helps computer users who are hard of hearing or deaf.

• Captioning. Through captioning, content of video or audio files are displayed in text format for persons with hearing disabilities.

• Rate enhancement or literacy support. This is accomplished through software that predicts or completes the word which helps users with slow keyboard input.

• Mouse and pointing devices alternatives/replacements. Examples are joysticks or trackballs, mouse pointers controlled by head movement tracked by infrared or ultrasound technology, switches (e.g., foot pedals) instead of mouse, and touch screens.

• Eye-aware applications. Certain physical disabilities prevent persons to use a mouse and, hence, the computer. Eye-aware applications enable them to use a computer by allowing them to use their eyes in connection with the software to click and move around the computer screen.

• Switch Inputs. Breath switches are operated with user´s mouse and substitute button switches, whereas motion switches consider user movement instead of contact or pressing buttons.

• Keyboards. Miniaturized keyboards for persons with limited range of movement/strength, or enlarged keyboards for persons with poor motor control. Also, there are Braille keyboards for typing through a Braille interface.

• Voice recognition. Spoken commands or texts are recognized and executed. It is convenient that each user has a voice model file for optimal voice recognition of the system.

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[48]   Cfr. e-Accessibility Toolkit for Policy Makers, G3ict Initiative and ITU, http://www.g3ict.com/resource_center/toolkit, Chapter 10. No native language in the American continent is supported, although there are regions where up to 80% of the population is indigenous.

[49]   These Braille displays vary on the number of cells displayed (40 or 80), and some are compatible with screen readers. Cfr. e-Accessibility Toolkit for Policy Makers, G3ict Initiative and ITU, http://www.g3ict.com/resource_center/toolkit, Chapter 10.

- Braille devices. Examples of Braille devices: Braille printers, PDAs with a Braille interface that can be used for input or output information, or Braille translator (text to a Braille display).

End user equipment in general should: (1) include volume control functionalities for persons that are hard of hearing, (2) have bigger screens for low vision persons, (3) have software that translates text to voice and voice to text, for blind and low vision persons, (4) recognize the verbal commands so that a person with a physical disability may establish and end a communication without having to press any button, and (5) be compatible with other accessories or assistive technology that avoids interference, degradation or unusability of the devices of persons with disabilities. The compatibility between assistive technology and telecommunication equipment is fundamental, otherwise a person that needs a device to hear that is not compatible with the telephone, will be deprived of the use of telephone communication due to the interference between the assistive device and the telephone.

V   Examples of accessible equipment and services

Although accessible equipment and services are evolving along with ICTs, the following is a list of some of the current equipment and services used to make them accessible for persons with disabilities.

1   Telephony

The following services are accessible: (1) the short messaging service (SMS) enables communication with and between persons with hearing disabilities, (2) video, through telephones, makes communication possible with sign language, and (3) relay services that, through an operator, enable communication between and with persons with a hearing disability. In these relay services, the operator performs the link for the call that is functionally equivalent to a call between persons without hearing disabilities. The relay services can be used through text telephones, internet or video. The video relay services allow the use of sign language by the person with hearing disability.

2   Text telephones

Text telephones are used by persons with hearing disabilities. With the advent of Voice over IP (VoIP) and other Internet services, text telephones are facing another challenge because new technology is erecting a barrier for using text telephones. Unless certain ITU-T and other standards are used[50], text telephones may not work over the Internet.

3   Real-time text

Real-time text is a means of communication through text that is sent and received immediately, character by character. The main difference with Instant Messaging (IM) is that in IM the person writes the text and then has to send the message. In Real-time text, there is no need to press any button to send the text conversation, because the text that is being written appears in real time on the other person's device. Real-time text is the functional equivalent to telephony, but in text. This means that, for example, two people communicating through Real-time text are reading what the other person is writing in the same moment as the writing is taking place. Real-time text does not require any special equipment (i.e., text telephone) and can be created over the internet if the standards above are implemented.

4   Public phones

The public phones to be accessible for persons with disabilities: (1) they must be at a height of between 90 to 120 centimetres from the floor to allow people in wheelchairs use them without the assistance of another person, (2) must have volume control, be compatible with hearing assistive devices, have screens for text and keyboard in order to enable communication with persons with hearing disability, and (3) must have a Braille keyboard and notices (i.e., emergency numbers).

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[50] Relevant standards for text telephones interoperability and compatibility are: ITU-T T.140, RFC 4103, RFC 3641, 4566, and RFC 5194. Mobility is covered by The 3GPP IMS defines the features of SDP that ToIP uses in 3GPP TS 26.114 v7.4.0 A5 Al.

5 Television

The television is accessible by: (1) including subtitles, open or closed captioning that conveys the text equivalent of what is spoken enabling a person with a hearing disability to receive the information transmitted in a program, (2) the sign language interpreter on the screen during transmission of news or a program[51], (3) audio description on a separate captioning channel that enables people who are blind or have low vision to hear a description of the action on the screen, and (4) use of an emergency alert sound for people with visual and cognitive disabilities in case of emergencies and natural disasters.

6 Websites

Web accessibility is generally achieved when persons with disabilities are enabled to use the web as a policy and best practice. Such accessibility allows persons with disabilities to perceive, understand, navigate, interact and effectively contribute to the web. A number of people acquire disabilities with age and therefore are among the beneficiaries of accessible websites. Web accessibility addresses a wide range of disabilities including visual, auditory, physical, speech, cognitive, and neurological disabilities which create a barrier to effective use of the worldwide web[52]. Currently, more than 26 countries have accessible web design requirements worldwide[53]. Website accessibility is described in the international standards as found in the World Wide Web Consortium (W3C) Web Content Accessibility Guidelines 1.0 posted at http://www.w3.org/TR/WCAG10/ and Web Content Accessibility Guidelines (WCAG) 2.0 posted at http://www.w3.org/TR/WCAG20/. A checklist for the standards can be found at http://www.w3.org/TR/WCAG10/full-checklist.html.

7 Documentation and support

ICT equipment and services may be accessible to persons with disabilities, but sometimes product documentation is not. Therefore, documentation of equipment, services, prices and tariffs should be made available in alternative formats without additional charge. For example, the telephone bill could be delivered in an audible format or through a Braille invoice, upon request. Also, customer service of manufacturers and service providers should be prepared to provide assistance to persons with disabilities.

VI Selected accessibility projects

Colombia. Colombia launched an accessible telephone service that through a relay service a deaf or hard of hearing person may communicate with a hearing person by accessing an Internet centre. The access network of this accessible telephone service has computers and text telephones (TTY). Users of these services include deaf, hard of hearing or persons with speech disabilities, their relatives and acquaintances. There are three relay service centres (Bogotá, Medellín and one at a national level). Regarding television, this public service must have closed captioning, subtitles or sign language. Additionally, Colombia has installed in public libraries, telecentres and educational institutions, technology for blind or low vision persons, such as screen reading software, Braille printers, and digital book readers.

Daisy Consortium. Digital Accessible Information System (DAISY) is an open, non-proprietary, and interoperable standard that meets requirements for accessibility to printed works.[54] No license fees are charged for using this system. DAISY´s vision is that all published information be available at the time of release in an accessible format and at no extra cost. Therefore, DAISY books are digital files that contain a human narration of part of the source text, that synchronize the file to related markings in the text file within the audio file, and that provides a navigation control so that users can move seamlessly through files.

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[51] It is easier to include this functionality in digital TV signals than on analog TV.

[52] http://www.w3.org/WAI/intro/accessibility.php#making

[53] Waddell, Cynthia D. "Worldwide Accessibility Laws and Policies" in Web Accessibility: Web Standards and Regulatory Compliance, Apress 2006.

[54] www.daisy.org.

Currently, DAISY also participates for preparedness in emergency situations so that information for evacuation is in an accessible format[55].

France. Mobile operators (Association Française des Opérateurs Mobiles, AFOM) came to an agreement to facilitate access to mobile services by persons with disabilities ("French Mobile Accessibility Agreement") in 2005, while mobile telephone manufacturers also joined this agreement in 2007. The commitments were: (1) to propose equipment adapted for the needs of persons with disabilities, evaluate the devices according to each type of disability, elaborate a list of criteria for selecting telephones, offer more models of accessible telephones, and improve the ergonomics, (2) to develop specific services that foster autonomy of users, provide special tariffs and free services, make available information in sign language, provide telephones with better functionality for voice recognition, as well as for reading of SMS and text, and (3) to share information about products designed for persons with disabilities, establish a hotline for accessible products and services, distribute brochures, and the French Mobile Accessibility Agreement[56]. AFOM plans to develop new functionalities adapted to each type of disability, to expand their scope to new actors (i.e., elderly), and to open the commitments at a European level.

Italy. The University of Trieste in Italy has a Masters degree Programme in Assistive Technology whose goal is to instruct *design for all* principles, as well as to study the most advanced research in assistive technology. This master degree program responds to the need to train in assistive technology, and to contribute to the competitiveness of the assistive technologies market.

Korea. Korea developed a software tool named Kado-Wah that enables designers and programmers to create accessible websites that also allow adequate use with assistive technologies. The Kado-Wah automatically evaluates the accessibility of the website, identifies problems, and adjusts the source code.[57]

Mali. Mali presented a project known as "Cyber Espace" that responds to ICT needs for persons with disabilities by providing Internet access and courses for ICT use at affordable prices. Through the ITU ICT Development Fund, ITU is supporting Mali to implement a project for a Cyber Espace (or multi-purpose community telecentre) equipped with assistive technology for persons with disabilities.

Romania. The Bucharest School for the Blind is a public school that has installed a school laboratory, therefore using ICTs as a means to empower their students with skills to improve self-confidence and to increase their independence. The lab has a computer with Internet access, a Braille keyboard, and text-to voice software in Romanian. The project now includes scanning manuals and books to create a database pursuant to the school curricula, which will enable students to access all the information in such manuals and books, even if there is no Braille version of them.

South Africa. The National Accessibility Portal in South Africa provides, *inter alia*, services through specific centres which have accessible ICT equipment (e.g., screen readers, speech recognition software) and is staffed by personnel trained in ICT and disabilities, and a web portal in the eleven official languages. The National Accessibility Portal has been developed by a partnership between the Meraka Institute, a representative group of the Disabled Persons´ Organizations, and the Office on the Status of Disabled Persons in the Presidency.[58]

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[55]   Cfr. Kawamura, Hiroshi, "The role of ICT policy in promoting access to knowledge for persons with disabilities: Case Study on Tsunami Preparedness of Persons with Disabilities" presented on the Seminar on Sharing Experience on Best Practices and Services for People with Disabilities on September 17, 2007, Geneva, Switzerland.

[56]   Cfr. www.afrom.fr/v4/STATIC/accesphandicapees/Handicapes.htm#charte.

[57]   ITU-D, Document 1/117 from the Republic of Korea to the Second Meeting of ITU-D Study Group 1, Geneva, September 18-21, 2007.

[58]   Cfr. G3ict Initiative and ITU-D, e-Accessibility toolkit for policy makers, http://www.g3ict.com/resource_center/toolkit, Chapter 10 (Contributions by J. E. Baker, L. McArthur, J. Silva, J. Treviranus, and Cynthia Waddell).

Sri Lanka. Sri Lanka implemented several ICT accessibility projects: (1) one that provided telecommunication facilities in centres where persons with disabilities live, learn or work, (2) payphones are installed at a height that a person in a wheelchair can easily reach, (3) assistive technology has been provided, (4) payphones with text messages have been encouraged for people with hearing disability, (5) bills in Braille are provided upon request, and (6) the *e*NABLE project helps persons with disabilities to access ICTs.

Sri Lanka´s *e*NABLE considers the needs of the community, and its capacity to learn to use ICTs. Its objective is to serve at grass root levels, with emphasis on children and women. *e*NABLE centres have computer labs (i.e., computers with Braille facilities). The telecommunication service providers have also contributed to the *e*NABLE project and they train people on ICT access. Sri Lanka´s success story has been possible thanks to the effort of the telecommunication regulator, that made operators contribute to the accessibility projects and encouraged people to utilize the ICT accessible centres.

Sweden. Sweden has a *Call direct* project that will allow a person to dial a single number through the relay service to the destination number, in the same way as an ordinary call is dialled. The *Call direct* project will also permit direct dialling to emergency services which may use relay services when needed.

USA. The National Public Radio Laboratories (NPR Labs) of the USA have a project of *Accessible Digital Radio Broadcast Service* which will provide: (1) digital radio reading services for the visually impaired and print disabled, and (2) captioned radio for deaf and hard of hearing[59]. The reading services may be turned on for the reception of eligible users. A report on radio captioning available on the NPR Labs website explains how radio captioning works and identifies several requirements for its implementation, for example the need for fast text channels and suitable display screens[60].

VII   e-Accessibility toolkit for policymakers

BDT in partnership with G3ict has developed an online e-Accessibility Toolkit for Policy Makers on Accessibility and Service Needs for Persons with Disabilities (http://www.e-accessibilitytoolkit.org/) which includes ten chapters. Chapter One introduces the UN Convention on the Rights of Persons with Disabilities and its e-Accessibility requirements. Chapter Two explains that the benefits of e-accessibility extend beyond persons with disabilities to cover the general population. Chapter Three introduces accessibility basics while chapter Four explores a range of accessible ICTs, for example providing details on web accessibility. Chapter Five addresses product development and design, including the concept of universal design, while chapter Six explains the role of public procurement in promoting accessible ICTs in national markets. Chapter 7 explores the promotion of assistive technologies while chapter 8 addresses the topic of international cooperation, for example, in setting standards for accessible ICTs. Chapter 9, which is still under development, will look at the role local governments can play and Chapter 10 identifies steps national policy makers and regulatory authorities can take to develop and implement policies to implement the accessibility requirements of the UN CRPD.

The toolkit was launched in May 2009 and follow-up is being provided by regional training workshops, including in the Africa and Asia-Pacific regions[61]. Such regional forums and workshops share a range of critical policy and regulatory measures to promote accessible ICTs for persons with disabilities. Websites for these forums provide access to the presentations and other resource materials provided at the meetings. For example, ITU Members can access two sets of training materials, one on web accessibility and another on public procurement from the Asia-Pacific regional forum programme on the website.[62]

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[59]   www.nprlabs.org.

[60]   http://www.nprlabs.org/research/accessibleradio/CaptionedRadioFundamentals-1stOTABroadcast.pdf

[61]   Asia Pacific Regional Forum on Mainstreaming ICT Accessibility for Persons with Disabilities, held in Bangkok, Thailand, from 25 to 27 August 2009 and ITU Workshop on Accessibility, held in Bamako, Mali 13 – 15 October 2009.

[62]   http://www.itu.int/ITU-D/asp/CMS/Events/2009/PwDs/programme.asp

VIII Good accessibility practices

1 Mainstreaming, awareness and legal framework

Mainstreaming accessibility to ICTs by persons with disabilities implies that legislation, regulation, policies and programmes should consider at least *the general accessibility principles* set forth in section III above. Consequently, persons with disabilities should participate in the decision making processes.

Raising awareness is also key to the success of ICT accessibility and to generate more active participation of governments, private sector and civil society. *Awareness campaigns, workshops, essays and reports* can be *tools for setting ICT accessibility* in the priority topics of each country´s agenda.

Legislation and regulation should address both positive obligations towards accessibility, and positive discrimination for accessing products, services and information for persons with disabilities.

2 ICT technical standards

Development of accessibility technical standards that allow interoperability, usability of ICT services/equipment with assistive technology, and quality of service is essential. Design of services/equipment must take into account persons with disabilities accessibility needs under the principle of *universal design or design for all*. Guidance on what universal design is and how to achieve it is strongly recommended to harmonize accessibility standards implementation.

3 Government procurement

Public procurement plays an important role in ensuring the accessible ICTs are available in national markets. Not only do public procurement requirements ensure that ICT equipment and services purchased by governments are accessible for government employees and persons from the public with disabilities using public services, such requirements further encourage ICT equipment manufacturers and software developers to produce accessible ICTs. Most manufacturers and developers operating in countries with public procurement requirements have discovered that it makes no economic sense to develop accessible product lines for the government and non-accessible product lines for the general public. Rather they have opted to produce only accessible products.

ICT equipment and services covered by such requirements include web technologies (information services, websites, online applications), public access terminals (ATMs, information kiosks, vending machines, information displays, point of sale payment systems, door entry systems), application software, telecommunication devices and services, smart cards.[63] More information on the role public procurement can play in promoting e-accessibility and steps to implement such requirements is provided in Chapter Six of the ITU-G3ict e-Accessibility toolkit.

4 Universal service

Universal service, considered as the availability of telecommunication services to all, must necessarily take into account ICT accessibility by persons with disabilities. Consequently, universal service programmes should *design specific projects making ICT accessibility for persons with disabilities a reality*. New projects must consider that even if there is newer technology, legacy accessible equipment will continue to be used (for example, TTY).

5 Accessible websites

The information and knowledge society rely heavily on information from websites. Therefore, *websites must incorporate accessibility criteria*. Governments and public interest websites must be accessible, otherwise persons with disabilities are deprived of the fundamental right to information, and several fundamental rights would not be realized (for example, right to education). Private websites should be encouraged to be fully accessible.

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[63] Cfr. ITU, Meeting Information and Communications Technology Access and Service Needs for People with Disabilities (prepared by Cynthia D. Waddell), Document SIS-07/005-E presented at the Seminar on Sharing Experience on Best Practices and Services for People with Disabilities, Geneva, September 17, 2007, p. 28.

6   Assistive technology and equipment

Assistive technology and accessible equipment should be *available and affordable*. Otherwise, funding, tax incentives (i.e., duty exemption on assistive technology import) or other financial schemes should be designed to allow persons with disabilities to acquire the appropriate assistive technology and equipment to effectively access ICTs.

7   Emergency information and services

Emergency information must be provided in several formats to be accessible to persons with disabilities and cover a wide range of types and degrees of disabilities. Moreover, emergency services must have relay services support for persons with hearing disabilities.

8   Enforcement and class actions

Effective mechanisms and procedures should be in place to assure compliance of ICT accessibility laws and regulations. Legal standing or the right to file complaints to enforce legal provisions should be granted to individuals, disabilities organizations or other relevant groups. Class action should also be considered insofar as these types of actions tend to be more effective than individual complaints.

9   Gathering information

Due to lack of information, laws and regulation generally do not address the needs of persons with disabilities and their access to ICTs at affordable prices. Hence, *countries should gather information and data regarding disabilities and ICT usage for generating statistics*. Statistics should be comparable in order to *create indicators* that support enactment of legislation/regulation, implementing policies and programmes.

10   ICT accessibility education

Education and *courses on ICT accessibility of equipment, services and assistive technology should be incorporated in universities′ syllabus* (i.e., engineering, public policy, computer science careers). Additionally, specialization on ICT accessibility by persons with disabilities should be encouraged.

11   Certification

Certification schemes of compliance with ICT accessibility for persons with disabilities should be encouraged. Where countries have mandatory accessibility provisions, certification schemes would provide assurances that services provided and equipment manufactured is accessible. Where there is no binding legislation, accessibility certification could be a competitive advantage for those service providers and equipment manufacturers selling accessible ICTs

12   Self-regulation

Self-regulation, codes of practice and sector agreements or commitments should be fostered. These may also contribute as a guide to establishing what should be understood as ICT accessible in a given product or service.

IX   Guidelines for ICT accessibility policies

ICT accessibility policies will not emerge over night. Consistent and persistent steps should be taken to properly design policies and to implement them for an effective ICT accessible environment in a given country. The following is a proposal of the steps that can serve as guidelines for establishing ICT accessibility policies:

1   Mapping existing laws and regulations

Many countries have laws and/or regulations that address non-discrimination of persons with disabilities provisions and general accessibility provisions (e.g., access to buildings or public transportation), and some others have specific provisions for ICT accessibility. States that have signed the CRPD have additional obligations on accessibility issues which include ICTs. However, such laws or regulations seldom address all

concerns for giving equal access to ICTs to persons with disabilities. Therefore, mapping existing laws and regulations is of the essence. This will enable, first, to know the current legal framework of a given country, and subsequently this can be used to draw up appropriate ICT accessibility policies which will take into account the State´s obligations and the gaps which need to be solved pursuant to the principles of ICT accessibility (see section III above).

In mapping existing laws and regulations, certain questions should be considered: (1) are there specific laws addressing disabilities related to ICTs? (2) are there specific regulations addressing disabilities related to ICTs? (3) what are the obligations for the government or public authorities to provide ICT accessibility? (4) are there obligations for telecommunications operators/licensees? If yes, are those obligations only for the incumbent/dominant or for all operators? (5) what type of accessible ICTs are mandated by law, regulation or licenses? (6) who is in charge of verifying that such legal or regulatory provisions are enforced? (7) is ICT accessibility considered within universal service programs? If yes, what type of ICT services or equipment are considered. It is important to note that a thorough and frank mapping is done. It is far better acknowledging that a country has no laws/regulations for ICT accessibility than pretending to have them.

2   Information and statistics

Countries should gather information and data specifically addressing: (1) number of persons with disabilities, disaggregated by type of disability (e.g., visual, hearing, mental) and by groups with multiple disabilities (e.g., persons with hearing and visual disabilities), (2) number of persons with disabilities with effective access to ICTs, disaggregated by ICT (e.g., television programs with captioning, computer usage with screen readers), (3) number of public centres that provide ICT accessible services (e.g., Internet centre with screen readers and Braille printers), (4) the percentage of government websites that comply with accessibility standards, and (5) the percentage of government procedures or services provided through the Internet and electronic means that are fully accessible (e.g., annual income declarations made through electronic means). These data should be periodically updated to reflect the changes in ICT accessible services and equipment in each country, as well as effective ICT accessibility for persons with disabilities.

3   Mapping best practices and cases

Laws and regulations generally contain mandatory provisions; however, self-regulation and projects from the private sector or civil society tend to provide excellent case studies and best practices of how to make ICT accessibility a reality. Consequently, mapping best practices and success cases will prove to be an excellent input for policy design.

4   Status of e-Accessibility

Information and statistics gathered should help to depict the status of e-Accessibility in a State and its different regions. This picture of e-Accessibility will certainly provide evidence of the gaps and deficits in services and equipment, as well as the differences between urban/rural and high/low income zones. However, the status of e-Accessibility will serve to focus attention on relegated areas. For example, in a given country it is possible that public websites are generally accessible, but television programming lacks captioning. Another example could be that public policy has emphasized providing accessible ICTs in cities, but has delayed or forgotten persons with disabilities in rural areas who are perhaps fewer in number but who are in equal need. Finally, emergency telecommunication services may be widely available for the population, but the special needs of persons with disabilities have not been considered which excludes them from receiving timely alerts in the event of emergency situations.

5   Active participation of persons with disabilities and consultations

The best resource for adequate and effective policy design is to perform consultations with persons with disabilities and disabled persons organizations, achieving their active participation. Nobody will be in a better position to comment or provide feedback to proposed legislation or public policy measures than persons with disabilities. "Nothing about us, without us" must be considered in ICT accessibility for persons with disabilities. In countries where civil society is less active, an additional effort should be made to encourage participation by persons with disabilities. In any case, consultations must consider accessibility issues and features (e.g., meetings with wheelchair access, captioning of speeches or sign language), surveys must also

be accessible (e.g., if in printed format, then a Braille version should be made available). In summary, policy makers should be sensitive to special considerations for achieving successful participation of persons with disabilities, as individuals or as organized groups.

6 Mainstreaming

A next step should be to mainstream ICT accessibility for persons with disabilities. Mainstreaming will involve taking into consideration accessibility principles in a cross-cutting manner. This implies that ICT accessibility issues must be considered not only when focusing specifically on persons with disabilities or during certain stages of consultation, but in any law, regulation, policies and programmes design that is linked with ICTs, and in all stages of the design and implementation process.

7 All stakeholders

All stakeholders must be involved or in some manner participate in ICT accessibility policy designing and in reviewing its effective implementation.

Legislators and regulators will have to review existing laws and regulations, so as to ensure that they comply with ICT accessibility policy. The CRPD may not be as detailed as to refer to different ways of assuring equal ICT access for all, including persons with disabilities. Therefore, legislators and regulators, both from local and national governments, will have to amend the legal and regulatory framework in order to fully comply with the CRPD mandate.

Generally, several Ministries hold responsibilities in their respective sector for ICT accessibility, such as the Ministries of Communications, Education, Health, and Labour. It is important that these Ministries are also considered relevant stakeholders in ICT accessibility policy.

Besides the periodic report that countries to the CRPD have to present, it is important that countrywide audits are performed to realize effective implementation of ICT accessibility measures at local and national government levels.

Civil society and non governmental organizations on disabilities or accessibility are a good source of information, can be a channel between individuals with disabilities and government policy makers, and can also serve as watchdogs of effective implementation of accessibility policies and the CRPD, if the country has ratified it. The CRPD mandates that civil society, persons with disabilities and the organizations that represent them, must fully participate in all stages of the process of reviewing the CRPD application[64].

Cooperation between the private sector and the government is essential. Legal or regulatory obligations to render ICT accessible will prove not to be enough, especially when considering possible private sector legal challenges that may take several years. Therefore, laws, regulations and policy design must pursue the maximum effectiveness for ICT accessibility implementation. There are several alternatives that can be taken into account to ensure that public procurement of ICT equipment and services are accessible, for example, preferential tax treatment for production or importation of ICT accessible equipment, and benefits for research and development in ICT accessibility which could also include funding.

8 Priorities, timeframe and budget

Recommending minimum desirable ICT accessible services could prove to be counterproductive. Each country must make its own assessment of what its ICT accessibility priorities are, depending on local conditions and the number of people with disabilities. Budget constraints and cost should not override the need of having ICT accessibility policies, programs and projects in a given country. Therefore, each country must consider that to finish a 10,000 kilometre journey, it has to start with the first step. The schedule for implementing policies and strategies will then depend on specific local conditions, and should be seen as a different stage process towards full ICT accessibility for persons with disabilities.

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[64] Article 33 of the CRPD.

9   Training, education and research

No amount of availability of ICT accessible equipment, services and software can replace the need of training and education to persons with disabilities, school teachers of persons with disabilities and community centres, among others. The best approach to training and education is that which considers the needs of the community and empowers people of the same community to be the trainers under the strategy of «teach the teachers».

One of the challenges of the vast majority of countries is that they are, in general, only importers of ICT technology. However, this should not discourage fostering projects that involve research and further development of ICT accessible equipment, services, and software. For example, public universities with an appropriate back-up and funding of national or international entities, public or private, may research and develop software for specific ICT accessibility functions such as screen readers in local languages as are being developed in Nepal and Sri Lanka[65].

10   Periodic reviews

ICT accessibility for persons with disabilities is –overall- in its infancy. In ICT accessiblity for persons with disabilities, there is no final goal or target that when achieved, the work and effort is over. It is important to monitor progress, detect delays or drawbacks, focus on new challenges imposed by technology´s continued evolution. Consequently, periodic reviews on ICT accessibility must be performed in order to adapt the legal framework, policies and programmes to solve the present and future needs for rendering ICTs fully accessible to persons with disabilities.

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[65]   See presentations in Session 9 of the Asia-Pacific Regional Forum from Japan (for work done in Nepal) and Sri Lanka at http://www.itu.int/ITU-D/asp/CMS/Events/2009/PwDs/programme.asp.

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ITU, documents and presentations at the Asia-Pacific Regional Forum on Mainstreaming ICT Accessibiliy for Persons with Disabilities, Bangkok, Thailand, 25-27 August 2009,

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Annex A

Summary of Guidelines for ICT accessibility policies and best practices

ICT accessibility policies will not emerge overnight. Consistent and persistent steps should be taken to properly design policies and to implement them for an effective ICT accessible environment in a given country. The following is a summary of guidelines for establishing ICT accessibility policies:

1   Mapping existing laws and regulations that address non-discrimination of persons with disabilities provisions and general accessibility provisions (e.g., access to buildings or public transportation), as well as those that have specific provisions for ICT accessibility.

2   Information and statistics should be gathered by countries addressing: (1) the number of persons with disabilities, disaggregated by type of disability and by persons with multiple disabilities, (2) the number of persons with disabilities with effective access to ICTs, disaggregated by ICT, (3) the number of public ICT centers that provide ICT accessible services, (4) the percentage of government websites that comply with accessibility standards, and (5) the percentage of government procedures or services provided through the Internet and electronic means that are fully accessible. These data should be periodically updated to reflect the changes in each country of ICT accessible services and equipment, as well as effective ICT accessibility for persons with disabilities.

3   Mapping best practices and cases that can be self-regulation and projects from the private sector or civil society.

4   Status of e-Accessibility in a country and its different regions to depict the gaps and deficits in several services and equipment, as well as the differences between urban/rural and high/low income zones. This information will enable a country to adopt appropriate policies to progress in e-Accessibility.

5   Active participation of persons with disabilities and consultations, to receive feedback on proposed legislation and public policy measures. These consultations must consider accessibility issues and features, surveys must also be accessible.

6   Mainstreaming ICT accessibility for persons with disabilities which implies considering accessibility principles in a cross-cutting manner.

7   All stakeholders must be involved or in some manner participate in ICT accessibility policy design and in reviewing its effective implementation.

8   Establish priorities considering the local conditions and population with disabilities in a given country. These priorities should be established within a timeframe and seek to be progressive measures to implement wide accessibility taking budget into account.

9   Training, education and research are paramount, and should consider the needs of the community seeking to empower people of the same community to be the trainers.

10   Periodic reviews should be performed to monitor progress, detect delays or drawbacks, focus on new challenges imposed by technology´s continued evolution.

11   Fostering the development of accessibility technical standards to allow interoperability, usability of ICT services/equipment with assistive technology, and quality of service is essential.

12   Design of services/equipment must follow the principle of universal design or design for all.

13   Public procurement should require that ICT equipment and services are accessible for persons with disabilities for government employees or persons from the public with disabilities.

14   Universal service programmes should design specific projects making ICT accessibility for persons with disabilities a reality.

15   Governments and public interest websites must be fully accessible, and private websites should be encouraged to be fully accessible.

16   Assistive technology and accessible equipment should be available and affordable. Otherwise, funding, tax incentives or other financial schemes should be designed to allow persons with disabilities to acquire the appropriate assistive technology and equipment to effectively access ICTs.

17   Emergency information must be provided in several formats to be accessible to a wide range of types and degrees of disabilities. Moreover, emergency services must have relay services support for people with hearing disabilities.

18   Enforcement and class actions, as well as other effective mechanisms and procedures should be in place to assure compliance of ICT accessibility laws and regulations.

19   Certification schemes of compliance with ICT accessibility for persons with disabilities could be another means to achieve e-accessibility. Self-regulation, codes of practice and sector agreements or commitments should also be fostered.

Annex B

Summary of available technological solutions and economic cost evaluation

Chapter Four of the *e-Accessibility toolkit for policy makers*[66] provides useful information about available technological solutions for ICT accessibility.

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[66] ITU- G3ict e-Accessibility toolkit for policy makers, http://www.e-accessibilitytoolkit.org/.

Annex C

Summary of identified challenges

- Provisions for ICT accessibility for persons with disabilities may not be explicit, and in many cases are a result of interpreting anti-discrimination law, disabilities law or telecommunications law.

- Legal provisions enacted considering disability issues from a medical standpoint (e.g., disability as a "defect" rather than addressing disability with emphasis on ability and integration).

- Effectiveness of legal and regulatory provisions, that is, turning good accessibility provisions into reality.

- Having an unorganized or passive civil society, especially in connection with civil society organizations of or for persons with disabilities.

- Lack of knowledge by policy makers of how to effectively communicate with persons with disabilities either as individuals or groups.

- Lack of interest of politicians and governments to consult with persons with disabilities before implementing policies or enacting legal provisions.

- Holding consultations, seminars, meetings or forums that are not accessible for persons with disabilities.

- Customer base for assistive technology is small compared to mainstream technology, in part because persons with disabilities needs vary considerably depending on the type and extent of the disability.

- Due to a limited market of assistive technology, production of assistive technology does not benefit from economies of scale, and there are no competing developers/manufacturers as in other telecommunication areas. Moreover, if market-driven competition is encouraged then transfer of technology will be costly or non-existent, and collaboration between researchers and the disability communities will be discouraged.

- Assistive technology may be proprietary software solutions, which renders it more costly or prevents further research and development by third parties.

- When ICTs are updated, upgraded or a new version appears, assistive technology has also to be updated otherwise the "technology gap" would widen. When the updated, upgraded or new version relies on proprietary technology, hardware or software, assistive technology will increase costs with workarounds and these will be borne by the small customer base.

- Lack of generally available or comprehensible (e.g., due to language) information of the existing ICT assistive devices (e.g., equipment, software, hardware) for access by persons with disabilities.

- In assistive technologies, certain languages and, specially, native languages are unsupported

- The socio-economic factors which will render assistive technology unaffordable for most users with disabilities. The cost of certain assistive technology may represent more than the average yearly income of an individual in some countries.

- Assistive technology research and development capacity is non-existent in the vast majority of countries.

Annex D

Index of country examples

Brazil, Colombia, Democratic Republic of Congo, European Union, France, Italy, Korea, Mali, Mexico, Romania, South Africa, Sri Lanka, Sweden, USA, and Venezuela

Annex E

Links to relevant sources of information

International organizations

- ITU-G3ict e-Accessibility toolkit for policy makers, http://www.e-accessibilitytoolkit.org/.
- Dynamic Coalition on Accessibility and Disability (DCAD), http://www.itu.int/themes/accessibility/dc/index.html
- Global Initiative for Inclusive ICT (G3ict), http://www.g3ict.com/
- Joint Coordination Activity on Accessibility and Human Factors (JCA-AHF), http://www.itu.int/ITU-T/jca/ahf/

Assistive technology

- For information about assistive technology products, http://www.abledata.com/.
- For research, development and education on inclusively designed emerging information and communication technology and practices, see http://atrc.utoronto.ca/index.php> http://atrc.utoronto.ca/ of the Adaptative Technology Resource Centre from the Faculty of Information of the University of Toronto.

Accessible websites

For website accessibility, see http://www.w3.org/WAI/.

Planning accessible meetings

Following is a list of online resources proposed by the DCAD that will help for planning an accessible meeting:

- ITU tutorial on accessibility, website at http://www.itu.int/ITU-T/worksem/accessibility/tutorial/index.html. Online webcast of the tutorial "Making ITU Accessible: Web Design, Web Conferencing and Real Time Web Captioning" at http://www.itu.int/ibs/ITU-T/200804tutorial/index.html
- Guide to Planning Inclusive Meetings and Conferences, Treasury Board of Canada Secretariat at http://www.tbs-sct.gc.ca/pubs_pol/hrpubs/tb_852/gpimc-gprci_e.asp. (French and English)
- Plan an Accessible Meeting, posted at Ontario Province, Canada, website at http://www.mcss.gov.on.ca/mcss/english/how/howto_meeting.htm (French and English)
- Access Checklist, Disabled Women's Network in Ontario, it provides an helpful guide, website at: http://dawn.thot.net/access_checklist_full.html (French/English)
- Planning Accessible Conferences and Meetings, State of Michigan, website at: http://www.michigan.gov/documents/Planning_Accessible_Conferences_and_Meetings_59735_7.doc
- Meeting information and communications technology access and service needs for people with disabilities, background paper, online at: http://www.itu.int/ITU-D/study_groups/SGP_2006-2010/events/2007/Workshops/documents/05-successpolicies.pdf