

Role of Assistive Technology in Empowering Differently Abled People

Manya Kheria and Prof (Dr) Satya Narayan Misra

ABSTRACT:

A recent National Seminar conducted on "Inclusiveness of the Differently Abled: Challenges and Opportunities in India" concluded that Acts and Laws solely cannot guarantee the inclusivity of people with disabilities- society plays a larger role in ensuring full and equal socioeconomic participation of differently-abled persons. The biggest challenge faced today is how to mainstream people with disabilities (PWDs) in society. The solution for this impediment is not only technology and funding but also empathy. PWDs do not require people to sympathize with them and treat them differently, they want the society members to empathize with them. Persons experiencing disabilities want the right to live an independent life with equal opportunities. The Rights of Persons with Disabilities Act (2016) aims to ensure "respect for inherent dignity", "individual autonomy including the freedom to make one's own choices, and independence of persons" and "full and effective participation and inclusion in society". These targets can only be achieved when PWDs get a barrier-free environment to maximize their potential and live a dignified independent life. Research has shown that Assistive Technology and innovation can positively impact PWDs and reduce their dependency on family members. However, there is not much existing literature on how Assistive Technology can help integrate PWDs in the society. This paper seeks to answer how Assistive Technology is an apt medium of helping PWDs lead their lives the way they want and make them feel that they belong with the society through an analysis of secondary data.

Keywords: Assistive Technology (AT), Persons with disabilities (PWDs), Convention on the Rights of Persons with Disabilities (CRPD), Assistance to Disabled Persons (ADIP) Scheme

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I. INTRODUCTION:

Today, one billion people, 15% of the total global population have some kind of disability. Between 110 to 190 million people, one-fifth of the world's disabled population, have significant disability. Developing countries tend to have a higher disability percentage as compared to developed countries.¹ In India, the 76th round of National Sample Survey conducted by the National Statistical Office in 2018 stated that 2.2% of the Indian population was facing some kind of disability.²

It is quintessential to first understand what disability precisely means. A disability is a physical or mental condition that makes it harder for the person to perform certain activities and participate and interact with the world.³ The World Health Organization has stated three dimensions of disability- impairment in a person's body or mind functioning, activity limitation and restriction in participation⁴

Research has shown that those experiencing disability have more likelihood of facing unpropitious socioeconomic outcomes such as higher poverty, less access to education and employment and poorer health outcomes.⁵ Those having disability also face marginalization from society and their participation in the labor market is markedly low.⁶ However, as Chris Burke, an American Down syndrome advocate had once said, "It's not our disabilities, it's our abilities that count". It is our responsibility to ensure that disabled people have equal

¹<https://www.worldbank.org/en/topic/disability>

²https://economictimes.indiatimes.com/news/economy/indicators/indias-2-2-population-suffering-from-disability-nso-survey-for-july-dec-2018/articleshow/72202650.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

³<https://www.cdc.gov/ncbddd/disabilityandhealth/disability.html>

⁴World Health Organization, International Classification of Functioning, Disability and Health (ICF)external icon. Geneva: 2001, WHO.

⁵<https://www.worldbank.org/en/topic/disability>

⁶<https://www.thejakartapost.com/academia/2019/01/24/technology-can-help-equality-of-people-with-disabilities.html>

access to jobs, health, and education so that they too receive equal opportunities to achieve their dreams and live a good life.

The advent of technology has shown the human race that not even the sky is the limit. It has helped humans in every field, from industries to health. Today, technology has become a part of our daily life. There is a rising consumer demand for “accessible technology” that can be used by everyone.⁷ There has been a rise of Assistive Technology (AT), that is, any equipment, item, product system or software that helps to maintain, improve or increase the functional capabilities of differently abled.⁸ Some examples of Assistive Technology include wheelchairs, hearing aids, electronic device modifications to make them more accessible, remote control devices for lights and fans, talking books, magnifier and Braille note taking devices.⁹

The paper attempts to examine the benefits of AT, Use of AT in India and suggestions that can be implemented to make AT equally accessible in India and ensure social inclusion of PWDs.

II. BENEFITS OF ASSISTIVE TECHNOLOGY

Assistive technologies enable people with disabilities to overcome impediments they face in all types of environment, thereby helping to equalize opportunities for them.¹⁰

Appropriate assistive technology compensates, at least partially, for a limitation to people with disabilities.¹¹ The main benefit of assistive technology is that it decreases dependency of disabled people on others and thus increases their independence. An apt example is that AT enables students with disabilities to compensate for some restrictions and impairments.¹² Besides this, studies have shown that AT also reduces the hours of personal assistance required by those with disabilities which has potential humanitarian and financial benefits.¹³

AT increases possibilities for participation for people with disabilities and promotes and protects equal enjoyment of human and fundamental rights. Assistive Technology has increased independence of disabled persons that has in turn helped to ensure better access to job opportunities and education. AT has become an interface between the person and the life that they want to lead. Incorporation and use of assistive technology has a transformative effect on self-concept and body image impacting the way those with disabilities view themselves and their disabilities. These changes have long-lasting substantial impacts on a person’s sense of identity and his/her interactions with others.¹⁴

Besides benefitting people with disabilities, assistive technology also has indirect benefits in the form of financial benefits to the family of the disabled people. Since AT reduces the hours of personal assistance needed, a full time caregiver is not required, thereby decreasing costs in the long run. Besides, it also reduces the efforts and energy expenditure of the families and caregivers of those persons with disabilities.¹⁵ Moreover, AT

⁷<https://www.resna.org/About/RESNA-News/RESNA-Blog/assistive-technology-all>

⁸<https://www.atia.org/home/at-resources/what-is-at/>

⁹<https://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?article=1296&context=edicollect>

¹⁰Koulikourdi, A. (2008), “Assistive technologies in Greek libraries”, *Library Hi Tech*, Vol.26, no.3, p.387-397.

¹¹<https://www.nichd.nih.gov/health/topics/rehabtech/conditioninfo/help#:~:text=Appropriate%20assistive%20technology%20often%20helps,the%20need%20for%20other%20support.>

¹²Center for Parent Information and Resources. (2018). *Considering assistive technology*. Retrieved September 24, 2018, from <http://www.parentcenterhub.org/considering-at/>

¹³Helen Hoenig, Donald H. Taylor, Jr, and Frank A. Sloan, 2003:

Does Assistive Technology Substitute for Personal Assistance Among the Disabled Elderly?

American Journal of Public Health **93**, 330_337, <https://doi.org/10.2105/AJPH.93.2.330>

¹⁴Deirdre Desmond, Natasha Layton, Jacob Bentley, Fleur Heleen Boot, Johan Borg, Bishnu Maya Dhungana, Pamela Gallagher, Lynn Gitlow, Rosemary Joan Gowran, Nora Groce, Katerina Mavrou, Trish Mackeogh, Rachael McDonald, Cecilia Pettersson& Marcia Scherer (2018): Assistive technology and people: a position paper from the first global research, innovation and education on assistive technology (GREAT) summit, *Disability and Rehabilitation: Assistive Technology*, DOI: 10.1080/17483107.2018.1471169

¹⁵Amy Nicolson, Lois Moir& Jeannine Millstead (2012) Impact of assistive technology on family caregivers of children with physical disabilities: a systematic review, *Disability and Rehabilitation: Assistive Technology*, 7:5, 345-349, DOI: [10.3109/17483107.2012.667194](https://doi.org/10.3109/17483107.2012.667194)

has a transformative effect on how disabled persons interact with others and their personal relationships with their family members.¹⁶

USE OF AT IN INDIA

The ‘Convention on the Rights of Persons with Disabilities’ (CRPD) that has been ratified by 181 members and signed by 163 members aims at changing the attitude towards PWDs (persons with disabilities). Adopted on 13th December, 2006 it necessitates governments of different countries to meet the assistive technology requirements of its citizens.¹⁷ The Government of India has implemented three main legislation measures to address the needs of PWDs. These include Persons with Disability (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995, National Trust for Welfare of Persons with Autism, Cerebral Palsy, Mental Retardation and Multiple Disability Act, 1999 and Rehabilitation Council of India Act, 1992.¹⁸ The Rights of Persons with Disabilities Act (RPwD) was adopted in 2016 by the Indian Government to implement “the United Nations Convention on the Rights of Persons with Disabilities and for matters connected therewith or incidental thereto”.¹⁹

The Persons with Disability Act, 1995 was an important event wherein a 3% reservation was created for differently abled persons in the fields of education and employment. RPwD in 2016 further expanded the scope of PWDs by including dwarfism, cerebral palsy, muscular dysfunction and acid attack victims. In 2015, the Government of India also created a separate department for the Empowerment of Persons with Disability. The National Program for the Welfare of Persons with Disabilities under the Empowerment of Persons with Disability department comprises schemes such as the Deendayal Disabled Rehabilitation Scheme, assistance for aids, and rehabilitation of physically and mentally challenged have been put in place. CRPD and RPwD have helped create a legal environment that has made state, national and governmental organisations obliged to ensure all areas of development, services and public life are equally accessible to all PWDs.

The Assistance to Disabled Persons (ADIP) Scheme is another important scheme executed by the Indian Government that has been in operation since 1981. The main goal of ADIP Scheme is to “assist the needy disabled persons in procuring durable, sophisticated and scientifically manufactured, modern, standard aids and appliances that can promote their physical, social and psychological rehabilitation by reducing the effects of disabilities and enhance their economic potential”. All assistive technology, that is, the aids and appliances supplied under the Scheme have to be duly certified. ADIP Scheme also covers conduct of required corrective surgeries before giving assistive devices. The Scheme provides grants-in-aid to agencies for purchase and distribution of assistive devices to PWDs. All aids and appliances below and including Rs. 10,000 are covered under the Scheme for Single Disability. For all assistive devices costing more than Rs 10,000 but up to Rs 20,000, Rs. 10,000/- will be given for each disability and Rs. 12,000/- for students with disabilities. For all aids and appliances costing above Rs. 20,000/-, Government shall bear half the cost of these items and the remainder shall be contributed by either the State Govt. or beneficiary concerned, subject to prior Ministry approval on case to case basis and limited to one-fifth of the Budget under the Scheme.²⁰

Even after all these measures and schemes have been put in place, the access to Assistive Technology in developing countries such as India is limited.²¹ The principles laid down by the CRPD that The Rights of Persons with Disabilities Act (2016) aims to fulfil include “respect for inherent dignity”, “individual autonomy including the freedom to make one's own choices, and independence of persons” and “full and effective

¹⁶Deirdre Desmond, Natasha Layton, Jacob Bentley, Fleur Heleen Boot, Johan Borg, Bishnu Maya Dhungana, Pamela Gallagher, Lynn Gitlow, Rosemary Joan Gowran, Nora Groce, Katerina Mavrou, Trish Mackeogh, Rachael McDonald, Cecilia Pettersson & Marcia Scherer (2018): Assistive technology and people: a position paper from the first global research, innovation and education on assistive technology (GREAT) summit, Disability and Rehabilitation: Assistive Technology, DOI: 10.1080/17483107.2018.1471169

¹⁷<https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities.html>

¹⁸Pal, Joyojeet, Lakshmanan, Meera :[ACM Press the Fifth International Conference - Atlanta, Georgia (2012.03.12-2012.03.15)] Proceedings of the Fifth International Conference on Information and Communication Technologies and Development - ICTD '12 - Assistive technology and the employment of people with vision impairments in India

¹⁹http://legislative.gov.in/sites/default/files/A2016-49_1.pdf

²⁰<http://disabilityaffairs.gov.in/content/page/adip.php>

²¹Johan Borg, Anna Lindström and Stig Larsson, Assistive technology in developing countries: a review from the perspective of the Convention on the Rights of Persons with Disabilities, ProsthetOrthotInt 2011 35: 20, DOI: 10.1177/0309364610389351

participation and inclusion in society”.²² However, today not all PWDs in India have access to AT or equal opportunities. For example, a study has shown that excluding a small group of wealthy urban people, most of those who are visually impaired do not have proper exposure to formal education or technological items. This shows that most of these individuals grow up not believing that they too can participate in socioeconomic activities and live an independent life. Research has further shown that when these persons are provided with AT, it plays a significant transformative role in their lives, opening up possibilities for them and enforcing belief in them that they too can participate in labor forces.²³

Stephen Hawking, a world-famous theoretical physicist with motor neuron disease (ALS) had once said, “My advice to other disabled people would be to concentrate on things your disability does not prevent you from doing well. And do not regret the things it interferes with. Do not be disabled in spirit as well as physically.” Today, Stephen Hawking is known for his work on black holes that made its study possible. However, it was technology that gave Stephen Hawking the ability to accomplish after paralysis struck him at a young age. Today, there are many more talented brains like Stephen Hawking in India that cannot maximize their potential because of non-access to AT.

One of the major reasons for the limited access to AT in low and middle income countries such as India is the high costs of these technological pieces that are way out of reach for the poorer populations.²⁴ Although the Government of India has implemented several schemes under the National Program for the Welfare of Persons with Disabilities, the allocation of funds to these schemes is below the requirements. For example, the allocation of budget to the National Program for the Welfare of Persons with Disabilities was 351.73 crores in 2017-18, 368.10 crores in 2018-19, and 688.00 crores in 2019-20. The allocation of funds to autonomous bodies including National University of Rehabilitation Science and Disability Studies, Rehabilitation Council of India and Indian Sign Language, Research and Training Centre was 238.75 crores in 2017-18, 257.25 in 2018-19 and 262.02 in 2019-20. The disbursement of funds to Public Sector Undertakings including National Handicapped Finance and Development Corporation and Artificial Limbs Manufacturing Corporation of India was 37.74 crores in 2017-18, 43.48 crores in 2018-19 and 101.21 crores in 2019-20. The transfer of funds to states and union territories to centrally sponsored schemes was 855.00 crores in 2017-18, 1070.00 in 2018-19 and 1204.90 in 2019-20.²⁵ Today, about 30% of disabled people in India have to make out of pocket expenditure of about Rs.2447/- per month and for most of the PWDs ATs are out of reach.

Furthermore, some policies implemented in India restrict the economic and education opportunities for PWDs. An example of this is handwritten exams for jobs, professional applications for open listed positions, and university selections. These regulations hamper the chances for PWDs, for instance, those for who are visually impaired since the policy prescribes a scribe instead of self-paced AT. This means that the test taker has no control over the test given by them. The system of 3% quotas for PWDs besides being discriminatory, is also not implemented properly. Most corporates and sectors find a way to restrict PWDs. This reduces job and economic opportunities for PWDs. Furthermore, even if PWDs are given jobs, they are provided with no proper ATs which results in them not being able to maximize or reach their true potential. Study has also shown that visually impaired are given lower salaries in some jobs than their sighted colleagues. Indian public transit surveys show extremely low rates of accessibility and obstacles in the mobility of PWDs.²⁶

Discrepancies in policy enforcement in addition to an automobile industry that prefers manual transmission vehicles presents big obstacles of driving for PWDs in India in comparison to developed countries such as the United States of America. An expansion of driver rehabilitation services and designing AT modified

²²http://legislative.gov.in/sites/default/files/A2016-49_1.pdf

²³Pal, Joyojeet, Lakshmanan, Meera :[ACM Press the Fifth International Conference - Atlanta, Georgia (2012.03.12-2012.03.15)] Proceedings of the Fifth International Conference on Information and Communication Technologies and Development - ICTD '12 - Assistive technology and the employment of people with vision impairments in India

²⁴The “Voice” Has It: Screen Reader Adoption and Switching Behavior Among Vision Impaired Persons in India Ted McCarthy MSc a , Joyojeet Pal PhD b & Edward Cutrell PhD c a Biomedical and Health Informatics , University of Washington , Seattle , Washington , USA b School of Information , University of Michigan , Ann Arbor , Michigan , USA c Technology for Emerging Markets , Microsoft Research India , Bangalore , India Accepted author version posted online: 27 Feb 2013.Published online: 14 Oct 2013.

²⁵<https://www.indiabudget.gov.in/>

²⁶Pal, Joyojeet, Lakshmanan, Meera :[ACM Press the Fifth International Conference - Atlanta, Georgia (2012.03.12-2012.03.15)] Proceedings of the Fifth International Conference on Information and Communication Technologies and Development - ICTD '12 - Assistive technology and the employment of people with vision impairments in India

vehicles for PWDs²⁷ will be a significant step towards helping PWDs have independent lives and further encourage their full participation in social and economic activities.

III. CONCLUSION

The paraplegic centres for the Indian army are today funded out of Regimental funds rather than by Government. There is severe underreporting in India today due to socio-cultural barriers such as gender bias and class distinction. According to data, 18.7% of the population experienced some kind of disability out of which 12.6% were suffering from severe disability²⁸. However, according to the 76th round of NSSO(December, 2008), only 2.3% population of the Indian rural population and 2% of the Indian urban population suffer from disability²⁹. This is extremely concerning especially since the data clearly reflects that many PWDs have not even been counted in as a result of which they cannot benefit from any of the government sponsored schemes.

Assistive Technology is the best means today to empower persons with disabilities and give them a fair chance to live an independent life and achieve their true potential. Increasing the awareness of the potential benefits and widespread accessibility of Assistive Technology will help to provide the PWDs with the best opportunities to live independently and maximize their potential. AT not only helps to expand the social and economic chances and participation of PWDs but also gives them hope of an inclusive and accessible future. AT should not be viewed as appliances needed to meet someone's physical limitation but rather as a means of fulfilling a person's functional and social needs.³⁰

In order to tackle the inaccessibility of AT in India today, some reforms and measures can be implemented. First, a collaboration of Government and the Corporate sector will help in the mass production and distribution of ATs. Second, helping PWDs by providing job opportunities and aiding in distribution of aids and appliances should be made a part of Corporate Social Responsibility (CSR) activity for the corporate sector. This will also help imbibe a sense of commitment, brotherhood and empathy among people. Third, the Disability Law should be amended to include elderly who are disabled too.

Fourth, innovation should be encouraged and acknowledged. For example, the Jaipur Foot also known as Jaipur leg was a rubber-based prosthetic leg that weighed at least 4 kgs and made it very difficult to walk around with³¹. Dr APJ Abdul Kalam along with his team made developed lightweight prosthetics from space-age material that was ten times lighter as compared to the Jaipur leg.³² This dual technology and innovation has helped millions of people not only walk easily but also lead a normal life.

Fifth, there is also a need to address some key issues such as the vague structure of legislation on disability that makes it unreachable for the recipients it targets. The recommendations of UNCRPD should be not be blindly followed. It should be tailor-made for India, keeping in mind the needs of PWDs here. Only 11% architects in India are trained to develop disabled-friendly buildings. Courses such as architecture should accommodate disabled-friendly teachings too. Public awareness and participation of PWDs in social events will act as a driving force for social inclusion of differently abled. Accessible electoral booths, provision of wheelchair friendly vans, and training sessions with staff is required. Workplaces have to be sensitised and social stigma has to be removed to empower PWDs. Government's budgetary support towards training of special educators is very less. The Government should implement Delhi High Court's order for 2 special educators per school. Study of disabilities must be incorporated in the school curriculum to spread awareness and overcome social stigma. Proper mechanisms must be put in place to effectively monitor the outcome of government sponsored schemes for PWDs. The use of AT in competitive testing and subsidizing aids and appliances will help PWDs get access to an independent life with full and equal socioeconomic participation. India is a country of vast talent and we have to ensure that every person gets an equal opportunity to reach their maximum potential.

It is of paramount importance that we treat people with disability as "equal" and "normal", rather than with bias or special treatment. We have to focus not only on integration but also on social inclusion of all PWDs. AT might have a tremendous positive impact on PWDs but it is only with social support that the PWDs

²⁷Nahom M. Beyene, Aaron Steinfeld, Jon Pearlman & Rory A. Cooper (2012) Exploration of health perceptions and assistive technology use by driving status as related to transportation independence in New Delhi, India, *Disability and Rehabilitation: Assistive Technology*, 7:4, 314-322

²⁸Marietta Orlowski(2015)Introduction to Health Behaviors: A Guide for Managers, Practitioners & Educators. USA: Cengage Learning, Inc

²⁹[http://www.mospi.gov.in/sites/default/files/publication reports/Report 583 Final 0.pdf](http://www.mospi.gov.in/sites/default/files/publication%20reports/Report%20583%20Final%200.pdf)

³⁰Scherer, M.J. and R. Glueckauf, *Assessing the Benefits of Assistive Technologies for Activities and Participation*. Rehabilitation Psychology, 2005.

³¹https://en.wikipedia.org/wiki/Jaipur_leg

³²https://www.business-standard.com/article/news-ians/kalam-concerned-about-disabled-developed-lightweight-prosthetics-115072801304_1.html

will be benefitted and be able to live a life they desire. We have to encourage and support all persons and strive to establish an inclusive society where every person has access to full human rights and socioeconomic participation.

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