Modern Technological Intervention Advancements for the Physically Challenged and Disabled Population

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Edited by

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My sincere gratitude to my dear parents for their unconditional love, support and blessings

Mr. ASHOK AND Mrs. KANCHAN BHATIA

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PREFACE

In the quest to make the world a better place for people with disability, an unlikely hero has appeared - technology. Simple technological advances today are creating a world of opportunities for children and adults with disability. The role and potential of technological advancements to connect people and provide access to education, commerce, employment and entertainment has been rapidly growing and increasing. The advent of communication technologies and advanced intervention tools promises to revolutionize the lives of people by removing obstacles/ barriers and expanding the scope of access to even the disabled population. The technological advancements can help in social inclusion and accessibility to new technological interventions which are robust and flexible based on their needs. The need of the hour is to provide technological solutions with multidisciplinary approach to resolve the problems and improve the quality of life of disabled, physically challenged and elderly population with focussed technological interventions that aim to provide autonomy and independence to persons with disability through holistic development by creating enabling environment for their empowerment through use of such modern scientific technological interventions.

Technological advances have changed the way people live. However, not all people have benefitted equally, due to limited accessibility, social and economic barriers. Throughout human history, new and changing technologies have impacted on the way people live their lives. Today, it is built into nearly every part of daily living, from work, consumer goods, to recreational activities and social interactions. Information and communications technologies have also dramatically increased connectivity between people and their access to information, further helping to raise living standards. However, for the 1 billion people living with some form of disability around the world, technological advances that could enhance inclusion, such as Apps on smart phones, interactive whiteboards in the classroom and 3-dimensional films can be a challenge to access. In spite of being the world's largest minority group, persons with disabilities have remained largely invisible in mainstream development frameworks and its processes. The United Nations General Assembly continues to reiterate accessibility as a means and a goal

for inclusive, sustainable development and as key for empowering and including all persons in the future development efforts.

The advent of communication technologies and advanced intervention tools promise to revolutionize the lives of people by removing obstacles and barriers and expanding the scope of access to even the disabled population. The technological advancements can help in social inclusion and accessibility to new technological interventions which are robust and flexible based on their needs. The need of the hour is to provide technological solutions with multidisciplinary approach to resolve the problems and improve the quality of life of disabled, physically challenged and elderly population with focussed technological interventions that aim to provide autonomy and independence to persons with disability through holistic development by creating enabling environment for their empowerment through use of such modern scientific technological interventions. Despite its existence, not many books are available in this area and it would be one of its kind which would incorporate knowledge and expertise from professionals working globally in the field since past several years to help establish the technology. It will provide insight to budding researchers and students to explore the field further.

The present book would explore the emergence of modern technological interventions for the disabled and physically challenged population including elderly population and its growth as one of the most promising technologies in healthcare sector in the next decade and beyond which is impacting the life of such population group and their families. Further the book would highlight the certain key challenges which need to be addressed before it is possible to completely reap the benefits from these technological interventions in near future. It will be useful for people working in the field of rehabilitation, special education and clinicians working with disabled population.

I would like to extend my sincere gratitude to all contributing authors for their painstaking efforts and helping me in incorporating finer details in the present book. The book covers diverse topics which would enlighten the readers. I am grateful to my parents and family members for their kind support in allowing me to complete the book in time. I also acknowledge the support of my present institution and Cambridge Scholars Publishing for allowing me to complete this challenging assignment in available time. I hope the present book would serve the due purpose for which it was initiated and support people working in the field to enhance their skills and guide budding researchers in the field.

Finally, I thank Almighty God for his kind blessings, wisdom and grace to enable me to complete this book.

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CHAPTER 1

DISABILITIES AND THEIR CLASSIFICATION

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Abstract

When talking about the term disability, different words are frequently used, such as impairment, crippled, or handicapped. Put simply, disability means the inability of a person who is disabled to perform daily activities in a normal way. It is a concept that has evolved gradually and changed for the better. Nowadays, the term disability is not only determined by physical impairment but is also regarded as being caused by environmental barriers in society. There are different types of disability: congenital disorders, behaviour disabilities, communication disabilities, personal care disabilities, loco-motor disabilities, and many more. Each disability is not only significant to a disabled person but to the educational environment, society, and other members of society. In this chapter, emphasis will be placed on the concept of disability—to outline the different classifications of disabilities, and their educational significance.

Keywords: Disability, models of disabilities, rights of person with disabilities, classification of disabilities

Concept of disability

Disability refers to the inability of a person to perform daily tasks in a normal way. Examples include: disturbances in behaving appropriately; in

personal care (such as excretory control and the ability to wash and feed oneself); and in loco-motor activities (such as the ability to walk).[1]

Disability is a condition caused by an accident, trauma, genetics, or disease that might limit a person's mobility, hearing, vision, speech, or cognitive function. Incapacity is recognised as limiting or preventing, for example, mobility (thus creating a right to use parking spaces reserved for disabled people, for instance); the ability to drive ("legally blind" people may not drive); or to work.[2]

Disability as a term has several connotations, for example, disabled, handicapped, crippled, and physically challenged, which have been used interchangeably. The term disability is so vast and complex that there are multiple definitions, approaches, and perspectives based on the various models of disabilities. Disability has been defined differently by individuals, groups, and organisations, and it also differs from country to country.

The history of disability dates back to ancient times, when "disabled person[s]" were killed or abandoned in the woods in Ancient Greece; kept as jesters for the nobility in the Roman Empire; experienced acts of infanticide during the Renaissance; and were drowned and burned during the Spanish Inquisition.[3] As a result, people with disabilities were considered unfit because of their deformity and often segregated from the rest of society.

In the medieval period, people believed that disability was a consequence of one's sin or that of one's ancestors and, therefore, considered as retribution from God**.** People with a disability were viewed as sickly, stigmatised as criminals, were victims of abuse (physical, mental, sexual, financial), subjected to inhumane treatments, kept in isolation and generally not afforded the same treatment as people without a disability, including an education (because they were not allowed to attend neighbourhood schools); denied work opportunities, were not provided with proper care and were often forsaken either by the family or by society. Thus, they were

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[1] *International Classification of Impairments, Disabilities, and Handicaps: a Manual of Classification Relating to the Consequences of Disease.* Geneva, 1980.
[2] Blocksidge, David, and Ron Chandran-Dudley. *Disabled Peoples Associations Dictionary of Disability Terminology.* Singapore: Disabled Peoples Association (DPA), 2003.
[3] Karten, Toby J. Embracing Disabilities in the Classroom: Strategies to Maximise Students' Assets. Sage Publishing, 2008.

labelled negatively, as people without any ability and considered a burden to others.[4]

By the 1800s, with the rise of the Industrial Revolution and achievements in the areas of science and medicine, people began to acknowledge that persons with disabilities were victims of mistreatment and views on disability began to change. Disability now began to be viewed as a result of health conditions caused by disease, accident, trauma, genetic disorder, or other health conditions in the individual and the interaction of society, policy, and public health. People began to believe that through proper health care and training they could become productive members of society and lead normal lives. This influenced the medical model of disability which states that disability is caused by disease, trauma, or other health conditions that require medical care by professionals.[5]

According to the International Classification of Functioning, Disability and Health, commonly known as the ICF, the medical model of disability is: "as a feature of the person, directly caused by disease, trauma or other health condition, which requires medical care provided in the form of individual treatment by professionals. Disability, according to this model, calls for medical or other treatment or intervention, to 'correct' the problem with the individual."[6]

Rhoda Olkin, in her book, *What Psychotherapists Should Know about Disability* (1999), talks about how the moral model of disability was shifted to the medical model of disability: "Disability is seen as a medical problem that resides in the individual. It is a defect in, or failure of, a bodily system and as such is inherently abnormal and pathological. The goals of the intervention are the cure, amelioration of the physical condition to the greatest extent possible, and rehabilitation (i.e. the adjustment of the person with the disability to the condition and the environment). Persons with disabilities are expected to avail themselves of the variety of services offered to them and to spend time in the role of patient or learner, being helped by trained professionals. Further, the medical model has spurred

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[4] Smeltzer, Suzanne C, Bette Mariani, and Colleen Meakim. "Brief Historical View of Disability and Related Legislation.Villanova University College of Nursing," January 28, 2017.
[5] Ibid.
[6] *Towards a Common Language for Functioning, Disability, and Health: ICF*. Geneva: World Health Organisation, 2002.

medical and technological advances that have improved the lives of people with disabilities."[7]

The introduction of the Rehabilitation Act, 1973 introduces a new paradigm, known as the minority model or social model, which viewed disability as a social construction, that the problems lie not within the persons with disabilities but in the environment that fails to accommodate persons with disabilities and in the negative attitudes of people without disabilities. Persons with disabilities are seen as a minority group—in the same way that persons of colour are a minority group—that has been denied its civil rights, equal access, and protection.[8] Thus, it viewed disability as a result of the environment and the society in which the individual lives, and not solely due to impairment. Both these factors hinder the person with a disability engaging as members of a family or in their communities, and receiving the necessary care and services. As a result, the medical model was rejected and the social model was accepted because it viewed disability as a socially created problem due to barriers imposed on people with impairment, and a matter of fully integrating individuals into society.

The ICF defined the social model of disability as "a socially created problem and not at all an attribute of an individual. In the social model, disability demands a political response, since the problem is created by an unaccommodating physical environment brought about by attitudes and other features of the social environment."[9]

The Union of the Physically Impaired against Segregation (UPIAS), founded in 1972 by Paul Hunt (1937–1979), was an early disability rights organisation that established the principles upon which the Social Model of Disability was based. The UPIAS's *Fundamental Principles of Disability* (1976) states that: "In our view, it is a society which disables physically impaired people. Disability is something imposed on top of our impairments, by the way, we are unnecessarily isolated and excluded from full participation in society."[10]

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[7] Olkin, Rhoda. *What Psychotherapists Should Know About Disability*. New York, London: The Guilford Press, 1999
[8] Ibid.
[9] *Towards a Common Language for Functioning, Disability, and Health: ICF*. Geneva: World Health Organisation, 2002.
[10] *The Union of the Physically Impaired Against Segregation and the Disability Alliance Discuss Fundamental Principles of Disability: Being a Summary of the*

Today, the situation for disabled people has changed for the better, and the interpretation of the term disability has broadened because disability is no longer conceptualised as a consequence of a disease, but is understood as a dynamic interaction between a person's health condition, environmental factors, and personal factors. There are various organisations, whether run by public or private bodies, which strive to work and protect disabled people. The government has also made an effort to assimilate various laws, rights, and acts to ensure that a person suffering from a disability (be it physical, mental, cognitive, sensory, or emotional) is being treated as a normal human being, and that no individual or body can discriminate against them on such grounds.

The ICF, developed by the World Health Organisation in the *World Report on Disability* (2011) "understands functioning and disability as a dynamic interaction between health conditions and contextual factors, both personal and environmental… Disability is the umbrella term for impairments, activity limitations, and participation restrictions, referring to the negative aspects of the interaction between an individual (with a health condition) and that individual's contextual factors (environmental and personal factors)."[11] It therefore sees disability, not just as a health problem, whether physical, mental, social, emotional, cognitive, visual, etc., but also as the interaction of personal factors and environmental factors. Overcoming the difficulties faced by people with disabilities requires the removal of environmental and social barriers.

The United Nations Convention on the Rights of Persons with Disabilities (UN-CRPD) came into force on May 3rd, 2008. It views disability as a human rights issue. Disability is also an important development issue with an increasing body of evidence showing that persons with disabilities experience worse socioeconomic outcomes and poverty than persons without disabilities. In its guiding principles, it states that people with disabilities should be respected for being different and accepted as part of the human race. They should be given equal freedom and opportunity for full and effective participation in society**.** In *The United Nations Convention on the Rights of Persons with Disabilities: a Commentary*, the preamble states that it was drafted to remind and draw attention to "the difficult conditions faced by persons with disabilities who are subject to multiple or

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Discussion Held on 22nd November 1975 and Containing Commentaries from Each Organisation. London: Union of the Physically Impaired Against Segregation, 1976.
[11] *World Report on Disability: 2011*. Geneva: World Health Organization, 2011.

aggravated forms of discrimination."[12] In the preamble, it acknowledges that every human being (whether "persons with disabilities" or "without disabilities") should be given freedom, liberty, equality and justice on an equal basis, have equal access to health, education, information, and communication, be able to fully participate in the physical, social, economic and cultural environment. Furthermore, it recognises that disability is caused by the environment and social barriers; that females with disabilities are at greater risk of violence, abusive treatment or exploitation, whether at home or outside; it highlights the issues of a person with disabilities living in poor conditions due to poverty and the need to understand its negative impact; and confirms that society and the state should provide protection of, and assistance to, persons with disabilities and their families so that they can benefit from their rights as persons with disabilities.

In 1995, the Government of India, under the Ministry of Law and Company Affairs passed the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, (PWD Act), which came into law on 7th February, 1996. For the first time, the Indian government created an act for persons with disabilities to ensure equal opportunities and protection of their rights, and allowed them to participate as members of society.

According to the act, a person is said to be disabled when he or she suffers not less than forty per cent of any kind of disability as certified by a medical authority. It listed seven types of disabilities: blindness, low-vision, leprosy-cured, hearing impairment, loco-motor disability, mental retardation, and mental illness.[13] The act therefore perceived the term disability in a narrow sense because it viewed disability from a medical perspective.

In 2016 it was replaced with the "Rights of Persons with Disabilities" (RPWD) Act. The *Handbook on Rights of Persons with Disabilities Act 2016* states the definition of disability as per the act: "a person with a disability is one who has a long-term physical, mental, intellectual or sensory impairment which, coupled with different barriers around him,

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[12] Fina, Valentina Della, RacheleCera, and Giuseppe Palmisano, eds. *The United Nations Convention on the Rights of Persons with Disabilities: a Commentary.* Springer International Publishing, 2017.
[13] "Disabled Persons in India- A Statistical Profile 2016." Social Statistics Division, Ministry of Statistics and Programme Implementation, Government of India. Accessed November 20, 2019.
http://mospi.nic.in/sites/default/files/publication_reports/Disabled_persons_in_India_2016.pdf.

hinders his full and effective participation in society equally with others."[14] This definition recognizes that disability results from the interaction between the disabled person and the environment (the attitude of people and the barriers in the society) that hinders their full participation.

It is a significant step by the government because this act ensures the right to equal opportunity and the practice of non-discrimination as it provides access to inclusive education, free education for children with benchmark disabilities, vocational training, and self-employment. It safeguards rights and protects people from cruelty, inhumane treatment, abuse, violence, and exploitation, allowing the individual with a disability to fully participate in society because it views them as differently-abled.

The Americans with Disabilities Act, (ADA) of 1990, and amended in 2008, states that the purpose of the act is "to provide a clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities."[15] *Americans with Disabilities: Exploring Implications of the Law for Individuals and Institutions,*[16] provides the definition of disability as per the act: "that an individual with a disability is one who: (i) has a physical or mental impairment that substantially limits one or more of such person's major life activities, (ii) has a record of such an impairment, or (iii) is regarded as 'having such an impairment'." The American with Disabilities Act prohibits discrimination and aims to ensure that persons with disabilities are given the same opportunities as others: for instance, in employment, that if persons with disabilities are qualified, they should be given equal opportunities for appointment, leave, promotions, training, allowance, concession, social activities, and other benefits of employment. State and local governments should provide equal opportunity to persons with disabilities to participate in all of their programmes and services, such as employment opportunity, the right to vote, access to transportation, health care, and public education, and attending social services activities**.** It is required from the governments, whether state or local, to alter or adapt the specific architectural structure of their buildings so that they will be

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[14] *Handbook on the Rights of Person with Disabilities Act 2016*. New Delhi: The Hans Foundation, n.d.
[15] Jones, Nancy Lee. *The Americans with Disabilities Act (ADA): The Definition of Disability*. Washington, D.C.: Library of Congress, Congressional Research Service, 2006.
[16] Francis, Leslie Pickering, and Anita Silvers. *Americans with Disabilities Exploring Implications of the Law for Individuals and Institutions*. New York: Routledge, 2000.

accessible to persons with disabilities. Modifications, where applicable in terms of policies, practices and procedures, are required to avoid discrimination. No discrimination, segregation, exclusion, or unequal treatment is allowed in restaurants, movie theatres, hotels, doctors' offices, private schools, convention centres, day-care centres, homeless shelters, funeral homes, and recreation facilities, like sports stadiums and fitness clubs. Persons with disabilities who suffer from hearing and speech impairments are given access to telecommunications relay services to communicate with each other through a third-party communications assistant.

In conclusion, it can be seen that the concept of disability has changed for the better, even though the term "disability" covers a great number of functional limitations, caused by various impairments that restrict individuals from participating effectively and efficiently in their daily lives. But, through the different laws, rights, and acts passed by the government, the lives of disabled people have improved whereby they are treated as equally-abled members of society. The shift from the medical model to the social model has changed attitudes and made people realise that disability is not caused by impairment due to trauma, accident, genetic disorder or disease (physical, mental, cognitive, social or emotional); rather, it is barriers in the environment which hinder their full participation as individuals who can contribute to society.

Classification of Disabilities

As mentioned above, disabilities affect the physical, mental, cognitive, social, or emotional aspects of an individual, and each disability ranges from mild to severe. The cases of disabilities take various forms and may be due to congenital disorder, like Down's syndrome, cleft lip, cleft palate, cerebral palsy, cystic fibrosis, or a heart condition. Some are progressive in nature, like muscular dystrophy, Alzheimer's disease, Huntington's disease, scleroderma and chronic obstructive pulmonary disease (COPD), while others are developmental, like autism, intellectual disability, epilepsy, mental retardation, and behaviour disorder.

In 1976, the World Health Organisation (WHO), under the title of the *International Classification of Impairments, Disabilities, and Handicaps* (ICIDH), classified disabilities into nine categories: behavioural disabilities, communication disabilities, personal care disabilities, loco-motor disabilities, body disposition disabilities, dexterity disabilities, situational disabilities,

particular skill disabilities, and other activity restrictions.[17]

The report by the Congressional Research Service titled *The Individuals with Disabilities Education Act (IDEA), Part B: Key Statutory and Regulatory Provisions* mentions the Individuals with Disabilities Education Act (IDEA), which was originally enacted in 1975 as the Education for All Handicapped Children Act. It is the main federal statute governing special education for children from birth through to the age of 21 that authorises grant programmes to support special education services. IDEA protects the rights of children with disabilities to a free appropriate public education. Under the IDEA, they have categorised 13 types of disabilities: autism, deaf-blindness, deafness, emotional disturbance, hearing impairment, intellectual disability, multiple disabilities, orthopaedic impairment, other health impairment, specific learning disability, speech or language impairment, traumatic brain injury and visual impairment. A child must fall into one of the categories of disabilities listed by IDEA for him or her to be eligible to receive grant funds and special education services.[18]

The Rights of Persons with Disabilities (RPWD) Act, 2016, lists 21 types of disabilities: Parkinson's disease, blindness, thalassemia, low-vision, loco-motor disability, leprosy-cured person, mental illness, hearing impairment (deaf or hard of hearing), dwarfism, muscular dystrophy, intellectual disability, cerebral palsy, autism spectrum disorder, chronic neurological conditions, multiple sclerosis, specific learning disability, sickle cell disease, speech and language disability, multiple disabilities (including deaf-blindness), haemophilia and acid attack victim.

In this chapter, the common types of disabilities that are most prevalent in educational settings are laid out:

1. **Specific Learning Disability:** Specific learning disability, often known as learning disability or learning disorder, is a psychological condition that affects the student's thinking, listening, speaking, writing, ability to do mathematical work, or spelling. The book published by the National Centre for Learning Disabilities entitled, *The State of Learning Disabilities: Facts, Trends, and Emerging Issues*, cites the definition given by IDEA on specific learning disability as "a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written,

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[17] *International Classification of Impairments, Disabilities, and Handicaps: A Manual of Classification Relating to the Consequences of Disease. Geneva, 1980.*
[18] Dragoo, Kyrie E. *The Individuals with Disabilities Education Act (IDEA), Part B: Key Statutory and Regulatory Provisions*. Congressional Research Service, 2017.

which disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations. These terms include conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The terms do not include a learning problem that is primarily the result of visual, hearing, or motor disabilities, mental retardation, emotional disturbances, or environmental, cultural, or economic disadvantage."[19] The most common types of specific learning disabilities are: dyslexia, dyscalculia, dysgraphia, dyspraxia, dysphasia or aphasia, auditory processing disorder, visual processing disorder, non-verbal learning disabilities, and attention deficit or hyperactivity disorder.

- **Dyslexia**: Dyslexia, also called a reading disability, affects language, fine co-ordination skills, and working memory skills. It is a condition where a child cannot read and finds difficulty with speech sounds, word decoding, rate of reading, comprehension, spelling, written expression, rhyming, and discrimination of symbols.
- **Dyscalculia**: Dyscalculia is a condition related to the inability to solve mathematical problems. It is a condition in which the child finds difficulty with counting, understanding word problems, learning numbers, memorising multiplication tables, telling the time, numerical placement confusion, counting money, and estimating number quantities.
- **Dysgraphia**: Dysgraphia is related to a disorder associated with writing, both the quality of written expression and the physical act of writing. If a child suffers from this disorder, he or she finds difficulty in writing, drawing, grammar, trouble in forming letters properly, and the spacing between letters or words become inconsistent, hence the handwriting may be illegible.[20]
- **Dyspraxia**: Dyspraxia falls under specific learning disability, which is also termed developmental coordination disorder, clumsy child syndrome, and developmental dyspraxia. A child suffering from this type of disorder may have difficulty with fine motor skills like tying shoe laces, maintaining balance, cutting, writing, drawing, hand-eye coordination, and manual dexterity. [21]

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[19] Cortiella, Candace and Horowitz, Sheldon H. *The State of Learning Disabilities: Facts, Trends, and Emerging Issues.* New York: National Center for Learning Disabilities, 2014.
[20] Ibid.
[21] Newman, Tim. *Medical News Today*, December 8, 2017. https://www.medicalnewstoday.com/articles/151951.

- **Dysphasia/Aphasia**: Dysphasia and aphasia is a language disability caused by brain damage. A person who suffers from this condition has a communication disorder that affects his or her ability to understand spoken language, signs, or to express themselves, whether verbally or non-verbally, and finds difficulty in concentrating and retaining information. Both types have an impact on a person's ability to understand the language, but dysphasia is moderate and aphasia is severe—where there is a total loss of speech.[22]

- **Auditory Processing Deficit**: Also termed Auditory Processing Disorder, is a kind of disability where individuals have difficulty understanding and interpreting auditory information or discriminating between different sounds. Individuals who suffer from this type of disorder have trouble recalling spoken information, reading comprehension, written expression, spelling, distinguishing sounds, and sounds in words.

- **Visual Processing Deficit**: Sometimes called Visual Processing Disorder, describes the incapacity of individuals to understand or interpret and use visual information. They have difficulty discriminating shapes, maps, symbols, reading, pictures, an inability to recall visual information, and confusion in discriminating one item from other items.[23]

- **Non-Verbal Learning Disabilities**: In her book, *Nonverbal Learning Disabilities at Home: A Parent's Guide*, Pamela B. Tanguay shows that Non-Verbal Learning Disabilities (NLD) is a pervasive, neurologically-based learning disability that is caused by damage to the brain's circuitry. NLD is considered a syndrome, meaning that this type of disability comprises a cluster of skill deficits which impact upon virtually every aspect of an individual's life. The primary areas of deficit are in the nonverbal domains, and it affects the individual's ability to learn academic and life skills. The primary strengths of individuals with this kind of disability are auditory and verbal, but they have varying difficulties in areas viz., tactile or visual difficulties with poor attention and perception, psychomotor coordination, adaptability, special orientation, mental flexibility, pragmatics of language, social skills, generalising information and

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[22] Vandergriendt, Carly. "Healthline" *Healthline*, September 18, 2018. https://www.healthline.com/health/dysphasia.
[23] Cortiella, Candace and Horowitz, Sheldon H. *The State of Learning Disabilities: Facts, Trends, and Emerging Issues.* New York: National Center for Learning Disabilities, 2014.

emotional instability.[24]

- **Attention-Deficit/Hyperactivity Disorder (ADHD)**: This disorder is due to brain-based disorder and has alternative terms, such as hyperactive (hyperkinetic) child syndrome, brain-injured child, minimal brain dysfunction, perceptually handicapped child and deficits in attention, motor/perception (DAMP). Persons with this disability are easily distracted, impulsive in their behaviour, abnormally overactive, or a combination of these features. Consequently, such children have difficulty in doing their work quietly, cannot wait in line or take turns, talk impulsively, fidget, and can seem disorganised, or forgetful.[25]

2. **Multiple Disabilities:** Multiple disabilities refer to a condition in which a disabled person suffers from more than one disability, which may affect his or her physical, mental, emotional, and social aspects. Children suffering from multiple disabilities may find it difficult to learn, retain information, develop communication skills (verbal and non-verbal), have low self-esteem, and be emotionally unstable. In order to have a clear understanding of the term multiple disabilities, definitions are cited below. In *Supporting Children with Multiple Disabilities*, several definitions have been cited:

> "In *New Directions* (1985) a child with multiple handicaps is defined as one whose additional disabilities, physical, sensory, mental, or behavioural are severe enough in themselves to interfere with normal development or education. Children with multiple disabilities form a diverse group with many different combinations of disabilities and degrees of severity of the handicap."[26]

> "Cassel, P. (1989) saw these children as suffering from any continuing disability of body, intellect, or personality likely to interfere with their normal growth, development, and capacity to learn."[27]

> "Best, A. (1992) asserts that multi-sensory impairment is the most current all-embracing label used to describe a person who has very special and complex needs, particularly relating to the use of information from all

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[24] Tanguay, Pamela B. Nonverbal Learning Disabilities at Home: A Parent's Guide. London: Jessica Kingsley Pub., 2001.

[25] Millichap, J. Gordon. *Attention Deficit Hyperactivity Disorder Handbook: A Physician's Guide to ADHD*. Seconded. New York: Springer, 2010.

[26] Mednick, Michael. *Supporting Children with Multiple Disabilities*. Birmingham: The Questions Publishing Company Ltd, 2004.

[27] Ibid.

senses."[28]

3. **Autism:** Autism is derived from two Greek words: "aut" means "self", and "ism" refers "to a state". Therefore, autism implies "living in self". The term autism was coined in 1911 by the Swiss psychiatrist, Eugen Bleuler.[29] Autism may be defined as a pervasive developmental disorder, characterised by impairments in communication and social interaction, and restricted, repetitive and stereotypic patterns of behaviour, interests and activities.[30] Autism is not only confined to children with lower I.Q., but is also found at all levels of I.Q. The common characteristics of autism have been mentioned in the book, *Understanding Autism Spectrum Disorders: Frequently Asked Questions*, by Diane Yapko. They are as follows:

- **Communication:** Children with autism suffer from delayed, or lack of, speech and language development, and often have difficulty in communicating with others or engaging in sustained conversations because they lack the receptive skills (listening and reading), have limited nonverbal communication (pointing, gesturing or eye contact), and it is hard for them to understand humour, metaphor or figurative language due to limited understanding of language beyond its concrete meaning. It is generally observed that people with autism often repeat words, phrases, and topics from someone else, commercials, books, or videos and make up their language whilst communicating with others.[31]
- **Social Interaction:** Autistic people are characterised by severely reduced social interactions.[32] Their peer social interaction can range from being totally absent to an inability to maintain desired relationships due to sensory impairments (visual, auditory, tactile, olfactory) that obstruct the ability to respond and participate in social reciprocity. There can also be limited understanding of nonverbal cues to regulate social interaction. Moreover, they can also lack imagination, hence there is limited to no development of "pretending" or imaginative play, and a rigidity and inflexibility in

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[28] Ibid., 9.

[29] Gupta, Vidya Bhushan. *Autistic Spectrum Disorders in Children*. New York: Marcel Dekker, 2004.

[30] Dodd, Susan. *Understanding Autism*. Elsevier Australia, 2005.

[31] Yapko, Diane. *Understanding Autism Spectrum Disorders: Frequently Asked Questions*. London and New York: Jessica Kingsley Publisher, 2003.

[32] *Blocksidge, David, and Ron Chandran-Dudley. Disabled Peoples Associations Dictionary of Disability Terminology. Singapore: Disabled Peoples Association (DPA), 2003.*

play and games.[33]

- **Behaviour:** It has been observed that the behaviour of children with autism is difficult and often challenging for parents, teachers, and other health workers. They are very rigid in their daily routines, including play schemes and rituals, and when disrupted they become non-functional. Autistic children are preoccupied with certain areas of interest, activities, and parts of objects. Self-stimulation is an important behavioural pattern with autistic children, like repeating phrases or sounds, motor movements (rocking, spinning, pacing, twirling, or hand flapping).[34]

4. **Emotional Disturbance:** Emotional disturbance is a condition of a person's emotional temperament that is reflected through their behaviour. In the *Journal of Emotional and Behavioural Disorders*, an article entitled *State Definitions of Emotional Disturbance* cites the definition of "emotional disturbance" given by the U.S. Department of Education, following the classification of disabilities listed in the Individuals with Disabilities Education Act (IDEA):

Emotional disturbance means a condition exhibiting one or more of the following characteristics over a long period and to a marked degree that adversely affects a child's educational performance:

(A) An inability to learn that cannot be explained by intellectual, sensory, or health factors;
(B) An inability to build or maintain satisfactory interpersonal relationships with peers and teachers;
(C) Inappropriate types of behaviour or feelings under normal circumstances;
(D) A general pervasive mood of unhappiness or depression;
(E) A tendency to develop physical symptoms or fears associated with personal or school problems.[35]

The emotional disturbance therefore concerns lifelong conditions that not only have a severe impact on the child's behaviour, but also in other areas such as educational achievement, because he or she is unable to learn, maintain social relationships, or build interpersonal relationships in the

[33] Yapko, Diane. *Understanding Autism Spectrum Disorders: Frequently Asked Questions*. London and New York: Jessica Kingsley Publisher, 2003.
[34] Ibid.
[35] Wery, Jessica & Cullinan, Douglas. (2013). State Definitions of Emotional Disturbance. Journal of Emotional and Behavioral Disorders. 21. 45–52. 10.1177/1063426611418234.

classroom, or display inappropriate behaviour or feelings and exhibiting mood disorders. Emotional disturbance is caused by three factors, as stated in *Emotional and Behavioural Problems: A Handbook for Understanding and Handling Students*:

a) Biological factors, which may be the results of genetic disorder, brain damage or dysfunction (due to traumatic brain injury, stroke, neurological illness), poor nutrition which leads to malnutrition, allergies to certain types of food, and personality types or temperament;[36]

b) Family factors, such as the size and structure of a family, the interaction among the members of a family or their interpersonal relationships, the influence of parents on the achievement or failure of the child, and external pressures affecting families;[37]

c) School factors, which include deficiencies or lack of school personnel to understand that every child is a unique being, and failure to accommodate students' variable intelligence, academic achievement, and social skills.[38]

5. Hearing Impairment: Hearing impairment is a medical term that indicates a person's partial loss of hearing in either both ears or one ear only. Hearing impairment is determined by environmental and genetic factors. The World Health Organisation has classified the levels of hearing impairment ranging from mild hearing impairment to profound hearing impairment. In brief, the different levels of hearing impairment are outlined below. It should be noted, however, that a person with no significant hearing impairment falls within the range of 0–130 decibels (dB). The range of decibels given here is according to the World Health Organisation.

1) **Mild hearing impairment**: A person who suffers from hearing impairment within the range of 26–40 decibels (dB) falls under the level of mild hearing impairment or a slight handicap. They find difficulty only with faint speech.

2) **Moderate hearing impairment**: A person who suffers from hearing impairment within the range of 41–55 decibels (dB) falls under the level of moderate hearing impairment. They find difficulty in direct conversation.

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[36] Zionts, Paul L, Laura L Zionts, and Richard L Simpson. *Emotional and Behavioral Problems: A Handbook for Understanding and Handling Students.* California: Corwin Press, Inc. A Sage Publications Company, 2002.
[37] Ibid.
[38] Ibid 5.

3) **Moderately severe hearing impairment**: A person who suffers from hearing impairment within the range of 56–70 decibels (dB) falls under the level of moderately severe hearing impairment or marked handicap. They find difficulty with the telephone.

4) **Severe hearing impairment**: A person who suffers from hearing impairment within the range of 71–90 decibels (dB) falls under the level of severe hearing impairment or severe handicap. They can understand only amplified speech.

5) **Total or profound hearing impairment**: A person who suffers from hearing impairment which is more than 91 decibels (dB) falls under the level of total or profound hearing impairment or extreme handicap. Usually, they cannot understand even amplified speech.

It is seen that when a child has hearing impairment it affects not only their language development, due to difficulty in differentiating the sounds of language or letter sounds, but it is also impossible to gain their full attention. They also have difficulty in terms of social-emotional development because often they find it difficult to communicate with others. Thus, hearing impairment affects the educational development or achievement of a child, which ultimately affects the well-being of a child and his or her personality development.[39]

6) **Visual Impairment:** Visual impairment is described as an impairment of vision caused by injury, disease, or is congenital, and affects an individual in his or her daily activities. Visual impairment comes in varying degrees: slight, moderate low vision, severe low vision, profound low vision or moderate blindness, severe or near-total blindness, and total blindness.

In 1992, The World Health Organisation (WHO), defined visual impairment from a functional aspect, that is, visual impairment or impairment of visual functioning refers to a person with low vision. It is said that even after treatment or standard refractive correction they still have visual acuity of less than 6/18 (which falls under the category of moderate vision impairment), to light perception and a visual field of fewer than 10 degrees from the point of fixation. Individuals who fall under this category can potentially use their vision in planning and performing their daily tasks.[40]

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[39] Reddy, G. Lokanadha, R. Ramar, and A Kusuma. *Hearing Impairment: An Educational Consideration*. New Delhi, India: Discovery Publishing House, 2004.
[40] Naipaul, Shivani, and Nishanee Rampersad. "A Review of Visual Impairment." *African Vision and Eye Health*77, no. 1 (2018).
https://doi.org/10.4102/aveh.v77i1.393.

In the *World Report on Vision* published by the World Health Organisation in 2019*,* the meaning of visual impairment or vision impairment refers to when an eye condition affects the visual system and its other functions. The degree of impairment can worsen as an underlying eye condition progresses. It also stated that persons with visual impairment experience difficulties in their life from access to quality eye care, rehabilitation, and other support services, to lower rates of workforce participation and productivity, and higher rates of depression, violence, abuse, bullying, motor vehicle accident, and anxiety. Children with early onset of severe visual impairment may experience delayed motor development, delayed social-emotional development creating lower self-esteem, and delayed language and cognitive development leading to a lower level of educational achievement.[41]

7. **Deafblindness:** The term "deafblind" was first used in 1993 in place of "deaf/blind, or "deaf-blind". When these two words—deaf and blind—are combined into one word, deafblind, it suggests a unique impairment or dual impairment of hearing and sight in individuals. Possible causes of deafblindness may be infection (parasite, bacteria, or virus), genetic or chromosomal syndrome or birth defect, congenital birth trauma, accident, or due to aging.[42] The *Code of Federal Regulations: Containing a Codification of Documents of General Applicability and Future Effect* states that deaf-blindness: "means concomitant hearing and visual impairments, the combination of which causes such severe communication and other developmental and educational problems that they cannot be accommodated in special education programs solely for deaf or blind children."[43]

Since humans are social beings and cannot isolate themselves, in daily life they continually need access to information, communication with others, and the ability to move around the environment. But for a person who is deafblind, it is quite difficult because even finding out general information proves to be problematic, and without information that a person gains through his life experiences, he or she cannot store knowledge of the world. Communication is another challenge for a deafblind person. The obvious difficulty for them is that very few people will know how to do it

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[41] *World Report on Vision*. Geneva: World Health Organisation, 2019.

[42] Aitken, Stuart, Marianna Buultjens, Catherine Clark, Jane T Eyre, and Laura Pease, eds. *Teaching Children Who Are Deafblind: Contact Communication and Learning*. London: David Fulton Publishers, 2002.

[43] *Code of Federal Regulations: Containing a Codification of Documents of General Applicability and Future Effect*. Washington, DC: Published by Office of the Federal Register National Archives and Records Administration, 1992.

successfully, like using sign language, using simple gestures, facial expressions, or movements of the body. A person who is deafblind has difficulty moving around, especially in unfamiliar surroundings. All of these difficulties faced by them require someone's assistance and often they are seen to withdraw into a private world.[44]

8. **Orthopaedic impairment:** *Special Education in Contemporary Society 5e: An Introduction to Exceptionality* states the definition of orthopaedic impairment given by IDEA: "A physical disability that occurs from congenital anomalies, diseases, or other causes that adversely affect a child's educational performance."[45] Orthopaedic disability comes under physical disability: different authorities have different terms for orthopaedic impairment, such as motor impaired, crippled, children with loco-motor handicap and children with a neuromuscular disorder. Orthopaedic impairment is due to malformation or malfunction in bones, muscles, and joints.[46] Common causes of orthopaedic impairments are nervous system disorders, traumatic spinal cord injury, stroke, muscular dystrophy, cerebral palsy, epilepsy, muscular-skeletal disorders, and many more.[47] As a result of these conditions, the child (or adult) cannot move about or use his or her limbs in a normal way, which, in turn, adversely affects their education.[48]

Educational Significance

Every disability comes with different needs and requires unique ways of managing; each one also has educational significance. If educational institutions, like schools, colleges and universities want to adopt an inclusive approach, they have to meet the needs of individuals with disabilities and certain requirements need to be fulfilled, such as the following:

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[44] Aitken, Stuart, Marianna Buultjens, Catherine Clark, Jane T Eyre, and Laura Pease, eds. *Teaching Children Who Are Deafblind: Contact Communication and Learning*. London: David Fulton Publishers, 2002.

[45] Gargiulo, Richard M. *Special Education in Contemporary Society 5e: An Introduction to Exceptionality*. United States: SAGE Publications, 2015.

[46] Dash, Neena, and M. Dash. *Essentials of Exceptionality and Special Education*. New Delhi: Atlantic Publishers & Distributors, 2005.

[47] Dhawan, M. L. *Education of Children with Special Needs*. New Delhi: Isha Books, 2005.

[48] Dash, Neena, and M. Dash. *Essentials of Exceptionality and Special Education*. New Delhi: Atlantic Publishers & Distributors, 2005.