PHYSICAL ACCESSIBILITY OF PEOPLE WITH DISABILITY: ANALYSIS OF PUBLIC & PRIVATE UNIVERSITIES IN CAPITAL OF PAKISTAN - ISLAMABAD

By

Saba Amjad

(00000119182)

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THESIS ACCEPTANCE CERTIFICATE

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Signature: _____

Name of Supervisor: Dr. Abdul Waheed

Date: _____

Signature HOD: _____

Date: _____

Signature (Dean/Principal): _____

Date: _____

Dedication

To my beloved Parents

Acknowledgment

First of all I thank Allah Almighty who blessed me to complete my research efficiently and honestly. Next I would like to express my gratitude to my beloved parents and family for their support & encouragement during my whole journey. Eventually I am so grateful to my supervisor Dr. Abdul Waheed for his critical feedback, guidance and advice as well as to my committee members Dr. Asghar Naeem & Dr. Irfan Ahmed Rana for their help and cooperation throughout my research.

I am delighted to thank all of them for their unwavering support.

(Saba Amjad)

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List of Acronyms

ADA	Americans with Disabilities Act
AIOU	Allama Iqbal Open University
BBA	Bachelor of Business Administration
BDS	Bachelor of Dental surgery
BU	Bahria University
CASE	Center for Advanced Studies in Energy
CDA	Capital development Authority
CIIT	COMSAT Institute of Information & Technology
DFID	Department for International Development
FATA	Federally Administered Tribal Areas
GB	Gilgit Baltistan
HEC	Higher Education Commission
HEIs	Higher Educational Institutes
ISO	International Organization of Standardization
JICA	Japan International Cooperation Agency
KPK	Khyber Pakhtunkhwa
LDA	Lahore Development Authority
MBBS	Bachelor of Medicine & Bachelor of Surgery
MS	Master of Sceince
NA	National Assembly
NIT	National Institute of Transportation
NUML	National University of Modern Languages
NUST	National University of Science & Technology
PBS	Pakistan Bureau of Statistics

PCATP	Pakistan Council of Architects and Planners
PEC	Pakistan Engineering Council
PKR	Pakistani Ruppee
PSDP	Public Sector Development Program
PWD	People with Disability
PWDs	People with Disabilities
QAU	Quaid-e-Azam University
RECOUP	Research Consortium on Educational Outcomes and Poverty
SD	Sustainable Development
SPSS	Statistical Package for Social Sciences
STMU	Shifa Tameer-e-Millat University
SZABIST	ShaheedZulfiqar Ali Bhutto Institute of Science & Technology
UN	United Nations
WHO	World Health Organization

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Abstract

Sustainable Development Goals (SDGs) succinctly describe the special person's rights thus it is impossible to attain sustainable development by secluding and segregating the citizens with disabilities by overlooking the prevalence of such minority group. This study aimed to assess the extent to which barrier-free infrastructures have been provided. For this, an observatory survey was conducted in 7 public and 3 private universities in Islamabad. A mean score analysis was done to measure the status of facilities for people having mobility issues. Findings showed that provision of facilities (e.g. slip-resistant access routes, absence of protruding objects and provision of accessible stairs, etc.) was made whereas some infrastructural elements were ignored that mainly included ramps and elevators majorly in private universities, designated parking lots, washrooms and signage in both public and private universities. The overall condition of accessibility in public universities (0.65) was slightly better as compared to private institutes (0.59). However, measures for the improvement and retrofitting of accessible infrastructure are imperative. Additionally, this research will provide insights into the standards of accessibility and also contribute to emphasize accessible infrastructure that must be assured in any educational institute by designers, planners, architects and engineers from designing to monitoring stages.

Chapter 1

INTRODUCTION

The problems of disabled people and disability are so special since any time anyone can be a victim of any kind of impairment and can become disable for a limited period or lifelong. It may be from birth, any accident, and environmental conditions or otherwise. The possibility of physical or other types of impairment increases as people age.

WHO states disability as a term that covers limitations in bodily functions, impairment and restriction in participation. A problem in body structure is an impairment; a difficulty found by any individual while performing a task /action is an activity limitation; whereas a problem felt by any individual in involving daily life situations is termed as restriction in participation (WHO, 2018).

The world's total population is approximately 7.5 billion (Worldometers, 2018). Out of which, 15% population meaning 1 billion person experience some kind of disability. Disability's ratio is more in growing countries. One-fifth of the approximated global total have substantial disabilities (The World Bank, 2018).

PWDs are multifarious. A large number of social, political, economic and physical barriers are faced by less able people, hampering their full participation and contribution to society. In different parts of the world, some barriers are tried to address in order to uplift the social status of such people but the percentage is very small as compared to the needs and demands. An individual will be considered 'disabled' is strongly related to the built environments (enabling or disabling) that surround that specific person. If one cannot move in a building on one's own, definitely it will lower one's morale making him/her feel miserable.

In order to ensure the provision of all people's rights and eradication of inequalities & other issues from the planet, world leaders followed SDGs in September 2015 at a UN Summit. Universally apply to all; these goals are to help the countries in order to end poverty and to tackle all other issues (including the suppression of inequalities) that are becoming a hurdle in the way of their development. 17 SDGs along with 169 linked targets aim for a resilient, inclusive and sustainable future for people(United Nations, n.d). These goals cover 3 dimensions including social inclusion, economic growth, and environmental protection.

Every development must incorporate the below-mentioned SD goals, according to its nature, in order to uphold sustainable development benefiting all.

Figure 1.1: Sustainable Development Goals

Below mentioned targets are of those goals that emphasize (directly or indirectly) the rights of PWDs.

Goal # 4: Ensure Inclusive& Quality Education for All & Promote Lifelong Learning.

- Its main emphasis is to obviate gender disparities in educational areas and assurance of equal access at all levels of educational and vocational training for **PWDs**, indigenous persons and children in vulnerable conditions by 2030.

Moreover, this includes the construction of new and up-gradation of the existing educational infrastructures that are child and **disability sensitive** as well as can provide safe, inclusive &efficient learning surroundings for everyone (United Nations, n.d).

Goal # 10: To Reduce Inequalities within &Among Countries

Facts and figures under Goal # 10 state ‘’although social security has been importantly expanded at a global level, yet **PWDs are up to 5 times** more than average to find catastrophic outlays on health’’. Some of the targets of the same goal satisfy the rights of disabled people are:

- By 2030, it must be ensured to empower and encourage the inclusion of all at social level, economic and political degree, regardless of their age, **disability**, gender, or another status, etc.

Likewise, another focus of the goal is to ensure adequate opportunity for all. This could be done by **reducing inequality of outcome**, mainly by rejecting discriminatory laws or policies as well as practices and to promote adequate legislation, and actions in this respect (United Nations, n.d).

Goal # 11: Make Cities Inclusive & Safe as well as Resilient & Sustainable

- It emphasizes on the provision of accessible, safe, as well as sustainable systems of transport for all, in a way by improving the road safety, expanding the public transport, with main attention to the demands of endangered people such as women and children, **PWDs** and older people by 2030.
- By 2030, it underlines to improve **inclusive as well as sustainable urbanization**. Also to enhance the capacity for integrated, sustainable and participatory planning for human settlement and participatory management in all countries.

Similarly, by 2030, it aims for the provision of universal access to, inclusive and safe as well as accessible and green public spaces for vulnerable persons in particular for **PWDs**(United Nations, n.d).

The total population of Pakistan is approximately 207.8 million (PBS, 2017). According to the 1998 census, in Pakistan, 2.49 percent of inhabitants have some sort of disability. This percentage is smaller than by WHO estimated percentage equals to 7& NGO percentage is 10 out of the total population. These are estimated populations, as proper statistics are not present. An endeavor to carry out some comprehensive surveys for the assessment of associated problems of PWDs, by the government, is absent. The significant lack of authentic data about the prevalence as well as the status of the disabled population is observed. Hence lacking proper and authentic data, it is hard to gauge and understand the problems being faced by such a population.

The annual growth rate (current) of various disabilities is found at 2.65 percent per year which is more than the total population's annual growth rate (2.03%) in Pakistan. Merely 14 percent of PWDs are in work, rest is dependent upon the family members for their fiscal support(Waqar, 2014). We cannot afford to ignore such amount of population if we want sustainable development.

We always talk about sustainability and equal rights for all when it comes to development. But unfortunately, most of the time, it ends up like all talk no action. Promises mean nothing without proof. We need to incorporate the universal design in our planning standards and building codes for independent movement of PWDs. The dilemma is, during the 2017 census in Pakistan, disability column has been eliminated from the data form which has become a huge hurdle in the estimation of total disabled population. So, the main issue is

not in the individual but in the society.

BACKGROUND OF RESEARCH

Islamabad is one of the largest cities in Pakistan. It is the hub of all governmental activities. Islamabad is an advanced city pertaining to approximately all major facilities in its developed areas. A large proportion of the population migrates here from all over the country, mostly from Punjab, FATA, GB& KPK due to its development and employment facilities or otherwise. Due to such hype, it should be developed in a way benefitting all without any discrimination and prejudice. The built environment should be disable-friendly and such that it is accessible to all. Most of the public buildings (including educational institutes) in Islamabad do not incorporate the concept of universal design at the time of their development, consequently causing difficulty for less-able people to enter and hinder their movement in such buildings.

Literature showed that research in Ghana was carried out on *'Assessment on the accessibility of public buildings and its facilities to the disabled in Ghana'*. Findings of this research showed, despite the policies, laws and the efforts of the government for a conducive environment for PWDs, there were still difficulties in physical accessibility since public buildings did not have facilities such as ramps, lifts, elevators, and so on. If some had, then these were not designed according to the required standards and as a result, persons with disabilities face discrimination, violation of their rights and impediments to exhibit their full potential to contribute to the development of Ghana and Africa (Addi, 2011).The paper was concluded by specifying the need for policy to address the problems, challenges and the difficulties faced by PWDs in their daily operations (Kportufe, 2015).

Another research on *'A study of facilities for physically disabled people in public buildings in Nigeria'* was done. This study used a list of facilities present for PWDs in public

buildings covering the recognition and determining functional condition of accessible facilities. 257 public buildings were explored in total. The findings showed that most of the facilities needed by PWDs were lacking in no. of public buildings. Out of which, some of the infrastructural facilities were found in few buildings but with the inappropriate condition o\for operation. Hence, lack of such key facilities hinder the activities of special persons having a physical mobility issue (A. Soyingbe, Ogundairo, & Adenuga, 2016).

1.1 RESEARCH PROBLEM

Different kinds of disabilities may generate different kinds of functioning limitations but these can be reduced if we eliminate the barriers that aggravate these limitations cum disability situations. In the absence of necessary actions, low functional limitations can easily become diverse causing a high risk of social and economic exclusion. CWDs may face no. of problems in gaining the education and if they get admitted to any institution then their accessibility in the building becomes one major issue of their daily routine, only because of the unavailability of certain universal structures in the building. There are certain codes used internationally for inclusive design. In Pakistan, it requires proper attention for universal design in all public buildings including educational, hospitals, hotels & malls, etc. It becomes easy to maneuver from such issues when one has certain guidelines to follow and if these are present then evaluation and assessment are required for effective implementation in order to avoid discrimination and negligence in this regard.

1.2 RESEARCH QUESTIONS

i) What are the relevant legislation, policies, and building codes for inclusive designs?

ii) Are higher educational institutes designed/constructed according to the demands of disabled people?

iii) How exigent is the part/role of a professional to reform and ensure accessibility in building regulations?

iv) What is the reason behind the laxity of accessible design in public buildings?

1.3 RESEARCH OBJECTIVES

i) To review relevant legislation, policies and building codes for accessibility of special people in public buildings.

ii) To explore higher educational institutes, in accordance with disabled people's demands.

iii) To highlight the rationale of heedlessness regarding accessible design.

iv) To suggest missing facilities those conform to the less able people convenience.

1.4 PURPOSE OF STUDY

Due to negligence in the provision of necessary infrastructural facilities, the potential, competence, and talent of disabled people are being restricted. Resultantly, this forms a major barrier in the development of PWD's abilities. Developments should be such that it is accessible to all. We live in a mechanized world living a fast track life. Nobody knows what will happen tomorrow. The provision of accessible design is very important in order to avoid seclusion of disabled people from society. This research includes the review of policies/laws to check either these are silent or absent regarding the necessary structures for physical accessibility of PWDs in higher educational institutes. Later, exploring the buildings will tell us about the status/level of universal design in educational institutes in the capital city of Pakistan.

1.5 SIGNIFICANCE OF STUDY

If barriers are eliminated and there is a positive interaction between people and the environment, then opportunities for personal empowerment and social inclusion will be more. But barriers can be eliminated only when these are commented or noticed. This study will

mainly explore the level of work (if done) on universal design in the case of higher educational institutes in Islamabad. Besides all developmental works, here in Islamabad development should be such that benefit & satisfy disabled people enough for their independent movement.

Inclusive design is economically effective, as to address the special needs of each group in society, the cost of special services is much higher than those of public policies/programs designed for all (which tends to be cost-effective). In addition, in case of emergency, less able people can easily evacuate and save their lives instead of doing nothing and waiting for other's help to exit from that place. Universal design also concedes the contribution that each human being can make to the development process. This promotes the strategy benefitting society as a whole rather than concentrating on some groups of society.

Chapter 2

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

This chapter will summarize and review the policies/laws present for the involvement and inclusion of disabled people in the society and practices of the provision of necessary facilities for independent movement of such population globally.

2.1 REVIEW OF RELATED THEORIES

The following sections cover the study of the literature and theories on above-mentioned fields which will try to establish an academic background of this research. Because in order to explain the relationship between the desired facilities and independent movement of the less-able people some paradigms, of related studies, should be introduced first as a background of this research.

2.1.1 Disability

We are living in such a time where, if not everyone then, the majority of people focus to achieve their targets in the shortest possible time. It may be due to the fact of fast-paced technology which is trending people towards more mechanized living. In such conditions, it happens that we usually forget the rights of some minorities ignoring their social needs as well.

Any person having any disability implies as one who, on report of any injury, illness, or deformity, is less-able while undertaking any profession. They include visually less-able people, hearing-impaired persons, and physically and mentally less-able people(Japan International Cooperation Agency & Department, 2002).

Some major types of disability include impairment of vision, listening, mental health, etc. moreover intellectual less-ability, acquired brain injury (ABI), autism spectrum disorder, and

physical disability, these are some other types. Where *physical disability* makes a person limited towards his/her physical functioning, mobility, stamina and dexterity causing a serious impediment to his/her daily normal routine.

2.1.2 Causes of Disability

Causes of disability are various, some are known and some are unknown. Known causes include biomedical that arises inside the body of a person and socio-environmental, meaning external of the body such as a person's lifestyle and behavior. The fact is, there is always a possibility of disability to start at any stage of life which may cover prenatal, perinatal, neonatal, early childhood, adolescence, young and old age.

2.1.3 Accessibility

ISO defines accessibility as 'thelevel to which a product, device, service, environment or facility is operable by as many people as possible, including by PWDs as well. The issue of accessibility has become more critical with the rising number of older people in the population worldwide (Gasiorowski-Denis, 2010).

The inclusion of PWDs in the society largely depends on the planning of urban infrastructure& environment as well as on the provisions of facilities & services for them. So every development should incorporate such elements or structures that make it accessible for all without discriminating any set of population.

Table 2.1: Key Principles of Universal Design (UD)

Principles	Description
Equitable Use.	Design must be useful & marketable for PWDs.
Flexibility in Use.	Design shall accommodate a broad range of persons preferences & abilities
Simple and Intuitive Use.	The use of design shall easy to comprehend, irrespective of the user's feel, knowledge, skills, and concentration level.
Perceptible Information.	Design shall communicate important information efficiently to the user, irrespective of user's receptive abilities.
Tolerance for Error.	The design minimizes hazards and the adverse effects of an accident or unintended actions.
Low Physical Effort.	Design must be effective, comfortable& with less fatigue.
Size and Space for Approach and Use,	Suitable size & space is provided to approach, manipulation and use the facility irrespective of user's body size and mobility.

This shows accessibility is strongly associated with universal design, such as a design that is approachable by everyone(Kamarudin, Ariff, Ismail, Bakri, & Ithnin, 2014).

2.1.4 a) Public Buildings

Buildings, non-residential buildings/structures, constructed wholly or partially with state or municipal funds are termed as 'Public Buildings'. Mainly these include public hospitals, public educational institutes, courthouses, churches, mosques, hotels, shopping malls, bus terminals, and embassies, etc. Selected buildings of this research include public universities in Islamabad.

b) Private Buildings

On the other hand, buildings owned by the any individual, organization, and corporation are termed as 'Private Buildings'. Public authorities have certain proprietary rights over

private owners such as compulsory acquisition, the right to tax the property, etc. Sampled buildings under this category for the research are private universities of Islamabad.

2.1.5 Educational Institutes

A place or building that provides the learning environment/space, where people of any age can gain an education. These buildings categorize as pre-schools, childcare schools, primary schools, secondary schools, colleges & universities, etc. Accommodation of the facilities of PWDs in schools, infrastructure is critical.

Croft (2010) states that physically less-able students in any school environment are less-favored by the facilities and schooling surroundings, in general. Likewise, as per HEFCE/HEFCW (1999), physically disabled people pose specific challenges to HEIs not only pertaining to gaining accessibility to buildings but also concerning much wider access issues related to the curriculum, learning,& assessment (Kabuta, 2014).

2.2 LAWS & POLICIES RELATED TO DISABILITY IN PAKISTAN

There are no. of international conventions to which Pakistan has been ratified. Nationally, various policies and laws are also here to address the problems of disabled people. Only the ones related to the accessibility or addressing the related issues are mentioned below.

2.2.1 International Legislation

Pakistan ratified various conventions on women's rights and rights of girls and children with disabilities given as below:

i) Convention on the rights of the child (CRC) on 12 November, 1990. In some of its articles, it identifies the right of the children with disabilities.

ii) Vocational rehabilitation and employment (Disabled ones) convention on 25 October, 1994. This emphasizes that the aim of vocational rehabilitation is to

enable the PWDs to advance them in suitable and desired employment and ensure their full integration in society.

iii) Convention on the rights of persons with disability(CRPD) in August 2011. Some of its articles identify the issues, problems as well as rights of PWDs(The Institute of Social Justice).

2.2.1. (iii) Convention on the Rights of PWDs (CRPD)

Pakistan becomes a signatory of the Convention on the Rights of PWDs (CRPD) in 2008 and ratified in 2011 (Patrik Andersson al., 2016). The Convention is aimed as a human rights tool. It assumes a broad classification of PWDs and rechecks their fundamental freedom and human rights. One of the major roles includes the clarification and qualifications of rights apply to PWDs and identification of fields where adaptations need to be made for special persons to efficiently practice their rights. It also emphasizes the areas of violated right of PWDs and puts importance on the reinforcement of protection of rights(United Nations - Disability, n.d).

2.2.2 National Legislation and policy

Pakistan has various legislation/policies pertaining to the rights of people with disabilities given as below:

2.2.2.1 The Disabled Persons (employment and rehabilitation) Ordinance, 1981:

The Ordinance was the 1st conventional measure for institutional concern of PWDs in the country. This Ordinance helped to create Funds and demonstrate the National Council for the Rehabilitation of persons with disabilities, rules of which were notified in 1983. The Council was mandated for the formulation of policy for the

employment, welfare as well as rehabilitation of persons with disabilities. Under *NA Ordinance 1981, (10A. Amending of or making of by-laws of building access),* It states that Govt. shall make laws to approve construction plans of new public and private buildings (but owned by public) if only they have adequate provision in design to ensure efficient accessibility to wheelchair and other modes in use by PWDs.

2.2.2.2 National Policy for PWDs (2002):

This is a brief document having a certain systematic plan of action to get its objectives mainly for the empowerment of PWDs. The policy was documented in consultation with the related departments and ministries that mainly include health, labor & manpower, housing and works, science & technology, and some NGOs. This policy involved administration related, legal and some other measures for the provision of facilities through assessment education, vocational training as well as employment.

One of its key areas of attention and focus was to ensure the accessibility of people with disabilities in public areas. Briefly mentioned under heading, *design of buildings, parks and public places:* it states, to ensure the safe access to PWDs in public buildings, codes of practices for the design of all new buildings and adaption of existing ones will be made and issue in association with the councils of architects, planners and engineers (Ministry of Social Welfare & Special Education) (Government of Pakistan, 2002).

2.2.2.3 National Plan of Action (NPA), 2006-2025 (2006):

In order to operationalize the National Policy (NP) for PWDs, NPA was introduced in 2006. As a mixed operational approach, NPA aspired to address the problems of accessibility, the inclusion of PWDs by utilizing all potential resources. This plan includes *17 important areas of intervention* which imports short-term steps

that must be adopted no latest than June 2009 and long-term steps to be taken by July 2025.

On the other hand, one of the long-term targets includes “creation of a barrier-free surroundings for PWDs in all public buildings (private & commercial) &public places and revision of bye-laws of construction. In addition, efficient enforcement of social assistance and effective expansion of social security program would be beneficial”(The Institute of Social Justice).

2.2.2.4 The Special Citizen Bill (2008):

The objective of the bill is for the provision of the accessibility to PWDs at each public place and provision of facilities at such places for their easy independent movement("National Assembly of Pakistan," 2015).

2.2.2.5 Islamabad Declaration on Accessibility for PWDs:

National Consultation (NC) on Accessibility was organized by Special Talent Exchange Program (*STEP)* collaborating *Sight savers International* as well as *Handicap International* and *Ministry of Social Welfare and Special Education* in Islamabad, on 17-18 April 2006. PWDs, representatives of PWDs, disability specialists, health specialists, state’s representatives as well as services providers and managers, architects, and lawyers were seated together for a two-day seminar in Islamabad.The main emphasis of the seminar was on accessibility and the creation of enabling environments for the independent movement of PWDs.

2.3 BUILDING REGULATIONS RELATED TO ACCESSIBILITY

Building codes related to universal design in Pakistan are as follow:

2.3.1 The Accessibility Code of Pakistan (ACP) -2006:

The 'ACP-2006' draft is the achievement of Director General of Special Education and their Consultants PEPAC(Ministry of Social Welfare & Special Education). Main emphasis of this draft was basically to provide a barrier-free environment to the disabled people (Ministry of Social Welfare & Special Education, 2006).

One chapter Scoping Requirements briefly illustrates the extent of requirements depending upon the building type and area etc. shown in the below table.

Table 2.2: Requirement of Infrastructural Facilities as per Building Type

Sr. #.	Areas/Uses	Extent of requirement	
		Mandatory	Preferred
Outdoor Areas:			
1	Roads & Streets	Sidewalks, Street Intersections, Street Crossings, Parking, Street Furniture	-
2	Open Spaces & Public Parks	Shelters/Rest Areas, Walkways, Refreshment & Dining Areas, Toilets, Ablution Areas, Park furniture.	Parks, Grounds, Play Areas, All Recreational Facilities, Areas meant for the exclusive use of Women & Children.
Vicinity of Buildings:			
1	Open Areas within Site Boundaries	Site Entrance, public Areas, Entrance to the Building, Routes to the Buildings, Parking Areas	Play Areas, Resting Areas, All path and Walkways, Employee Work Areas.
2	Common & Public Use Areas		
3	Restricted Access Areas		
Interior of the Building:			
1	Educational Institutes & Health Care Centres/Hospitals	Entrance, Means of Emergency Exit, Means of Horizontal 7 Vertical Circulation, Toilets, Main Facility Areas & All common Areas	Service Areas, Administrative Offices.

ACP of Pakistan passed around a design manual related to accessibility. To modify existing buildings, constructed roads as well as parking areas in relation to the demands of physically disabled persons, this manual mainly provides technical guidelines.

The manual highlighted not only particular international standards for the designing of external and internal structures of the buildings that may deem necessary for accessibility besides it contributed for the road and street areas, footpaths as well as pedestrian crossings with suitable signage to help PWDs to travel between home, and other destinations.

On the other hand, **United Nations enable** specifies the design manual for the inclusive design i.e. *'accessibility for the disabled - a design manual for a barrier-free environment'***.** This manual identifies that design of Educational buildings should be such that:

- Accessibility to teaching and administrative as well as common areas
- Appropriate arrangements for any stepped lecture halls/ auditoriums.
- Provision of minimum1 accessible unisex rest room.
- Usability of all recreational facilities by disabled people.
- Buildings for physical education must be accessible to disabled people.
- Accessibility to all book stacks.
- In the case of libraries, all library facilities must be accessible.
- Provision of a special room for sightless & hearing-impaired people (United Nations Enable, 2004).

Segregation is the social position of no. of individuals with disabilities who could be stigmatized and denied access to buildings, services, education as well as work as a result of inaccessibility and attitudinal barriers hindering their participation in their social life. To eradicate attitudinal barriers that might exist from normal individuals towards disabled ones or the reverse, there is a need to accommodate such population in our daily infrastructure development works by incorporating the facilities of their demand i.e. focus on universal design (Abdou, 2011).

2.3.2 CDA Building Bylaws:

We don't have any sound & composite building codes enhancing the provision of inclusive structures in the buildings, during its design or construction phase, here in Islamabad except one or two facilities (provision of ramp & parking) included in CDA building bylaws.

2.3.3 LDA Building Bylaws:

Codes specifying the barrier-free infrastructure are as follow:

- 6.2.3: In all buildings otherwise residential,
  - A ramp having min.4' feet width & max. a gradient of 1:6 must be provided for PWDs.
  - In any multi-storey buildings every floor must be accessible via ramp, in case of non-provisions of lifts.
  - Provision of a toilet area for the disabled.
  - No ramp is needed for a building of plot size less than 7 Marla.
- 7.4.2 states that lift must be provided in a building of plot size above 7 Marla. Also, lifts must meet the international standards. Moreover, several lifts must be provided keeping the size, its building height as well as use of the building

in view while conforming with standards of Uniform Building Code (UBC), 1997 or (IBC) International Building Code (IBC), 2006 of USA & NRM, 1986((LDA), n.d).

2.3.4 CBC, Karachi Building Bylaws:

Cantonment Board Clifton, Karachi includes the following bye-laws for the buildings in Clifton Cantonment in the practice of the powers confabulated through section 186 of the Cantonments Act, 1924 and approved and confirmed by the Federal Government.

- Minimum 1stall out of every 50 car parking stalls must be dedicated for PWDs.
- Provision of at least one W.C. for PWDs must be provided (Cantonment Board Clifton, 2007).

2.4 RELATED RESEARCH ALREADY CARRIED OUT

2.4.1 At International Level

The research titled '*Measuring Perceived Accessibility of SWDs at A Public University'* was conducted at Colorado State University. The purpose of the research was to assess the perceived accessibility of PWD and on the perceived quality of their education. Participants of this research included students with disabilities. The questionnaire included 33 questions analysis of which concluded that students found the campus accessible meaning implemented minimum standards set by ADA do serve the need of students with disabilities as compared to the building that does not have any such provision. However, the need for renovation and modification as per ADA standards was also highlighted by the students in older buildings as well as for

some other accessible facilities such as signage & accessible sidewalks, etc. (Simonson, 2012).

In Brazil, research on '*physical accessibility for disabled people: analysis of toilet facilities in primary health care units'* was carried out in from Aug 2014 to May 2015. The objective of this study was basically to evaluate the accessibility of toilet facilities for physically disabled people in health care units present in urban and rural areas. 157 health care units were analyzed. Analysis of buildings was done on the basis of a checklist, developed after a review of the technical standard 9050 prepared by the Brazilian National Standards Organization. Data processing was done by using SPSS. Results of the analysis showed the provision of toilet facilities range from 50% to 75% for less-able people in health care units(Áfio et al., 2016).

Another research in Malaysia was carried out on *'barrier-free campus: University Malaya, Kuala Lumpur'*. The main objective of the research was to highlight the need of necessary infrastructure for accessibility in the campus, from PWDs perspective. The questionnaire technique was used to know the views of PWDs regarding the provision of necessary infrastructure. From the findings, it was highlighted that the provision of the accessible design facilities was not widely made in University Malaya. In terms of PWD's accessibility and mobility, some areas were satisfactory whereas some were still in need of improvement. Some areas do have the provision of certain facilities but not up to standards, hence some necessary actions were recommended to provide systems to assist PWDs in campus area(Osman, Radzi, Bakri, & Ibrahim, 2015).

One more research conducted on '*applicability of Malaysian standards and universal design in public buildings in Putrajaya'.* The areas of study not only included disability issues and accessibility problems but also the accessibility level in

Malaysia, the study of Malaysian standards and implementation of universal design in the built-environment with the significance of public buildings in the study area. Data collection methodology incorporated the measurement of the facilities and documentation in the form of photographs in 5public buildings in the city. The studied facilities in the buildings; parking space, pedestrian areas, guiding blocks, ramps at sloppy areas, entrance, doors and doorways, interior pathways, information desk, stairs, lifts, escalators, religious facilities, building's signage, restroom; were measured and assessed using Malaysian standards guidelines of accessibility. Based on the results of the study most of the buildings have required facilities/infrastructures hence not much huge modifications were needed to be done but small amendments and retrofitting can add to the large improvement to the building's accessibility level(Kadir & Jamaludin, 2012).

Likewise, research on *'physical barriers faced by people with disabilities (pwds) in shopping malls'* was done in Malaysia. The main objective was to discuss the issues of accessible facilities, their usability by PWDs in shopping malls along with the importance of the updated Malaysian standards (MS 1184:2014). 3 case studies were opted in Malaysia to assess accessibility for persons with disabilities. Quantitative and qualitative both techniques were applied in this study. Data was collected through semi-structured interviews with people with disabilities to determine their perception of accessibility status in subject buildings. Access audit as well as site observations were done.This study's findings showed that generally, accessibility in the sampled shopping malls was at satisfaction level. However, the physical barriers pointed out during the study could be minimized more if not omitted completely (Bashiti & Rahim, 2016).

2.4.2 At National Level

The research titled *'architecture a social responsibility reforming urban surroundings, a barrier free responsive environment enabling limited ability: cases from Karachi, Pakistan'* carried out in Karachi. This explored the status of the response preparedness as well as interventions in Karachi. The main objective of the research was to assess the various dimensions of the built-environment in relevance to specific requirements of people with limited abilities. Hospital and educational buildings were taken as case studies. Structured and semi-structured interviews were conducted with the professional. Also, a survey was done to analyze the existing situation of selected buildings. However, results showed some infrastructures are provided in some buildings for the accessibility of PWDs whereas dire need towards the implementation of laws and policies was recommended(Afzal, 2015).

There is a deficiency of awareness on the issues that PWDs face in developing countries in general. PWDs most of the time face lack of equal rights in all walks of life. The Government of Punjab has established 246 educational institutions in previous 10 years. Hundreds of dedicated special schools, and colleges in Punjab are helping PWDs to educate themselves i.e. 25,000 SWDs. Although Government is taking serious steps to educate special persons, it is assumed that PWDs are lacking enough facilities for access to buildings and information as equally as to a normal student in our country does(Awais & Ameen, 2017).

A research *'disabled citizens: a case study of Pakistan'* indicates that PWDs are being neglected. Too little has been exercised to uplift the social status and provide them facilities. Laws are either silent or absent in reference to the protection of the rights of the Disabled. Not much has been in practice as well as put in implementation. State's protection to the vulnerable has been almost negligible. Other

countries of the world viz. the developed and the developing areas of the world cases of whose have been investigated under this research show strong attachment to the implementation of laws so that disabled people can be part of the mainstream of society. Efforts are made to bring them to the forefront instead of hiding them backward. Pakistan needs to take immediate action to create more spaces and facilities for its PWDs(Khalid Salahuddin, 2007).

Similarly, research on '*counting the invisible: understanding the lives of people with disabilities in Pakistan'* was conducted by RECOUP & funded by DFID. Data obtained from this study indicated that the majority of young special persons, who attended the school, did attend a conventional setting (97 percent). Only 1 young such person from the sample had attended a designated special school but that too at the secondary level which elevates a significant issue highlighting the needs to stress our attention on issues of accessibility and quality in the regular system for PWDs(Singal, Bhatti, & Malik, 2011).

Several infrastructural problems can easily be solved by the bureaucracy,i.e. simply by implementing the laws, already present and may help PWDs to manoeuvre around in the surroundings. For example, building codes for accessibility are present but these do not implement by the development authorities at provincial, municipal and district level as SOPs prior to formally approving the plans for the construction of new buildings, roads, and housing societies. The accountability of all concerned departments and in power government is mandatory. The Securities and Exchange Commission of Pakistan (SECP) need to address the corporate sector so they can submit reports on a regular basis on execution of accessibility by-laws and building standards in their offices, the State Bank may ask all banks to provide their special cheque books with Braille, etc.(Shah, 2016). But the lack of interest and ownership on

part of the relevant ministries and organizations of both federal and provincial governments are making the accessibility phenomenon more difficult to achieve.

The Higher Education Commission (HEC) emphasizes to carryout necessary steps to enable PWDs in the HEIs, in order to get equal opportunities of education. It states under '*policy for students with disabilities for higher learning institutes in Pakistan'*, the university will assure that the services need to provide in a way that meet the demands of the students and PWDs. Such as accessibility in libraries to get books, provision of needed information in larger print, accessible ramps, dedicated areas (washroom & parking) as per national and international disability code. Likewise, other physical infrastructural facilities in HEIs such as footpaths, curb stones, road-crossings, signage, etc. must observe the min. requirements of the International Disability Code in the Architecture planning and designing of such facilities (Higher Education Commission).

Moreover, some key points of the 2017-18 Budget regarding Public Sector Development Program (PSDP)are as follow:

- General public expenditure on the public's service was estimated at 2,553.6 billion.
- PSDP size is Rs 2.113 trillion.
  - Out of the above figure, 1112 billion rupees have been allocated to provinces, Federal PSDP has been estimated at 1001 billion rupees.
    - Rs 35.662 billion are assigned for the Higher Education Commission.
    - For the betterment of National Health Services, Regulations and Coordination Division Rs 48.701 billion are assigned.

The Planning, Development and Reform Division would collect an allocation of Rs16.798 billion (The News International, 2017).

One can easily construe the lack of implementation and the evaluation process regarding accessibility issues and related necessary facilities. The dilemma is no one is accountable for the budget, where it is being used or expensed as no execution is there. If we have budget allocation of health, educational and infrastructural facilities then these must be used in pursuit of improved accessibility. Disabled people can feel autonomous only when they have easy access to the buildings for their daily movement.

Chapter 3

METHODOLOGY

This Chapter explains the Materials & Methods adopted in this research. The techniques used to complete the study include research design, research population, research sample size, research study area, questionnaire design, software for analysis.

3.1 STUDY AREA

The area selected for the present study is the capital of Pakistan, Islamabad. In 1960, the development of Islamabad was started and is the only planned city of Pakistan. It's master plan covers 906 km2 and is divided into 5 zones. Its population in 1961 was approximately 117,669, 805,235 according to the 1998 census report which increased to app. 2 million as per the 2017 census report(PBS, 2017). Due to this speedy increase in population, Islamabad has experienced a number of predicted and unpredicted modifications. Here, the continuous growth of the man-made structures and growing population posed various challenges(Butt, Waqas, Iqbal, Muhammad, & Lodhi, 2012). This may due to the employment opportunities available here or otherwise. In most of the development works we usually ignore the needs/demands of less-able people. One of the main reasons behind the seclusion and segregation of PWDs from society and social mainstream is our biased behaviors towards universal design. The absence of such a kind of universal perspective will contribute to the expansion of the segregated and unequal society visible at present.

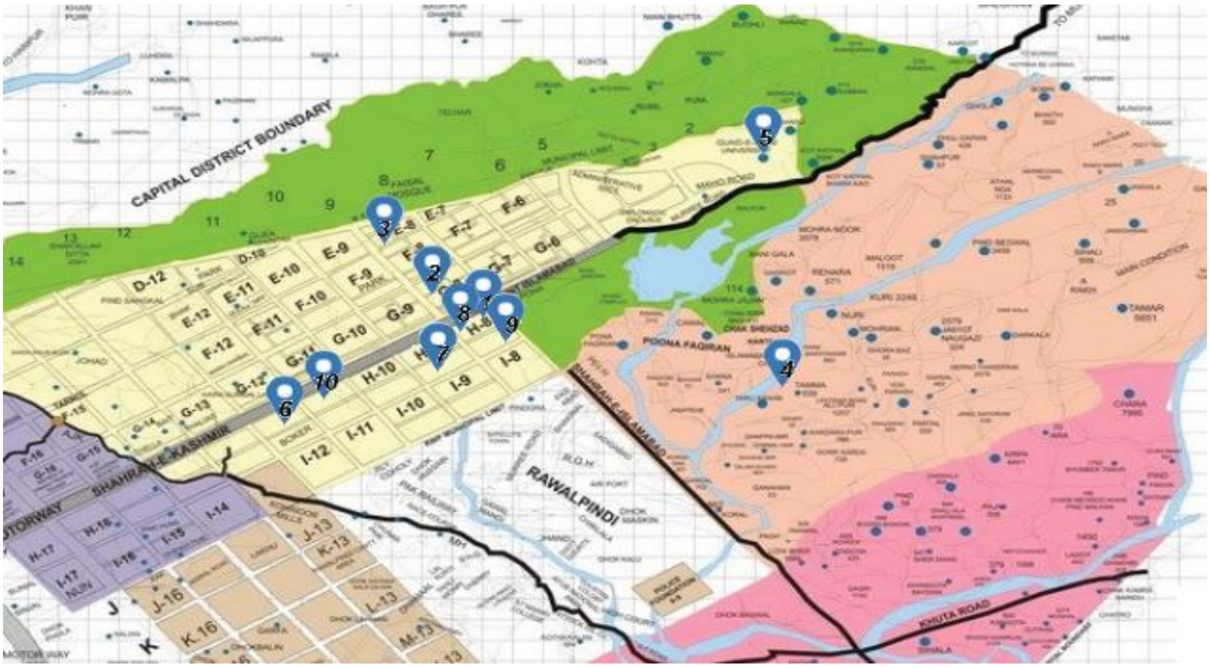


Figure 3.1: Master Plan of Islamabad

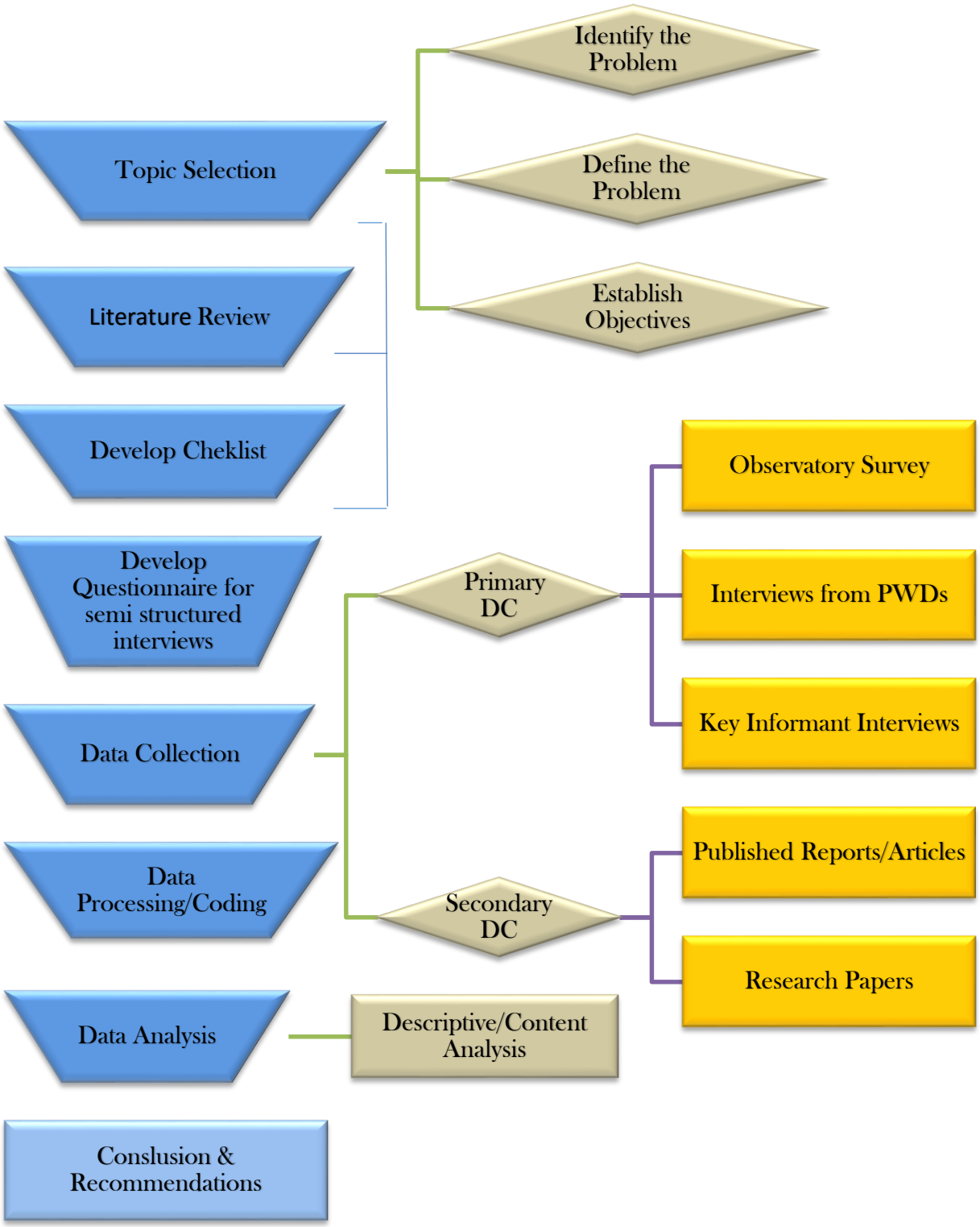


Figure 3.2: Flow Chart of Research Methodology

3.2 STUDY DESIGN

This research includes the collection of data from the respondents only once/at one point. Hence, this is a cross-sectional design.

3.3 STUDY SETTING

According to Denzin (1970) and Dixon et al.(1988) different methodologies in research cause greater validity & reliability in comparison to a single methodological approach(Samuel Kwame Ansah, 2014). Thus threefold technique was adopted to get the information related to the accessibility of PWDs in public & private universities. The first part of data collection was the Field Survey, in which sampled/selected buildings were explored in reference to the developed checklist. On the other hand, the second element was the collection of data from PWDs through Questionnaires. As it is one of the easiest and fastest methods of data collection and becomes more accurate when it comes to processing and analysing the collected data. Whereas, the third element was the collection of information from the experts (Key Informant Interviews) related to policies/laws/standards as well as existing practices through structured interview.

The research was carried out in Public & Private Universities of Islamabad. Total Public Universities registered as per HEC of Pakistan's website are 14, out of which, the following universities are sampled randomly covering 50 percent of the total.

- Allama Iqbal Open University (AIOU)
- Bahria University (BU)
- COMSATS Institute of Information & Technology
- National University of Modern Languages (NUML)
- National University of Science & Technology (NUST)

- Quaid-e-Azam University (QAU)
- Shaheed Zulfiqar Ali Bhutto Institute of Science & Technology (SZABIST).

Additionally, a total of 6 private universities are registered with HEC of Pakistan taking 50% sample randomly following 3 universities have been included in this study.

- Wish Campus (Riphah International University)
- National University of Computer & Emerging Sciences (FAST-NUCES)
- Shifa Tameer – e – Millat University (STMU)

3.4 RESEARCH POPULATION

The targeted population consists of the physically disabled person (majorly include students or employees in educational institutes).

3.5 SAMPLE SIZE

Due to the fact of the unknown population, disabled people interviewed at the time of the survey are selected randomly and using snowball sampling.

3.6 DATA COLLECTION

For the survey, a checklist (See Annex-B)was prepared after a thorough review of literature specifically, ADA standards, UN standards and the best practices of universal design internationally along with design codes/standards (See Annex-A). The major elements included in the list for this research are as follow:

- Access routes (surfaces & protruding objects) (10 elements)
- Parking(6 elements)
- Ramps (6 elements)
- Doors (9 elements)
- Water coolers (5 elements)
- Cafeteria (7 elements)

- Elevator (5 elements)
- Stairs (8 elements)
- Washrooms (7 elements)
- Accommodation (8 elements)
- Libraries (6 elements)
- Playgrounds (3 elements)
- Recreational spaces(2 elements)
- Spaces for religious deeds (2 elements)
- Fire Safety (6 elements)
- Signage (5 elements) etc.

The ultimate objective of data collection through questionnaires from PWDs is to assess the issues of such people pertaining to their accessibility & movement in the buildings.

For structured interviews from the experts, some questions were constructed to elicit the reasons for existing scenarios and information related to universal design Expert's interviews were basically to get the feedback to get to know about the main reasons behind the laxity of accessibility phenomenon in our infrastructure development.

3.7 DATA ANALYSIS

The technique used for data analysis is 'Descriptive Analysis'. This is used to identify the basic elements of data from a study and provide the brief information about the measures and sample. This analysis helps the researcher to present the information in a manageable form.

Microsoft Excel software was used to analyze the data obtained after surveying each sampled university. Analysis of observatory survey was done manually by coding the options as mentioned below:

Index	1	0
Description	provided as per standards	not Provided/not as per standards

A composite index was made to get the final score of each factor for the respective dimension by taking the observed value of each parameter;

$$\text{Score of Factors= F} = \left(\frac{\sum x}{n}\right)$$

where x is the score of parameter and n is the total number of parameters

$$\text{Final Score of each dimension} = \left(\frac{\sum F}{N}\right)$$

Where F is the score of factors and N is a total number of factors.

Later on, final scores of respective factors were interpreted through the following criterion values;

Index	0-0.2	0.2-0.4	0.4-0.6	0.6-0.8	0.8-1
Description	Very Poor	Poor	Acceptable	Good	Very Good

Furthermore, (Statistical Package for Social Sciences) SPSS was used to analyses the responses gained by the sampled population.

Limitation of Research

One of the limitations of the study was it only assessed the physical accessibility of people with mobility issues. It generally was due to the prevalence of physical disability in society in contrast to other disabilities, therefore, accessible infrastructures or facilities for sufferer of hearing, visual and communication impairments were not addressed in the study despite the fact that different kinds of disabilities demand various types of facilities to live without dependency to work effectively in educational institutes.

Another limitation was the time constraint due to which only 50% of universities of both public and private institutes were examined. Moreover, the administration of 1 university refused to allow us to survey the institute with the notion that this is not a building for disable students as we do not enroll them so no provision of facilities is there in the building. Besides, another university declined the request to survey the building due to the sensitivity of the area and security issues.

Chapter 4

DATA ANALYSIS & RESULTS

This chapter illustrates the results of the observatory survey of public & private universities as well as of the questionnaires, analyzed by using SPSS. The statistical analysis includes frequency distribution, bar charts & pie charts, these would be used for data presentation.

As per Higher Education Commission (HEC) official website, there are 14 public universities and 6 private universities in Islamabad. The numbers of universities surveyed for research are as follow: 50% sample of public & private universities covering 7 & 3 institutes respectively (total 10) are surveyed to get to know about the actual status of accessibility in such buildings.

Buildings (of sampled universities) that have been visited randomly for the purpose of research are as follow:

Public Universities

1. Allama Iqbal Open University: This public university was established in 1974, located in H-8/2 Islamabad. 70% of enrolled students are employed meaning it is providing opportunities to working-class people to pursue their studies along with their jobs (Allama Iqbal Open University). Faculty of Education, Social Sciences & Humanities, Arabic &Islamic Studies & Faculty of Science are the major schools in AIOU. The majority of the students are women. Buildings surveyed for the research purpose are as follow:

i) Faculty of Education.
ii) Department of Computer Sciences
iii) Library
iv) Liaqat Hall (Hostel)
v) Cafeteria

2. SZABIST University: Campuses of Shaheed Zulfikar Ali Bhutto Institute of Science & Technology are in Islamabad, Karachi, Hyderabad, Larkana & in Dubai as well Islamabad Campus is located in H-8/4. Offered programs include the Faculty of Management Sciences, Computer Sciences, and Social Sciences& Executive Programs. Surveyed buildings are mentioned below:

i) Department of Faculty

ii) Department of Management Sciences

3. Bahria University: BU was established by Pakistan Navy in 2000. Multidisciplinary programs offered in BU include Health Sciences, Engineering Sciences, Computer Sciences, Management Sciences, Social Sciences, Law, Earth & environment Sciences, Psychology & Maritime Sciences. It has campuses in Islamabad, Karachi & Lahore. Surveyed buildings of Islamabad campus located in E-8 are given below:

i) Quaid Block

ii) Sir Syed Block

iii) Fatima Hostels

4. COMSATS University: Comsats Institute of Information & Technology (CIIT) was established in 1998, located at Park Road, Islamabad. Currently, more than 7,908 students are enrolled in a different program offered here in CIIT. Academic departments include Faculty of Architecture & Design, Information Science & Technology, Engineering, Business Administration and Faculty of Science. Other campuses are in Abbottabad, Wah, Lahore, Attock, Sahiwal& in Vehari. To know the status of accessibility in CIIT, below mentioned buildings were surveyed.

i) Department of Electrical Engineering

ii) Department of Computer Science

iii) Department of Physics

5. Quaid-i-Azam University: Quaid-i-Azam University (QAU) was established in 1967. It is located at university road, Islamabad. Offered programs involve the Faculty of Natural Sciences, Biological Sciences, Social Sciences, Pharmaceutical Sciences & Faculty of Medicine. Surveyed buildings include:

i) School of Politics & International Relations

ii) Department of Social Sciences

iii) Admin Block

iv) Library

v) Cafeteria

6. NUST University: National University of Science & Technology (NUST) was established in 1991, located at H-12, Islamabad. NUST campuses are in Karachi, Risalpur& Rawalpindi as well. No. of schools are here in this university offering various programs including Business, Art, Design & Architecture, Social Sciences and Humanities, Chemical & Material Engineering, Civil & Environmental Engineering, Electrical Engineering and Computer Sciences, Microwave &Millimeter-Wave Studies, Applied Sciences, Mechanical & Manufacturing Engineering, Modelling & Simulation Studies, Natural Sciences, Advances Studies in Energy etc. Buildings visited to check the accessibility within the institute are as follow:

i) Centre for International Peace & Stability

ii) National Institute of Transportation

iii) Center for Advanced Studies in Energy

iv) Concordia 1

v) Ayesha Hostel

7. NUML University: National University of Modern Languages (NUML) was established as an institute in 1969, later upgraded to a university on May 2000.Campuses are in Lahore, Islamabad, Karachi, Faisalabad, Hyderabad, Multan, Peshawar and Quetta. Faculties include, Computer Studies & Engineering, English Studies, Management Sciences, Translation & Interpretation, Social Sciences, Education, Economics, Mass Communication, Pak Studies, Islamic Studies, and Peace& Conflict Studies, etc. The whole institute covers an area of 25 acres. Below mentioned buildings were visited:

i) Department of Foreign Languages

ii) Faculty of Engineering & Computer Science

iii) Library

iv) Cafeteria

Private University

8. Shifa Tameer-i-Millat University: STMU is located at H-8/4 Islamabad. Academic programs offered include Medical Technology, Pharmacy, Physiotherapy, Health Services Management, Business Administration, Computer Sciences, and Medical Image Technology, etc. This institute is consists of a single building having four floors (including basement, ground floor, 1st floor & 2nd floor).

9. Wish Campus (Riphah International University): Riphah University was chartered by the Federal Government of Pakistan in 2002. Constituent campuses are in Islamabad,

Rawalpindi, Lahore, Faisalabad & U.A.E. offered programs are MBBS, BDS, Media Studies, Mass Communication, Accounting & Finance, Mental Health Studies, Electrical Engineering, Biomedical Engineering & Software Engineering, etc. Wish Campus is all-girls building.

10. NUCES-FAST University: University is located at H-11/4, Islamabad over an area of 15-acre land. Other campuses are in Peshawar, Lahore, Karachi &Faisalabad. Faculty in Islamabad campus includes BBA, Accounting & Finance, Computer Engineering, Electrical Engineering, Management Sciences & Software Engineering, etc. To get to know about the status of accessibility within the campus whole institute was visited as it has only 2 buildings that include

i) Department of Computer Sciences
ii) Department of Electrical Engineering

Findings showed that accessible infrastructural facilities were not implemented widely in universities. Only certain areas incorporated some facilities such as stairs, access routes, drinking fountains, cafeteria, library, and doors, etc. whereas, most of the buildings were in dire need of major improvements for ramps, designated parking, classrooms, washrooms, and signage.

Table 4.1: Status of Accessibility as per Observatory Survey done in HEIs

Sr. no.	Elements	Public Universities							Private Universities		
		AIOU	SZABIST	Bahria University	Comsats University	QAU	NUST	NUML	NUCES-FAST	Shifa Tameer-i-Millat	RiphahWish campus
1	Parking	0.4	0.17	0	0	0	0.4	0.21	0.22	0	0.33
2	Access Routes	0.84	0.6	0.73	0.82	0.82	0.74	0.65	0.53	0.4	0.6
3	Ramps	0.87	0.83	0.55	0.37	0.33	0.36	0.04	0	0	0
4	Cafeteria	0.57	1	0.57	0.57	0.85	0.64	0.28	0.71	1	0.7
5	Doors	0.89	0.89	0.92	1	0.91	0.91	0.92	0.96	0.57	0.7
6	Water Cooler	1	1	0.86	1	1	1	1	1	0.8	1
7	Elevators	0	0.4	0	0.60	0.36	0.6	0	0	0	0
8	Fire Safety	0	0.83	0.39	0.67	0.13	0.53	0.37	0.27	0.67	0.33
9	Libraries	0.93	1	1	1	1	0.75	1	1	0.17	0.67
10	Washroom	0.51	0.85	0.67	0.75	0.41	0.7	0.89	0.62	0.57	0.42
11	Playgrounds/Grounds	0.67	1	0	0.25	0.81	1	1	1	0.3	1
12	Recreational Spaces	1	1	1	1	1	0.9	1	1	1	1
13	(Prayer Room/Mosque)	1	1	0	1	1	0.5	0	1	0.5	1
14	Accommodation (in case of hostels), Classroom (in case of departments)	0.525	0.75	0.625	0.625	0.6	0.525	0.5	0.54	0.625	0.5
15	Stairs	1	1	0.95	1	0.99	1	0.96	1	1	1
16	Signage	0	0.6	0.66	0.60	0	0	0.6	0.60	0.4	0.6
Average Score		0.6378	0.8075	0.5578125	0.70	0.6381	0.6597	0.5888	0.6531	0.500313	0.61563
Final Score		0.65							0.59		

Some major components of accessible infrastructure that require improvements and retrofitting in the university buildings are illustrated below:

NOTE: All institutes written under box cover private universities.

Outdoor Facilities

An accessible building must design outdoor facilities approachable for all including people having mobility issues. One of such outdoor facilities is parking. Accessible parking allows people with limited mobility to access all parts of the community (Tierney, 2002).

1. **Parking:**

Provision of parking facility is important due to automobile dependency. Lacey (2004) highlighted the importance of accessible parking because cars are the easiest method of transport for people having physical disabilities(Soltani, Sham, Awang, & Yaman, 2012). After the observatory survey, it was noted that parking space is usually provided but this lacks allocation of designated parking facilities for PWDs. A review of the literature recommended that designated parking for PWDs should be accessible near the building entrance with the shortest possible access routes. Also, surfaces should be slip-resistant and provision of signage for the designated parking stalls should be mandatory(United Nations Enable, 2004); (Canadian Human Rights Commission, 2007); (ADA Government, 2010). Findings of the present study revealed that not a single university justified the standards as half (50%) of the parking facilities and designated parking places for disabled people were missing in both public and private HEI. Although enough space was there in one-third of buildings (30%) but the proper marking of parking lane and reservation for PWDs were lacking. Only two public institutes partially satisfied the parking facilities by providing the facility near building entrance. Parking spaces were found at far distances and did not cover

the whole departments effectively which might be due to the fact of old-time construction as the institute was constructed decades back. Due to lack of parking spaces inside the campus or department, students are forced to park their vehicles outsides the campus especially in private universities. Such kind of situations pertaining to limited accessibility or availability of parking facilities on/off-campus can make students more dependable on their family members or peers. The findings related to poor parking conditions and facilities for PWDs of the present research are consistent with the findings of other researches. Osman et al. (2015)reported similar results when observed parking facilities for less able people in the University of Malaya, Kuala Lumpur where only certain areas have good accessibility while others needed improvement. Similarly,Engelbrecht and De Beer (2014)noted that more than 10% of access constraints were associated with parking facilities.

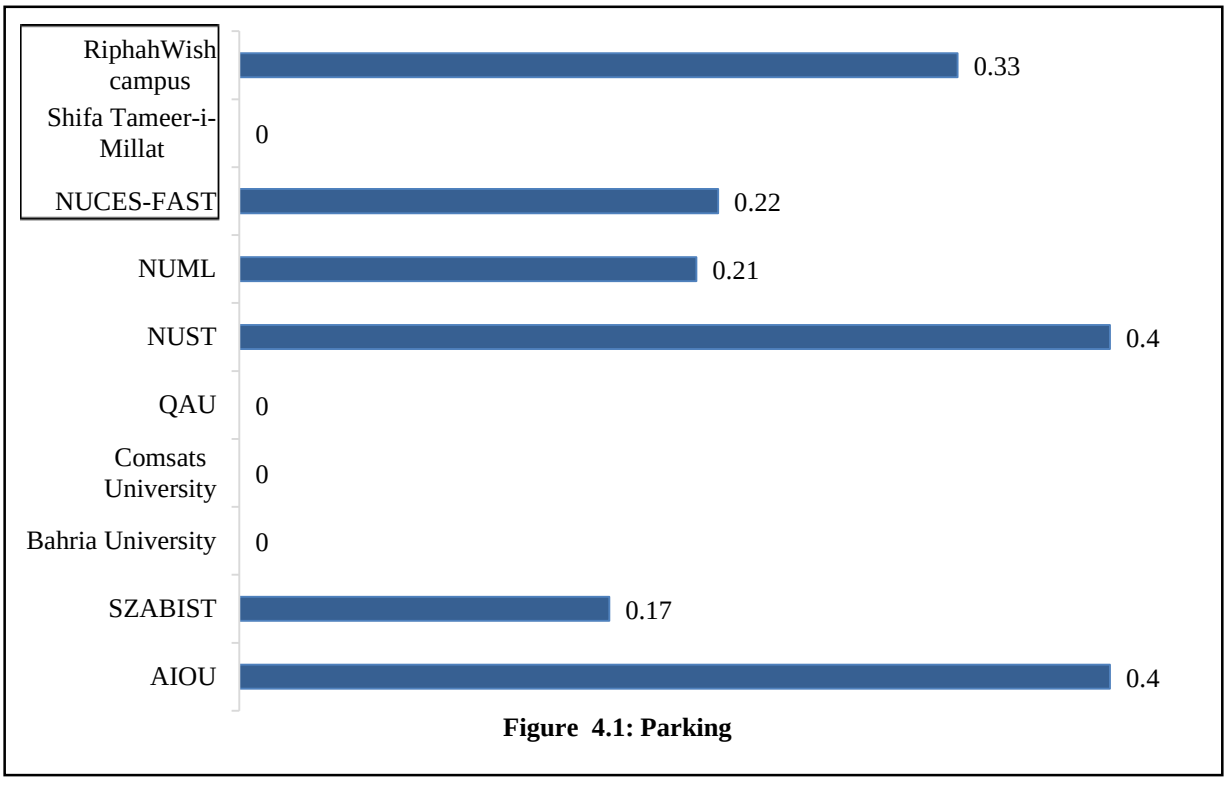


Figure 4.1: Parking

Picture 4.1: Parking in **Wish Campus** **Picture 4.2:** Parking in **NUML**

Circulation

Circulation is the movement through space. Horizontal and vertical circulation should be designed to ease the move between internal and external spaces as well as must be adequate for safe and unobstructed movement. In this study, vertical circulation included three (03) building elements i.e. ramps, stairs, and elevators however only doors were included under horizontal circulation. For any building, these items should be clearly defined and designed in a way that promotes people having mobility issues to access the needed building facility.

1. Ramp

Historically step entrance in the buildings remained a big issue for the less-able people. Access ramps are the most common solution to the aforementioned problem due to their simple design and least vulnerability to breakdown. The literature review suggested that to satisfy accessibility standards, all buildings that are of public use must have ramps of an appropriate slope to allow wheelchair users to access them and landings on the ramp should be designed to drain water from their surfaces. Moreover, the provision of handrails must be

ensured on each side of the ramp and besides cross and running slope should be as per standards(United Nations Enable, 2004); (Canadian Human Rights Commission, 2007); (ADA Government, 2010). During the survey, it has been noted that the provision of ramps was either totally missing or these were not as per local standards. In one-third HEIs (40%), PWDs facing serious problems of accessibility due to the non-availability of ramp especially in private sector HEIs. During the survey, it was pointed out that initially temporary steel made ramps were provided which were removed later on. Remaining institutes have the provision of fixed concrete ramps in most of the visited buildings. However, issues of ineffective and inefficient provision of ramp were also noted especially that of steep slopes and narrow width. This limits the accessibility of less-able people hereby they have to ask their fellows for help to enter in to the building where ramps are not provided.

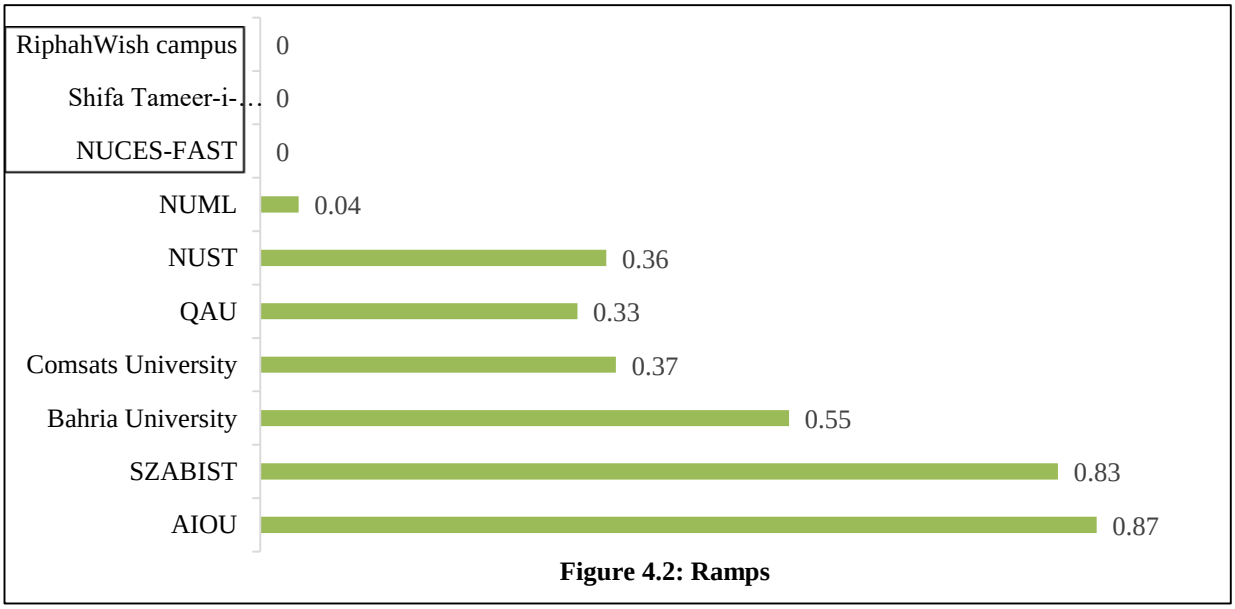


Figure 4.2: Ramps

Despite ramps being the cheapest, many past studies have reported no provision of ramps in public buildings. While studying the accessible infrastructure in schools,Ibrahim, Osman, Bachok, and Mohamed (2016)reported that almost half of the surveyed schools lacked the provision of ramps creating hindrance in the enter and exit of the less able students. Likewise, Kadir and Jamaludin (2012)found that ramps were too steep that could be dangerous to

special persons while using.

Picture 4.3: No Ramp in **STMU**

Picture 4.4: Ramp in **Centre for International Peace & Stability, NUST**

Picture 4.5: Ramp in**Faculty of Science Department, QAU**

Picture 4.6: Ramp in **NUML**

2. Stairs

Stairs are the essential component of any building therefore needs modifications to make

them accessible and user-friendly in public as well as educational buildings. Stairs should be as per standards to make these accessible for the people using canes, walkers or any kind of walking aids. However,Danso, Ayarkwa, and Dansoh (2011)stated that vertical circulation including staircases was well-designed in newer buildings yet needed certain amendments for the complete elimination of constraints causing fatigue to people with disabilities. The results of the present research further reinforce the findings of Danso et al. (2011). Staircases were found accessible in almost all the universities with an overall score of 0.9. In newer campus building, stair surfaces were found slip-resistant, levelled and smooth with handrails on sides. However, in slightly older institutes, modification is required to enhance the accessibility and make the staircases approachable and useable for the less-able people where handrails were provided only on one side while provision on both sides is imperative.

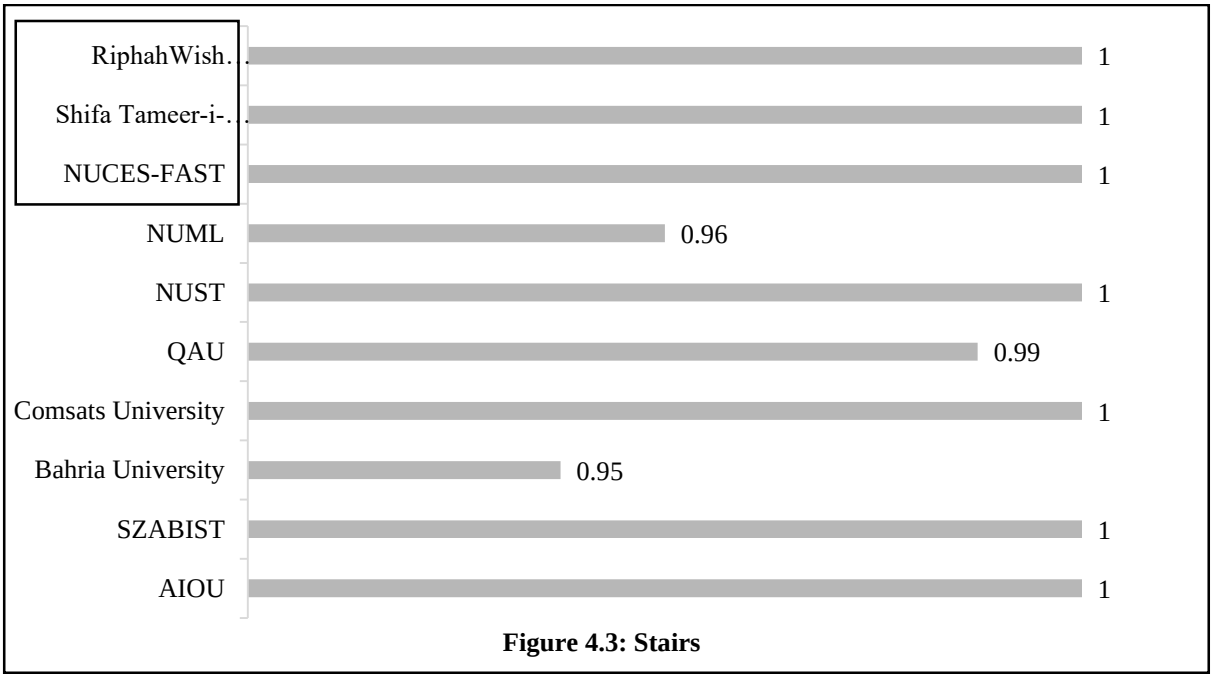
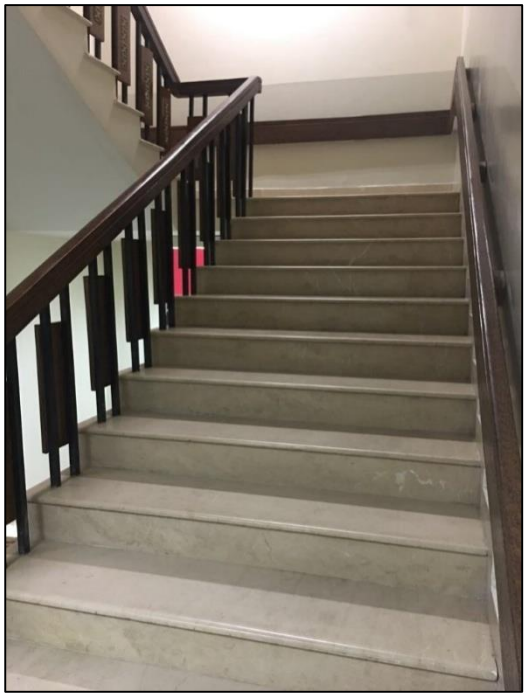


Figure 4.3: Stairs



Picture 4.7: Stairs in **Quaid's Block, Bahria University**

Picture 4.8:Stairs in **School of Politics & International Relations, Quaid-e-Azam University**

3. Elevator

In institutes of more than one storey, a student has to move vertically either to avail the facility of library for reading, laboratory for any kind of experiments or to attend the lecture in the class room constructed at the above floor. Therefore, multi-storey buildings must be designed such that special persons can easily move on the upper floors without depending on anyone. Width of elevator door must wide enough to allow wheelchair users to enter through it. It must have handrails on side walls and emergency buttons should be installed at approachable height for universal use(United Nations Enable, 2004); (Canadian Human Rights Commission, 2007); (ADA Government, 2010). However, past researches have reported serious negligence in the provision of such facilities in the university buildings in the modern era. According toOsman et al. (2015),while researching on 'Barrier-Free Campus: University Malaya, Kuala Lumpur' concluded that infrastructural facilities majorly including ramps, lifts, and handrails, etc. in different sampled buildings were lacking and if these were

present then provision was ineffective and inefficient. The situation of accessibility to the upper floors was unsatisfactory due to the lack of elevators in most of the buildings. Few universities have provided lift or elevator facilities in multi-storey buildings. Surprisingly, not a single private institute has the facility of elevator whereas only 4 public universities have the facility of elevators in 40% of surveyed departments in contrast to remaining buildings thus this feature is needed to be addressed.

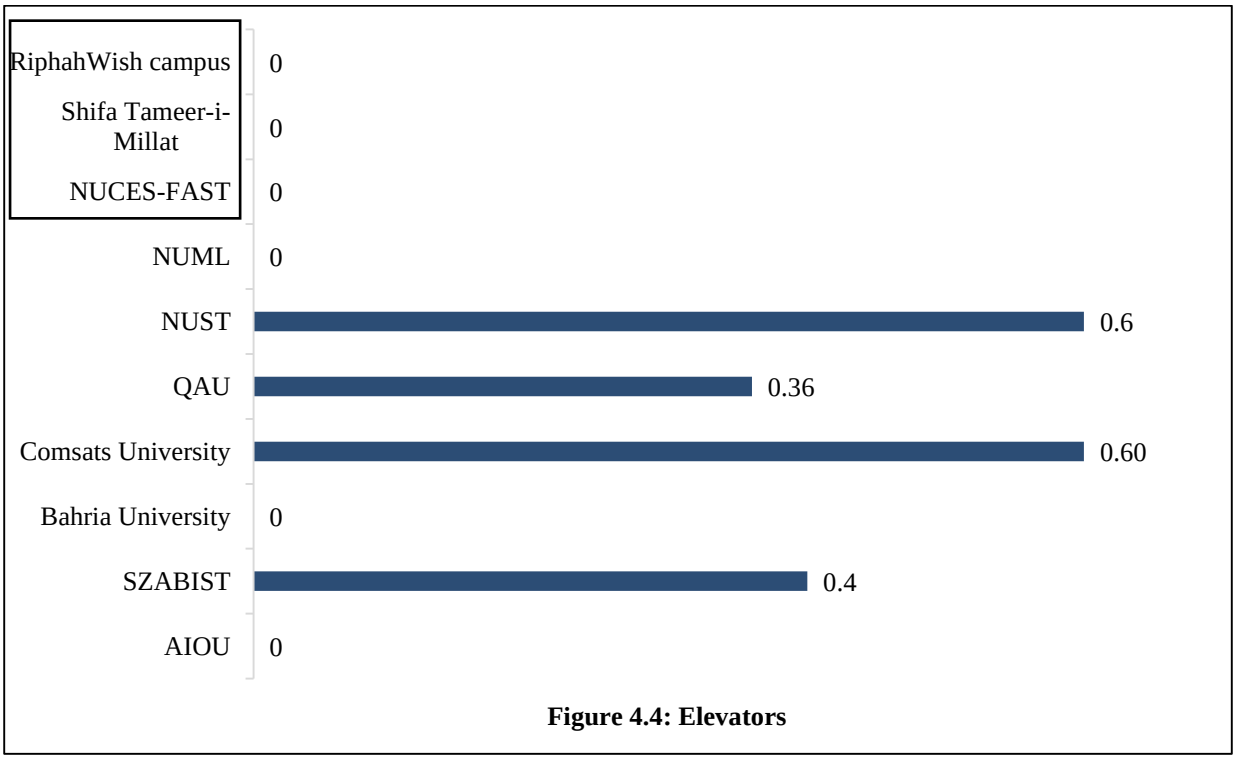


Figure 4.4: Elevators

Picture 4.9: Inside view of Elevator in **Electrical Department of Faculty, SZABISTEngineering Department, Comsat University**

Picture 4.10: Elevator in

4. Doors

Accessibility of a facility plays a vital role in deciding the physical activity of PWDs. Satisfying all other infrastructural elements, the literature review showed that doors shall also be wide enough that a wheelchair user can easily enter through it and shall have a lever type knob and vertical glass panel to make it easily useable for him/her. Also, doors must have enough manoeuvring spaces on the push and pull sides as well(United Nations Enable, 2004); (Canadian Human Rights Commission, 2007); (ADA Government, 2010). Positively in most of the universities, doors were accessible. In most public and private universities, doors were accessible with respect to its dimension (width) but lacked vertical glass panel and lever type knob handle in majorly private institutes. The mean score of private universities showed 0.74 compliance with accessibility standards and public institutes showed 0.92, however the overall score of usability of doors is 0.86.

Similarly, suitability and adaptability of doors were found above 50% adequate when(EWEMAR, 2008)researched on level of satisfaction in environmental adaptation in

general hospitals in GAZA. Moreover, analysis of another research done by (Kadir & Jamaludin, 2012)showed that for door facility, mean of all assessed building was satisfactory (70%). Such statistics illustrate that most of the buildings satisfy accessibility standards of door facility for physically disable people yet modification in the existing provision is still required to be in full compliance with universal standards.

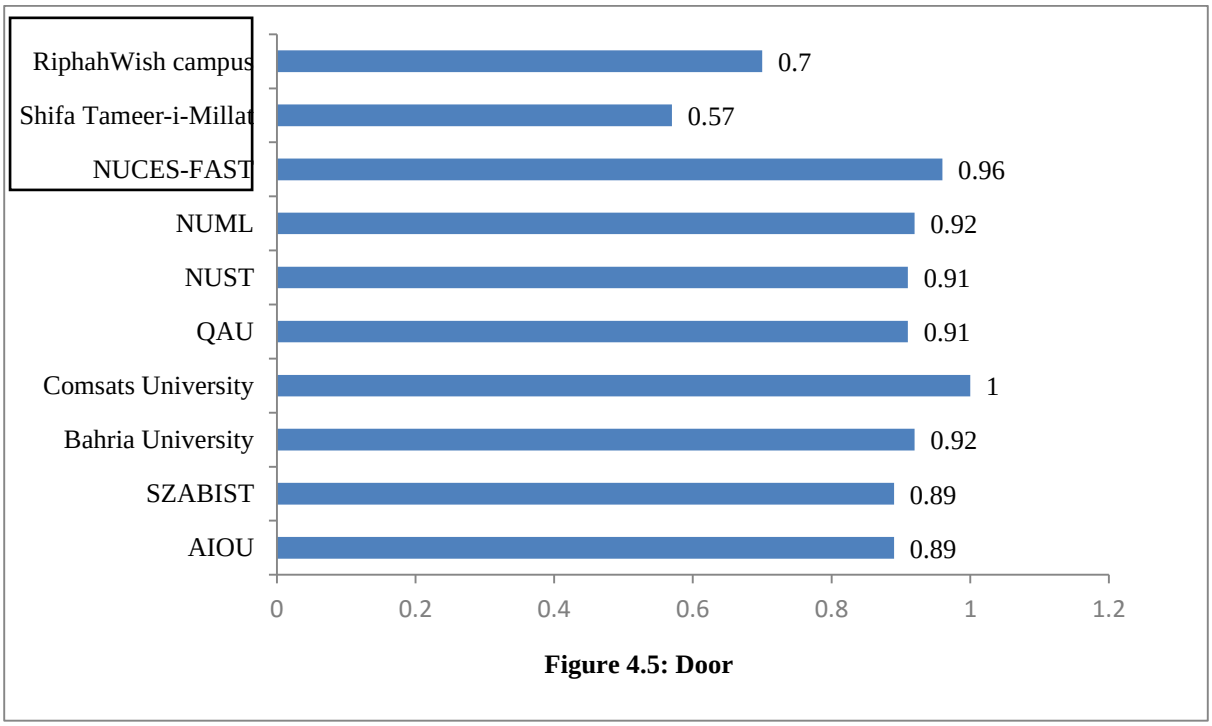


Figure 4.5: Door

Picture 4.11: Door in **Wish Campus**

Picture 4.12:Door in **Center for Advanced Studies Energy, NUST**

In CASE department at NUST University, the door (shown in above picture) is the best illustration of the accessible door opposite to the one shown in Wish Campus.

Indoor Facilities

Inaccessible indoor facilities of any building restrict special persons to be effective and live a normal life. For any student who has any kind of disability, class rooms and washrooms must be approachable and accessible.

1. **Classroom**

The literature review of various accessible codes suggests that classrooms or accommodation should be designed by keeping the fact in mind that any students with disability may get admission in the institute. Such as all facilities including electric switches and windows should be accessible in the class room. In addition, class rooms must have accessible doors and arrangement of class room furniture should be in a way that spares

enough space at the front for the seating of wheel chair user. As per survey findings, in public and private universities, the situation of classrooms was not accessible for physically disabled people such as doors of classrooms were not operable from both sides but through slight effort, this could be made completely accessible. The average score of all HEIs is 0.58. Likewise, Osman et al. (2015)at the time of their research observed the condition of lecture halls and residential areas of the university as poor and average respectively. Insufficient facilities for disable people hinder their activities in universities, therefore, it is required to listen to and act upon the needs of disabled people in order to make institutes more inclusive and accessible for them.

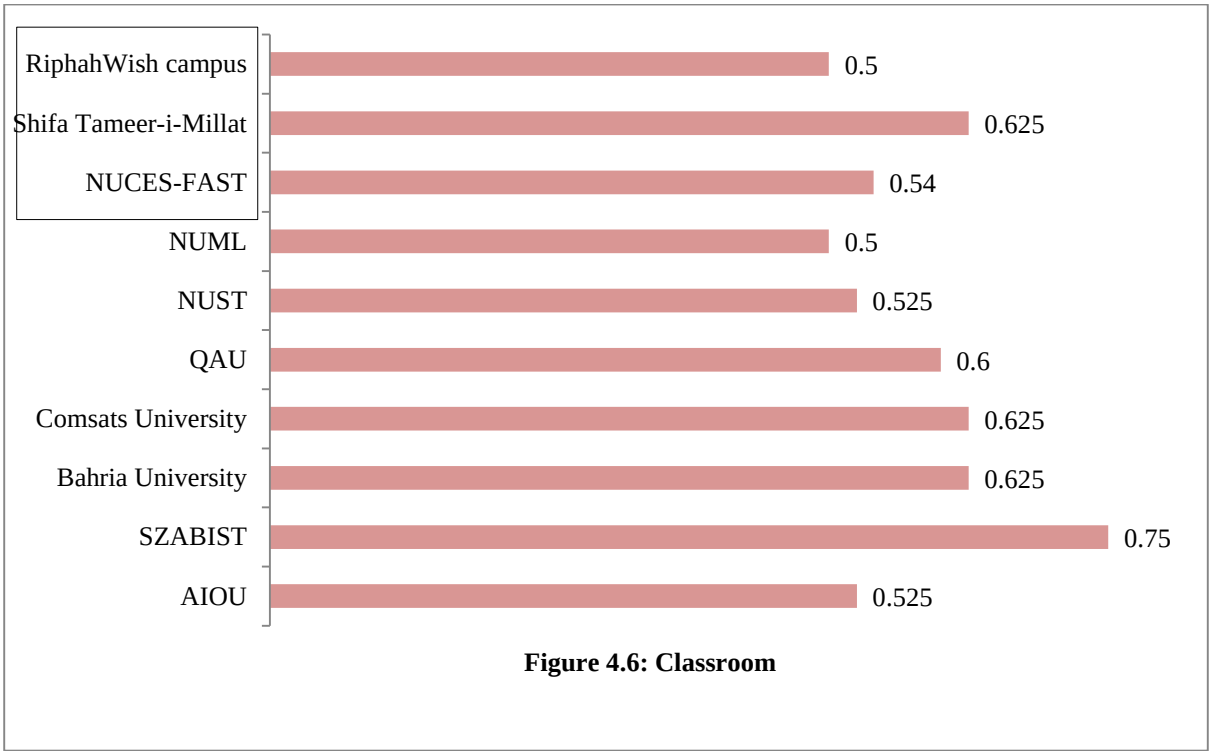


Figure 4.6: Classroom

Picture 4.13: Ramp for entering the classroom in the **Department of Natural Sciences** at **Quaid-e-Azam University**

2. Washroom

Kamarudin et al. (2014) stated that opportunities to attend activities for PWDs are less as compared to people without disabilities which are majorly due to the inaccessible environment. However, sustainable development goals succinctly outlined the inclusion of minorities and disabled people in every development. The literature review suggests that the washroom should be an accessible facility. These include that the door should be operable from both outside and inside. Moreover, the toilet seat and the wash basin must be approachable. The condition of washrooms was less satisfactory due to the less width of the door area and a small area of washroom. Compliance with accessible standards in private and public institutes was found 0.53 and 0.68 respectively whereas cumulative score pertinent to

accessible washroom of all institutes was 0.6.Findings showed that three public universities have the provision of the accessible washroom for persons with disability in some of the buildings but with a deficient element such as handrails. On the other hand, private and 4 public buildings don't have the provision of barrier-free washrooms. For example, in the Faculty of Education, AIOU threshold height of the door is more than the standards, making it troublesome for a disabled student to access the washroom. Likewise,Kabuta (2014) while researching in higher learning institutes in Tanzania observed less favored washrooms for physically disabled people where 60% of washrooms were in poor condition. Another researcherKportufe (2015)found results during a research on assessment of 32 government buildings in Ghana where 92% of premises of surveyed buildings did not have sanitary accommodation for physically disabled people.

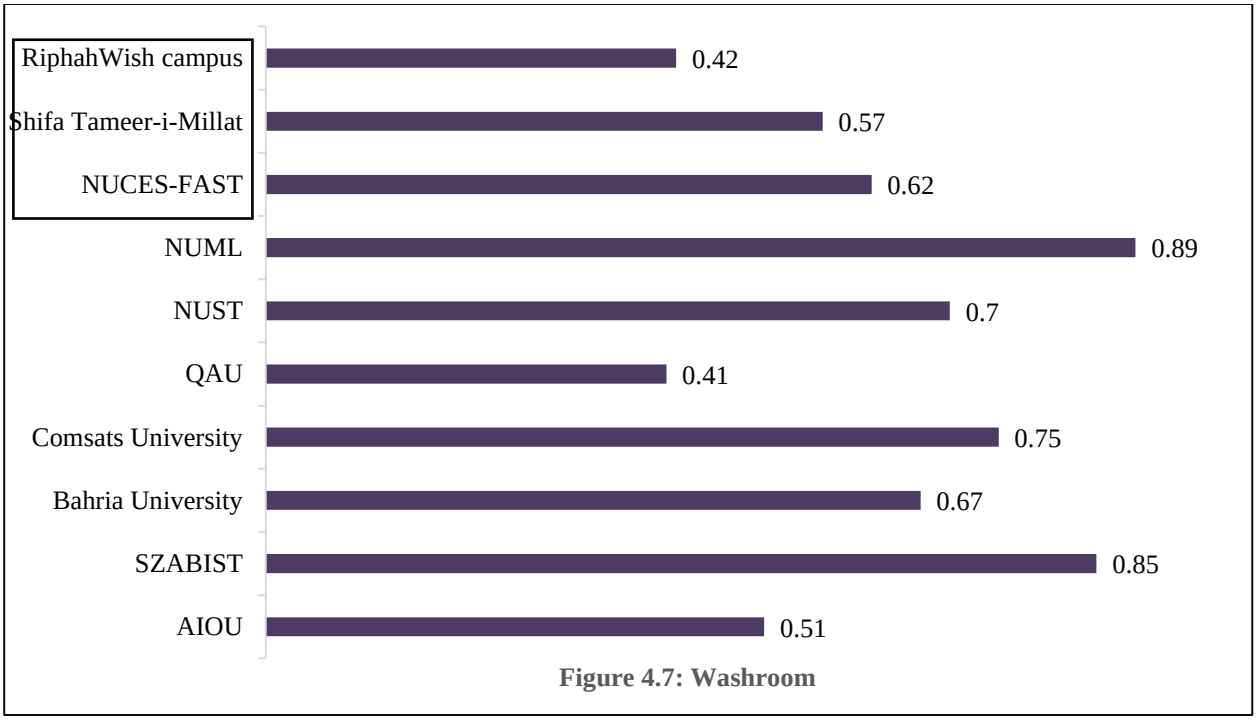


Figure 4.7: Washroom

Picture 4.14: Washroom Door in Faculty of Education, **AIOU**

Picture 4.15: Accessible Washroom in Faculty of Engineering &Computer Sciences, **NUML University**

Communication Aid

For the movement in the outdoor environment or indoor area, indication and direction is necessary. Signage is of the tools that facilitate orientation. Satisfying universal design, provision of signage is paramount specifically for the PWDs.

1. Signage

Signage, an element of way finding and information is very important for a building to make it accessible as these are directional and informative. These must be consistently located wherever facilities are needed to be identified as accessible an international symbol of access is imperative (United Nations Enable, 2004); (Canadian Human Rights Commission, 2007); (ADA Government, 2010).Simonson (2012)while researching on 'Measuring Perceived Accessibility of Students with Disabilities at a Public University' found, students complained about the poor number and orientation of signage etc., in the older buildings.

Furthermore,Osman et al. (2015) established from the analysis that provision of signage in the university was ineffective and inefficient causing trouble for special people to access certain locations. Likewise, statistics of the present study showed that signage was one of the most overlooked facilities in HEIs. Not a single university has the universal symbol of disability at specific places for easy access. Survey and its analysis suggested that this could be due to the reason that provision of facilities or reservation of some specific areas for special persons was unavailable. However emergency exit signs are provided in most of the buildings which should be provided in all buildings along with mandatory universal infrastructural elements

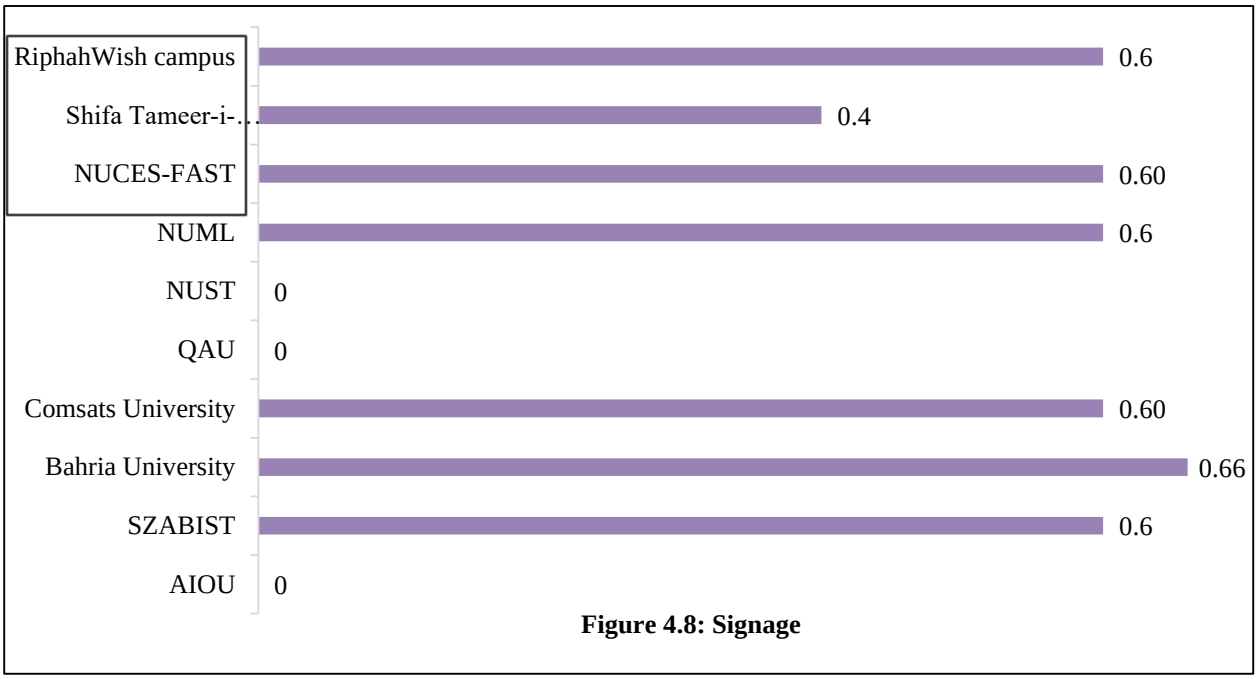


Figure 4.8: Signage

1. DEMOGRAPHIC PROFILE OF RESPONDENT

i) Gender & Age

Total 90 people participated in the research and filled the questionnaire as shown in the table below. Respondents include both males (51%) and females (49%) who have some kind of disability. As sample population majorly included university students as well as employees

so the prevalence of the respondents of age ranging 20-30 years (57.8%) was greater than those with the age between 10-20 years (5.6%). However, one-fourth of the total respondents was between 30-40 years (25.6%) whereas 11.1% were above 40 years.

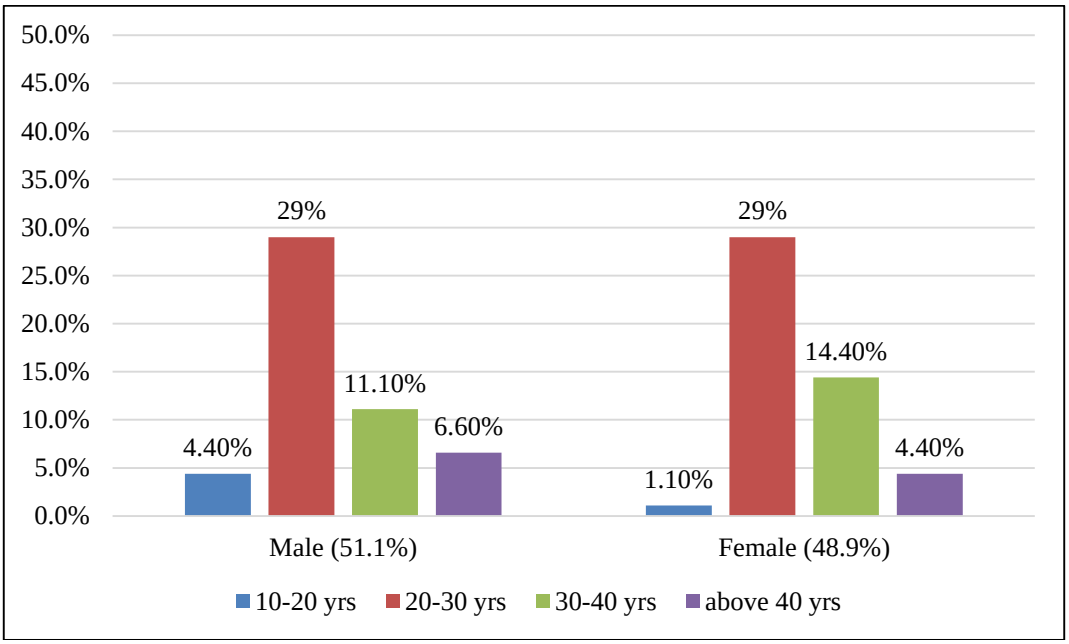


Figure 4.9: Demographic Details of Respondents

ii) Profession/Source of Earning

As the below table shows, approximately half of the total respondents (46.7%) were students, whereas comparatively a low number nearly one-quarter of whole (26.7%) covers the population who are employees and the majority of them are doing their jobs in educational institutes. However, the proportion of less than one quarter (20%) comprises of the respondents who were dependent on their parents, meaning after matric or intermediate education they do nothing and rely on their family for living. Lastly, the prevalence of the ones who do their own business (6.7%) is very low as compared to the aforementioned categories. Most of them have their own NGOs majorly working for the social inclusion of disabled people.

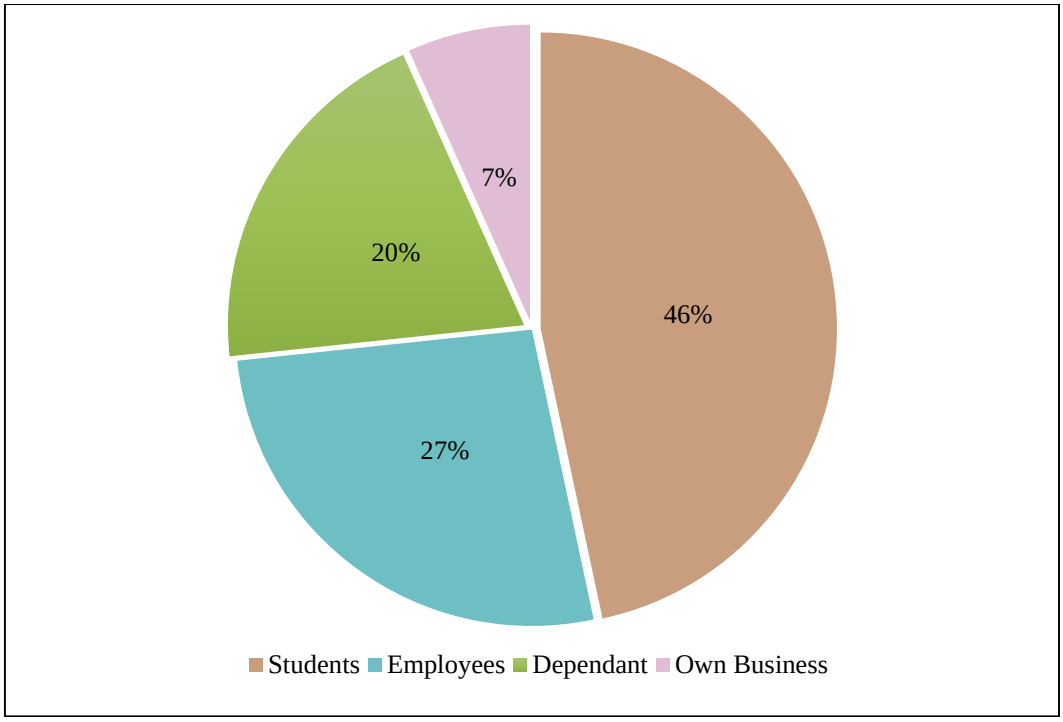


Figure 4.10: Profession of Respondents

2. DISABILITY & MOBILITY

Difficulties in mobility were the most commonly responded disability (89%) under this research. Disparities in other reported types of disabilities from the respondents such as visual impairment (2%), hearing impairment (2%) and speech disorder (7%) can explain by the fact that the preliminary focus of research is to check the status of accessibility in universities, therefore, the targeted population includes the people who have mobility/accessibility issues.

The responses showed that the prevalence of physical disability due to polio (74%) is very high as compared to the brain/spinal cord injury sufferer (18%) and cerebral palsy sufferer (8%). It is therefore plausible that our government's steps towards polio eradication can lower the number of people with physical disabilities. Proportions other than polio were reported from the respondents as a result of some kind of major or minor accidents and earthquake hazards or otherwise.

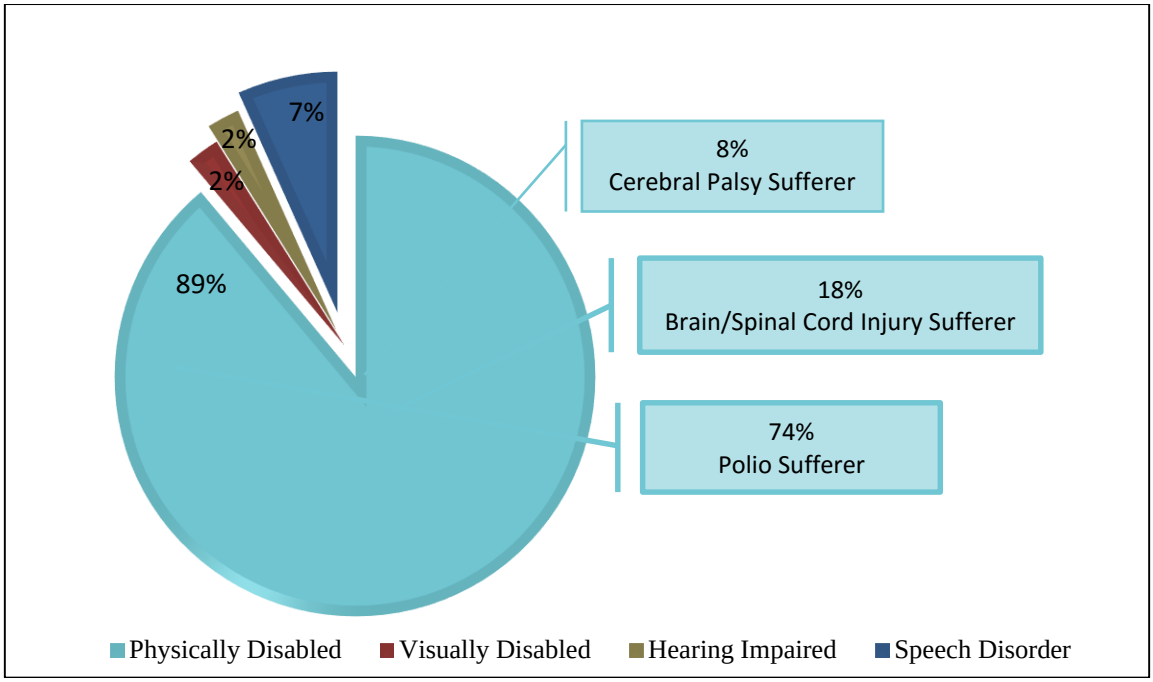


Figure 4.11: Type of Disability

Moreover, respondents were probed about the use of mobility aids whether they can move without these or not? More than half of the respondents (65%) who always use mobility aids mostly use wheel chairs. Other assistive devices used by handicapped people for their mobility are crutches, walkers and assistive cane etc.Less than 1 quarter of all respondents (18%) who never depend on any mobility aid for their movement include people who have some speech & hearing disorder or issues related to some kind of impairemnet in their hand or arm, hence such people can walk easily without any assistance.

A group of people comprising of those who use assistive devices sometimes (8%) and rarely (7%) reported that they can maneuver in their homes without using these devices but use whenever they go outside their houses, meaning the severity of their mobility issues is less as compared to those who are always dependent on mobility aids.

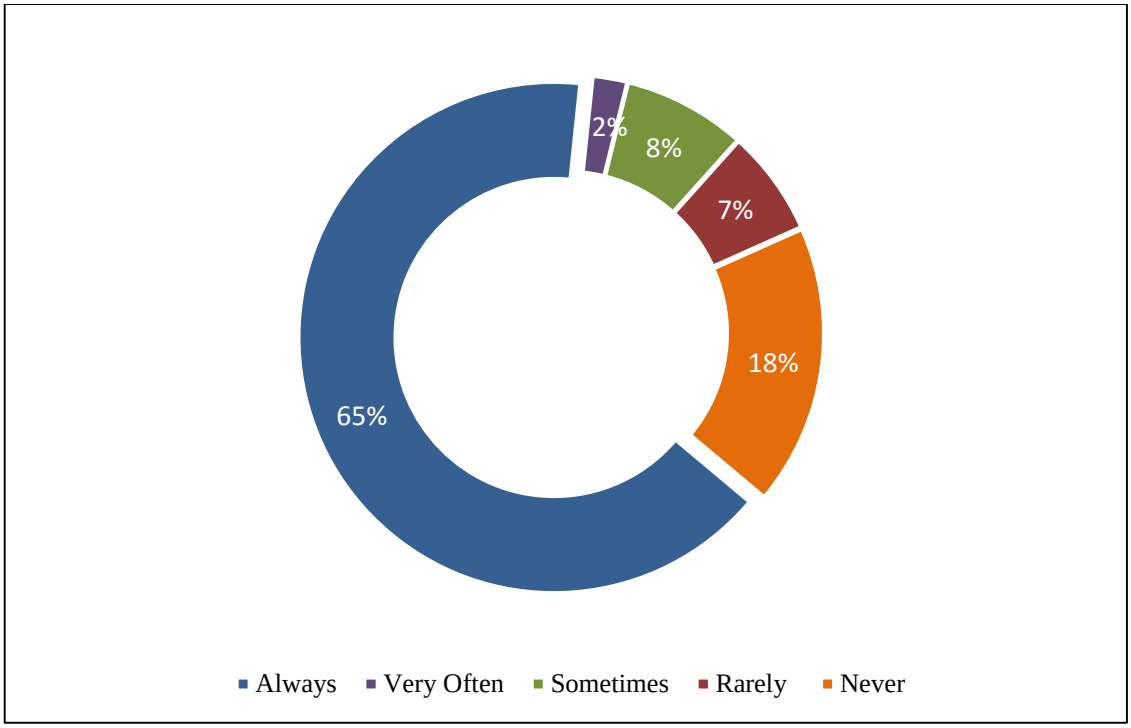


Figure 4.12: Use of Mobility Aids

3. PERCEPTION OF RESPONDENT

3 questions were added to get the perception of PWDs related to accessibility issues they face. These covered reasons as well as solutions behind societal barriers, equal rights (either there is the provision or not) the and difficulties in educational institutes.

1. Accessibility issues of PWDs in Educational Institutes

Many educational institutes lack universal design facilities that restrict PWDs in their independent mobility, putting them in more vulnerable situations. Different categories of constraints that were experienced by the targeted population pertaining to their accessibility in educational institutes are shown in figure 5. Almost one-third of the respondent claimed that lack of awareness (35.5%) and non-implementation of building codes (6.7%) as major causes of restricted mobility of PWDs in higher educational institutes. According to half of the respondents major constraints in their independent mobility are associated with the lack of accessible infrastructure (46.70%).

a) *Lack of Accessible Infrastructure*: As per respondent's views, accessible facilities that were found insufficient and lack of which become troublesome for people having physical disability majorly include parking, ramps, signage, access to fire safety facility, elevators, etc. Designated parking was not provided in HEIs. Likewise, ramps were absent however these must be provided in every building that is approachable by the public wherever change in level is present. Similarly to access upper floors in institutes it becomes difficult for PWD due to lack of an elevator. Signage was also lacking in the building that cause confusion for PWD to know about the designated accessible facilities (if provided). Moreover, respondents were not satisfied with the accessibility to fire safety facilities in the building because emergency exit ramps were absent. One of the respondent briefly explained the issues of accessibility as

> *"First of all one constraint that we face is lack of designated parking as it makes difficult for a wheel-chair user to come out from the car and move out from the lot specifically incase of congested parking as space becomes insufficient for us. Moreover, ramp is not provided at the entrances of most of the departments. Besides we have to depend on our fellows to go upstairs as the provision of elevators/ramps is not made which makes us feel inferior and becomes troublesome for the fellows too by lifting the wheel-chair while helping us in this regard. Last but not the least; lack of designated washrooms are one major problem which makes it difficult for us to maneuver around therefore provision of accessible infrastructure must be ensured to encourage the student like us to get admission in HEIs without any hesitation."*

b) Lack of Awareness: Lack of awareness is one of the major reasons behind the negligence that PWDs face from society towards their rights. Moreover, the behaviour of people towards PWDs is very prejudiced. Most people do not behave well and show disgrace while talking or performing any activity along with PWDs which manifest the lack of acceptance of the subject population. Respondents have corroborated that people's stereotyping and discriminatory nature led stigmatization as well as continued invisibility of special persons. If people are not aware of disability how come they incorporate their facilities while designing & executing any building plan? A plan should only be accepted by the responsible departments if the provision of accessible infrastructural facilities is there. The aforementioned condition is there in our laws but the dilemma is the

heedlessness by our respected departments towards such an important element of sustainable development. Feedback from one of the respondents is quoted as

> *"I feel people consider us less capable as compared to persons without a disability. This behavior majorly arises from the lack of awareness about disability and rights of people with disability. Awareness can surely reduce this discrimination and educate the society to consider PWD as an equal citizen."*

c) Implementation of Building Codes: Lack of execution and follow-up of existing laws are causing more issues for PWDs in order to maneuver around in the buildings. To ensure the provision of rights of PWDs, universal design is one of the main factors to be focused upon. Implementation of a plan having accessible facilities costs less than to incorporate these facilities later after construction is completed. The government must ensure that each public building plan has accessible infrastructural facilities before approval for construction. As quoted by a respondent too that

> *"It is the responsibility of government organs to ensure equal opportunities for PWD in every field specifically regarding their accessibility. However, in my university provision of accessible infrastructure is lacking at large scale. Our dependency on our fellows becomes a hurdle in our competencies. If the government will take major steps in implementing the codes effectively only then we will walk in out institutes independently."*

d) Lack of Accessible Employment and Sympathetic Behavior: On the other hand, jointly less than one-quarter respondents stated lack of accessible employment facilities (2.2%) and sympathetic behaviour (5.6%) as main issues of social exclusion of PWDs. Some people consider disability as a fault of sufferer or curse from God which is irrational and anecdotal altogether (Shahzadi, 1992; Hussein et. al., 2002; Nidhi Singal, 2008). PWDs are able and willing to work to be financially independent and contribute towards wider society and community development (Waterhouse, Kimberley, Jonas & Glover, 2010; Narayanan, 2018). One of the respondents gave feedback that;

> *"We face discrimination pertaining to our employment facilities in HEIs. Despite having a quota for PWD, employers are reluctant to employ special persons due to*

their disability. If a person having a physical disability is capable of the designated job then he/she must be considered for that position. Moreover, people feel pity for us and this sympathetic behaviour is discouraging for us. I just want to say that people should be empathetic rather than sympathetic to us."

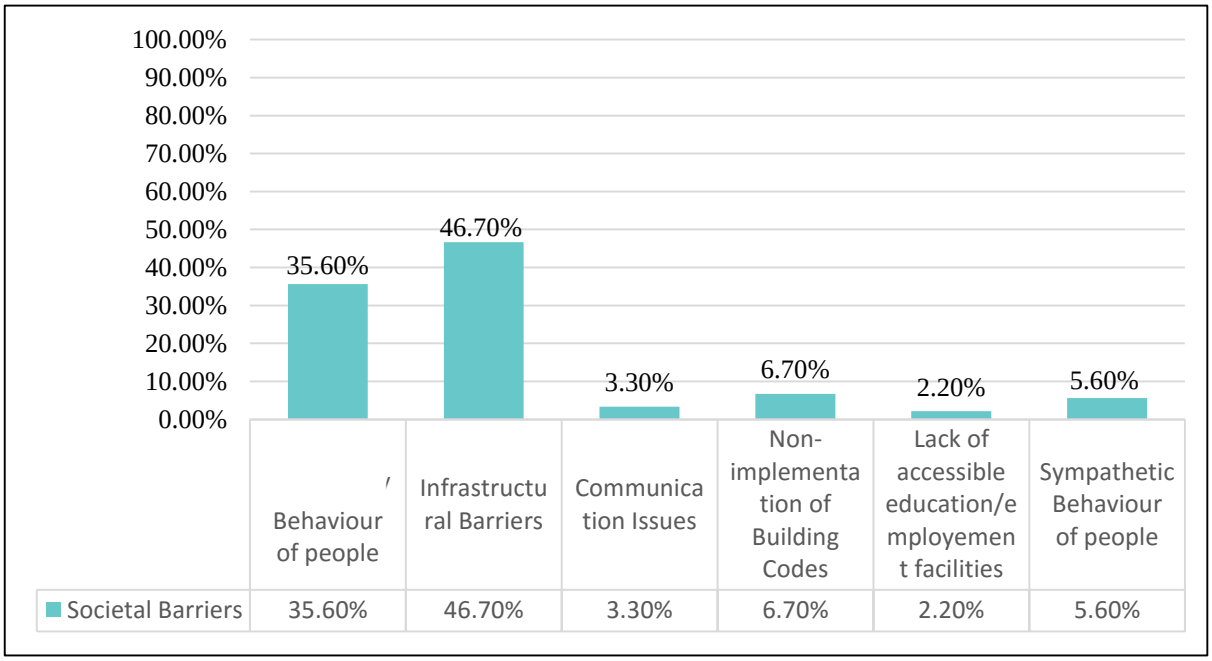


Figure 4.13: Accessibility Issues in HEIs

Chapter 5

CONCLUSION

This research provided a critical evaluation of accessible infrastructural facilities present at public and private universities in Islamabad - the capital of Pakistan. Because if issues pertaining to the segregation and seclusion of disabled people are not addressed effectively, sustainable development cannot be achieved. Universities must be accessible to uphold the rights of PWDs.

Survey and analysis depicted that provision of some barrier-free structures was made whereas some major facilities were neglected. Comparative analysis after scrutinizing public & private institutes demonstrated that in all buildings, access routes in the campuses were slip resistant without any protruding object hindering the maneuvering space. Doors, libraries, classrooms, and stairs were accessible for special persons. However, in private universities either ramps were not provided or provision was in-efficient lacking proper standards. Designated parking places for disabled people were missing in almost every institute. Although enough space was there in some of the universities but the proper marking of lane /area and reservation were lacking. Additionally, in private institutes, all buildings were of more than one storey but the provision of the elevator was not made whereas some public buildings did incorporate the facility. During the survey, facilities that make a washroom an accessible place were found absent. One building in NUML which is a public university has one washroom of a comparatively larger area. However like every other institute handrails were not provided in any washroom of examined building. Moreover, one major problem in all buildings was the absence of signage. Averagely public universities (mean = 0.65) were more accessible as compared to private universities (mean = 0.59). This stated that the administration of the institutes must pay heed to retrofit necessary infrastructures to make these buildings as accessible campuses.

Moreover, this study highlighted six major barriers to the accessibility in HEIs in Islamabad by taking the perception of people with a physical disability. One of the major constraints was the lack of accessible infrastructure. This restricts people to approach the certain place, move/work independently resultantly they have to rely on somebody else. More over people are not aware of inclusive design, therefore, ignoring the right of people with disability. Likewise, heedlessness from government organs is alarming. Non-implementation of building codes is fostering barriers for PWDs and segregation in the community is increasing resultantly. Communication issues, lack of accessible facilities and sympathetic behavior were also responded by people involved in the study.

An overview of the findings on major infrastructural components that greatly restrict the activity of people with disabilities in universities will assist in developing the measures for the improvement and retrofitting that are required for sustainable development. The study provides insights into accessibility standards and also contributes to emphasize the notion of accessible standards that must be ensured in any educational institute while designing, approving construction drawings and monitoring of such buildings.

Chapter 6

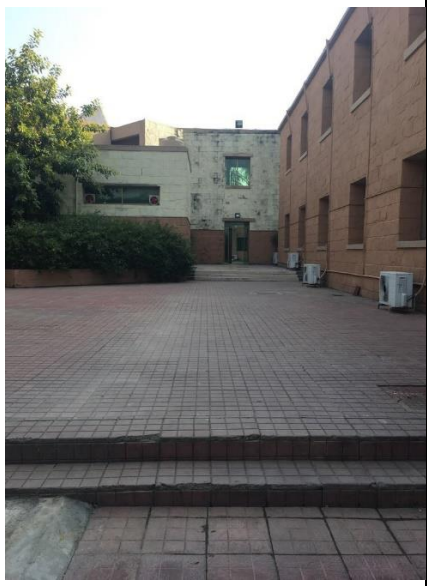
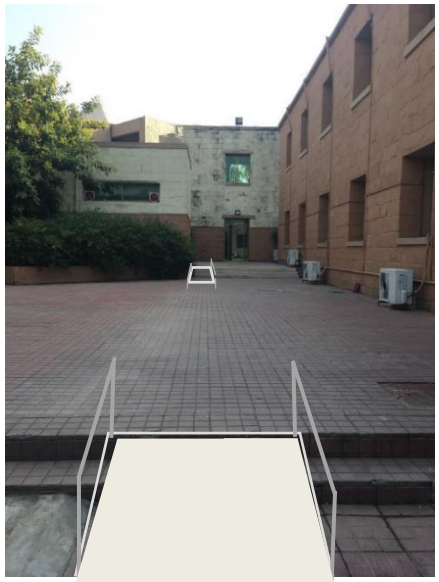
RECOMMENDATIONS

Some recommendations are as follows to ensure accessible infrastructures in buildings making these accessible for PWDs.

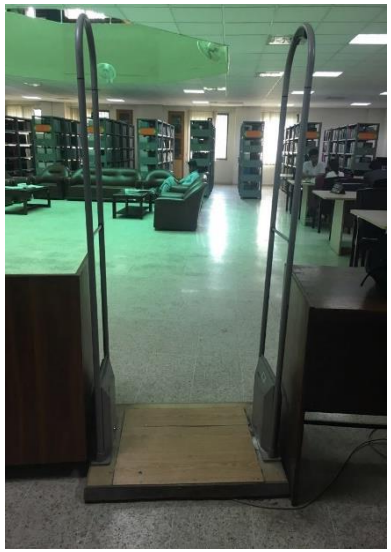
- State's policy on PWDs should be implemented in the light of accessibility codes in all HEIs.
- Issues concerning their involvement in social life and the provision of equal rights must be reflected in disability related laws and policies.
- Higher Education Commission of Pakistan should establish infrastructure codes for HEIs and their satellite campuses. These building codes must incorporate necessary facilities for PWDs.
- Legislative compulsion and follow up of bye laws related to accessible infrastructure must be ensured thus capital development authority should make accessibility codes mandatory for a newly constructed building plan and retrofit the existing universities in reference to the accessible standards.
- There is a strong need to raise awareness among the planners, architects and universities administration regarding the accessibility issues of PWDs.
- To eliminate the issues of accessibility in the buildings, PWDs must be ensured to be part of the planning and design wing.

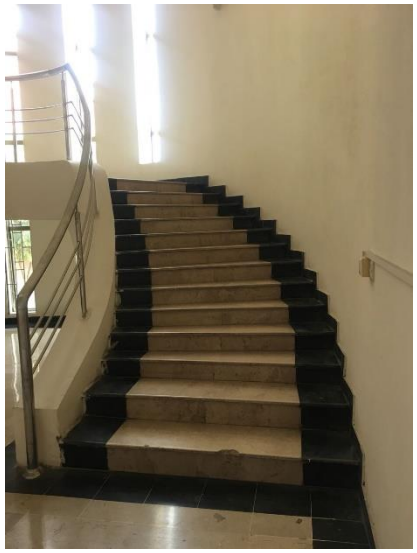
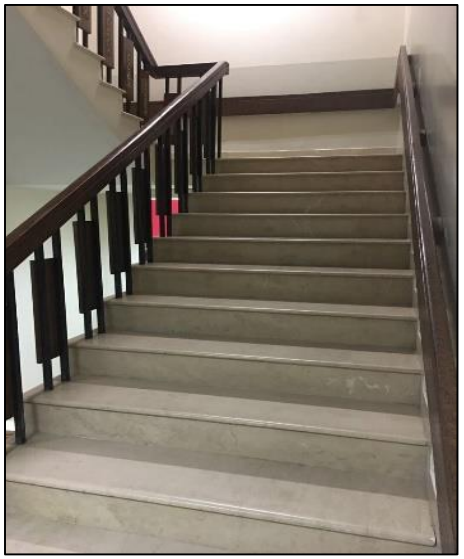
In light of accessible building codes developed in this research, some modifications were proposed in **NIT building, NUST** taking it as a case study.

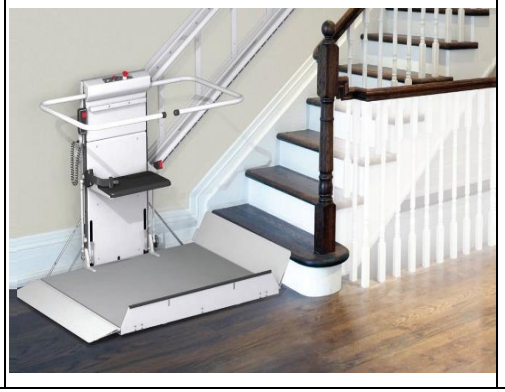
Sr. no.	Infrastructure Element	Existing Situation	Recommended Changes	Description	Estimated Cost of recommended changes by PMO, NUST (in PKR)
1.	**Parking**		 (Accessible Parking as an Employment Accommodation: A Practical Guide for Employers)	▪ Parking spaces designated for PWDs should be marked with the lines and all dimensions (width etc.) should comply with universal design standards. ▪ Access routes must avoid the provision of any protruding object and if provision is made than it should not reduce the width of the accessible areas. ▪ Surfaces must be firm, slip-resistant and water free level. ▪ Curb ramp must be provided if level difference is there between leading from access aisle to the side walk.	7,670 (Market rate-2018)

2.	**Ramp**			▪ Cross slope, running slope (1:12) and clear width of the ramp should be as per standards because it has been seen that ramps are provided in the buildings but inaccessible due to slope or width dimensions. ▪ Handrails on both sides are mandatory to ensure the accessibility and safety. ▪ Level landing must be provided where direction changes and this should be designed in a way to drain water during rainy seasons.	1,33,000 with granite strips. 40, 000 max (without granite strips but with checker tiles). For upper 3 stairs = 31,450

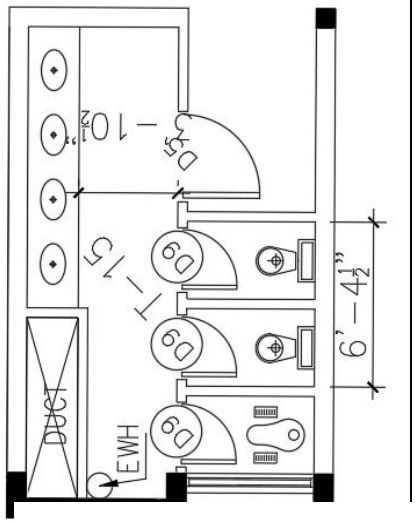
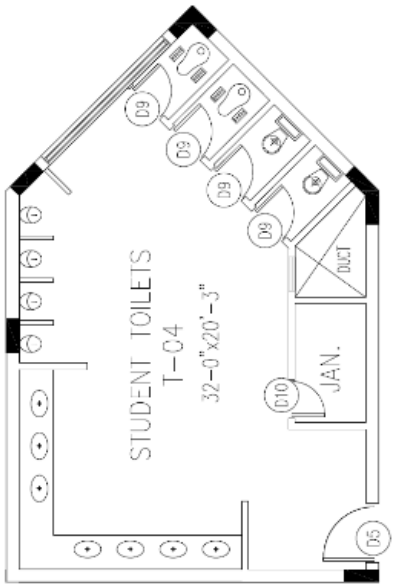
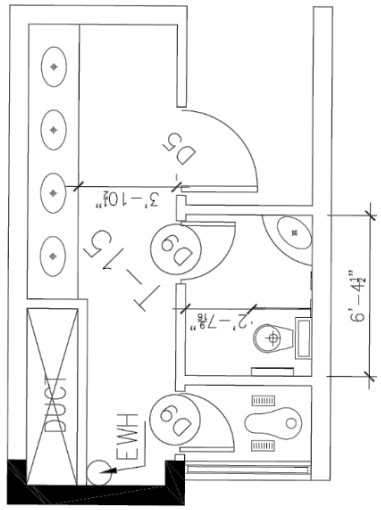
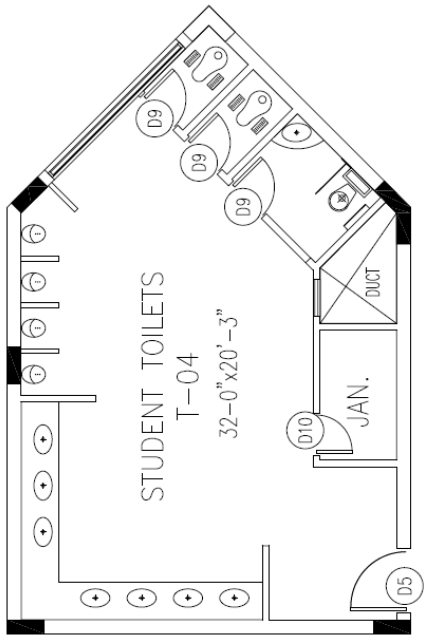
3.	**Ground/ Seating Lawn**			▪ Curb ramps shall be provided to make it possible for PWDs to enter in the ground.	2,855 (only of concrete 1:2:4 & 1:4:8)
4.	**Door**		 (Building for Everyone: A Universal design Approach)	▪ Doors in any educational institute must have a vertical glass panel and level knob handle to ensure the accessibility of this facility to people with disabilities. ▪ Threshold height should not exceed 0.5 to 0.8 inches. ▪ Door hardwares and width of the door should have compliance with accessible standards. ▪ The provision of enough maneuvering space	Cost of existing door is 25,000 whereas estimated cost of recommend

				on push and pull side of the door should not be ignored. ▪ Door should be operable from both sides.	ed door is 16,000
5.	**Library**		This existing walkthrough structure should either be taken out from the entrance of library or make wide enough with accessible threshold height so a wheel chair user can easily pass through it.  (Building for Everyone: A Universal design Approach)	▪ First and foremost libraray should be at accessible floor. Secondly it must have a counter of height that is approachable by wheelchair users (as shown in the picture). ▪ Aisles must have enough maneuvoring space for wheel chair users. ▪ Provision of seating space for disabled people apart from the seating arrangement for non-disabled people is imperative.	N/A

6.	**Classrooms**		N/A	▪ Class rooms must have seating arrangement in a way that provide enough area for a wheel chair user to adjust him in the available area at front side of the class room.	N/A
7.	**Stairs**			▪ Grab bars or handrails shall be on both sides of stairs. ▪ Stair nosing and surface shall be slip resistant. Due to space constraints in NIT building ramps cannot be provided to access first floor. Provision  of lift would be costly but stair lift with platform	$1,000 - $4,000 (mentioned on below link https://www.payingforseniorcare.com/financial-assistance/p

				can be an option. ▪ Inclined movement platform lift includes 3 elements i.e. a railing and an electric generator as well as a moving platform. ▪ This lift must be installed with the stair wall without obstructing the exit width. ▪ These lifts can be installed on all type of staircase including the spiral staircase. ▪ Min. width of the stairs should be at least 2.95 ft for installation purpose.	latform-lifts.html)
8.	**Cafeteria**	Cafe is located on second floor. Only stairs are provided and no provision of ramp or elevator has been made.		▪ Cafeteria in every educational institute should be accessible and preferably on ground floor. If vending machines are provided in cafés then operating system should be at a height that is operable by the disabled people. Also seating must be done in a way that provides enough	$1,000 - $4,000

				manoeuvring and seating space for people having mobility issues. Counter height should be approachable and visual display must be at a height readable for them. ▪ Furthermore, for drinking water fountain administration of educational institute shall provide either the water dispenser or the type of water cooler whose spout height is easily accessible by people with disabilities.	

9.	**Washroom** **<u>Female</u>** **<u>Male</u>**	  	  	▪ The door shall be equipped with a lever-type knob. ▪ A shelf shall be located above the floor no higher than 2.6 ft – 3.6 ft. ▪ Min.space between the centreline & side wall of lavatory is 1.5 ft. ▪ Provision of handrails is imperative. ▪ Seat heights should be between 17" to 19" above finished floor level.	Estimated cost is 47,624

10.	**Signage**	International symbol of accessibility is not provided in whole building.	 (a) Proportions International Symbol of Accessibility	▪ Signage shall be consistently located. ▪ Where facilities are required to be identified as accessible an international symbol of access shall be used. ▪ Where signage is provided it must have a glare-free surface.	8100

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Annexure

Annexure – **A**

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The list is prepared after thorough review of literature regarding codes/standards pertaining to accessibility present in various countries globally so as to develop a checklist for observatory survey (Annex-B). It was helpful in completing MS research thesis on "Physical Accessibility of People with Disability: Analysis of Public & Private Institutes in Capital of Pakistan - Islamabad". This information will be kept anonymous and used only for study purposes.

Annexure – **B**

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The Checklist is designed for observatory survey which is done to assess whether accessible infrastructures are provided in Higher Educational Institutes in Islamabad or not. It will be helpful in completing MS research thesis on "Physical Accessibility of People with Disability: Analysis of Public & Private Institutes in Capital of Pakistan - Islamabad". This information will be kept anonymous and used only for study purposes.

CHECKLIST FOR OBSERVATORY SURVEY OF HEIs IN ISLAMABAD

Sr. no.	Elements	Range
A	**Parking**	
1	Is there accessible parking near the building entrance?	Yes
2	Circulation routes adjacent to accessible parking spaces shall be part of the shortest accessible route to the building entrance.	Yes
3	Number of accessible parking stalls required for 1 - 25 spaces	1 to 2
4	There shall be a curb cut and curb ramp if there is a level change leading from the access aisle to the sidewalk	Yes
5	Parking and adjacent access aisle has a firm, stable, slip-resistant and level surface	Yes
6	Each accessible parking space shall be designated for use by persons with physical disabilities	Yes
B	**Access Routes**	

a	**Surfaces**	
7	Ground surfaces/floors shall be stable and slip resistant.	Yes
8	A vertical rise between 7 - 13 mm (0.27 - 0.5 inches) on accessible routes [except for elevators, elevating devices & curb ramps] shall be	beveled at slope up to1:2
9	Running slope steeper than 1:20 becomes a ramp or curb ramp	1:20 to 1:25
10	Are curb Ramps provided?	Yes
11	Curb ramp shall provide for appropriate drainage system so that water will not accumulate on travel path.	Yes
b	**Protruding Objects**	
12	For long paths of travel, resting areas should be provided.	Yes
13	The leading edge of any protruding object shall be at height of	1.15 ft. - 2.23 ft.
14	Protrusion object shall not reduce the width of an accessible route.	Yes
15	Minimum clear width of interior accessible routes shall be	3 ft. to 4.26 ft.
16	Minimum clear width on exterior accessible routes shall be	2.9 ft. to 6.5 ft.
C	**Ramps**	
17	Min. clear width of ramp shall be	2.9 ft. to 4.25 ft.
18	Running slope of the ramp shall be	1:10 to 1:20
19	Max. cross slope of a ramp should be	1:40 to 1:100
20	Landings on the ramp should be designed to drain water from their surface	Yes
21	Level landing must be provided where direction changes	Yes
22	Handrails shall be provided on sides of the ramp.	Yes
D	**Cafeteria**	
23	Is cafeteria accessible?	Yes
24	The top of the counter & table heights shall between	2.3 ft. to 3 ft.
25	Seating spaces for wheel chair person shall have enough manoeuvring space to circulate	Yes
26	Seating spaces for wheel chair person shall have enough manoeuvring space to approach the table/counter	Yes
27	Vending machines (if provided) shall be operable by PWDs	Yes

28	Cafes shall be located on the ground floor for an easy access of PWDs.	Yes
29	Information on visual display should be at a readable height for wheelchair users.	Yes
E	**Doors**	
30	Min. clear width of the door way shall be	2.5 ft. to 3.1 ft.
31	Where revolving doors are used, there must be the provision of adjacent door complying with the requirement of clear width	Yes
32	Door hardware to be operable by one hand without tight grasping & pinching etc.	Yes
33	Door hardware must be mounted above floor level at a height of	1.3 ft. to 3.9 ft.
34	The maximum threshold height at doors to be no more than	0.5 - 0.8 inch
35	At double-leaf doors, at least one leaf complies with requirements for clear width and maneuvering space at doors	Yes
36	Sliding door hardware to at least be exposed and usable from both sides	Yes
37	Doorways shall have a level maneuvering area on the push and pull sides of a door	Yes
38	There must be provision of vertical glass panel instead of any horizontal one.	Yes
F	**Water Cooler**	
39	Is there any provision of accessible fountain?	Yes
40	Spout height about floor level should be	2.4 ft. to 3 ft.
41	The spout located at front of the unit	Yes
42	If hand operated, controls are located at or near the front, both sides, of fountain	Yes
43	Minimum clear floor area in front of a drinking fountain	2.5 ft. to 4.4 ft.
G	**Elevators**	
44	Elevator operation shall be automated	Yes
45	clear min. width of door opening should be	2.9 ft. to 3.4 ft.
46	Handrails are provided on walls of elevator	Yes
47	Emergency control buttons shall have their centrelines above the floor a min. of	2.9 ft. to 3.9 ft.
48	The elevator floor has a firm, stable, and slip-resistant surface	Yes
H	**Fire Safety**	
49	All exits shall be visible.	Yes
50	All exits shall be easily discernable and accessible from the areas served by them	Yes

51	Exit access aisles may be level or ramped with a slope not exceeding	1:8 to 1:20
52	Provision of signage giving direction of emergency exits	Yes
53	Visual alarms shall be lights that flash in conjunction with the audible emergency alarms	Yes
54	The width of exit corridors shall be not less than	3.3 ft. to 3.9 ft.
I	**Libraries**	
55	The aisles shall be a minimum width of	2.9 ft. to 3.5 ft.
56	Provision of some sitting area/space for wheelchair users	Yes
57	Seating spaces for persons in wheelchairs shall have a minimum clear floor area of (width x depth)	2.5-3.9 ft. to 2.6-6.3 ft.
58	Seating spaces for persons in wheelchairs shall have adequate manoeuvring space to approach the seating area	Yes
59	Signage should be provide at a height even readable for wheelchair users	Yes
60	Controls/system provided in library shall be operable by disabled people.	Yes
J	**Washroom**	
61	The minimum floor area shall not be less than	24 ft2 to 37 ft2
62	Washroom shall be accessible	Yes
63	The door shall be equipped with a lever-type knob	Yes
64	The washroom door shall be operable from the outside under emergency conditions	Yes
65	A shelf shall be located above the floor no higher than	2.6 ft. to 3.6 ft.
66	At least one of each type of washroom accessory shall be provided with its operable parts and controls located above the floor a maximum height of	3 ft. to 3.9 ft.
67	Minimum distance between the centreline of the lavatory and the side wall is	1.5 ft.
K	**Playgrounds/Grounds**	
68	Curb ramps shall be provided to make it possible for PWDs to enter in the ground	Yes
69	Seating benches shall be there in the ground.	Yes
70	Ground shall be designed to avoid any water accommodation in any part of playing area	Yes
L	**Recreational Spaces**	

71	Such places shall be accessible	Yes
72	Any indoor activity/sport to have enough manoeuvring space for disabled people	Yes
M	**Religious Deeds (Prayer Room/Mosque)**	
73	Space shall be enough for PWDs to pray comfortably in prayer room./mosque	Yes
74	One side of the room shall be for disabled people having enough manoeuvring space with signage	Yes
N	**Accommodation**	
75	Windows in rooms shall have opening and locking mechanisms located a height from the floor of	1.3 ft. to 3.9 ft.
76	Exterior spaces, including patios, terraces and balconies that serve the guest room shall be accessible	Yes
77	Living and dining areas shall be accessible	Yes
78	The clear floor space shall be positioned for parallel approach to the side of the bed	Yes
79	Number of toilet and bathing room facilities to be accessible	No fewer than 1
80	At least one water closet, one lavatory, and one bathtub or shower shall be accessible	Yes
81	Grab bars, handrails shall be in every corridor, mess hall, TV room etc. for easy movement	Yes
82	An emergency alarm shall include both audible and visual signals	Yes
O	**Stairs**	
83	The maximum riser height shall be	0.3 ft. to 0.6 ft.
84	The minimum tread depth shall be from 0.7 ft. to 1.1 ft.	Yes
85	Flights of stairs shall have uniform riser heights and tread depths	Yes
86	There shall be no open risers	Yes
87	The minimum width of staircase shall be	No fewer than 1
88	Stair nosing shall be slip-resistant	Yes
89	Grab bars, handrails shall be on both sides of stairs	Yes
90	Exterior stairs shall be designed to avoid water accumulation	Yes
P	**Signage**	

91	Signage shall be consistently located	Yes
92	Where facilities or their elements are required to be identified as accessible, the International Symbol of Access shall be used	Yes
93	Interior signage to be located on the latch side of the doors.	Yes
94	Where signage is provided, it shall have a glare-free surface	Yes
95	Visual characters shall be conventional in form and shall not be italic, oblique, script, highly decorative, or have other unusual form	Yes

ANNEXURE – C

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National Institute of Transportation (NIT)

The Questionnaire is designed to interview the people having disability specifically physical disability to highlight the issues pertaining to their accessibility. It will be helpful in completing MS research thesis titled ""Physical Accessibility of People with Disability: Analysis of Public & Private Institutes in Capital of Pakistan - Islamabad". This information will be kept anonymous and used only for study purposes. Your cooperation in this regard will be acknowledged and appreciated.

Demographic Questions:

1. Gender of respondent

Male	
Female	

2. Age of respondent

10 – 20	20 – 30	30 – 40	Above 40

3. What is the profession or source of earning?

_____

4. Type of disability

Physically Disable	Visually Disable	Hearing Impairment	Other

5. Type of physical disability

Cerebral Palsy	Multiple Sclerosis	Brain or Spinal Cord Injury	Other

6. How often you walk without mobility aids?

Always	Very Often	Sometimes	Rarely	Never

7. How often do you use your mobility aids (Prosthetics, wheel chair, crutches etc.)?

Always	Very Often	Sometimes	Rarely	Never

8.What are the societal problems you face & how these can be eliminated?

9.It has been observed that PWDs don't have equal opportunities. In your opinion, what are the reasons behind such discrimination and how this can be improved?

10. According to you, what are the major problems in educational institutes/universities and their solutions as well?

_____

_____

11. How comfortable you feel in your department/university? (Rate on a scale of 1 to 10 where 1 is uncomfortable and 10 comfortable).

1	2	3	4	5	6	7	8	9	10

12.As per existing infrastructure of your institute/university, rate following elements on a scale of 1 to 10, where 1 is uncomfortable and 10 comfortable.

Scale / Elements	1	2	3	4	5	6	7	8	9	10
Parking										
Surfaces										
Protruding Objects										
Ramps										
Cafe										
Doors										
Water Cooler										
Elevator										
Stairs										

Library										
Washroom										
Playground										
Prayer Room/Hall										
Fir Safety										
Accommodation										
Signage										

ANNEXURE – D

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National Institute of Transportation (NIT)

The Questions are designed to interview the experts of reputed organizations in Islamabad, Pakistan. to find out how to implement accessible infrastructures in HEIs. It will be helpful in completing MS research thesis titled "Physical Accessibility of People with Disability: Analysis of Public & Private Institutes in Capital of Pakistan - Islamabad". This information will be kept anonymous and used only for study purposes. Your cooperation in this regard will be acknowledged and appreciated.

1. What comes to your mind when one says accessible design? What does it mean?
2. The concentration of discourse around inclusive/universal design is critical. Do you agree?
3. Are standards that exist being implemented even at the minimal level?
4. In your opinion, about what percentage relevant legislation is beneficial for accessibility?
5. Do you think there is a need to raise awareness about inclusive/universal design?
6. What information or experience can help to convince clients to change their attitudes?
7. Do you think there is a need to publicize this effort?
8. Inclusive or universal design is about lifetime span. What is your opinion?
9. Do you agree that difficulty increases in case of poor application/operationalization of any inclusive principle?
10. What are the reasons behind the inadequate accessible structures in public buildings?