

# A Conceptual Framework for Analyzing Critical Factors of PDS Learning Experience and PDE Employment Experience

by

Masum Uddin Ahmed  
21273001

A thesis submitted to the Department of Computer Science and Engineering  
in partial fulfillment of the requirements for the degree of  
M.Sc. in Computer Science and Engineering

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# Declaration

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2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. We have acknowledged all main sources of help.

**Student's Full Name & Signature:**

MASUM

---

Masum Uddin Ahmed  
21273001

# Approval

The thesis titled “A Conceptual Framework for Analyzing Critical Factors of PDS Learning Experience and PDE Employment Experience” submitted by

1. Masum Uddin Ahmed (21273001)

Of Fall, 2023 has been accepted as satisfactory in partial fulfillment of the requirement for the degree of M.Sc. in Computer Science and Engineering on December 1, 2023.

## Examining Committee:

External:  
(Member)



---

Mohammad Zahidur Rahman, PhD  
Professor  
Department of Computer Science and Engineering  
Jahangirnagar University

Internal:  
(Member)



---

Muhammad Iqbal Hossain, PhD  
Associate Professor  
Department of Computer Science and Engineering  
Brac University

Internal:  
(Member)

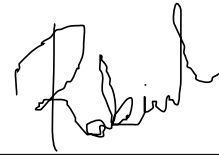


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Moin Mostakim  
Senior Lecturer  
Department of Computer Science and Engineering  
Brac University

**Examining Committee:(Cont.)**

Supervisor:  
(Member)



---

Md. Golam Rabiul Alam, PhD  
Professor  
Department of Computer Science and Engineering  
Brac University

Program Coordinator:  
(Member)



---

Md Sadek Ferdous, PhD  
Associate Professor  
Department of Computer Science and Engineering  
Brac University

Head of Department:  
(Chair)



---

Sadia Hamid Kazi, PhD  
Chairperson and Associate Professor  
Department of Computer Science and Engineering  
Brac University

# Abstract

This study aims to examine the relationship and status of education and employment for people with disabilities in Bangladesh. The study employs a mixed-methods approach, including a survey of people with disabilities to grasp their educational and employment situations. The purpose of this study investigation is to explore the factors impacting students and employees with disabilities in Bangladesh. The questionnaire consisted of a mix of numerical, categorical, and multiple-choice questions. This paper adopts multiple data science approaches to measure the reliability between survey items. Seven factors under three dimensions for students with disabilities (PDS) and eight factors under three dimensions for employees with disabilities (PDE) were examined to analyze the influence of their learning and employment experiences. A total of 208 responses were collected from students and employees, and 200 valid responses were retained after data cleaning. Necessary data pre-processing was applied. From the findings, eight factors influencing the learning experiences of students and employment experiences of employees were identified. Finally, the analysis results are presented in the form of suggestions for developing inclusive learning and employment opportunities for individuals with disabilities in Bangladesh. The survey reveals key obstacles for people with disabilities in Bangladesh, including accessibility issues, inadequate accommodations, negative attitudes, and undervaluation in education and employment. It underscores the urgent need for inclusive policies and more research to support their education and employment. The study highlights the requirement for diverse and more effective research methods to comprehend and provide support for individuals with disabilities in Bangladesh.

**Keywords:** Consequential Factors; Statistical Analysis; Conceptual Framework; Text Analytics; Natural Language Processing (NLP); Data Science; Learning and employment experience; Individuals with Disabilities; Inclusivity and Diversity; Obstacles to Engagement, Factors Enabling Engagement

## **Dedication**

I would like to dedicate this thesis to my loving parents, spouse, daughter, and our respected teachers whose guidance and support allowed me to accomplish this work. Without their belief and encouragement, this would not have been possible as a student with disabilities, and I am truly humbled.

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# Nomenclature

The next list describes several symbols & abbreviation that will be later used within the body of the document

*ANOVA* Analysis of Variance

*NLP* Natural Language Processing

*PDE* People with Disabilities-Employees

*PDS* People with Disabilities-Students

# Chapter 1

## Introduction

A large percentage of the world's population has a disability, an estimated 1.3 billion people experience significant disability. This represents 16% of the world's population or 1 in 6 of us [35], and the majority of them live in developing countries. With a population of 163 million, Bangladesh ranks as the eighth most densely populated nation globally [39]. In Bangladesh, professionals in the field of disability rights and support also estimate a prevalence of 10%, but there is a lack of reliable and up-to-date statistics on the matter. Different government and non-government agencies have conflicting estimates, with one survey reporting by the Bangladesh Bureau of Statistics a rate of 9% and another stating 1.41% [38] [40]. The large number of people with disabilities in Bangladesh is recognized as requiring special attention. In Bangladesh, the education system is structured in such a way that it comprises a compulsory 5-year period of primary education, succeeded by 3 years of junior secondary education, 2 years of secondary education, and an additional 2 years of higher secondary education. Mandatory education is solely required during the primary stage, and it is provided without any charge up to that level. Girls in Bangladesh receive free education up to the secondary level. Although specific data on primary-level enrollment is unavailable, approximately 26% of children in Bangladesh attend pre-primary schools. Out of this, 51% of girls and 43% of boys are enrolled. Fewer than 10% of individuals with disabilities manage to pursue higher education despite facing challenging circumstances. The vast majority, around 90%, do not have access to higher education [37]. Individuals with disabilities feel reluctant to participate in education and employment opportunities because they face social ridicule. According to the 2022 survey conducted by the Bangladesh Bureau of Statistics, 56.41% of individuals with disabilities reported experiencing ridicule or mocking in the 12 months prior to the survey[36]. Of these incidents, 73.87% were occasional, while 20.22% were often, and 5.91% were always. Most of the teasing (90.56%) occurred from neighbors, followed by relatives (40.53%), friends (26.99%), and family members (23.46%). The survey also revealed that 2.80% of the country's population is living with disabilities, and 7.7% are living with functional disabilities. In developing countries, the unemployment rate for people with disabilities of working age ranges from 80 to 90 percent[33]. Another study demonstrated the employment rate for persons with disabilities in Bangladesh stands at a mere 1%[8]. In recent study shows, that one out of every three individuals aged 15-65 who have disabilities is employed in Bangladesh, with many of them being self-employed or working in family businesses[36]. Approximately one-third of people with disabili-

ities participate in social and religious activities. Half of these individuals receive healthcare primarily from public and private health centers or hospitals. One in every three people with disabilities is registered with the appropriate authority, and over 90% of them have received government disability allowance at some point. The employment situation for people with disabilities in Bangladesh is a topic of growing concern. Despite the country's efforts to improve accessibility and provide support for individuals with disabilities, unemployment rates for this population remain high. By examining the current challenges state of study and employment for individuals with disabilities in Bangladesh, this paper hopes to shed light on the need for further action to improve the situation and promote equal opportunities for all. The paper will also include the data analysis of the survey conducted on the sample population of people with disabilities in Bangladesh. Furthermore, the paper will also explore the best practices and policies implemented by other countries that could be adapted to improve the educational and employment situation of people with disabilities in Bangladesh.

## 1.1 Research Motivation

The education and employment of people with disabilities in Bangladesh are critical aspects of social inclusion and equity. Despite efforts to promote equal opportunities, individuals with disabilities often face unique challenges in accessing education and securing meaningful employment. To address these challenges effectively, it is imperative to explore the influential factors that impact the education and employment situations of this marginalized group. This research aims to delve into the multifaceted aspects of the education and employment experiences of people with disabilities in Bangladesh. By collecting survey data from students and employees with disabilities through Google Forms, we seek to identify and analyze the key variables that significantly influence their educational and occupational trajectories. The study will adopt a comprehensive approach, examining a wide range of factors that may play a pivotal role in shaping the lives of people with disabilities in Bangladesh. These factors may encompass socioeconomic background, accessibility of educational institutions, the availability of support services, perceptions of disability, governmental policies, and workplace accommodations, among others. The analysis will employ factor analysis techniques to distill the complex interplay of variables into meaningful dimensions. By identifying these influential factors, we aim to provide valuable insights into the challenges faced by individuals with disabilities in Bangladesh and the opportunities for improvement. Moreover, the research intends to contribute to evidence-based policymaking by shedding light on areas where targeted interventions and support mechanisms can have the most significant positive impact. Understanding the dynamics that affect the education and employment outcomes of people with disabilities is crucial not only for advancing social justice but also for harnessing the untapped potential of this segment of the population. By unraveling the intricacies of these influences, we aspire to facilitate the creation of a more inclusive and equitable society in Bangladesh, where individuals with disabilities can thrive academically and professionally. This research endeavors to explore the influential factors that shape the education and employment experiences of people with disabilities in Bangladesh. Through rigorous data collection and analysis, we aspire to pave the way for informed decision-making,

policy formulation, and targeted interventions aimed at enhancing the lives and opportunities of individuals with disabilities in the country.

## 1.2 Research Objectives

This thesis aims to categorize the factors influencing the learning and employment experience of people with disabilities based on their feedback on their experience in education and employment in Bangladesh so that special focus can be given to these criteria to develop an inclusive society in the future.

Therefore, the question that this research is trying to answer is:

**How do various factors influence the learning and employment experiences of people with disabilities in Bangladesh and how can this knowledge be used to develop a more inclusive society?**

In our research focusing on **people with disabilities-students (PDS)**, we will categorize them into three distinct groups based on their expressed perspectives on learning experiences within the realm of education, as shared in survey text responses. Subsequently, we will conduct sentiment analysis, categorizing these experiences as 'Excellent,' 'Good,' or 'Poor.' This analysis will enable us to identify influencing factors and focus on enhancing the tools of education for PDS in need of improvement.

In our research concerning **people with disabilities-employees (PDE)**, we will classify them into three distinct categories based on their articulated viewpoints regarding employment experiences within the workforce, as reported in survey text responses. Following this, we will carry out sentiment analysis, categorizing these experiences as 'Excellent,' 'Good,' or 'Poor.' This analysis will facilitate the recognition of impacting factors and help us concentrate on improving the tools available for the employment of PDE requiring enhancements.

So, this study will individually investigate the experiences of (1) People with disabilities-students (PDS), and (2) People with disabilities- employees (PDE). The objectives of this research are as follows:

1. To identify and categorize the experiences of students and employees with disabilities in Bangladesh in terms of education and employment.
2. To determine the key variables and factors that influence the learning and employment experiences of people with disabilities in Bangladesh.
3. To examine the relationships and correlations between the identified variables and the categorized experiences of people with disabilities.
4. To assess the validity of common beliefs about student learning and employee employment in the context of individuals with disabilities in Bangladesh.



5. To provide insights and recommendations for improving education and employment for individuals with disabilities in order to foster a more inclusive society.

### 1.3 Research Contribution

The aim of this study is to discover the factors and elements that affect the experiences of students and employees in the realms of education and employment. To make it clearer, the contributions of this research have been broken down into several steps:

#### For PDS-

1. Proposing a conceptual model for PDS.
2. Demonstrating and preprocessing data collection for PDS.
3. Analyzing critical factors influencing the learning experiences of PDS.
4. Assessing and ranking the variables and dimensions impacting PDS learning experiences.
5. Discussing challenges, along with parallel facilitation and recommendations for PDS.

#### For PDE-

1. Proposing a conceptual model for PDE.
2. Exhibiting and preprocessing the data collection for PDE
3. Analyzing critical factors influencing the employment experiences of PDE.
4. Evaluating and ranking the variables and dimensions affecting PDE employment experiences.
5. Discussing challenges, along with parallel facilitation and recommendations for PDE.

### 1.4 Organization of the thesis

The remaining sections of this research study are as follows.

#### **Chapter-2: Related Work**

This chapter includes an overview of the works that are similar and relevant to the proposed scheme.

#### **Chapter 3: Methodology**

This chapter reflects on the methodology employed to conduct the entire experiment, including the approach and evaluation process. This section will provide detailed information about the conceptual framework, dimensions, explanation of the survey questionnaire dataset using figures, dataset collection and pre-processing, sentiment analysis, data validation using Cronbach's alpha along with factor analysis, and the evaluation through ANOVA tests.

#### **Chapter 4: Result and Discussion**

This chapter presents the experimental results and provides a detailed discussion. It includes the obtained statistical results, encompassing both pairwise comparisons

and an overall analysis. Additionally, the chapter addresses the challenges faced by PDS and PDE in education and employment, while also offering potential facilitators and recommendations.

### **Chapter 5: Conclusion**

This chapter draws conclusions from all the discussions regarding this work, discusses its limitations, and also explores areas in which future work can be done.

# Chapter 2

## Related Work

Numerous authors have undertaken research to identify the challenges and offer potential solutions with regard to the education, lifestyle, and employment of individuals with disabilities both in developed and developing countries. The study employs a machine learning approach to identify key features that influence disabled students' engagement in post-higher education activities and subsequent employment in the UK[25]. In this article, the authors identify the factors influencing people with disabilities' attitudes toward BE(Neighborhood built environments) that can facilitate or suppress their mobility, using exploratory factor analysis, specifically focusing on people with physical disabilities and people with visual impairments living in Austin and Houston metropolitan areas in the USA[29]. In this paper, the authors have conducted a study to explore specialized education for persons with disabilities in Bangladesh, which employed both quantitative and qualitative methods as a combined research approach (also called an integrated approach)[22]. In this paper, the authors explored the motivational factors that drive the entrepreneurial endeavors of entrepreneurs with disabilities and the challenges they face, including personal, environmental, financial, operational, infrastructural, and informational constraints[21]. The research paper examines the employment situation of people with disabilities in Canada[10]. The findings show that people with disabilities have a lower employment rate and face barriers to accessing employment opportunities. The study underscores the need for policies and accommodations to promote the inclusion and employment of people with disabilities. This research paper analyzes the social exclusion faced by people with disabilities in Bangladesh[26]. The findings show that people with disabilities often face discrimination, limited access to education, employment, and healthcare, and exclusion from mainstream society. The study underscores the need for policy interventions and societal changes to promote their inclusion and participation in all aspects of society. This paper investigated the relationship between disability and the factors influencing schooling in Bangladesh[11]. The research paper reviews the challenges of implementing inclusive education in developing countries. The findings show that despite its importance for promoting education access, inclusive education faces challenges such as lack of resources, inadequate teacher training, and negative attitudes towards disability. The study highlights the need for policy interventions and teacher training programs to promote inclusive education and address implementation barriers. This paper underscores the urgent need for action to enhance inclusive education in developing countries[4]. The research paper examines employers' perspectives

on employment barriers and facilitators for people with intellectual disabilities[18]. The study reveals that negative attitudes, lack of information, and concerns about job performance are significant barriers to hiring and accommodating people with intellectual disabilities. However, employers who had positive experiences identified workplace accommodations and support services as key facilitators. The research highlights the need for greater awareness, education, and support services to enhance employment opportunities for people with intellectual disabilities. Other researches also highlight comparable factors that play a role in a person with disabilities' ability to maintain employment, including personal experiences, vocational readiness, job satisfaction, the supportive environment, adaptive behavior, and life satisfaction[12],[16],[15]. The study identified five critical factors influencing the decision to adopt HRIS in hospitals: IT infrastructure, top management support, IT capabilities of staff, perceived cost, and competitive pressure and found existence of significant differences in all factors across different adopting groups and exposes constructive proposals to researchers, hospitals, and the government to enhance the likelihood of adopting HRIS[14]. In this article, a semi-structured interview with people with disabilities, employers, and disability employment services providers to identify eight factors that were most important in achieving successful employment outcomes: nature of the disability, disability disclosure, personal motivation, employer attitudes, job characteristics, corporate culture and climate, government support and societal attitudes[32]. In this paper, a scoping review of the empirical literature was conducted to examine individual/system level, programmatic, and key themes within lived experiences that affect self-employment outcomes[31]. In this paper, a linear regression analysis method was used using survey data on the status of the disabled in companies generated by KEAD, and it was found that the statistical effects of the explanatory variables input into the regression model differed by age group[28]. In this paper, the authors proposed a method to solve the problem of the lack of resources in the South Korean market through the use of virtual reality technology, which is called virtual reality virtual reality. The factors affecting employment for individuals with developmental disabilities include demographic characteristics, daily living skills, communication abilities, cognitive abilities, participation in employment services, and satisfaction with employment services[30]. In this paper, the authors focus on the employment of people with disabilities, the risk factors they may face at workplace and assessment of risk factors, which is very important that the place to work matches the physical and psychological characteristics of the employee[17]. In this study, a conceptual framework based on empirical research on self-employment of individuals with disabilities in the United States was tested on federal data on individuals who had become successfully self-employed through Vocational Rehabilitation (VR) services[13]. The study emphasizes the importance of improving in-service training for government primary school teachers. It is crucial to equip them with effective teaching techniques suitable for diverse students and enhance their collaboration skills with various stakeholders in the school community to ensure the successful implementation of quality inclusive education[24]. The research carried out a cross-sectional study, which involved 393 families seeking Government services for their children with disabilities from the Centre for the Rehabilitation of the Paralyzed in Bangladesh[23]. The term "Government services" encompasses several components, including (a) disability allowance, (b) integration into mainstream schools, (c) educational stipends, (d) rehabilitation services provided by the

Ministry of Social Welfare, and (e) designated seats in public transportation. In 2001, the government of Bangladesh enacted the Disability Welfare Law. The Law seeks to protect the rights of persons with disabilities and ensure equal opportunities for their participation in education, training, and employment opportunities[5]. This study employs a mixed methods approach, combining qualitative and quantitative methods, and aims to investigate 1) the advantages that students with physical disabilities have gained from being part of educational institutions and work-places, 2) the particular difficulties they encountered, and 3) innovative approaches to encourage their greater involvement in these areas. In order to provide organization and framework to the survey interview, the survey posed these five theme questions explicitly and then delved deeper into student and employee responses by asking additional probing questions[27]. The authors conducted an ethnographic study of summer undergraduate research experiences at four liberal arts colleges, where faculty and students work collaboratively on a project of mutual interest in an apprenticeship of authentic science research work[7]. The hypothesis in this study is that undergraduate research enhances the educational experience of science undergraduates, attracts and retains talented students to careers in science, and acts as a pathway for minority students into science careers is examined. The study examined the benefits of undergraduate research experiences and found that they enhance the educational experience and attract talented students to careers in science[6]. In this article, the authors present a history of education for students with disabilities, and present a set of strategies for creating and maintaining Inclusive Classrooms, as well as guidelines for using the computer to support major Instructional Principles[19]. In this article, Over 2.5 billion people worldwide need assistive products, a number expected to surpass 3.5 billion by 2050. Challenges include limited access, policy gaps, and fragmented services, requiring attention for universal health coverage and sustainable development[34].

# Chapter 3

## Methodology

This chapter provides an overview of various data science and a machine learning technique employed for the analysis of our conceptual model. We outline the fundamental principles underlying each hypothesis, elaborate on the dataset, and explain the data preprocessing step applied for its utilization in this research. We propose two conceptual frameworks here:

**ELS- framework for PDS is constructed with three dimensions: Education Program, Learning Environment, Support and Facilities.**

**JOS- framework for PDE is constructed with three dimensions: Job, Organization, Support and Facilities.**

### 3.1 (ELS) Framework for PDS

Using questionnaire data from the dataset, this research formulates an ELS framework to explore the learning experiences of PDS. This framework encompasses three distinct dimensions for PDS. The main objective of this study is to investigate the influence of ELS elements on the intention to develop inclusive education for PDS. Therefore, the primary variable is 'PDS Learning Experience,' serving as the dependent variable. The independent variables used to explain the variance in the dependent variable include Education Program, Learning Environment, and Support and Facilities factors. As a result, this study aims to provide valuable guidance to educators and policymakers in Bangladesh, facilitating improvements in policies and decisions concerning students with disabilities. The research model is represented in Figure 3.1.

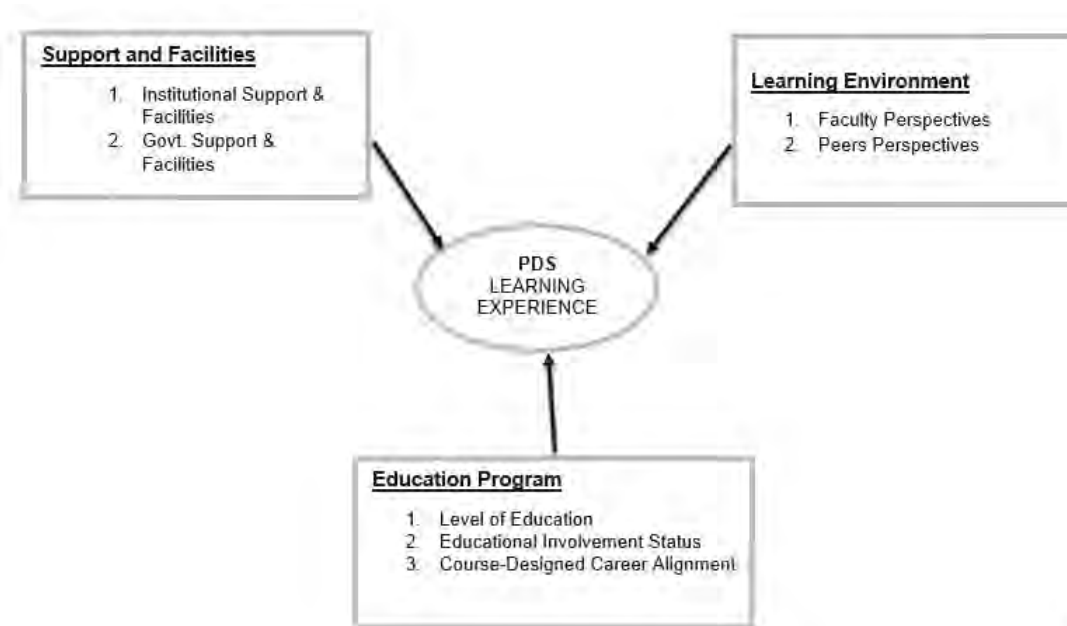


Figure 3.1: Conceptual model for PDS: Education Program, Learning Environment, Support and Facilities(ELS) model.

### 3.1.1 Dimensions and Hypothesis for PDS

There are 7 independent variables pertaining to PDS. We will measure three dimensions influencing students' learning experiences through 7 variables. Level of Education variable assesses the effectiveness of student education and their current and previous educational status, which is quantified through 3 items. The Educational Involvement Status is evaluated using 2 items to gauge students' educational engagement and class attendance abilities. Course-Designed Career Alignment is measured by 2 items that describe the prospects of future employment based on the chosen study field and major subject. Institutional Facilities and Support are assessed through 3 items, which encompass the institution's friendliness, adaptive technology availability, and scholarship or financial aid availability. Government Facilities and Support are addressed with 2 items that examine the management of tuition fees and the challenges faced in education. To evaluate Peers Perspectives, 6 items are employed to assess factors such as peer understanding, learning methods, assistance, underestimation, attitudes, and experiences of discrimination from peers. The Faculty Perspectives variable is measured by 6 items describing teachers' help, underestimation, attitudes, way of learning, discrimination, and discrimination from authority and management.

To investigate the hypotheses associated with this research, the collected data will be used to examine the relationship between the dependent variable of "PDS learning experience" to the study. We will subsequently conduct sentiment analysis, leading to the classification of these experiences from textual into 'Excellent,' 'Good,' and 'Poor' categories. Multiple analyses, including factor analysis, ANOVA tests will be conducted, in addition to reliability and validity tests. The data were analyzed using Statistical Package for Social Sciences (SPSS) version 25. By performing this essential analysis and identifying the relationships, we can direct our efforts toward improving the educational and employment resources for individuals with disabil-

ities that require enhancement. This endeavor will not only be advantageous for individuals with disabilities during potential future challenges but will also contribute to fostering an inclusive societal perspective in the future. Based on some common beliefs about PDS learning experiences, the following hypotheses have been constructed.

H1: The 3 categories of student learning experience significantly vary in the context of the educational involvement status.

H2: The 3 categories of student learning experience significantly vary in the context of the course-designed career alignment.

H3: The 3 categories of student learning experience significantly vary in the context of the institutional facilities and support.

The null hypothesis for PDS denoted as H0, suggests no relation exists between the three categories of PDS learning experiences.

## **3.2 (JOS) Framework for PDE**

By utilizing data gathered from questionnaires within the dataset, this investigation formulates a JOS framework designed to delve into the employment experiences of PDE. This framework comprises three distinct dimensions specific to PDE. The primary objective of this study is to analyze how JOS elements influence the intention to promote inclusive employment for PDE. Consequently, the key variable is 'PDE Employment Experience,' functioning as the dependent variable. The independent variables used to elucidate the variances in the dependent variable encompass factors such as JOB, ORGANIZATION, and Support and Facilities. As a result, this research aims to provide valuable insights to employers and policymakers in Bangladesh, facilitating improvements in policies and decision-making processes related to employees with disabilities. The research model is visually depicted in Figure 3.2





Figure 3.2: Conceptual model for PDE: Job, Organization, Support and Facilities(JOS) model.

### 3.2.1 Dimensions and Hypothesis for PDE

There are 8 independent variables pertaining to PDE. We will measure three dimensions or factors that influence the 'PDE employment experience' through 8 variables. Employment Satisfaction pertains to the assessment of abilities and job satisfaction. It is measured through 2 items. Employers Attitude is assessed using 2 items, depicting job refusal and workplace discrimination due to disabilities. Colleagues Perspectives are evaluated with 2 items that describe understanding-support, and the disclosure of disabilities to colleagues. Government Facilities and Support are measured via 2 items, representing government assistance in job seeking and training for individuals with disabilities. Working Opportunity is addressed with 2 items, reflecting equal job accessibility and job opportunity due to disabilities. Two items are utilized to determine Education Aligned Job, reflecting one's department and grade of their last academic qualification. The variable Job performance is assessed by 2 items describing the job performance scale and the impact of disabilities on job performance. Working Environment includes accommodation, suitability, and physical work environment accessibility, assessed through 3 items. Subsequently, we will proceed to perform sentiment analysis here as well, which will allow us to categorize these employment experiences into three groups: 'Excellent,' 'Good,' and 'Poor.'

In order to explore the hypotheses associated with this study, we will utilize the collected data to investigate the correlation between the dependent variable of "PDE employment experiences". This analysis will encompass various procedures, including factor analysis, ANOVA test as well as reliability and validity tests using SPSS. Through this crucial analysis and the identification of these relationships, we will be able to focus our efforts on enhancing employment resources for individuals with disabilities. The following hypotheses have been constructed for PDE Employment Experience.

H1: The 3 categories of employee employment experience significantly vary in the context of the employment satisfaction.

H2: The 3 categories of employee employment experience significantly vary in the context of the employers attitude.

H3: The 3 categories of employee employment experience vary in the context of the colleagues perspectives.

H4: The 3 categories of employee employment experience vary in the context of the Govt. facilities and support.

H5: The 3 categories of employee employment experience vary in the context of the working environment.

The null hypothesis for PDE denoted as H0, suggests no relation exists between the three categories of PDE employment experiences.

The goal of this study is to examine the validity of these common beliefs.

### 3.3 Dataset

This research recorded the experiences of students with disabilities (PDS) and employees with disabilities (PDE) in Bangladesh while they completed survey questionnaires. The participants willingly consented to participate in the research, and data was collected through various means, such as face-to-face interviews, telephone conversations, interactions with private organizations catering to individuals with disabilities, and engagement in online forums popular among disabled individuals. The study included 200 individuals with disabilities, consisting of 76.4% male and 23.6% female, who completed the survey.

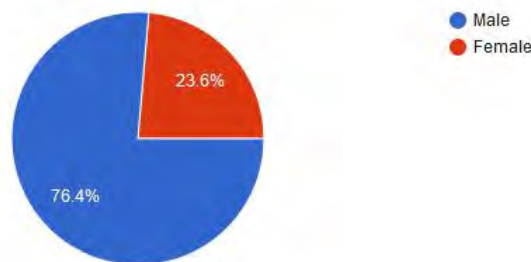


Figure 3.3: Participants Gender

Most of the participants in the study were between 20-30 years old, accounting for 65.7% of the total sample. Furthermore, 21.2% of the participants were between 30-40 years old. The remaining participants were distributed among the other age groups.

The study aimed to include individuals with various types of disabilities in the survey and found that 70% of the participants reported having physical disabilities. In contrast, 9%, 7.5%, 4.5%, 4%, and 4% reported having visual, auditory,

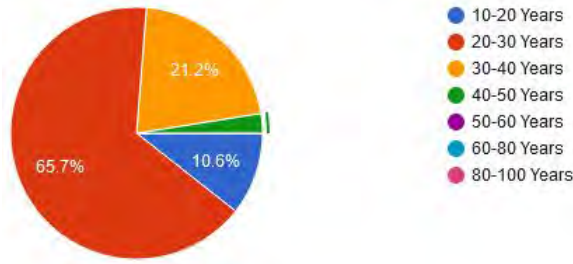


Figure 3.4: Participants Age

speech disabilities, intellectual disabilities, and multiple disabilities respectively as shown in Figure 3.5. Based on these findings, it can be concluded that individuals with physical disabilities are more actively engaged in education and employment than those with other types of disabilities. This may be attributed to the greater opportunities and fewer barriers available to individuals with physical disabilities. According to the survey questionnaires, 55% of disabled students (PDS) and 45%

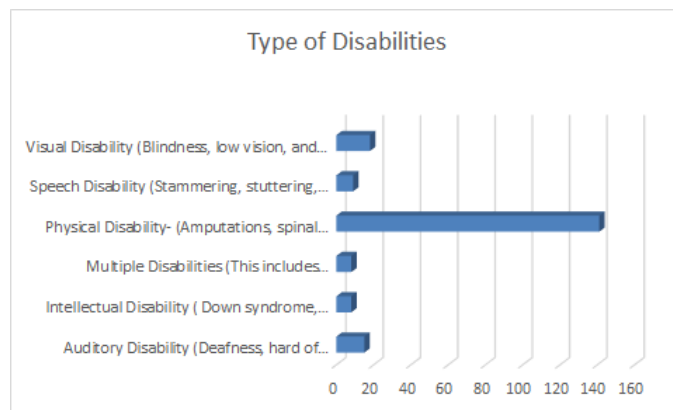


Figure 3.5: Participants with different types of disabilities

of disabled employees (PDE) in Bangladesh reported being currently active. These findings indicate that a significant proportion of participants were engaged in the study at the time of the survey.

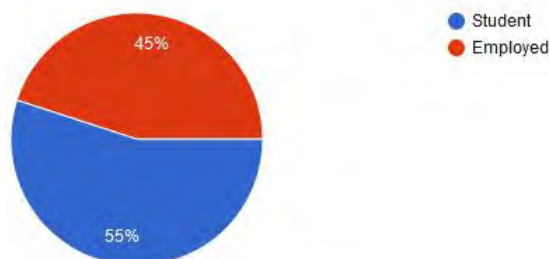


Figure 3.6: Participants Involvement Status

### 3.3.1 Questionnaires for PDS

Questionnaires for PDS used in the survey are described below-

Q1: Is your major subject expected to assist you in obtaining a job that is compatible with your disabilities? The aim of the survey question is to gather information from respondents about their expectations regarding how their chosen major or field of study will impact their ability to find a job that accommodates or is compatible with their disabilities. The possible answer options were Yes, No, and Maybe. The

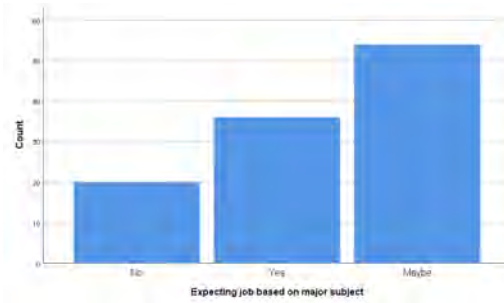


Figure 3.7: Expecting job based on major subject compatible with disabilities

graph indicates that a greater number of students are experiencing confusion, leading them to cast their votes as "Maybe".

Q2. Do you think you will get a job relevant to your study field? The goal was to assess the expectations and perceptions of the respondents regarding their prospects for obtaining a job that is directly related to the field of study they have pursued or are pursuing.

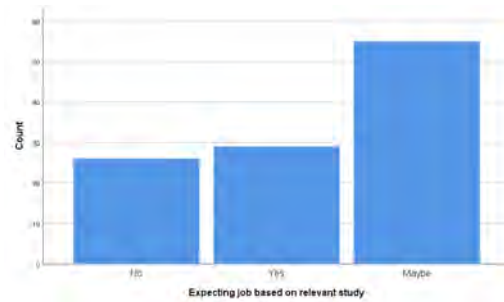


Figure 3.8: Expecting job based on relevant study

The graph suggests that most of the students are encountering uncertainty, resulting in them choosing "Maybe" when casting their votes.

Q3. What facilitated your participation and/or success in the Education program as a student with a disability? The goal of the survey question was to understand and insights from students with disabilities about the factors or elements that played a role in their ability to participate in and succeed in an education program. The possible answer findings were Motivation, Self-confident, Family help, Govt. help, and Nothing. The maximum caused was self-confident, motivation, and nothing as shown in the bar.

Q4. In which education phase are you studying? The aim of the survey question was

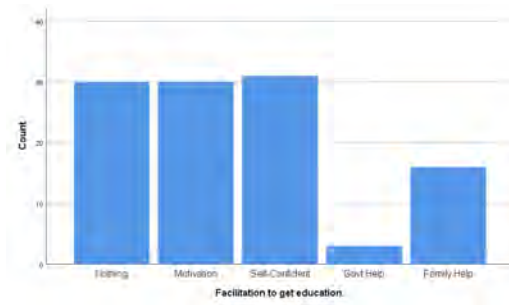


Figure 3.9: Facilitation

to collect information about the current educational phase or level of the respondents to understand their educational influence.

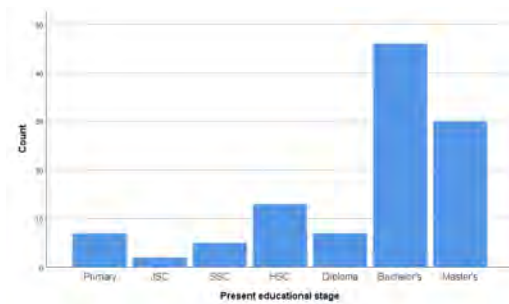


Figure 3.10: Present educational stage

The above histogram represents most of the students who are pursuing the Bachelor's or Master's Degree.

Q5. What was your last degree or certificate? The goal of this survey question was to collect information about the last educational achievement of the students.

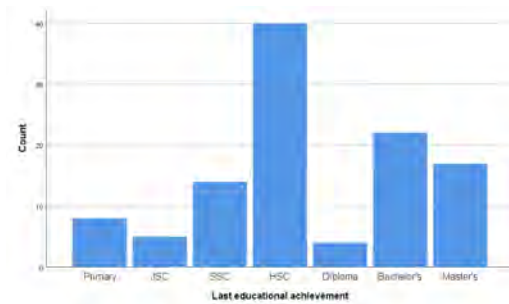


Figure 3.11: Last educational achievement

The graph depicts most of the student's last degree was HSC and Bachelor's.

Q6. How much can you participate in the education program, including living in the dorm, weekly seminars, daily lab work, and outside activities? The aim of this survey question was to assess the level of participation of students with disabilities in various aspects of the education program to identify potential barriers and inform support services.

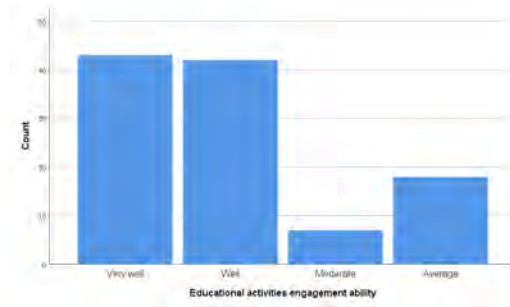


Figure 3.12: Educational activities engagement ability

In Figure 3.12, 'Very well,' 'well,' 'Moderate,' and 'Average' are used to denote the engagement levels of student activities. Most students experienced the 'Very well' and 'Well' categories.

Q7. What percentage of classes do you attend in a month? The goal of this survey question is to determine the percentage of classes PDS attend in a given month, providing insights into attendance patterns and potential academic performance indicators.

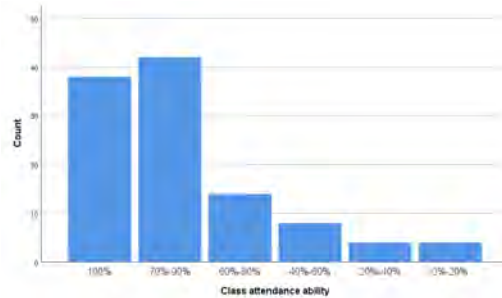


Figure 3.13: Class attendance ability

Figure 3.13 illustrates class attendance percentages ranging from 0% to 100%, with the majority of respondents having voted for the 70% to 100% range.

Q8. Do you find your institution friendly for students with disabilities? The aim of this survey question was to gauge respondents' perceptions of the institution's friendliness and support for students with disabilities, helping identify areas for potential improvement. The possible answer options were kept binary Yes or No.

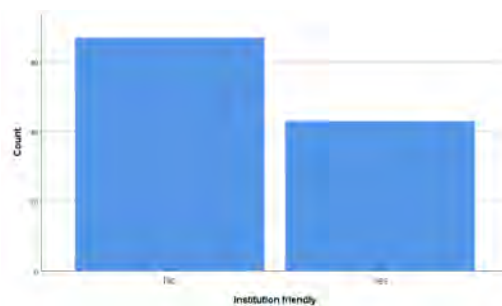


Figure 3.14: Institution friendly

The above histogram indicates that most PDS experienced that their institution is not friendly.

Q9. Does your organization use adaptive technology to assist students with disabilities in their learning? The purpose of this survey question is to gather information about whether the organization utilizes adaptive technology to support students with disabilities in their learning. It aims to assess the extent to which adaptive technology is integrated into the organization's educational practices and services. The possible answer options were kept binary Yes or No.

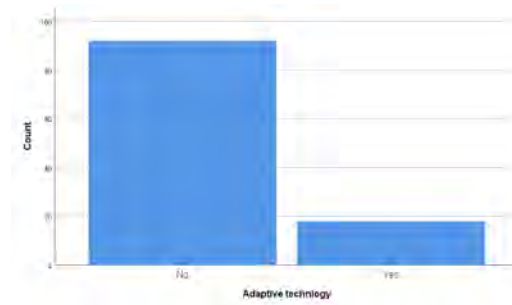


Figure 3.15: Adaptive technology

The above graph indicates that most PDS experienced that their institution does not use adaptive technology.

Q10. Does your institution offer scholarships or financial aid for students with disabilities? The aim of this survey question is to determine whether the institution provides scholarships or financial aid specifically tailored to support students with disabilities. The possible answer options were kept binary Yes or No.

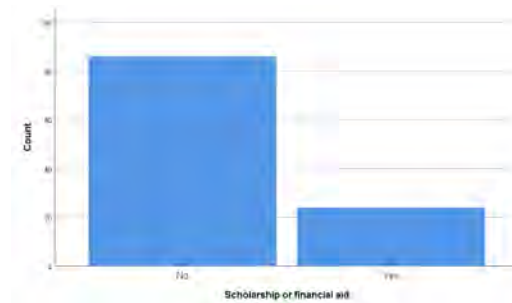


Figure 3.16: Scholarship or financial aid

The graph above suggests that the majority of PDS respondents have found that their institution does not provide any scholarships or financial aid.

Q11. How do you pay your tuition fee for education? The aim of this survey question is to gather information about the methods or sources that students with disabilities use to pay their tuition fees for their education. Five possible options were provided: from self-income, from family, financial aid, and multiple ways.

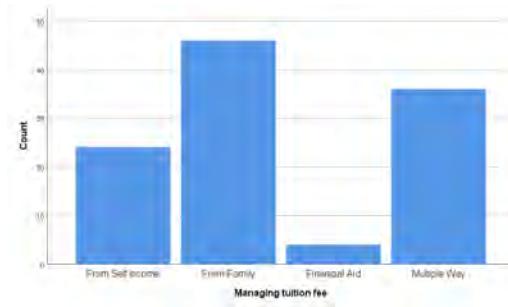


Figure 3.17: Managing tuition fees

The graph above implies that most of the surveyed PDS respondents rely on their families to cover their tuition fees.

Q12. What challenges do you face in the education program as a student with a disability? The aim of this survey question is to identify and understand the specific challenges that students with disabilities encounter while participating in their education program, with the goal of addressing and improving their educational experiences. Different opinions were expressed by them, and we identified five major problems by analyzing their opinions: financial issues, negative attitudes, transportation, and all challenges.

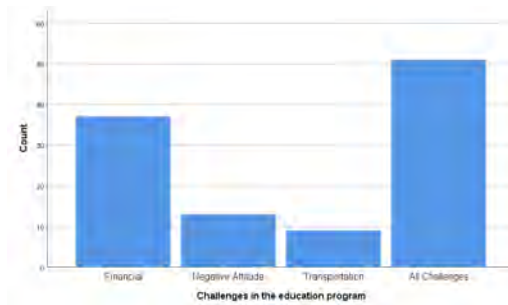


Figure 3.18: Challenges in the education program

The graph above implies that most of the students are facing multiple problems, including financial issues, negative attitudes, and transportation, as students with disabilities.

Q13. Do your peers understand your disability and your needs? The goal of this survey question is to assess whether students with disabilities feel understood by their peers and whether their peers are aware of their specific disability-related needs. PDS provided their votes on a scale of 1 to 5, where 1 represents poor and 5 represents the best.



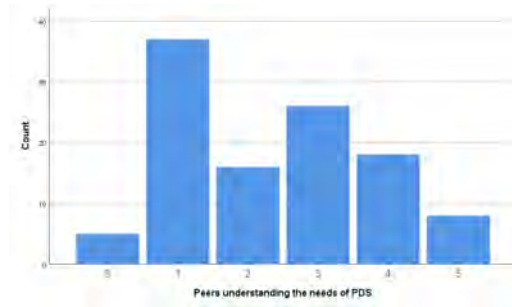


Figure 3.19: Peers understanding the needs of PDS

The histogram above suggests that a majority of students rated '1,' indicating that their peers are not very aware of their needs as students with disabilities.

Q14: Do you like the way your peers want to know about your disability? The aim of this survey question is to assess the respondent's satisfaction with the approach taken by their peers when inquiring about their disability. Six possible options were provided: never, always, sometimes, usually, often, and very often.

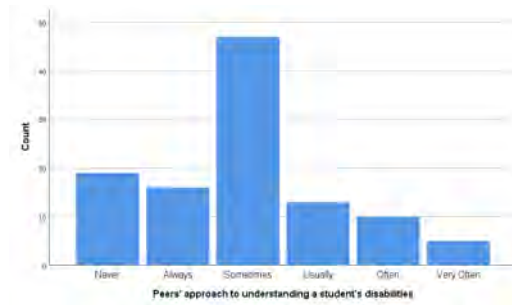


Figure 3.20: Peers' approach to understanding a student's disabilities

Figure 3.20 above indicates that most students sometimes approve of how their peers inquire about their disability.

Q15. Do your classmates assist you? The purpose of this survey question is to assess whether students with disabilities receive assistance from their classmates and to understand the level of peers' support within the educational environment. Six possible options were provided: never, always, sometimes, usually, often, and very often.

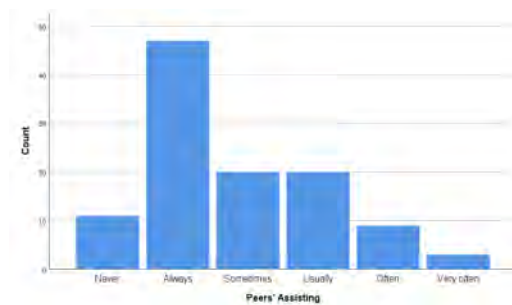


Figure 3.21: Peers' assisting towards PDS

The bar above indicates that most students always receive help from their classmates.

Q16. Do your peers underestimate your ability/skill though you are capable of doing more? The goal of this survey question is to gauge whether students with disabilities feel that their peers undervalue their abilities and skills, despite their potential for greater achievement. Six possible options were provided: never, always, sometimes, usually, often, and very often.

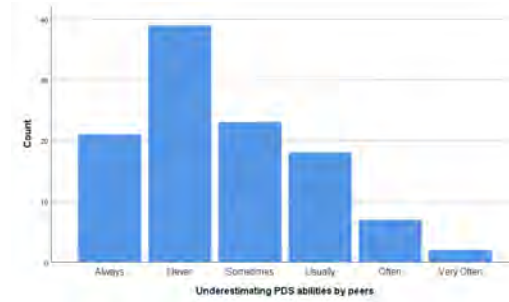


Figure 3.22: Underestimating PDS abilities by peers

The graph above shows that the majority of peers do not underestimate PDS’s abilities or skills.

Q17. What is the student’s attitude towards your disability? The purpose of this survey question is to assess the attitudes and perceptions of students toward students with disabilities. Four possible options were provided: Friendly and positively, Friendly but not positively, Positively but not friendly, and Neither Positively nor friendly.

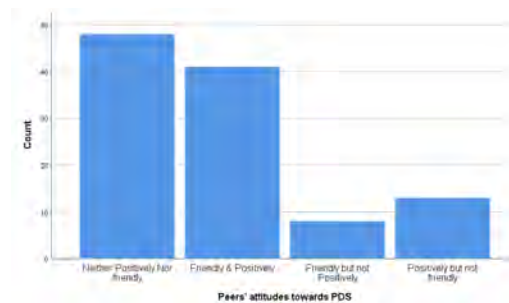


Figure 3.23: Peers’ attitude towards PDS

Figure 3.23 indicates that the majority of students feel that their classmates neither have a positive nor a friendly attitude toward them.

Q18. Have you experienced discrimination or negative attitudes from peers related to your disability? The goal of this survey question is to assess whether students with disabilities have encountered instances of discrimination or negative attitudes from their peers due to their disability. The possible answer options were kept binary Yes or No.

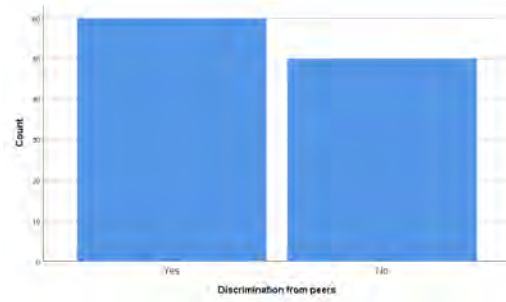


Figure 3.24: Discrimination from peers

Figure 3.24 suggests that most students with disabilities have encountered discrimination or faced negative attitudes from their peers due to their disability.

Q19. Do your teachers help you in education properly? The purpose of this survey question is to assess whether students with disabilities receive assistance from their teachers and to understand the level of teachers' support within the educational environment. Six possible options were provided: never, always, sometimes, usually, often, and very often.

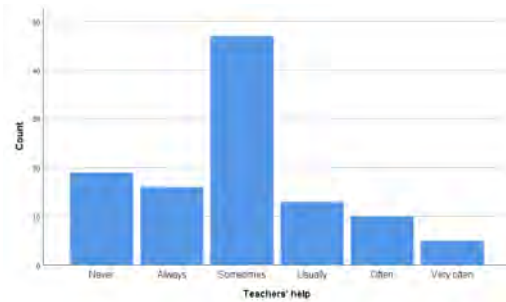


Figure 3.25: Teachers' help in education

The bar above indicates that most students sometimes receive help from their teachers.

Q20. Do your teachers underestimate your ability/skill though you are capable of doing more? The goal of this survey question is to gauge whether students with disabilities feel that their teachers undervalue their abilities and skills, despite their potential for greater achievement. Six possible options were provided: never, always, sometimes, usually, often, and very often.

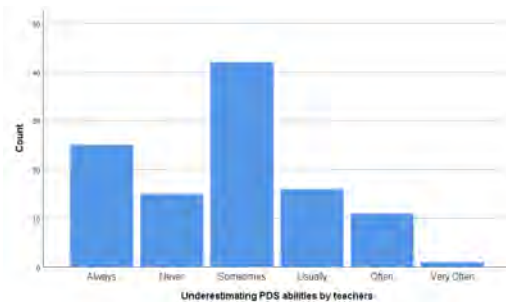


Figure 3.26: Underestimating PDS abilities by teachers

The graph above shows that the majority of students feel undervalued by their

teacher sometimes.

Q21. What is the teacher's attitude towards your disability? The purpose of this survey question is to assess the attitudes and perceptions of teachers toward students with disabilities. Four possible options were provided: Friendly and positively, Friendly but not positively, Positively but not friendly, and Neither Positively nor friendly.

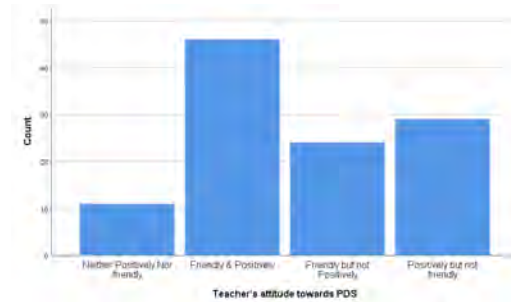


Figure 3.27: Teachers' attitude towards PDS

Figure 3.27 indicates that the majority of students feel that their teachers have a friendly and positive attitude toward them.

Q22. Have you experienced discrimination or negative attitudes from teachers related to your disability? The goal of this survey question is to assess whether students with disabilities have encountered instances of discrimination or negative attitudes from their teachers due to their disability. The possible answer options were kept binary Yes or No.

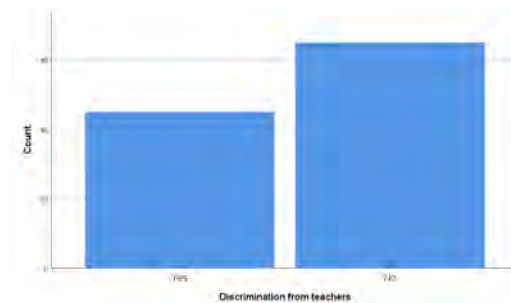


Figure 3.28: Discrimination from teachers

Figure 3.28 suggests that most students with disabilities have not encountered any discrimination or faced negative attitudes from their teachers due to their disability.

Q23: Do you like the way your teachers want to know about your disability? The aim of this survey question is to assess the respondent's satisfaction with the approach taken by their teachers when inquiring about their disability. Six possible options were provided: never, always, sometimes, usually, often, and very often.

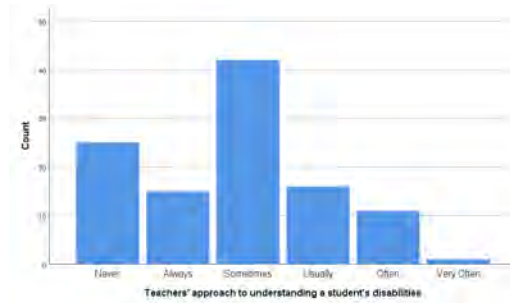


Figure 3.29: Teachers' approach to understanding a student's disabilities

Figure 3.29 above indicates that most students sometimes approve of how their peers inquire about their disability.

Q24. Have you experienced discrimination or negative attitudes from authorities/management related to your disability? The aim of this survey question is to assess whether students with disabilities have encountered instances of discrimination or negative attitudes from their academic authorities/management due to their disability. The possible answer options were kept binary Yes or No.

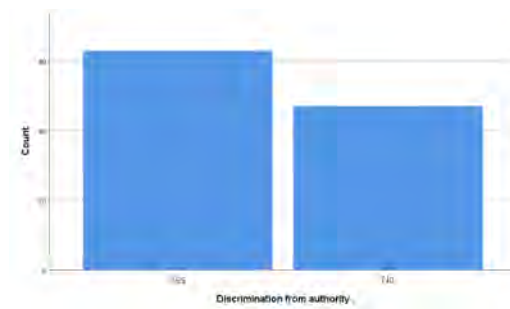


Figure 3.30: Discrimination from authority

Figure 3.30 suggests that most students with disabilities have encountered discrimination or faced negative attitudes from their authorities/management due to their disability.

### 3.3.2 Questionnaires for PDE

**Questionnaires for PDE used in the survey are described below-**

Q25. Do you feel that employers value the skills and abilities of employees with disabilities? The goal of the survey question is to assess the PDE's perception or opinion about how employers view and treat employees with disabilities in the workplace. It aims to gather insights into whether the respondents believe that employers appreciate and recognize the skills and abilities of people with disabilities, and whether there may be potential issues or areas for improvement in this regard. The possible answer options were kept binary Yes or No.



Figure 3.31: Employers value PDE for their skills and abilities

The above bar chart indicates that the majority of employees with disabilities (PDE) affirmed that employers do not appreciate the skills and abilities of employees with disabilities.

Q26. Are you satisfied with your current employment situation? The aim of this survey question is to assess the level of job satisfaction among employees with disabilities. It seeks to understand their contentment with their current employment situation, which can provide valuable insights for employers and organizations in promoting an inclusive and positive work environment. The possible answer options were kept binary Yes or No.

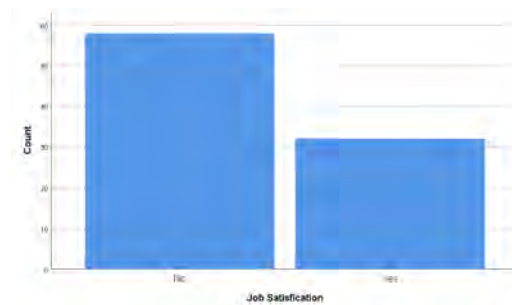


Figure 3.32: Job satisfaction

The bar chart above suggests that most employees with disabilities (PDE) have expressed dissatisfaction with their current employment situation as perceived by their employers.

Q27. Have you ever been denied a job or promotion because of your disability? The purpose of this survey question is to gather information about whether employees with disabilities have faced instances of job or promotion denial specifically due to their disability. It aims to assess and understand potential discrimination or barriers in the workplace, which can inform efforts to promote equal opportunities and inclusivity for individuals with disabilities. The possible answer options were Yes, No, and Maybe.

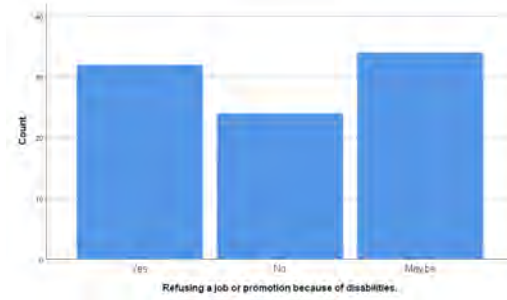


Figure 3.33: Refusing a job or promotion because of disabilities

The histogram above indicates that the majority of PDE responded with 'Maybe,' which suggests the presence of potential circumstances where they could face job denials due to their disabilities.

Q28. Have you ever felt discriminated against in the workplace because of your disability? The aim of this survey question is to inquire about the personal experiences of individuals with disabilities in the workplace, specifically focusing on whether they have ever felt discriminated against due to their disability. It aims to gather insights into potential instances of discrimination in the work environment and to assess the need for workplace inclusivity and anti-discrimination measures. The possible answer options were Sometimes, Never and Always.

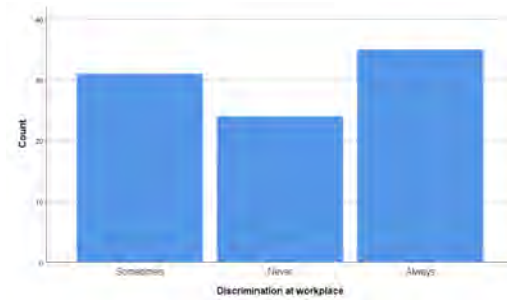


Figure 3.34: Discrimination at workplace

The graph illustrates that the highest number of respondents selected 'Always,' indicating that they often experienced discrimination in the workplace due to their disabilities.

Q30. How do you feel about the level of support and understanding provided by your colleagues and supervisor? The purpose of this survey question is to assess the perceptions and feelings of employees with disabilities regarding the support and understanding they receive from their colleagues and supervisor in the workplace. It aims to gather insights into the quality of interpersonal relationships, the level of support, and the overall work environment's inclusivity, which can inform strategies for creating a more supportive and inclusive workplace for individuals with disabilities. The answer options were on a scale of 1 to 5, where 1 represents poor and 5 represents the best. The answer options were on a scale of 1 to 5, where 1 represents poor and 5 represents the best.

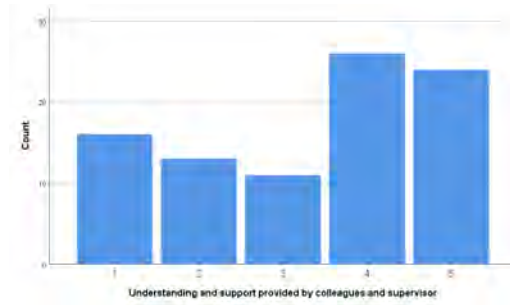


Figure 3.35: Understanding and support provided by colleagues and supervisor

According to Figure 3.35, the majority of respondents gave a rating of 4, indicating a positive perception of the support and understanding offered by their colleagues and supervisors in the workplace.

Q31. Are you comfortable disclosing your disability to potential employers? The goal of this survey question is to assess the comfort level of employees with disabilities in disclosing their disability to potential employers. It aims to gather insights into individuals' willingness to share information about their disability and any potential concerns or barriers they may face in the employment application process. This information can inform efforts to promote transparency and inclusivity in the hiring and employment of individuals with disabilities. The possible answer options were Sometimes, Never, Always, Usually, and often.

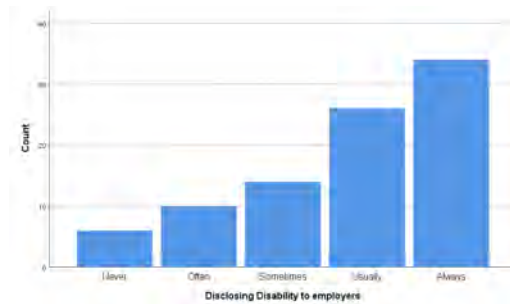


Figure 3.36: Disclosing Disability to employers

Figure 3.36 indicates that most PDEs always feel at ease disclosing their disabilities to prospective employers. Q32. Have you ever received any training or education from the government related to your disability? The aim of this survey question is to gather information about whether employees with disabilities have received any training or education related to their disability from the government. It seeks to assess the accessibility and availability of government-provided educational resources and support for individuals with disabilities in the workforce. The possible answer options were kept binary Yes or No.



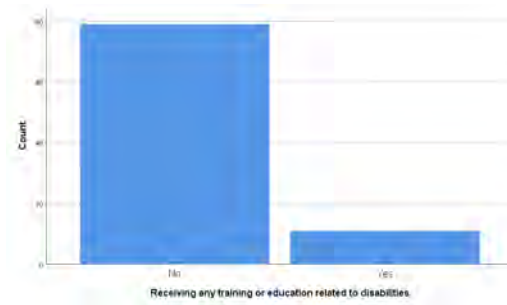


Figure 3.37: Receiving any training or education related to disabilities

Figure 3.37 illustrates that the majority of PDE voted 'No,' indicating that they have not received government-provided training or education related to their disabilities.

Q33. Have you ever received assistance or support from government programs for individuals with disabilities seeking/getting employment? The aim of this survey question is to inquire whether employees with disabilities have ever received assistance or support from government programs designed to help individuals with disabilities in their pursuit of employment. It seeks to assess the utilization and effectiveness of government support in facilitating employment opportunities for individuals with disabilities. The possible answer options were kept binary Yes or No.

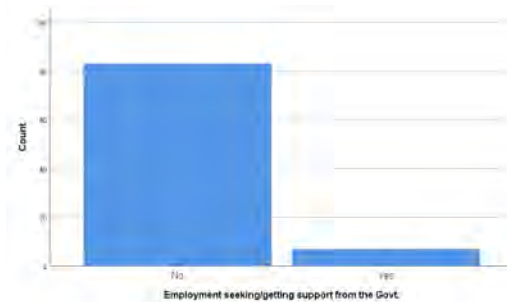


Figure 3.38: Employment seeking/getting support from the Govt.

Figure 3.38 shows that most PDE respondents selected 'No,' signifying that they haven't benefited from government programs intended to assist individuals with disabilities in their job search or employment efforts.

Q34. Do you feel that employment opportunities are equally accessible for people with disabilities? The goal of this survey question is to assess the respondent's perception regarding the accessibility of employment opportunities for individuals with disabilities. It aims to gather insights into whether employees with disabilities believe that employment opportunities are available on an equal basis and to identify potential barriers or disparities in the job market. This information can help inform efforts to promote inclusivity and equal employment opportunities for individuals with disabilities. The possible answer options were kept binary Yes or No.

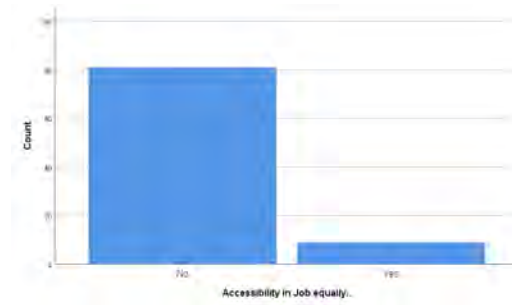


Figure 3.39: Accessibility in Job equality

The histogram illustrates that the majority of PDE participants chose 'No,' indicating their perception that employment opportunities are not equally accessible for individuals with disabilities.

Q35. Have you ever been selected for a promotion or job opportunity because of your disability? The aim of this survey question is to assess whether employees with disabilities have experienced situations where they were chosen for a promotion or job opportunity directly because of their disability. It seeks to understand the extent to which disabilities are considered as factors in employment decisions and the potential impact of disability-related affirmative action or diversity initiatives in the workplace. This information can provide insights into the effectiveness of such programs and their role in promoting inclusivity and equal employment opportunities for individuals with disabilities. The possible answer options were kept binary Yes or No.

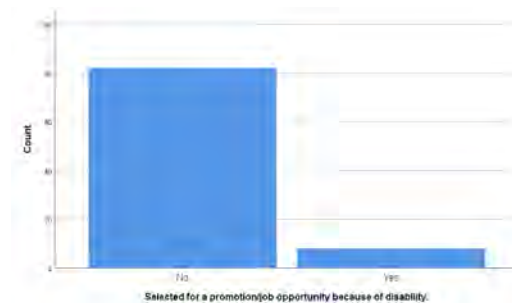


Figure 3.40: Selected for a promotion/job opportunity because of disability

The graph above depicts that most PDE respondents selected 'No,' signifying that they have never been chosen for a promotion or job opportunity solely because of their disability

Q36. What was the department of your last academic degree? The aim of this survey question is to gather information about the subject or department in which employees with disabilities obtained their most recent academic degree. It provides insights into the educational background and qualifications of these individuals, which can be valuable for understanding their skills and expertise in relation to their employment experiences. The possible answer options were Arts, Science, and Commerce.

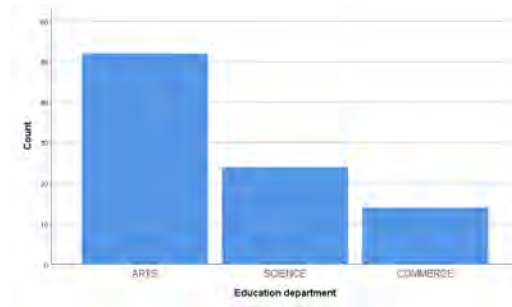


Figure 3.41: Education department

The graph above illustrates that the majority of PDEs pursued degrees from the Arts department.

Q37. Please tell the grade or the score of your last academic qualification. The goal of this survey question is to collect information about the grade or score achieved in the most recent academic qualification of employees with disabilities. This data can be valuable for assessing educational backgrounds and qualifications, which in turn can provide insights into the skills and capabilities of these individuals and how these qualifications relate to their employment experiences. The available response choices included '1st class,' '2nd class,' and '3rd class.'

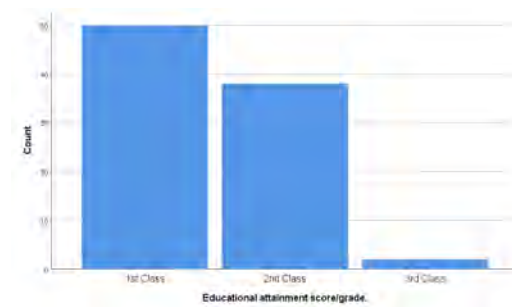


Figure 3.42: Educational attainment score/grade

The graph above shows that most PDEs obtained academic degrees in the '1st class' category.

Q38. How much can you perform your job duties effectively? The aim of this survey question is to assess the self-perceived effectiveness of employees with disabilities in carrying out their job duties. It seeks to understand their confidence and capability in performing their work tasks, which can provide insights into potential challenges or support needs in the workplace. This information can be valuable for improving workplace accommodations and facilitating success for employees with disabilities. The answer options were on a scale of 1 to 5, where 1 represents poor and 5 represents the best.

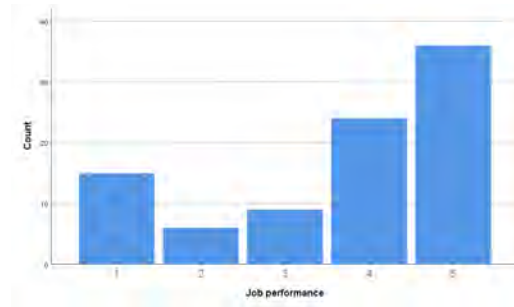


Figure 3.43: Job performance

Figure 3.43 reveals that most respondents rated with a score of 5, reflecting their high performance in their work despite facing disabilities.

Q39. Do you feel your disability affects your job performance? The goal of this survey question is to assess the self-perceived impact of a disability on an employee's job performance. It seeks to understand whether employees with disabilities believe that their disability affects their ability to perform their job effectively, providing valuable insights into potential challenges or areas where additional support or accommodations may be needed in the workplace. This information can inform strategies for promoting equal opportunities and inclusivity in the work environment for individuals with disabilities. The provided options were Never, Often, Sometimes, Usually, Always.

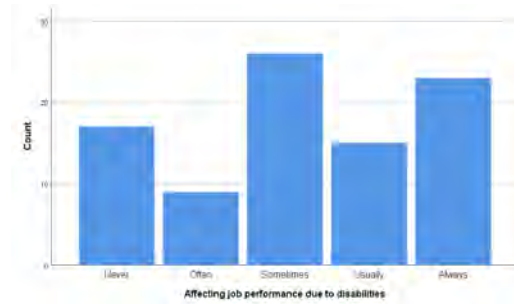


Figure 3.44: Affecting job performance due to disabilities

Figure 3.44 shows that a majority of PDEs sometimes experience an impact on their job performance due to their disabilities.

Q40. Do you feel that employers in your field are accommodating the needs of people with disabilities? The purpose of this survey question is to gauge the perception of employees with disabilities regarding the extent to which employers in their field are making accommodations to meet the needs of individuals with disabilities. It seeks to assess whether employees with disabilities feel that their workplace is inclusive and supportive and whether they believe employers are taking measures to accommodate and address disability-related needs. This information can help identify areas for improvement in promoting inclusivity and accessibility for employees with disabilities. The possible answer options were kept binary Yes or No.

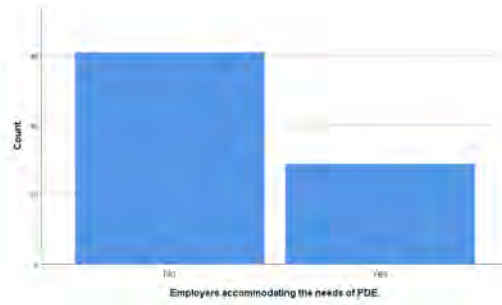


Figure 3.45: Employers accommodating the needs of PDE

The graph above indicates that the majority of PDEs have chosen "No" as their response, signifying that they have not received sufficient accommodations from their employers.

Q41. Have you ever received a suitable working environment and supportive materials provided by your employer for your workplace? The goal of this survey question is to inquire about whether employees with disabilities have ever received a work environment that is suitable for their needs and whether they have been provided with supportive materials by their employers. It seeks to assess the availability and effectiveness of workplace accommodations and support for individuals with disabilities, which can be vital in promoting inclusivity, accessibility, and job satisfaction for these employees. The possible answer options were kept binary Yes or No.

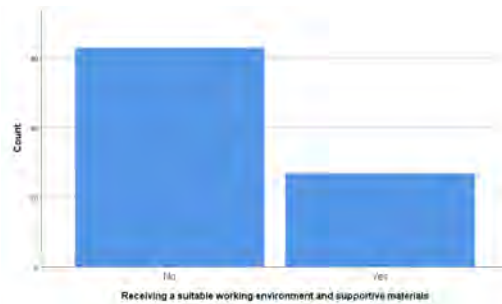


Figure 3.46: Receiving a suitable working environment and supportive materials

The histogram above shows that the majority of PDEs responded with "No," signifying that they have not been provided with an appropriate work environment and supportive materials by their employer in their workplace.

Q42. How do you feel about the accessibility of the physical work environment? The purpose of this survey question is to assess the employee's feelings and perceptions concerning the accessibility of their physical work environment. It seeks to understand how employees with disabilities perceive the physical workplace in terms of accommodating their needs and providing an environment that is accessible to all. This information can be valuable for identifying potential barriers and areas for improvement in ensuring an inclusive and accessible workspace for individuals with disabilities. The possible answer options were Ok, Not ok, Need more improvement.

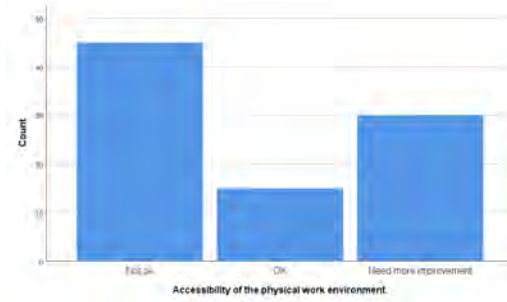


Figure 3.47: Accessibility of the physical work environment

The figure above, labeled as Figure 3.47, illustrates that most PDEs chose the option "Not ok," indicating their belief that the physical work environment's accessibility is inadequate for their needs.

### 3.4 Data Preprocessing

In this study, data preprocessing played a pivotal role in preparing the data for subsequent statistical analysis. To address missing values, we engaged in direct communication with participants, which enabled them to provide their opinions on the missing entries. Some, rows containing null values were removed, resulting in a dataset reduction of 200 rows. In order to standardize the data, a label-encoding method was applied, encompassing both ordinal and nominal scales.

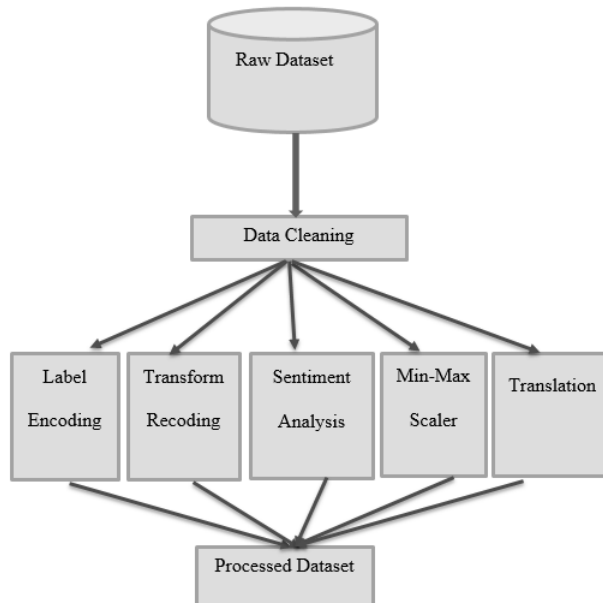


Figure 3.48: Top down Diagram of Data Preprocessing

The questionnaires having multiple options to choose from were separated and recoding was performed to transform it into categorical data. Given the predominantly categorical nature of the data, we undertook a transformation and recoding process, assigning numerical values to the data categories based on min-max scaling.

Such questionnaires were -What was the department of your last academic degree? Choose from all that apply. How do you feel about the accessibility of the physical work environment? Choose from all that apply. Although most of the features contained categorical data, there were some numeric data as well. Features having numeric data were - peers understanding PDS disability and needs score out of 5, support and understanding provided by colleagues and supervisor score out of 5, performing job duties effectively score out of 5. Min-max scaler was used to normalize these numeric data. In the Min-Max scaler, all the data is scaled in the range of 0 to 5. The equation for calculating normalized value using the min-max scaler would be –

$$X_{\text{norm}} = \frac{X - X_{\text{min}}}{X_{\text{max}} - X_{\text{min}}} \quad (3.1)$$

Finally, to find out the learning and employment experience of the students and employees we performed sentiment analysis according to NLP (Natural Language Processing). Sentiment analysis is a part of natural language processing (NLP). Sentiment analysis, also known as opinion mining, is a specific NLP task that involves determining the sentiment or emotional tone expressed in a piece of text. In the survey, participants were given the option to provide their perspectives on education and employment experiences in a text field. As part of the data processing phase for our research, these responses were subsequently translated into English, and Conducted sentiment analysis to categorize the experiences into positive, negative, or neutral sentiments. Subsequently, positive comments were categorized as 'Excellent,' neutral as 'Good,' and negative as indicative of a 'Poor' experience. VADER (Valence Aware Dictionary for Sentiment Reasoning), a sentiment analysis tool, was used to evaluate participants' sentiments concerning their education and employment experiences. VADER is a rule-based model designed for general sentiment analysis[9]. It functions as an NLTK module, providing sentiment scores based on the words used. It is used to analyze text data and determine the sentiment expressed in that text. It assesses whether the sentiment in the text is positive, negative, or neutral.



Figure 3.49: PDS Learning Experience Rating

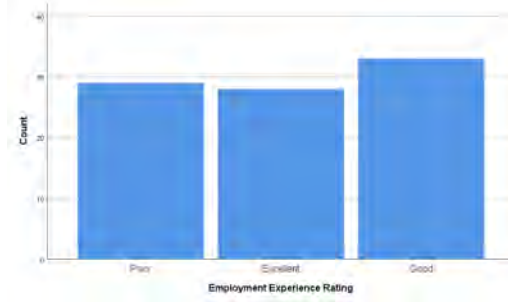


Figure 3.50: PDE Employment Experience Rating

After labeling the dataset, the learning experience to be Poor was found to be highest with a frequency of 42, followed by Excellent with a frequency of 37, and lastly, Good with a frequency of 31. In terms of, the employment experience to be Good was found to be highest with a frequency of 33, followed by Poor with a frequency of 29, and lastly, Excellent with a frequency of 28.

### 3.5 Data Validation

In this study, for finding the validity and reliability of the dataset, Cronbach's alpha was calculated for each variable. The factor analysis was employed to investigate convergent and discriminant validity. ANOVA test has been used to investigate the mean differences between 3 groups (Excellent, Good, Poor). Afterward, the mean difference was compared in a pair-wise fashion using post hoc multiple comparison analysis (Scheffees method).

The Cronbach's alpha coefficient is used to determine how consistently a group of survey questions or items measures the same trait. This coefficient assesses the level of agreement among these items. Since the survey dataset was derived from responses provided by students and employees, it is crucial to assess its validity and reliability before conducting the study. There is a possibility that some participants may submit inaccurate or random data through the survey. Therefore, it is essential to ascertain whether the dataset is valid enough for further analysis. The Cronbach's alpha for most of the variables was found to exceed 0.70, indicating a satisfactory level of data reliability, with some even reaching 0.90.

#### 3.5.1 Cronbach's Alpha

A multi-item scale or questionnaire may be evaluated for its internal consistency or reliability using Cronbach's alpha, which is a statistical metric[1]. It is a statistic that may take on values between 0 and 1, with higher values suggesting a more reliable result. Evaluation of the reliability of survey instruments and other forms of measuring tools is a typical practice in the social sciences and is supported by this method.

$$\alpha = \frac{k}{k - 1} \left( 1 - \frac{\sum_{i=1}^k \sigma_i^2}{\sigma_T^2} \right) \quad (3.2)$$

Where:



- $\alpha$  is Cronbach's alpha.
- $k$  is the number of items (questions) in the test.
- $\sigma_i^2$  is the variance of each individual item.
- $\sigma_T^2$  is the variance of the total scores across all items.

The value of Cronbach's alpha may be determined by first taking the score obtained from each scale item, linking that score with the overall score obtained for each observation, and then contrasting that value with the variation of the scores obtained from all of the scale items individually. It is easiest to understand Cronbach's alpha as a function of the number of questions or items included in a measure, the average covariance between pairs of items, and the overall variance of the entire measured score. Cronbach's alpha is sensitive to the number of items that are being measured as well as the distribution of those items since it is dependent on the correlation between the items on a scale. Even though a higher threshold of 0.8 or 0.9 may be more appropriate for certain kinds of research, the general rule of thumb is that an alpha of 0.7 or higher is considered acceptable for most research. However, some experts suggest that a lower threshold of 0.6 may be more appropriate for certain kinds of research. The Cronbach's alpha coefficient is a measure of dependability that is used by a significant number of academics and practitioners. It is not a measurement of validity, which is the amount to which a test measures what it is intended to assess; rather, it is a measurement of the test's consistency. Validity is defined as the extent to which a test measures what it is intended to measure.

### 3.5.2 Factor Analysis

Factor loading in factor analysis refers to the correlation between observed variables (indicators) and the underlying latent factors. It quantifies the strength and direction of the relationship between variables and factors. In essence, factor loadings indicate how much of the variance in an observed variable can be attributed to the factor. High factor loadings suggest that the variable is strongly associated with the factor, while low factor loadings indicate a weak association. The multi-item factors proposed in the model were analyzed to evaluate the reliability and the validity of convergence and discrimination. To test the convergent validity and discriminant validity, factor analysis with varimax rotation was employed for 41 items, comprising 24 items for PDS and 17 items for PDE. Most of the loading values of each observed indicator on its latent construct exceeded 0.6 (threshold value). Due to cross-low value and cross-loading of the factor loading, a few items were dropped. In our analysis, Bartlett's test for homogeneity of variances was conducted for each dimension constructed with various factors. The test revealed a highly significant result ( $p < 0.001$ ), indicating that the variances among the groups in the respective dimensions were not equal. The level of significance (p-value) conveys the strength of the result. In most cases, when the p-value is very close to 0 (e.g., 0.00), it's considered highly significant, indicating that there are significant differences in variances among the groups. In this study, a Bartlett test result of "0.00" implies that there are significant differences in the variances among the groups being tested. This could impact the choice of statistical methods and the interpretation of the analysis results.

### 3.5.3 Significance of Bartlett's Test

Bartlett's test is vital in research for assessing variance homogeneity. Its importance lies in:

- Assumption Check: Ensures equal variances among groups, a key assumption in various statistical tests.
- Data Quality: Maintains data integrity by detecting variance discrepancies.
- Analysis Guidance: Helps select appropriate data transformations or robust statistical methods when variances differ significantly.

In essence, Bartlett's test safeguards the reliability and validity of research results by ensuring that data conforms to statistical assumptions.

Table 3.1: Factor loading, reliability and validity analysis of PDS

Dimensions	Items	Item Description	Factor Loading	Cronbach's Alpha	Significance of Bartlett's test
Education Program	Variable: Level of Education			0.720	0.00
	Item1	Facilitation of participation in the Education Program.	0.568		
	Item2	Present educational stage.	0.911		
	Item3	Last educational achievement.	0.926	0.800	
	Variable: Educational Involvement Status				
	Item4	Student's educational engagement ability.	0.884		
	Item5	Students' class attendance ability.	0.902	0.804	
	Variable: Course-Designed Career Alignment				
	Item6	Expecting to secure a job that aligns with major subject and is compatible with disabilities.	0.926		
	Item7	Future job prospects based on study field.	0.857		
Facilities and Support	Variable: Govt. Facilities and Support			0.721	0.00
	Item1	Facing challenges in the education program.	0.814		
	Item2	Managing tuition fees for education by PDS.	0.902		
	Variable: Institutional Facilities and Support			0.770	
	Item3	Institution friendly for PDS.	0.737		
	Item4	Using Adaptive technology to learn.	0.843		
Item5	Scholarship or financial aid for PDS.	0.869			
Learning Environment	Variable: Peers Perspectives			0.763	0.00
	Item1	Peers understanding the needs of PDS.	0.694		
	Item2	Peers' way of learning about a student's disabilities.	0.959		
	Item3	Receiving assistance from classmates.	0.433		
	Item4	Underestimating PDS abilities/skills by peers	0.910		
	Item5	The peers' attitudes towards PDS.	0.944		
	Item6	Experiencing discrimination from peers.	0.524	0.763	
	Variable: Faculty Perspectives				
	Item7	Teacher's help in education.	0.959		
	Item8	Underestimating PDS abilities/skills by teachers.	0.912		
	Item9	The teachers' attitudes towards PDS.	0.910		
	Item10	Experiencing discrimination from teachers.	0.944		
Item11	Teachers' way of learning about a student's disabilities.	0.912			
Item12	Experiencing discrimination from authority and management.	0.944			

Dimensions	Items	Item Description	Factor Loading	Cronbach's Alpha	Significance of Bartlett's test
Organization		Variable: Employment Satisfaction		0.740	0.00
	Item1	Employers value the skills and abilities of PDE.	0.614		
	Item2	Employee job satisfaction.	0.659		
		Variable: Employers Attitude		0.821	
	Item3	Refusing a job or promotion because of disabilities.	0.927		
	Item4	Discrimination in the workplace.	0.831		
	Variable: Colleagues Perspectives		0.811		
Item5	Understanding and support provided by colleagues and supervisor.	0.878			
Item6	Comfortable Disclosing about disabilities.	0.888			
Facilities and Support		Variable: Govt. Facilities and support		0.865	0.00
	Item1	Employment seeking/getting support from the government.	0.910		
	Item2	Receiving any training or education related to disabilities.	0.877		
		Variable: Working opportunity		0.807	
Item3	Accessible in job equally.	0.849			
Item4	Chance for a promotion or job opportunity due to disabilities.	0.841			
Job		Variable: Education Aligned job.		0.704	0.00
	Item1	Department/Subject of last academic education.	0.857		
	Item2	Grade of last academic qualification.	0.870		
		Variable: Job performance.		0.701	
	Item3	Performance scale of job duties effectively.	0.854		
	Item4	Affecting job performance due to disabilities.	0.784		
		Variable: Working Environment.		0.730	
Item5	Employers accommodate the needs of PDE in the workplace.	0.792			
Item6	Receiving a suitable working environment and supportive materials.	0.732			
	Item7	Accessibility of the physical work environment.	0.668		

Table 3.2: Factor loading, reliability and validity analysis of PDE

## 3.6 Hypothesis Testing

Hypothesis testing is a procedure to assess the strength of evidence from the sample and establish a framework for making decisions related to the population. In this study, ANOVA test is used in order to evaluate the hypothesis which are considered as common beliefs. This will provide a method for understanding how each feature influences students' learning and employees' employment experiences to be poor, good, and excellent. Moreover, the Scheffe test has been used to make comparisons among groups (Excellent, Good, Poor) in the analysis of variance experiments. This experiment will allow us to make all possible contrasts between group means and represent a pair-wise (Excellent - Good, Good - Poor, Excellent - Poor) comparison.

### 3.6.1 ANOVA Test

The analysis of variance (ANOVA) is used for analyzing mean differences between more than two groups[3]. This may be performed by looking at the variation in the data and where it occurs (hence its name). The analysis of variance (ANOVA) is a statistical technique that compares the degree of variation that exists within groups

to the degree of variation that exists across groups. ANOVA is mathematically expressed as:

$$x_{ij} = \mu_i + c_{ij} \quad (3.3)$$

Where  $x$  is the individual data points (group and individual observations are denoted by  $i$  and  $j$ , respectively),  $\epsilon$  is the unexplained variation, and the model's parameters ( $\mu$ ) are the population means for each group. Each data point ( $x_{ij}$ ) is, therefore, the summation of the group mean and the error.

The F-ratio, a test statistic used in ANOVA as well as other traditional statistical tests, allows us to determine the chance of finding the data under the null hypothesis (P-value). A significant P-value (often regarded as  $P < 0.05$ ) denotes that the means of at least one group differ from one another in a significant way.

Null Hypothesis: All population means are equal Alternate Hypothesis: There is at least one population mean that differs from the others.

ANOVA divides the dataset's variation into between-group and within-group components. These variations are called the sums of squares. By comparing the mean of each group with the data's overall mean, the between-group variation (also known as between-group sums of squares, or SS) is calculated.

$$\text{Between (SS)} = n_1(\bar{x}_1 - \bar{x})^2 + n_2(\bar{x}_2 - \bar{x})^2 + n_3(\bar{x}_3 - \bar{x})^2 \quad (3.4)$$

In other words, by multiplying the sample size by the square of the differences between the means of each group = 1, 2, or 3), then adding the result. The BSS is then divided by the number of degrees of freedom (this is similar to the sample size, but it is  $n-1$  because the deviations must amount to zero) to obtain our estimate of the mean variation between groups. The difference between each observation and its group mean is known as the within-group variance (also known as the within-group sums of squares).

$$SSR = s_{group1}^2(n_{group1} - 1) + s_{group2}^2(n_{group2} - 1) + s_{group3}^2(n_{group3} - 1) \quad (3.5)$$

i.e., by multiplying the variance of each group by its degrees of freedom. Then, Within SS is Total SS minus Between SS. The mean variation within groups is then obtained by dividing the result by the total degrees of freedom, as previously. The F ratio is around 1 if the average difference between groups is comparable to that within groups. The F ratio rises over 1 as the average difference between groups exceeds the average difference within groups. It can be tested against the F-distribution of a random variable whose degrees of freedom correspond to the ratio's numerator and denominator in order to derive a P-value. The probability of obtaining that F ratio or a higher one is indicated by the P-value. Smaller P-values result from higher F ratios.

### 3.6.2 Scheffé Test

The Scheffé test, also known as the Scheffé technique, is a statistical test used in an analysis of variance (ANOVA) context to compare different means or groups[2]. It is used to identify whether means or groups are substantially distinct from one

another when many comparisons are done. Given the number of groups and degrees of freedom, the Scheffé test utilizes the F-distribution to compute the likelihood of receiving a certain test statistic. The test statistic is the ratio of the square mean between groups to the square mean within groups. Notably, the Scheffé test is a post-hoc test, which means it's employed after a significant ANOVA result to determine which groups are different. It is not used to determine the overall significance of ANOVA.

# Chapter 4

## Result and Discussion

### 4.1 Result Analysis

The findings of this study show that ANOVA analysis supports some of the hypotheses for PDS and PDE. Particularly, the analysis results in Tables 4.1 and 4.2 strongly support the hypotheses ( $P < 0.001$ ).  $P$  is assigned significance levels as follows: ( $*P < 0.05$ ), ( $**P < 0.01$ ), and ( $***P < 0.001$ ).

Table 4.1: Results of statistical analysis for PDS

Variables	F-Statistics	Excellent		Good		Poor	
		Mean	SD	Mean	SD	Mean	SD
Level of Education	1.183	10.945	3.822	11.000	4.211	12.119	3.465
Educational Involvement Status	15.177***	1.432	1.008	2.387	0.803	2.702	1.230
Course-Designed Career Alignment	11.370***	1.418	0.618	1.629	0.591	0.916	0.748
Govt. Facilities and Support	0.314	2.527	1.079	2.483	1.052	2.678	1.208
Institutional Facilities and Support	8.060***	0.351	0.384	0.365	0.388	0.095	0.224
Peers Perspectives	1.813	1.774	0.533	1.817	0.546	1.575	0.668
Faculty Perspectives	0.375	2.738	1.274	3.161	1.006	2.531	1.560

Table 4.2: Results of statistical analysis for PDE

Variables	F-Statistics	Excellent		Good		Poor	
		Mean	SD	Mean	SD	Mean	SD
Employment Satisfaction	8.464***	0.392	0.437	0.530	0.483	0.103	0.279
Employers Attitude	11.006***	0.982	0.600	1.454	0.753	0.603	0.772
Colleagues Perspectives	3.435*	3.339	1.114	4.000	1.138	3.275	1.373
Govt. Facilities and Support	3.261*	0.053	0.208	0.197	0.394	0.034	0.128
Working Opportunity	0.767	0.089	0.273	0.136	0.337	0.051	0.154
Education Aligned Job	0.114	1.500	0.608	1.560	0.569	1.500	0.566
Job Performance	0.375	3.392	1.271	3.606	1.235	3.327	1.483
Working Environment	13.511***	0.595	0.483	0.707	0.557	0.126	0.273

In addition, we conducted a pairwise analysis to ascertain the differences between each group and their impact on students' learning and employees' job experiences.

### 4.1.1 Pairwise analysis of PDS:

The PDS analysis results indicate that an Excellent experience significantly differs from a Poor experience and an Excellent experience significantly differs from a Good experience, particularly concerning Educational Involvement Status variables. As for the Course-Designed Career Alignment variable, a Good experience significantly differs from a Poor experience, and an Excellent experience differs from a Poor experience. In the case of the Institutional Facilities and Support variable, a Good experience differs from a Poor experience, and an Excellent experience differs from a Poor experience. However, there are some variations in certain instances when comparing the mean difference between (Excellent-Good) and (Good-Poor). Notably, variables such as Level of Education, Government Facilities and Support, Peers Perspectives, and Faculty Perspectives did not show statistical significance in the mentioned pair of groups. The summary of the pair-wise analysis for PDS is shown in Table 4.3.

Table 4.3: Results of pair-wise analysis for PDS

Variables	Difference between Excellent and Good	Difference between Good and Poor	Difference between Excellent and Poor
Level of Education	Not Significant	Not Significant	Not Significant
Educational Involvement Status	Significant***	Significant	Significant***
Course-Designed Career Alignment	Not Significant	Significant***	Significant*
Govt. Facilities and Support	Not Significant	Not Significant	Not Significant
Institutional Facilities and Support.	Not Significant	Significant**	Significant**
Peers Perspectives	Not Significant	Not Significant	Not Significant
Faculty Perspectives	Not Significant	Significant	Not Significant

### 4.1.2 Pairwise analysis of PDE:

Regarding PDE, the analysis reveals significant differences between Good experiences and Poor experiences, as well as between Excellent experiences and Poor experiences, specifically concerning the Employment Satisfaction variable. Furthermore, when examining the Employers Attitude variable, it is evident that Good experiences show significant differences from Poor experiences, and Excellent experiences show differences from Good experiences. In the context of the Colleagues Perspectives variable, Good experiences also show differences from Poor experiences. Regarding the Govt. Facilities and Support variable, Excellent experience differs from Good experience and Good experience differs from Poor experience. Additionally, within the Working Environment variable, there is an observation that Excellent experiences show significant differences from Poor experiences, and Good experiences also show significant differences from Poor experiences. However, when investigating the mean differences between (Excellent-Good) and (Good-Poor), diverse patterns are noted in certain cases. It's noteworthy that variables such as Working Opportunity, Education Aligned Job, and Job Performance did not demonstrate statistical significance in the mentioned pairings of groups. The summary of the pair-wise analysis for PDE is shown in Table 4.4.



Table 4.4: Results of pair-wise analysis for PDE

Variables	Difference between Excellent and Good	Difference between Good and Poor	Difference between Excellent and Poor
Employment Satisfaction	Not Significant	Significant***	Significant*
Employers Attitude	Significant*	Significant***	Not Significant
Colleagues Perspectives	Not Significant	Significant*	Not Significant
Govt. Facilities and Support	Significant*	Significant**	Not Significant
Working Opportunity	Not Significant	Not Significant	Not Significant
Education Aligned Job	Not Significant	Not Significant	Not Significant
Job Performance	Not Significant	Not Significant	Not Significant
Working Environment	Not Significant	Significant***	Significant***

**PDS-** In this study, the students' responses indicate that the most critical factors are in descending order: Level of Education, Faculty Perspectives, Govt. Facilities and Support, Educational Involvement Status, Peers Perspectives, Course-Designed Career Alignment, and Institutional Facilities and Support. Among the 3 dimensions, the Education Program (mean: 4.960) has been recognized as the most significant dimension for a better student learning experience. The rest in descending order are- Learning Environment (mean: 2.244) and Facilities and Support (mean: 1.415).

**PDE-** with regard to employees' responses reveal that the most important factors, ranked from highest to lowest, are as follows: Colleagues Perspectives, Job performance, Education Aligned Job, Employers Attitude, Working Environment, Employment Satisfaction, GOVT. Facilities and Support, and Working Opportunity. Among the three dimensions, Job (with a mean of 1.819) is identified as the most critical dimension for improving employees' job experiences. The other dimensions, ranked from highest to lowest, are Organization (with a mean of 1.648) and Facilities and Support (with a mean of 0.097).

### 4.1.3 Discussion for PDS

This study explores the factors that affect the education opportunities to adopt the model for people with disabilities in Bangladesh. The findings of the conceptual model that is being presented have a number of interesting implications that are represented in the form of a framework. As a result, some inferences can be derived from the study's findings and outcomes. To begin, it is acknowledged that within the PDS framework, the most influential factor is the Educational Involvement Status. The student's level of involvement in education and their capacity to attend classes reflects their determination to pursue education despite their disabilities. This commitment stems from their self-assurance, motivation, and the support they receive from their families. Another important factor that played an important role was the Course-Designed Career Alignment. Many students lack confidence and assurance regarding their prospects of securing a job that corresponds to their field of study and is accommodating of their disabilities upon completing their degree. As a result of the factors discussed, students with disabilities may face challenges in securing jobs aligned with their field of study and compatible with their disabilities. Their educational involvement status and the alignment of future job opportunities play significant roles in shaping their experiences. Another significant factor that was influential is Institutional Facilities and Support. A considerable portion of students who had sub-optimal learning experiences reported their inability to ac-

cess academic institutional support related to adaptive technology, scholarships, and disability-friendly institutions. It can be anticipated that a consequence of the lack of institutional facilities and support for students with disabilities is the potential for a poor learning experience. Students who do not receive adequate assistance in terms of adaptive technology, scholarships, and disability-friendly accommodations may face challenges in their education, which could impact their overall academic performance and satisfaction. Considering the dimension of the proposed conceptual framework, the Education Program was ranked 1st (mean: 4.960), as three major variables, Level of Education, Educational Involvement Status, and Course-Designed Career Alignment fall under this dimension. As discussed previously, Educational Involvement Status was crucial in determining students' learning outcomes. In addition, Course-Designed Career Alignment was also important. The state of the Institutional Facilities and Support was ranked 7 among all variables. However, one may argue that the Facilities and Support dimension should be 2nd of the most influential dimensions for the learning experience. However, in our study, it was ranked 3rd, out of 3 dimensions. The Learning Environment was our 2nd ranked dimension. This outcome could possibly be attributed to the interactions and attitudes of both faculty and peers toward students with disabilities.

Table 4.5: Student Overall Analysis

Dimensions	Mean	Rank	Variables	Mean	SD	Rank
Education Program	4.960	1	Level of Education.	11.409	3.812	1
			Educational Involvement Status.	2.186	1.178	4
			Course-Designed Career Alignment.	1.286	0.724	6
Facilities and Support	1.415	3	Govt. Facilities and Support.	2.572	1.116	3
			Institutional Facilities and Support.	0.257	0.354	7
Learning Environment	2.244	2	Peers Perspectives	1.710	0.596	5
			Faculty Perspectives	2.778	1.340	2

#### 4.1.4 Discussion for PDE

This research delves into the factors influencing the employment prospects for implementing a model for individuals with disabilities in Bangladesh. The outcomes of the presented conceptual model have various intriguing implications structured within a framework. Consequently, the study's findings and results yield certain deductions. First, it is a well-accepted fact that the most significant variable for PDE was Employment Satisfaction. It was found to be a major factor determining the overall outcome. Employees who have disabilities often perceive that their employers do not fully appreciate or recognize their skills and abilities, leading to a lower level of job satisfaction. This dissatisfaction may stem from a sense of undervaluation, which, in turn, can have a negative impact on their overall work experience and job contentment. Another significant variable that had a crucial impact was Employers Attitude. Many employees have poor experienced instances where employers declined to offer them job opportunities or promotions due to their disabilities, and they have also encountered discrimination within the workplace. These challenges highlight the hurdles that individuals with disabilities often face when seeking employment and pursuing career advancement. In terms of Colleagues Perspectives, it was found to be the least significant in this study. The majority of employees express satisfaction with the understanding and support they receive from their colleagues

and supervisors. As a result, they are often inclined to disclose their disabilities to these individuals. This reflects a positive and supportive dynamic within their work environment, where employees feel comfortable discussing their disabilities and seeking assistance when needed although there is still room for improvement. Govt. Facilities and Support were found to be the least significant in this study. According to 90% of employees with disabilities, regardless of whether they had excellent, good, or poor employment experiences, reported that they did not receive any training or support from the government to assist them in finding employment. This indicates a widespread absence of government-provided resources or programs aimed at helping individuals with disabilities secure and maintain jobs, regardless of their specific employment circumstances. Another noteworthy factor that had a critical influence was Working Environment. Employees with disabilities have encountered challenges related to a lack of appropriate accommodation, a work environment that doesn't fully meet their needs, and limited physical accessibility. This situation points to an area where employers may need to enhance their efforts to create more inclusive and accessible workplaces that cater to the diverse needs of their employees with disabilities. Considering the dimension of the proposed conceptual framework, Job was ranked 1st (mean: 1.819), one major variable, the Working Environment falls under this dimension. Organization was ranked 2nd (mean: 1.648), three major variables, Employment Satisfaction, Employers Attitude, and Colleagues Perspectives fall under this dimension. Facilities and Support was ranked 3rd (mean: 0.097), with two variables one is GOVT. Support and Facilities and another is Working Opportunity.

Table 4.6: Employee Overall Analysis

Dimensions	Mean	Rank	Variables	Mean	SD	Rank
Organization	1.648	2	Employment Satisfaction	0.350	0.446	6
			Employers Attitudes.	1.033	0.792	4
			Colleagues Perspectives.	3.561	1.244	1
Facilities and Support	0.097	3	GOVT. Support and Facilities.	0.100	0.282	7
			Working Opportunity.	0.094	0.269	8
Job	1.819	1	Education Aligned Job.	1.522	0.575	3
			Job Performance.	3.450	1.321	2
			Working Environment.	0.485	0.519	5

To sum up, after applying various data science techniques the major findings that should be considered for PDS and PDE are –

#### **PDS Findings-**

- The students' commitment to education, despite their disabilities, is evident in their active class participation and attendance, which is promising.
- Securing disability-friendly jobs related to their field of study upon degree completion.
- Institutions should offer adaptive tech, scholarships, and disability-friendly settings for disabled students.

#### **PDE Findings-**

- Employers should value the skills of employees with disabilities to boost job satisfaction and enhance their overall work experience.

- Employers should promote inclusive and non-discriminatory attitudes, offering better job opportunities and career advancement prospects for individuals with disabilities.
- Fostering a supportive work environment involves employees feeling comfortable discussing disabilities and seeking help from colleagues and supervisors.
- The government should offer training and resources to assist individuals with disabilities in securing and maintaining employment.
- Employers should strive to create more inclusive and accessible workplaces to better meet the diverse needs of employees with disabilities.

## 4.2 Challenges and Recommendations

Special Educational Needs and Disabilities (SEND) pertain to students who require additional educational support because they face challenges in learning due to health conditions or physical disabilities[20]. This study uncovered several themes from both the literature review and survey data discussed in previous chapters, emphasizing the challenges experienced by disabled students and employees in Bangladesh concerning their education and employment. Additionally, it identified potential facilitators to address these issues. Based on the questionnaires and accompanying graphs presented in the previous section, we identified specific challenges faced by PDS and PDE.

### 4.2.1 PDS Challenges and Facilitators:

1) **Challenge: PDS are not included in highly interactive and engaging learning environments.** or assigned to passive or observational roles with less engagement. Most of the students perceive being underestimated in terms of their abilities, despite being capable of accomplishing more.

**Facilitator: An institution can adopt management practices that enable students with disabilities to actively engage in the learning process.** PDS should be provided with opportunities to actively engage in tasks, allowing them to showcase their skills and strengths.

2) **Challenge: Negative attitudes displayed by faculty and peers.** Majority of students report experiencing discrimination or encountering negative attitudes from teachers, peers, or administrators during their studies.

**Facilitator: Establishing a supportive and inclusive community requires fostering positive attitudes among instructors, peers, and management.**

3) **Challenge: Participation is restricted due to limitations in physical spaces, including inadequate access to technology.** A considerable proportion of students with disabilities (PDS) express that the education system lacks appropriate adaptive technology and an accommodating environment for them to

pursue higher degrees smoothly. Consequently, they perceive educational institutions as unfriendly and not inclusive, not just for themselves but also for other individuals with disabilities, as indicated in Figure 4.1.

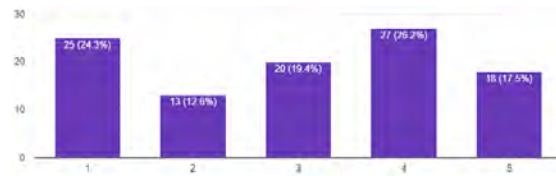


Figure 4.1: The percentage of PDS who view their institute as inclusive and accommodating for students with disabilities

**Facilitator: Physical spaces and technology access are universally designed or adapted to accommodate students with disabilities.** As an illustration, workplaces can incorporate adjustable table heights to cater to the needs of wheelchair users, along with the provision of lifts in each institute to ensure accessible entry without any difficulties.

4) **Challenge: Due to a lack of knowledge, teachers, authorities, and peers often lack the necessary preparation and understanding to support students effectively.** For instance, despite good intentions, teachers and peers may lack the necessary knowledge to fully comprehend the needs of individuals with disabilities (PDS). Consequently, they may struggle to provide appropriate support or refer students to the necessary resources. Additionally, the lack of knowledge often leads to uncertainty in how to approach individuals with disabilities, causing some teachers and peers to maintain a certain distance.

**Facilitator: Teachers/administrators/peers well-prepared to support students.** Promoting community engagement among students with disabilities and fostering diverse relationships between teachers, peers, and students can facilitate support. For instance, when a PDS student shares a living space with a roommate, the roommate can gain a better understanding of the student's abilities and needs, thereby offering support when it is most suitable.

5) **Challenge: Financial logistics.** Based on the survey, most of the academic institutes do not offer financial assistance or scholarships to students with disabilities. Additionally, the government's financial support for students with disabilities (PDS) is inadequate and not for all PDS. A majority of PDS rely on their family income to pay tuition fees, while some take up part-time jobs to cover the expenses.

The primary challenges of PDS are shown in Figure 4.2.



Figure 4.2: The primary challenges discussed by 110 PDS

**Facilitator:** The awareness of this issue by a program and its capability to exhibit flexibility in logistical matters in Govt and Non-Govt organizations.

#### 4.2.2 PDE Challenges and Facilitators:

1) **Challenge: PDE are not assessed based on their abilities:** Most of the PDE believe that people with disabilities face unequal access to employment opportunities. They feel that the skills and abilities of disabled individuals are overlooked due to their disabilities. Current employees have expressed their feedback, stating that they receive insufficient evaluations from their employers, despite their ability to understand and complete assigned tasks in the workplace. The squandering of skills leads to a decline in job interest.

**Facilitator:** A program aimed at raising awareness among employers about the importance of hiring individuals with disabilities. Besides, employers should assign employees to tasks that align with their core skills and acknowledge their accomplishments.

2) **Challenge: Negative attitudes of employers and colleagues:** Many employees experienced workplace discrimination due to their disability. A majority of employees assert that they have been deprived of job opportunities or promotions due to their disability based on the survey responses discussed in the dataset chapter.

**Facilitator:** Creating a supportive and inclusive community necessitates nurturing positive attitudes among employers, colleagues, and individuals in various roles.

3) **Challenge: Inadequate accommodation, including accessibility and supportive materials:** A significant number of employees express their dissatisfaction with their employers' lack of accommodation for employees with disabilities.

Most of the employees do not receive a suitable working environment or supporting materials from their employers. Additionally, the majority of employees believe there is a need for further improvement in the accessibility of the physical work environment, while some of them deem it completely inadequate. Consequently, a considerable number of employees with disabilities (PDE) express their dissatisfaction with their current employment situation.

**Facilitator: Making necessary accommodations, which encompass improved accessibility management and technology access, are specifically designed or modified for the use of Employees with disabilities (PDE). As an illustration, workspaces can be equipped with adjustable table heights to cater to the needs of wheelchair users.**

**4) Challenge: Insufficient governmental training and logistical support**

The majority of employees with disabilities receive insufficient training or education concerning their disabilities from the government, and they do not receive any assistance or support from government programs designed to help them find employment.

**Facilitator: Ensuring the provision of adequate disability-related training and programs to enhance skills, job prospects, and self-confidence. Additionally, implementing supportive policies and practices by the government to guarantee the employment of persons with disabilities (PDE).**

The study and employment challenges faced by people with disabilities in Bangladesh have been the subject of numerous research studies. This study reveals several key findings:

- Limited opportunities for education and training: People with disabilities in Bangladesh face significant barriers to accessing education and vocational training, which limits their ability to develop the skills and knowledge necessary to secure meaningful employment.
- Discrimination and stigma: Discrimination and social stigma towards people with disabilities are pervasive in Bangladesh. This often leads to exclusion from employment opportunities, social isolation, and limited access to essential services.
- Lack of policy and legal protection: There is a lack of comprehensive guidelines and legal protections for people with disabilities in Bangladesh. This limits their ability to advocate for their rights and access the services and support they need to thrive in society.
- Limited access to assistive technology and accommodations: People with disabilities in Bangladesh often have limited access to assistive technology and accommodations, such as mobility aids or adapted computer software. In developing countries, intermediate and assistive technology are often unaffordable or unavailable [34][41]. This further limits their ability to access education and employment opportunities.

- **Limited awareness and understanding of disability issues:** Employers, educators, and the general public in Bangladesh exhibit a widespread lack of awareness and comprehension concerning disability matters. This deficiency curtails the prospects for individuals with disabilities to engage fully in society and obtain the necessary support they require.

Considering these limitations, This research presents a comprehensive set of recommendations aimed at improving the education and employment system for individuals with disabilities in Bangladesh. The paper highlights the challenges this marginalized population faces and provides evidence-based strategies to create an inclusive environment that fosters their education and employment opportunities. The recommendations encompass policy changes, infrastructure development, awareness campaigns, capacity building, and stakeholder collaboration. By implementing these recommendations, Bangladesh can take significant strides toward empowering individuals with disabilities and promoting their social and economic inclusion.

### 1. Policy Reforms-

**Legislative Measures:** Advocate for inclusive policies and laws safeguarding the rights of individuals with disabilities, ensuring equal access to education and employment. Align these policies with international standards like the UN Convention on the Rights of Persons with Disabilities (UNCRPD).

**Inclusive Education Policies:** Drive the adoption of policies for inclusive education, enabling the integration of students with disabilities into regular schools. Offer necessary support, financial aid, scholarships, specialized services, and assistive technologies to cater to their diverse learning requirements

### 2. Infrastructure Development-

**Accessible Physical Infrastructure:** Enhance educational institutions and workplaces to be physically accessible by investing in ramps, elevators, restrooms, and parking for individuals with disabilities.

**Digital Accessibility:** Guarantee digital inclusivity by designing online platforms, educational content, and resources with features like screen readers, closed captioning, and alt text. Offer training and support to educators and employers to foster digital accessibility.

### 3. Awareness and Sensitization-

**Public Awareness Campaigns:** Launch and Initiate broad campaigns addressing stereotypes, misconceptions, and bias against individuals with disabilities. Educate about their potential and promote an inclusive society valuing diversity.

**Sensitization Programs:** Conduct programs to sensitize educators, employers, and the public, enhancing awareness of disability matters and cultivating inclusive mindsets. These programs should cover respectful language, interactions, and the significance of reasonable accommodations.

### 4. Capacity Building-

**Training for Educators:** Deliver thorough training to teachers, arming them with inclusive teaching methods, adaptive approaches, and classroom leadership skills. Empower educators to establish inclusive learning spaces catering to the varied requirements of students with disabilities.



**Skill Development for Individuals with Disabilities:** Develop and execute skill-building initiatives customized for individuals with disabilities. Provide vocational training, entrepreneurship workshops, technology instruction, and career guidance to boost their employability and smooth their entry into the job market.

#### 5. Collaboration and Partnerships-

**Government and Non-Government Collaboration:** Promote cooperation among government entities, NGOs, disability advocacy groups, and relevant stakeholders to synchronize actions in advancing inclusive education and employment.

**Employer Engagement:** Cultivate alliances with employers to establish workplaces that offer equitable job prospects, reasonable adjustments, and encouraging settings for individuals with disabilities. Provide incentives to companies championing diversity and inclusivity within their workforce.

#### 6. Monitoring and Evaluation-

**Data Collection and Analysis:** Set up a comprehensive data system to oversee inclusive education and employment progress. Continuously gather and assess data on enrollment, academic accomplishments, employment rates, and job satisfaction for individuals with disabilities.

#### **Impact Evaluation:**

Regularly evaluate strategy effectiveness and outcomes. Utilize results to refine existing programs, pinpoint areas for enhancement, and replicate successful models. By embracing these recommendations, Bangladesh can significantly advance inclusive education and job opportunities for individuals with disabilities. To succeed, we must work together—government, NGOs, educators, employers, and the community. This way, we'll build an inclusive society that values everyone's rights and potential, enabling active participation in education and the workforce.

# Chapter 5

## Conclusion

In conclusion, this study has the potential to address the challenges and offer potential solutions for the education and employment circumstances of individuals with disabilities in Bangladesh. This can be achieved by recognizing and addressing these key aspects. The findings indicate that eight variables contribute to improving the learning experiences of students and the employment experiences of employees. These variables include educational involvement status, course-designed career alignment, institutional facilities and support, employment satisfaction, employers attitude, colleagues perspectives, Govt. Facilities and Support and working environment. Some of these factors hold greater significance than others in influencing the experiences of individuals with disabilities, whether from poor to good, good to excellent, or poor to excellent level. By ranking these variables based on their significance, valuable insights have been generated that can inform impactful decisions regarding individuals with disabilities in Bangladesh in the future.

The study had a limited sample size of 200 students and employees participating in the survey program, and its primary focus was on capturing their experiences within the education and employment program, as a result, the study lacks a discussion on the perspectives of a significant number of disabled students and employees. Additionally, the study did not explore how various aspects of the participants' lives influenced their experiences. Consequently, this research endeavor aims to address the need for documenting the frequently overlooked voices of a more diverse group of students and employees. Further research is required to investigate the perspectives of a more diverse group of disabled individuals, using a substantial amount of data. This will help us understand how various aspects of their lives influence their experiences when working with new datasets through deep learning.

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# Supporting Documents

The research data was collected using Google Form questionnaires, and both the dataset and questionnaires are available here(<https://github.com/MasumUddin/Thesis.git>).