Exploring the Status of Industry-Academia Collaboration through Industrial Attachment Programme of Polytechnic in Kushtia District.

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Declaration

This research work has been done by ourselves and does not contain any material extracted from elsewhere or from a work published by anybody else. This work has not been presented elsewhere by the author for any degree or diploma. We also declare that the sources for information and materials, used in this report, are cited properly. Besides, we have acknowledged the support and assistance that we received during the research.

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Acronyms and Abbreviation

BTEB:	Bangladesh Technical Education Board
CBT&A:	Competency Based Training and Assessment
DTE:	Directorate of Technical Education
FGD:	Focus Group Discussion
ICT:	Information Communication Technology
ILO:	International Labor Organization
IT:	Information Technology
HSC (VOC):	Higher Secondary School Certificate (Vocational)
MOE:	Ministry of Education
NSDP:	National Skill Development Policy
NEP:	National Education Policy
NTVQF:	National Technical Vocational Qualification Framework
Eighth 5YP:	Eighth Fifth Year Plan
TMED:	Technical and Madrasah Education Division
TVET:	Technical Vocational Education and Training
TTTC:	Technical Teachers Training Institute
TIB:	Transparency International Bangladesh
UNESCO:	United Nations Educational Scientific and Cultural Organization
VTTI:	Vocational Teachers Training Institute
TVETIs:	Technical and Vocational Education and Training Institutions.
ISC:	Industry Skills Council
PPP:	Public Private Partnership
SDG:	Sustainable Development Goals
GDP:	Gross Domestic Product
SIAP:	Student Industrial Attachment Program
GoB:	Government of Bangladesh
BBS:	Bangladesh Bureau of Statistics

Acknowledgement

Abstract

The research aims to explore the present scenario of industry-academia collaboration in Kushtia district and suggests a way forward for industry-institution collaboration. The study uses both qualitative and quantitative approaches to answer research questions, including the current status and policies of industry-academia collaboration through the Industrial Attachment Program, challenges and opportunities associated with the program, and recommendations for improving collaboration. The target population is students, who have recently completed industrial attachment, industry academia member from Kushtia polytechnic institutions. TVET Experts of Bangladesh, Industry employer, Industry association members of Kushtia district have also participated in in-depth interview of this research program. We also analyze policy and guidelines regarding industry institution collaboration of Bangladesh Government. The data collection instrument consists of a self-designed questionnaire and a semi-structured interview guideline, while the data analysis techniques include descriptive statistics and thematic analysis. The study is significant because it provides insights into the current state of the students' industrial attachment program and offers recommendations for improving industry-academia collaboration and the relevance of TVET programs to the needs of the industry. The findings of the study can lead to the development of new strategies and policies for enhancing collaboration between academia and industry. Finally, the study will contribute to assess the present skill development programs of polytechnic graduates strengthening industry-academia collaboration, particularly the students industrial attachment program. This information can serve as a reference for policymakers, educators, and researchers interested in improving TVET and promoting sustainable growth through industry-academia collaboration.

Chapter-One: Introduction of The Study

1.1 Background:

The industry-institution linkage approach has proven successful in supporting TVET institutes and private sector companies to enter a mutually beneficial relationship that leads to skilled students finding employment (univoc.unesco.org, 2023). In Bangladesh, it has been found out that the collaboration of TVET and the industry is not getting effective due to a lack of initiative by TVET institutions and poor response from the industries (Raihan, 2014)

The world is under the Fourth Industrial Revolution (4IR) where the new generation needs to acquire skills in automation, digitization, and information technology to cope with the changing scenarios. New skills or competencies and knowledge according to the labor market requirements are needed and educational institutions are required to meet the need. To achieve the country's Sustainable Development Goals (SDGs) and 2nd Perspective Plan (2021-2041) technical institutions should have closed linkages with the world of work for the smooth and effective transformation of the traditional skills development system into a competency-based modern system. Since 2016, GDP growth has been above 7% and in FY 2022 GDP growth picked up to 7.2% due to faster growth in manufacturing activity (BBS, 2023). Bangladesh is passing through the phase of the demographic dividend that emerged in 2007. We have a working-age population of around 65% on the other hand unemployment among the youth group is quite high in Bangladesh, reaching 12.93% in 2022 (Statista, 2023).According to the Labour Force Survey 2016-17 conducted by the Bangladesh Bureau of Statistics (2018), youth unemployment in Bangladesh has doubled since 1993-94. The survey also found that about 85% of the labor force was engaged in informal employment (Bangladesh Bureau of Statistics, 2018). More than 55% of Bangladeshi expatriates are semi-skilled or low-skilled resulting in low-wage earnings (Bureau of Manpower, 2017)

So, in these situations preparing the potential workforce for the labor market (both domestic and overseas) (National Skills Development Policy, 2011 and 2022)has a clear-cut and well-informed vision based on the NSDA Act, 2018 and NSDA Rules, 2020. According to the National Skills Development Policy, approximately 8,000 public and private TVET Providers are engaged in equipping skilled workforces according to Competency Standard (CS) prescribed by industry and

professional associations using the Competency-Based Training & Assessment (CBT&A) method (Haolader et al., 2017). Where skills development training and quality assurance will be guided by National Skills Qualification Framework (NSQF). On the other hand, TVET institutions (TVETIs) are facing many challenges in skills development in Bangladesh. Some of the major challenges facing the education system are: the shortage of qualified teachers, the outdated and inadequate curricula, the lack of modern and effective resources for teaching and learning, the poor quality of graduates who do not meet the demands of the labor market, and the insufficient infrastructure. For the sake of improving the quality of TVET Institutions, it needs to identify the issues of TVET Institutions for providing skilled manpower to the industries for economic development.

The purpose of this research study is to examine the state of industry-academia partnership in Kushtia district. This paper will concentrate on the viewpoints of industry partners and the experiences of students who took part in the industrial attachment program. The study will provide light on how well the industrial attachment program works as a mechanism for fostering industry-academia cooperation.

This paper is organized as follows: First, a literature review will provide an overview of the concept and importance of industry-academia partnership and industrial attachment programs. Second, the research methodology will describe the research design, data collection methods, and data analysis techniques. Third, the research findings will present the experiences of students and the opinions of industry partners. Finally, the paper will conclude with some recommendations for enhancing industry-academia partnership.

In general, the understanding of industry-academia collaboration and the efficiency of industrial attachment programs in encouraging this collaboration would be improved by this research work. Policymakers, TVET experts, educators, and business partners that want to encourage industry-academia collaboration and help students get ready for the demands of the job market will be interested in the research's findings.

1.2 Statement of the Problem:

Technical and vocational education and training unquestionably might be a crucial component of long-term sustainable growth. There is a lack of study on the state of industry-academia collaboration through the industrial attachment program of polytechnic institutions in the Kushtia

district. This gap in knowledge prevents a full understanding of the benefits and challenges of the program, as well as the opportunities for improvement. Moreover, there is a need to address the issue of foreign workers in Bangladesh, who are taking up jobs that could be filled by local graduates with relevant skills and qualifications. The exact number of foreign workers in Bangladesh is unclear, but estimates range from 86,000 to several lakhs (hundred thousands). Most of these workers are from India, and only a fraction of them have legal work permits. According to Transparency International Bangladesh (TIB), out of the 2.5 lakh foreign workers in the country, only 90,000 are registered (tbsnews.net, 2021). Therefore, this research aims to explore the current situation of industry-academia collaboration through the industrial attachment program, and to suggest ways to enhance its effectiveness and impact on the employability and productivity of polytechnic graduates.

1.3 Importance & Rationale of the Study:

The study on the status of industry-academia collaboration through the industrial attachment program of polytechnic institutions in Kushtia district is important for several reasons.

Firstly, industry-academia collaboration is essential for preparing students for the demands of the job market. It allows students to gain practical experience and develop the skills necessary to succeed in their careers. The industrial attachment program is a key tool for promoting industry-academia collaboration, and therefore, understanding its effectiveness is crucial.

Secondly, Although the industrial attachment program, the study will assist in identifying the potential and problems related to industry-academia partnership. The creation of plans to deal with the problems and encourage productive collaboration will be guided by this information. In the context of the Kushtia district, where there is a desire to minimize the gap between academia and industry, this is especially crucial.

Thirdly, the study will provide insights into the perspectives of industry partners on the industrial attachment program. This knowledge is important for building stronger partnerships between academia and industry, as it helps to understand the expectations and needs of industry partners.

Fourthly, the study will contribute to the existing literature on industry-academia collaboration and industrial attachment programs. While there is a growing body of literature on this topic, there is a lack of research on the status of industry-academia collaboration through the industrial attachment program of polytechnic institutions in Kushtia district. The study will therefore fill this research gap and contribute to the overall understanding of industry-academia collaboration.

1.4 The Research Objective's:

The objectives of the research are

- ➢ To explore the present scenario of Industry-academia collaboration in Kushtia district.
- ➢ To suggest way forward for industry- institution collaboration.

1.5 Scope and limitations of the Study:

The proposed research will be limited to the following boundaries:

In this study we consider Kushtia Polytechnic Institute of Kushtia district, which may not represent the whole scenario of Bangladesh.

1.6 Research Questions

The following Questions will be resolved throughout the study work:

1. What is the present status of the industry-academia collaboration of Polytechnic Institute?
2. What are the current Policies and purpose of industry-academia collaboration through Students Industrial Attachment Programme?
3. What are the challenges and opportunities associated with industry-academia collaboration through the industrial attachment program in Kushtia district?
4. What recommendations can be provided for improving industry-academia collaboration through the industrial attachment program in Kushtia district?

Chapter-Two: Review of Literature

2.1 Introduction

Employers often complain that they do not get industry-fit skilled manpower. A recent study by the Bangladesh Institute of Development Studies (BIDS) found that the industrial sectors of the country are experiencing a 30% skills gap (BIDS, 20221).

In this study, we talk about the concept of industry-academia collaboration (IAC) and bring forward some of the key issues to better understand the existing scenarios of relevant policies related to skill development of Technical and Vocational Education and Training Institutions (TVETIs) through Industrial Attachment Program (SIAP). Aside from recommending different strategies of collaboration, this paper discusses how to improve the capacity of effective collaboration in order to increase the quality of SIAP while simultaneously raising the demand of skill manpower. Numerous papers have been published in peer-reviewed technical journals every year worldwide. But research conducted in our country on different TVET areas is still insufficient.

One of the most frequently encountered human capital development interventions is training, defined for the purposes of the present study as "*a planned intervention that is designed to enhance the determinants of individual job performance*" (Campbell, 2001). In order to enhance job performance, the skills and behaviours learned and practiced during training have to be transferred to the workplace, maintained over time and generalized across contexts (Holton III, 2003).

An effective industry- TVET institutions collaboration on training programme will among other factors help bridge the skill gap between what training institutions offer and the expectations of the industry, whilst also reducing cost implications of such training (Nyerere, 2009)The assessment of the effectiveness of industry- TVET institutions collaboration on training is critical in determining whether it has made intended impact to TVET institutions and industry, hence effective in delivery of quality graduates (Afeti, 2012)This is the reason why this study needs to conduct.

2.2 Definition and Importance of Industry-Academia Collaboration

Industry-academia collaboration (IAC) has long been a source of discussion in various ways. A vital first step toward closing the gap is fostering alumni engagement in industry and academia. Industry-academia collaborations are like earth and water, and they live in harmony. They cannot exist apart from one another. The collaborative effort between industry and academia promotes improvement in technology, resource and knowledge sharing, problem resolution in the real world, communication ability, and innovation. It is based on a model introduced by Connor et al. (2009) that industry needs are based on five success factors facilitated by research results: needing orientation, industry goal alignment, deployment impact, industry benefit, and innovation. It focuses on research actions like management engagement, network access, collaborator match, communication ability, and continuity (Sandberg, 2011)

The attainment of Education for All (EFA) goals, Millennium Development Goals (MDGs) and Vision 2030 depends largely on the relevance and quality of training and education. To achieve relevant and quality training calls for more concerted efforts from all stakeholders (Hollander, 2009).

Training especially in the TVET sub sector of education has been hindered by inadequate facilities and inappropriate curricula hence most graduates lack appropriate skills (Lelei, 2011)

(Finch, 1999) acknowledge that it is difficult for individuals and institutions to get all the highly specialized equipment needed to operate quality programmes in schools. It follows that while some skills could be obtained in the classroom, others are best developed in the workplace through work-based learning (Roegge, 1996;).

There are hardly any industry-academia collaborations in the country in the truest sense. An ideal collaborative situation can be achieved where technology, resource and knowledge share are possible from the industry to academia and vice-versa and makes both ends enrich.

2.3 Challenges and Opportunities for Enhancing Industry-Academia Collaboration

It is hard to develop a connection between academia and the industry until issues such as research relevance, training commitment, problem resolution in the real world, communication gap, contractual and privacy concerns are explicitly addressed (Garousi, 2017;)

The advent of the industrial transformations and, in particular, the fourth Industrial Revolution demanded the close collaboration of academia (acquisition of skills) and industry (application of those skills). More than ever before, industry required relevant skills to drive rapid changes in technology, particularly equipment and methods in the ever-increasing integration of systems (Harrison, 2012). The reduction in the number of polytechnics due to their upgrade to universities meant the various universities that trained engineers and technologists required to put aside time for these trainees to spend more time than before industry (Mohamedbhai.G., 2017).

The institution of industrial attachment in polytechnic education is significant. Industrial attachment underpinned by experiential learning is most appropriate option to enhancing polytechnic-industry nexus in the development of technically skilled and productive human capital potentials for the world of work. However, the polytechnic-industry collaboration in human capital development is hampered by inadequate educational infrastructure, logistics, funding for laboratories, workshops and industrial attachment supervision as well as poor Information Communication Technology (ICT) development.

The attainment of relevant and quality training calls for more concerted efforts from all stakeholders (Hollander, 2009)

2.4 Policies and Frameworks for Supporting Industry-Academia Collaboration

As stated in Chapter 5 of the Bangladesh National Education Policy 2010 (Ministry of Education, 2010), the policy ensures that an apprenticeship program will be introduced nation-wide and public-private partnership collaboration will be encouraged to establish new technical and vocational institutes and to develop their management.

In 2006, the Government of Bangladesh enacted the Bangladesh Labour Law (2006) according to law no 42 clause no 351 Government formulate labour rules 2015 which contains Chapter XVII on Apprenticeship. This new Labour rules supersedes the 1962 Apprenticeship Ordinance. According to the legal definition, "*Apprenticeship means a system of training in which an*

employer undertakes to employ a person and to train him or have trained him systematically in an apprenticeable trade or occupation for a period fixed in advance and in the course of which the apprentice is bound to work in the employer's service" (Bangladesh Labour rules, 2006),

Chapter 5 of the National Skills Development Policy of 2022 focuses on the role of the industry sector in skills development. It emphasizes the importance of industry participation in skills training to increase the employability of skills graduates. This chapter highlights the formation of Industry Skills Councils (ISCs) under the Company Act of 1994 as a way to develop a linkage between the industry and Skills Training Providers (STPs). The ISCs are expected to support the identification of occupations in demand by the industries, contribute to the development of competency standards, curriculums, and forecast the industry's demand for skills.

Skills development is a shared responsibility among a number of actors playing their respective roles towards a well-functioning national skills development training.

Skill includes the knowledge and technique acquired for doing any specific work, or the capability and ability to produce goods and services as per required standard of industrial and professional demand of national and international markets. Bangladesh National Qualification Framework (BNQF) has intended to apply CBT &A Method which consists two key principles:

1. Progression or graduation through the training delivery that will determine whether the trainees have met the set standards or competencies required by particular occupations; and not by the time spent in training sessions

2. Achievements of the trainees are measured against the job-related competency standards.

People's employability and competitiveness in the national and international labour markets will be increased for better earnings taking into account the importance of `adaptability to the technologically changing world of work.

2.5 Best Practices and Models from Other Countries

Germany has a long history of TVET. Demographic changes that became an important issue in the past years have led to a shortage of qualified workers nationwide. In order to overcome this challenge and to increase the supply of skilled labour the country has focused on:

Establishing stronger links between the dual vocational education and training system and institutes of higher education; improving integration into vocational training through basic skills and permeability; and. Establishing national coverage of branch-specific regional initial and

continuing training centres. In our study German TVET experience could highly conducive for formulating our strategic collaboration model.

Academia and Industry Collaborations: A Research and Professional Perspective (Wilson, 2021) has discussed the number of polytechnics due to their upgrade to universities meant the various universities that trained engineers and technologists required to put aside time for these trainees to spend more time than before industry (Mohamedbhai.G., 2017)

The institution of industrial attachment in polytechnic education is significant. Industrial attachment underpinned by experiential learning is most appropriate option to enhancing polytechnic-industry nexus in the development of technically skilled and productive human capital potentials for the world of work. However, the polytechnic-industry collaboration in human capital development is hampered by inadequate educational infrastructure, logistics, funding for laboratories, workshops and industrial attachment supervision as well as poor Information Communication Technology (ICT) development.

16 weeks (12 credit-300marks) industrial attachment program running for students according to this BTEB training implement by Institute and Industry personnel (Diploma Engineering Probidhan Retrieved from , 2023).

Energizing collaborative industry-academia learning: a present case and future visions (Kettunen, 2022)). This article presents a case study of a large-scale IAC R&D&I program in Finland that used a collaboratively created and publicly shared digital knowledge repository called "Treasure Chest" to facilitate knowledge creation and sharing among the participants.

An alumni-based collaborative model to strengthen academia and industry partnership (Kumar, 2022). This article proposes a model that leverages alumni engagement to foster IAC and bridge the gap between academic research and industrial practice.

2.6 Gaps and Limitations in the Existing Literature

The existing literature on industry-academia collaboration through industrial attachment programme has some gaps and limitations that need to be addressed by further research. Some of these are:

The lack of empirical studies on the impact and outcomes of industrial attachment programme on the skills development, employability, and productivity of TVET graduates in Bangladesh.

The lack of comprehensive and systematic frameworks and guidelines for designing, implementing, monitoring, and evaluating industrial attachment programme in collaboration with industry partners.

The lack of quality assurance mechanisms and standards for ensuring the relevance, effectiveness, efficiency, and sustainability of industrial attachment programme.

These gaps and limitations indicate the need for more rigorous and relevant research on industry-academia collaboration through industrial attachment programme in Bangladesh and beyond. This study aims to contribute to filling some of these gaps by exploring the status, challenges, opportunities, and recommendations for enhancing industry-academia collaboration through industrial attachment programme of polytechnic in Kushtia district.

2.7 Theoretical Framework:

This study aims to explore the status, challenges, opportunities, and recommendations for enhancing industry-academia collaboration (IAC) through industrial attachment programme (IAP) of polytechnic in Kushtia district. The study is based on the following thematic areas of collaboration between Technical and Vocational Education and Training (TVET) institutions and industry:

Policy Support: The extent to which the government can support the collaboration between industry and TVET institutions through policies, regulations, and incentives.

Curriculum Development: The extent to which the collaboration helps in the development of relevant and up-to-date curricula for TVET teachers and students.

Talent Recruitment: The extent to which the collaboration facilitates the identification and recruitment of talented individuals for industry positions.

Mutual Benefits: The extent to which the collaboration provides positive outcomes for both industry and TVET institutions.

The study uses various indicators or measures to assess the level and effectiveness of each thematic area of collaboration. The study also identifies the factors that influence or hinder the collaboration,

and propose strategies to improve it. The study draws on the existing literature and best practices from other countries to provide a theoretical and empirical basis for the analysis. The study also uses primary data collected from surveys, Key Informant Interviews, and focus groups with relevant stakeholders, such as TVET teachers, students, graduates, employers, and policy makers. The study uses both quantitative and qualitative methods to analyze the data and present the findings. The study contributes to the knowledge base on IAC through IAP in Bangladesh and beyond.
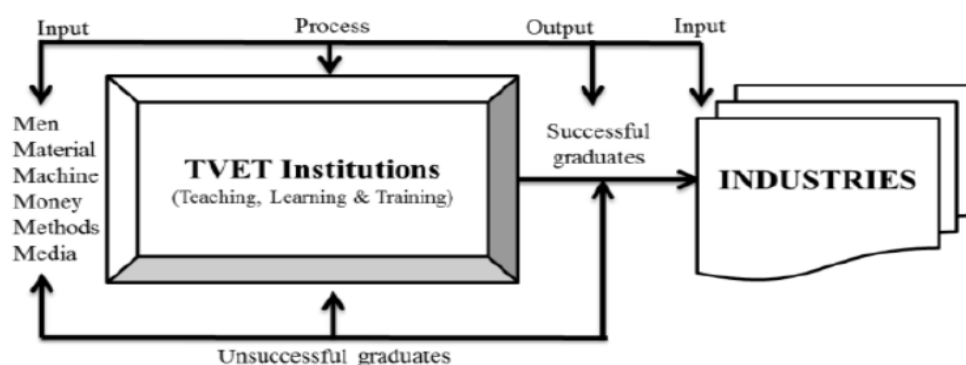
Figure 1: Output of TVET Institutes is the Input to Industries

According to the Republic of Kenya, technical institutions should have closed linkages with the world of work to solicit support of industry in the enhancement of practical training through such activities as donations of equipment and tools, staff exchange programs and placement of students and staff on work experience attachment (Raihan, 2014)

Initially, it requires sector based strong industrial skill councils in order to identify the labor market's skills needs. If the industrial base remains weak, the government could not pursue development of industry through skills development policies. In such cases, a huge challenge emerges to implement TVET policy to take the leading role in future-oriented skills development, rather than a passive response to labor demand.

Chapter-3. Methodology of The Study

3.1 Research design

We conducted a mixed methods study that combined a survey and a qualitative study. The survey aimed to capture the status of SIAP & perceptions of students who had completed industrial attachment programmes at polytechnic institutions in Kushtia district. The qualitative study focused on the preparation, challenges and strategies to improve the industrial attachment programme at Kushtia Polytechnic Institute. We chose this design because it allowed us to assess the current situation and explore the underlying issues of industry-academia collaboration in our context.

3.2 Data collection methods

We used two methods to collect primary data: a questionnaire survey and face-to-face interviews. We also used secondary data from official sources to support our findings.

3.3 Questionnaire Survey

We designed a 30-item close-ended questionnaire based on the theoretical framework of our study. The questionnaire covered different aspects of SIAP, such as current training experience, facilities, student perceptions, challenges and opportunities and was pilot-tested on 15 students who were not part of our study. We revised the questionnaire based on their feedback and suggestions.

We used simple random sampling to select 66 students (who had completed industrial attachment programmes within the last three years) from Kushtia Polytechnic Institute. . We distributed the questionnaire physically (42 respondents) and online using Google Forms (24 respondents). We obtained informed consent of the participants before they filled out the questionnaire. We collected the data anonymously and confidentially.

3.4 Face-to-face Interviews (Key Informant Interviews)

We designed semi-structured interview questions based on the research objectives and questions of our study. The interview questions aimed to elicit detailed information about the preparation, challenges and strategies to improve the industrial attachment programme at Kushtia Polytechnic Institute.

We contacted potential interviewees via email or phone calls and asked for their availability and consent. We take interviews individually from Principal of KPI, 5 Heads of Department, 3 TVET Experts, 4 Industry Employers, 1 Industry Association Member. We conducted the interviews at their convenient time and place. We recorded and transcribed the interviews with their permission.

3.5 Secondary data

We collected secondary data from official sources such as the National Education Policy 2010, National Skills Development Policy of 2010 and 2022, National Industrial Policy of 2022, Bangladesh Labor Rules of 2015, and Diploma Engineering Regulations of 2022. We used these sources to understand the background, context and policies related to industry-academia collaboration in Bangladesh.

3.6 Data analysis methods

We used different methods to analyse our primary and secondary data.

3.6.1 Quantitative Data Analysis

We used SPSS software to process and organize the questionnaire data. We performed descriptive statistics to summarize the demographic characteristics of the participants and their responses to each item. We interpreted and reported the results using tables, graphs and narratives.

3.6.2 Qualitative Data Analysis

We applied thematic analysis to identify the main themes and patterns in the data. We interpreted and reported the findings using quotes, charts and narratives.

3.6.3 Secondary Data

We used document analysis to examine and evaluate the secondary data. We compared and contrasted the different sources to identify similarities, differences, gaps and inconsistencies in the policies and guidelines related to industry-academia collaboration. We also used critical analysis to assess the strengths, weaknesses, opportunities and threats of these policies and guidelines for our context. We interpreted and reported the results using summaries, tables and narratives.

3.6.4 Evaluation and Justification of Methodological Choices

We aligned our methodological choices with our research objectives and questions. Our mixed methods approach enabled us to collect both quantitative and qualitative data that complemented each other and provided a comprehensive picture of industry-academia collaboration in Kushtia district. Our data collection methods allowed us to gather rich and diverse data from different sources and perspectives. Our data analysis methods enabled us to generate valid and reliable findings that answered our research questions.

We also addressed the potential biases or errors in our research. We ensured the validity and reliability of our instruments by pilot-testing them before use. We ensured the representativeness of our sample by using random sampling technique for the survey. We ensured the credibility of our findings by using multiple sources of evidence for triangulation. We ensured the ethical conduct of our research by obtaining informed consent from our participants, protecting their privacy and confidentiality, acknowledging our sources, and reporting our results honestly.

Phase 1:

Primary data collection & Analysis

(N=60) Students=65

Instrument: Questionnaire

Data Analysis: Descriptive Analysis using SPSS

Phase2:

In-depth Interview

(N=13)Principal=1, Head of Department=5, TVET Expert=3 Industry Employer=3, Industry Association Member=1

Instrument: Semi-structured Questionnaire

Phase 3: Document analysis

Stage 1 : Analysis of conventional Guideline(Regulation +Syllabus + Related literatures)

Stage 2: Analysis of Policies

Analysis of Policies (National Education Policy+ National Skills

Quantitative Data

Qualitative Data

Qualitative Data Analysis

Data Synthesis

Results & Findings

Discussion & Recommendation

Figure 2: Research Design

3.7 Data Analysis Matrix

The following is a data collection matrix for the study:

Table 1: Data analysis matrix

Research Questions	Data Sources	Data Collection Methods	Data Analysis Techniques
1. What is the present status of the industry-academia collaboration of Polytechnic Institute?	Students, industry partners, faculty members,	Survey questionnaire, In-depth interviews	Descriptive statistics, Thematic analysis
2.What are the current Policies and purpose of industry-academia collaboration through Industrial Attachment Program?	Faculty members, TVET Experts, Document analysis	In-depth interviews	Thematic analysis
3. What are the challenges and opportunities associated with industry-academia collaboration through the industrial attachment program in Kushtia district?	Students, industry partners, faculty members,	Survey questionnaire, In-depth interviews	Thematic analysis
4. What recommendations can be provided for improving industry-academia collaboration through the industrial attachment program in Kushtia district?	Students, industry partners, TVET Experts, faculty members, Documents analysis	Survey questionnaire, In-depth interviews	Thematic analysis

Chapter -Four: Results

4.1 Findings from Students Questionnaire:

The table-2 summarizes the demographic and academic characteristics of 100% students who completed industrial attachment programmes. The first set of information shows the distribution of institute type for the participants in the study. The table shows that all 66 participants were from government institutes. The second set of information displays the distribution of participants based on gender. The table shows that 55 participants were male, representing 83.33% of the total participants, while 11 were female, representing 16.67% of the total participants. The third set of information shows the distribution of participants based on age groups. The table shows that 57 participants were between the ages of 18-22, representing 86.36% of the total participants. Five participants were between the ages of 23-25, representing 7.58% of the sample, and four participants were above the age of 25, representing 6.06% of the sample.

The fourth set of information shows the number and percentage of students who studied in six different technology fields: Civil, Computer, Electrical, Electronics, Mechanical, and Power. The table shows that most of the data were collected from electrical technology students (40 or 60.61%), while only one student studied power technology (1 or 1.52%). This can be useful for understanding the status of industrial attachment programme in different fields.

The fifth set of information shows the distribution of participants based on attached industry, which is divided into three categories: Government, Training Institute, and Private Industry. The table-2 shows that most of the students were attached to training institutes (50 or 75.76%), while only a few students were attached to government (9 or 13.64%) or private industries (7 or 10.61%).

Table 2: Demographic and academic characteristics of students who completed industrial attachment programmes.

Element	Category	Frequency(%)
1.Institute Type	Government Institute	66(100%)
	Private Institute	0
2.Students Gender	Male	55(83.3%)
	Female	11(16.7%)
3.Students Age	18-22	57(86.4%)
	23-25	5(7.6%)
	Above 25	4(6.1%)
4.Studied Technology	Civil	03(4.55%)
	Electrical	40(60.61%)
	Computer	05(7.58%)
	Mechanical	10(15.15%)
	Electronics	07(12.12%)
	Power	01(1.5%)
5.Attached Industry	Government Institutions	9(13.6%)
	Training Institute	50(75.8%)
	Private Industry	7(10.6%)

However, for experiencing real work environment, the BTEB guideline clearly states that students have to go to industries for attachment programme. But real scenario is majority of students are going to training institutions for attachment program.

The table-3 shows the status of students during the industrial attachment program. The first set of information shows how the respondents arranged their industrial attachment. The table shows that 80.3% of the respondents had their attachment program arranged by their institute, while 15.2%

arranged it by themselves and 4.5% arranged it through an alumnus of their institute. This implies that the institution face challenges to send their students to industries as there is lack of effective collaboration process.

The second set of information shows the location of industries where respondents were attached. The table-3 shows that 47% of the industries were located in Gazipur City, followed by 31.8% in the same district, 18.2% in Dhaka City, and 3% outside the district. This indicates that most of the students went to Gazipur City instead of local city. It reflects the poor collaboration process of the institution.

The third set of information shows the number of days and hours worked per week by the respondents. The table-3 shows that most of the respondents worked for 4 or 5 days a week (28.8% and 30.3%, respectively), while fewer worked for 6 days (9.1%) or less than 4 days (31.8%). In terms of the hours worked per day, most respondents worked for 4-6 hours (36.4%) or less than 4 hours (31.8%). This highlights that there is a lack of training plan or training period because working time varies.

The fourth set of information shows the type of tasks performed by the respondents during the program. The table-3 shows that the majority of respondents performed different types of jobs (71.2%) rather than doing a particular job (25.8%). This suggests that as students went to training institutes, they performed different types of jobs, whereas in industries there is limited opportunity to perform various types of jobs.

The fifth set of information shows how the respondents learned during the program. The table-3 shows that most of the respondents learned by both doing and watching (54.5%), while 28.8% learned by watching how to work with, 10.6% did the task by themselves, and 10.6% did not learn anything. Moreover, the results suggest that the industrial attachment program provides a valuable opportunity for practical learning and exposure to different types of jobs.

Table 3: Evidence of the status of students during industrial attachment programme

Elements of the Evidence		Frequency	%
5.how to find out the industry for the Industrial Attachment	Arranged by your institute	53	80.3%
	Arrange by you	10	15.2%
	Arrange by any Alumni of your institute	3	4.5%
6. Location of attached industry from institution.	In the same district	21	31.8%
	Outside from the district	2	3.0%
	In Dhaka city	12	18.2%
	In Gazipur City	31	47.0%
7.Working per week	6 Days	6	9.1%
	5 Days	19	28.8%
	4 Days	20	30.3%
	Less than 4 Days	21	31.8%
8.Working per day	more than 8 hours	7	10.6%
	6-8 hours	14	21.2%
	4-6 hours	24	36.4%
	less than 4 hours	21	31.8%
9.Task performed in the industry during your Industrial Attachment Program	did a particular job	17	25.8%
	perform different types of jobs	47	71.2%
10. learning way during Industrial Attachment program	Did the task by yourself	3	4.5%
	Learned by watching how to work with	19	28.8%
	Learned by both doing and watching	36	54.5%
	did not learn anything	7	10.6%

In question 11of table-4 shows that, the respondents were asked about the similarity between the syllabus and the training task, and their responses were categorized into different ranges: 80-100%,

60-80%, 40-60%, 20-40%, and no response. The majority of the respondents (60.6%) answered that the similarity between the syllabus and the training task was in the range of 60-80%.

Question 12 was related to the employability improvement gained from the Industrial Attachment Program. The respondents were asked whether their employability improved after completing the program, and their responses were categorized as Yes, No. The majority of the respondents (51.5%) answered Yes, indicating that the program helped improve their employability.

In question 13, the respondents were asked whether they find desired organization where they did their Industrial Attachment. Most of the respondents (92.4%) answered Yes, indicating that they got desired organization where they did their Industrial Attachment.

The respondents were asked whether they considered the program to be necessary, helpful, possibly helpful. The majority of the respondents (60.6%) answered that the program was necessary for their future career development.

The question 15 was asked whether an industry-based project should be included in the curriculum, and how often it should be included. 53% of respondents believe that an industry-based project should be included in every semester. This option would provide students with regular exposure to real-world projects and industry practices, which can enhance their learning experience and prepare them for their future careers.

36.4% of respondents feel that an industry-based project should be included in every year. This option provides students with a good opportunity to gain industry experience, but at a slightly less frequent pace than the previous option.

Only 3% of respondents believe that an industry-based project should be included only in the 4th semester. This option may not provide students with enough time to gain significant industry exposure.

2% of respondents believe that there is no need to include an industry-based project in the curriculum. The reasons for this opinion may vary, but it is possible that they prioritize theoretical knowledge or believe that industry-based projects are not relevant to the curriculum.

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Table 4:Evidence of perception of students on some aspects of industrial attachment program.

Elements of the Evidence		Frequency	%
11.similarity between the syllabus and training task	80-100%	17	25.7%
	60-80 %	40	60.6%
	40-60%	6	9.1%
	20-40%	1	1.5%
	no response	2	3.0%
12.Employability improvement	34	34	51.5%
	29	29	43.9%
	3	3	4.5%
13.Desired Organization	Yes	61	92.4%
	No	5	7.6%
14.SIAP is Necessary to future career development	It is necessary	40	60.6%
	Does help	12	18.2%
	Possibly help	10	15.2%
	No response	4	6.1%
15.Involving industry based project in the curriculum	to include a industry-based project in every semester	35	53.0%
	to include a industry-based project in every year	24	36.4%
	include in 4th semester	2	3.0%
	no need to include	2	3.0%
	no response	3	4.5%

From table-4, it needs to be clear that this results is collected from all the respondents who participated both in training institutions and industries. One thing is very clear that students have got a very positive perception regarding Industrial Attachments program. Most of the students thinks this program is very helpful for their skill development as well as career development. Although, from table-1 only 10% students are going to private industries whereas 75% students are participating in training institutions. The most highlighted picture is 92% (among all the

respondents) students opined that they have got their desired organization. It creates a confusion that whether they are satisfied with training institute or they have a very little idea about this attachment program. When they are asked about including industry-based project in their curriculum, almost everyone agrees that it should include. 53% of them opined that industry-based project should include in every semester.

Again in Table-5, 90.9% of respondents answered "yes", indicating that they believe this would be beneficial for students. 6.1% of respondents answered "no", while 3% did not respond. Among all the respondents 59.1% of respondents found their industry supervisor to be "very helpful", while 36.4% found them to be "fairly helpful". Only 3% of respondents answered "not at all", and 1.5% did not have any supervisor.

Question 18 asks about access to machines and equipment during the attachment program. And the among all the respondents 57.6% of respondents rated the access as "good", while 39.4% rated it as "very good". Only 3% of respondents rated it as "moderate".

Among all the respondents 77% students responded that they give money for the attachment program. Approximately 20% students didn't have to pay any money. This results depicts that the collaboration process is not properly working on. Because in effective collaboration processes students shouldn't pay any money. As a result majority of the students are going to training institute for attachment program.

Question 20 asks about the availability of facilities for female and disabled students during the attachment program. Here it can be seen that in 48% training institute create facilities for female and physically challenged students.

Table 5:Evidence of Monitoring & training facilities of students on some aspects of industrial attachment program.

Elements of the Evidence		Frequency	%
16.Guide teacher visit during attachment	Yes	60	90.9%
	No	4	6.1%
	No response	2	3.0%
17.Industry supervisor attribute	very helpful	39	59.1%
	Fairly helpful	24	36.4%
	Not at all	2	3.0%
	didn't have any supervisor	1	1.5%
18. Access to the machines and equipment to perform tasks during attachment program.	Very good	26	39.4%
	Good	38	57.6%
	Moderate	2	3.0%
19.Payment given to attached industry for Industrial Attachment Program	Yes	51	77.3%
	No	13	19.7%
	No Response	2	3.0%
20.Facility for Female and disable student during SIAP	Yes	32	48.5%
	No	30	45.5%
	No Response	4	6.1%

In above table-5, different aspects of monitoring and training facilities can be seen. It has been clear that students are going to training institute by the support of institution. Institution guide teachers are regularly visiting these training institutions for monitoring purposes. Training qualities are seemed well. Because 59% students think their training supervisors were very good as well as 57% think during training program student's access to machines and equipment to perform tasks were good. The most highlighted questions of this table is did students have to pay any money? And the answer is, in 77% cases students have to pay money. Since institutions fails to collaborate with industry they cannot send students to industries. As a result to run this

attachment program some training institutions are built by some stakeholders in accordance with diploma syllabus. Now students are going to this training institution for attachment program by paying money. The further research is needed here to understand that Attachment Program in the training institution will be effective for skill development of diploma students.

In Figure-4 a bar chart is shown which is the representation of the type of attachment places where they went for attachment program and how they manage their attachment places for the attachment program. This chart explains among all the respondents majority 59.09% students arrange their attached place in training institutions and they are instructed by their institute. Only 7.58% goes to the industries and 13.64% goes to the government institutions referred by their institute. Again 12.12% arrange their own training institute by themselves, whereas 3.03% can find their attachment place in industry by themselves.
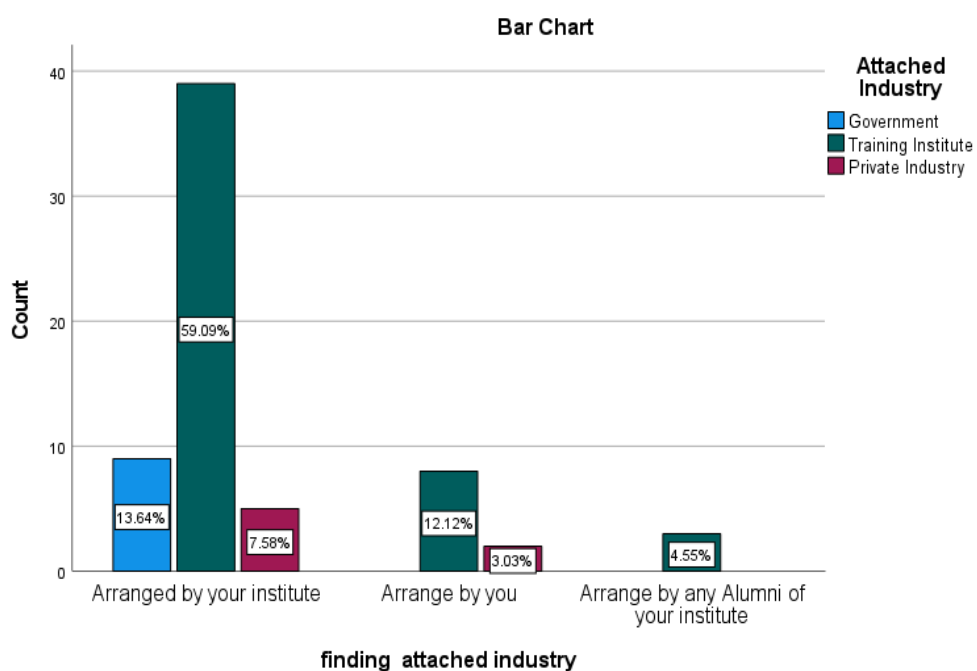
Figure 3: How to arrange industries for attachment vs type of industry for attachment.

From above chart it is clearly highlighted that majority students are going to training institution by their teachers motivation because industries are not interested to receive the students for attachment program as well as training institutions are easy to manage for the attachment program. This scenario is very alarming for this skill development program. Because in Training Institutions

students don't experience the real work-environment as well as students won't get updated machines and equipment as they can experience in industries. On the other hands institutions will feel relax and loss their motivation & efforts to collaborate with industry if they rely on Training Institution for this Attachment Program.

In Figure-5 the bar chart shows location based payment for industrial attachment program. Bar chart depicts students who participate in attachment program in Kushtia district Among them 23.08% students paid 3000tk to 5000tk and 7.69% students have to pay less than 3000 tk. Students whom went to Dhaka city majority paid 5000tk to 8000tk whereas in Gazipur city half of the students paid less than 3000tk and other half had to pay 3000tk to 5000tk.
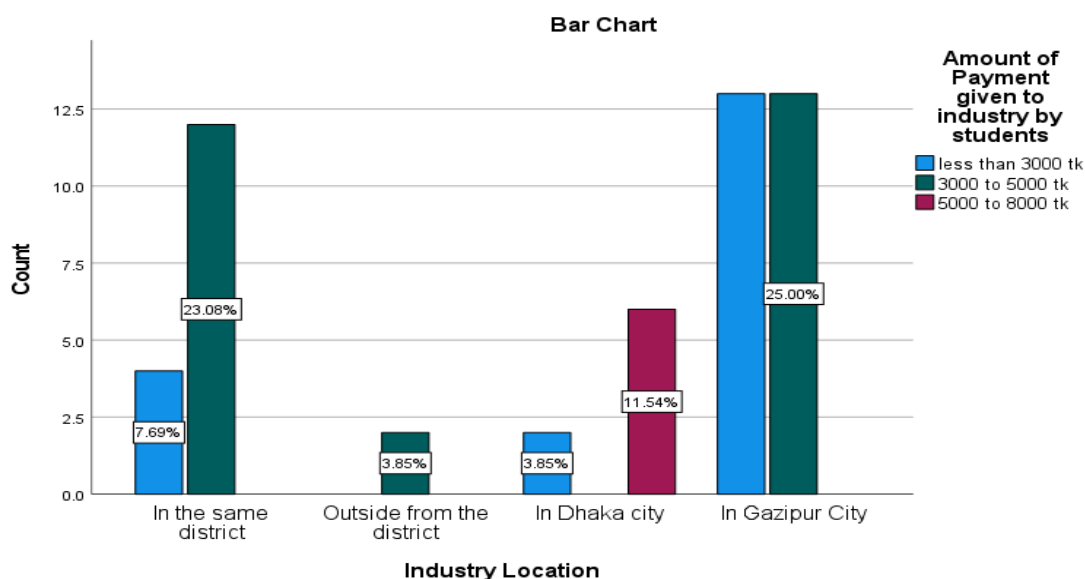
Figure 4:Industry location vs amount of payment given to attached place by the student.

From above figure it has been clear that Training Institutes are all around the country. Students of diploma program from Kushtia Polytechnic can complete their Industrial Attachment Program from Dhaka & Gazipur City. From this picture it can be concluded that students of Diploma program of all over the country now going to Training Institutions (less or more) for their attachment program.

Figure-6 shows the amount of job offered to the students from different type of attachment places. From this bar chart it can be seen that students participated in Government Institution, Training Institutions and Private Industry. 12.5% from the government institutions, 12.5% from the training

institution, 14.2% from private industry got job offer. The number is only 7 who got job offer among 63 respondents.
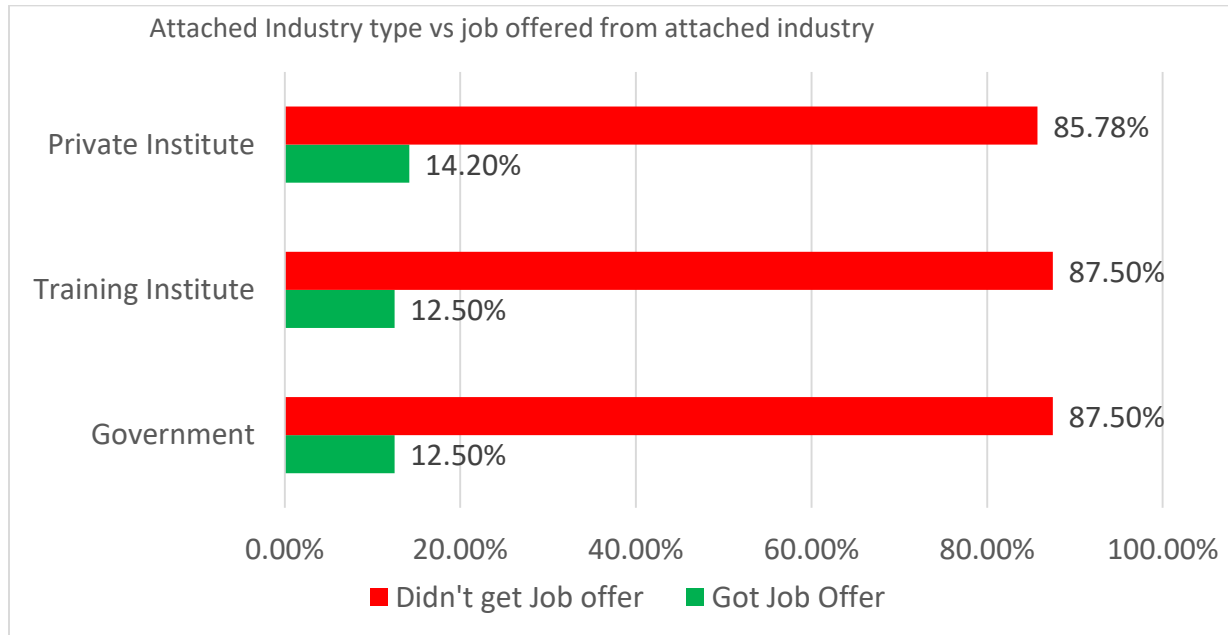
Figure 5: Attached Industry vs job offered from attached industry .

Since the collaboration process is very poor, Students can't find their job from Attachment program. If student goes for attachment program to the training institution, then industry won't have communication with academia members or students. As a result, employment opportunity for the diploma students will be concise and limited which will increase unemployment among diploma engineers.

4.2 Findings from Qualitative data of Academia Member and TVET experts:

This qualitative analysis is done from the in-depth interview of TVET Experts, Principal, Head of the department.

Partnership Agreement:

All the TVET experts said the government of Bangladesh have no law and policies on TVET industry linkages, provided the basis for the policy framework for TVET industry collaboration, i.e. Collaboration types, collaboration building methods, and specific roles of providers and enterprises.

All of the institutional respondents have said no formal partnership agreement occurs with clearly stated interests between the industry & institution for SIAP.

All of the industry employer said they don't have any formal agreement regarding attachment program.

Early Preparation for SIAP:

Qualitative findings for early preparation of student attachment program gets that Institute follows the BTEB provided Guidelines.

No central industry selection process is being followed here. Some head of technology prioritize industries that offer job opportunities to their graduates, while others focus on selecting industries based on their relevance to the technology being taught in the diploma programs. Some head of technology follow both.

One of the respondents Quote is *"sometimes we motivate students as well as sometimes students also motivate us for selection of attachment places"*.

All of the respondents had clearly stated that students are not being provided any learning topics or projects for industrial attachment program as well as any training plan.

Institutional Capacity:

In the qualitative analysis conducted for institutional capacity, all of the respondents expressed that the shortage of manpower and overloaded responsibilities of existing teachers create communication and follow-up difficulties with industries from institutions. One of the responders stated, "*we have a job placement cell, but it is not functioning due to manpower shortage*."

From the perspective of experts, several issues were identified, including the lack of leadership and management, insufficient infrastructure development, the absence of a counseling officer post in the organogram, the need for the preparation of a comprehensive training logbook, a lack of

coordination, an increased tendency of students to move from industry to training centers, the requirement for a database for TVET system, and a high teacher-student ratio.

Industry Engagement Programs:

Based on the in-depth interviews conducted, it was found that industries are not interested in taking diploma students for attachment programs as they view these programs as potential hindrances to their production.

One respondent mentioned that they only take their students on industry tours, but the cost for these tours is provided by the students, which makes it difficult to organize them regularly. Additionally, most respondents stated that they sometimes invite industry personnel for in-house training and seminars by paying them an honorarium. However, none of the teachers are sent to industries for training.

On the other hand, the TVET experts suggested several strategies to enhance industry engagement and student preparedness for the workforce. These strategies included:

- Organizing annual industry visits for students
- Providing industry training for teachers
- Incorporating industry experts in teaching 10% of practical classes
- Conducting workshops and seminars on relevant topics
- Establishing production labs and teaching factories on campus
- Offering apprenticeship programs for students
- Implementing an industry-based project-solving system for students

The TVET experts also emphasized the need for resource exchange provisions, small industry tours, and industry problem-solving steps to foster collaboration and mutual benefits between TVET institutions and industries.

Monitoring & Assessment Process of SIAP:

In this research analysis, it has been found that during attachment program teacher visited the attached place as a guide teacher once or twice during attachment program. Although some respondent highlighted that attachments places situated in Dhaka & Gazipur city are hardly visited due to the financial insufficiency for guide teacher visit.

One of the responded had clearly stated that "*a few numbers of student just buy their reports card from training institute with some money without participating in attachment program because of the preparation for DUET admission test*".

It has been found out that the Industrial Attachment Program takes place in 8th semester for 4 months period (16 week) consist of 300 Marks. Industry trainers provides 150 marks on the basis of evaluation reports (students need to writes the report) for 12 weeks training in industries. Rest 150 marks is provided for 4 weeks assessment by the departmental teacher on the basis of viva & presentation faced by the students.

All TVET experts suggested to form assessment committee involving industry personnel in these assessment process as per NTVQF and providing a dual certification i.e. students can also sit for assessment of NSC skill certificate during attachment program as well as attachment completion certificate.

Limitations of Financial Allocation:

The results of this research reveal a clear scenario of insufficient financial allocation for the skill improvement through SIAP, as reported by almost all of the respondents. The total amount allocated for SIAP is 13,000 BDT, out of which each student receives 12,000 BDT. The remaining 1,000 BDT is allocated for industrial training purposes and institutional costs for guide teacher and other managerial expenses.

The allocated 600 BDT for industry training purposes is divided into two categories: 300 BDT for raw material costs and 300 BDT for the trainer. However, one of the respondents noted that working as an industry trainer for industrial training as low-valued laborer's work. Additionally there are some issues with the money distribution process i.e. money should be provided to the instructors and related personnel except head office.

To incentivize industry engagement and improve the quality of vocational education and training, the TVET experts suggest several strategies. These include providing industry incentives, increasing the raw material fund, offering honorariums for industry trainers, raising government budget allocations, increasing guide teacher honorariums, raising the amount paid to students, and taking initiatives to enhance existing projects.

Curriculum Development According to Industry Demand:

The qualitative findings from the respondents revealed that various challenges lie in industry demand curriculum development for diploma program. These challenges include difficulty in

developing curriculum that aligns with the rapid growth of modernization of industries, lack of industry representatives devoting time to curriculum development, insufficient industry representative fees, and lack of training for curriculum development members.

Some of the respondents also highlights lack of combination and coordination among curriculum development members, changing teachers frequently in curriculum development committee, and the involvement of principals in the curriculum development committee as he remain busy in administrative work.

Other challenges identified were the improper functioning of Industry Skill Councils, the time requirements for curriculum development being too long.

Industry-Institute Collaboration Ensuring Mutual Benefits:

One of the respondents stated that, "*I don't think SIAP can benefit Industries at all because industry equipment is too modern and risky for our students to drive it professionally without proper skill* ".

Some of the respondents said that students are doing various consumer-related work during attachment program though most of the industry employer think this will disrupt their production. Some of the respondents suggested that upskilling program of industry employees, providing incentives to industry stakeholder on creating students training facilities, increasing training honorarium, implementing an industry-based project-solving system, industry problem-solving steps can benefit industries, which can boost up the collaboration of both parties.

Skill development through the SIAP:

Through the qualitative analysis most of the respondents agrees that through SIAP program students can only acquire the basic practical knowledge on some equipment, as most of the students are going to training institute for industrial attachment.

Some of the respondents don't think that present industry linkage increases the level of skills of students.

One of the respondents stated that "*existing SIAP is not an effective program for skill development. It should replace with industry-based project work through which industry will be benefitted as well as our students will be skilled.*"

Challenges of Industry-Institution Collaboration with TVET institute:

The qualitative analysis presents several challenges faced by Polytechnic institutes in Kushtia district, as well as potential solutions to improve collaboration with industries and increase job opportunities for graduates.

Some of the challenges

- **Lack of Industry-Institution Collaboration policy**
  - Lack of law and policies on TVET industry linkages for collaboration building methods, and specific roles of providers and enterprises.

- **Updating Curriculum to Keep up with Industry Advancements**
  - Difficult to update curriculum according to industry rapid growth.
  - Lack of industry representatives who have devoted time to curriculum development process.
  - Lack of training for the curriculum development members.
  - Lack of research-based data for curriculum development.
  - Changing teachers frequently in curriculum development committee.
  - Short time duration of the semester.

- **Financial Issues**
  - Insufficient funding for industry tours and other activities.
  - Insufficiency of GoB fund for organizing workshop and seminar with industries.
  - Insufficiency of government funding for training programs.
  - Inadequate incentives for industries to create interest among employer to provide training for Polytechnic Diploma students.
  - Trainers sometimes doesn't receive training money from local office Demotivation of industry trainers due to lack of honorarium from institutions side.

- **Challenges in Measurement and Evaluation**
  - Lack of Leadership and management capacity.
  - Willingness to communication with industry.
  - Assessment system of TVET.
  - Teacher student ratio in Polytechnic Institute.

- Diploma Prabidhan industrial attachment part only mention credit and mark distribution with some guidelines. No details training plan, syllabus or jobs for industry and institute part.
- Lack of monitoring and evaluation system for attachment programme.
- TVET teacher's requirement process.
- Industry selection guidelines for industrial attachment programme.

➢ **Resistance from Industry Employees**

- Lack of interest from industry employers/human management in providing training for Polytechnic Diploma students due to prioritizing.
- Lack of interest from industry employees.
- Disruption of production during training activities.
- Lack of legal rights for industries by the employee to take on students for training.
- All of the necessary Industry Skills Councils (ISCs) are not formed and functioning yet.

➢ **Industry Engagement Programs**

- Occasional invitation of industry people in seminars, workshop.
- Lack of industry-based skills training for TVET teachers.
- Lack of Industry based production lab in institute.
- Organize workshop, seminar with industry.
- Set up Production lab.
- No Provision for practical classes taken by industry experts.
- Part by part industry tour for all year students.
- Teaching factory concept

➢ **Limited Industries**

- Difficulty in allocating all students to industries due to limited industry participation.
- Difficulty of allocating all students to local industries for attachment
- Limited number of industries in TVET institute attachment areas.

➢ **Career Counseling and Job Placement Services**

Job placement cell can not perform tasks due to lack of manpower.

- No full-time counselling /job placement officer.
- No formal counseling services for students.

➢ Limited resources & Training environment

➢ Different work culture and processes

➢ Mismatch between the labor market (demand side) and TVET programs (supply side). In most cases The TVET sector is not providing skills that are useful for industry. No TVET data center for solves this challenge.

4.3 Findings from Qualitative Data of Industry Member:

This qualitative analysis is done from the in-depth interview of Industry Employer & Industry Association Members.

The findings of qualitative analysis from the respondents are categorize into following themes:

- **Perception of Industry Employer about Diploma Engineers:**

  One of the respondents stated "*I believe technical or vocational education is the only way of economic growth for the country* ". Most of the employer agrees that diploma engineers are good in hands on skill. But they have problems in adjustment with the work environment to their work stations.

- **Availability of Engineers:**

  One of the respondents said that they can hire B.Sc. engineers paying equal amount like Diploma engineers. So, availability of B.Sc. & Diploma Engineers is a major reason of being disinterested in skill program.

- **Authority and decision-making**:

  "*Though I run this industry because owner doesn't stay here, I am an employee here. I can't take decision like attachment program without stakeholder permission*" stated by one of the respondents. So, it needs to convince stakeholders by organizing programs occasionally for collaboration.

- **Training and Skill Development in Attachment Program**:

  All of the respondents said that they can only show how different machine & works are done here. Students can't participate in real task as students are not trained as well as task is too risky for them. One of the respondents think, trainees could work if they have legal right as an employee during training period.

The analysis also finds that huge amount of training participation, no dedicated supervisor during attachment program, lack of practical knowledge among students are also hindrance in attachment program.

- **Industry Benefits and Drawbacks of an Attachment Program:**

  The findings of qualitative data from all of the respondents comes to a conclusion that industries don't get any benefit from this SIAP.

  Additionally, waste of workhour, providing an employee for supervision, small amount of honorarium, huge number of trainees at a time, production hamper are the reasons of considering SIAP program as a burden.

- **Compliance with Government Policies:**

  Most of the respondents highlighted that there is no instruction from the authorities of the state. As of now some of the industries participating in attachment program considering it as social responsibilities.

  All of them think that government should make a policy and provide instructions to the local government engineering departments as well as private entities to participate in the manpower skill development programs.

- **Agreement and Communication with Educational Institutions:**

  The findings on agreement are industries don't make any agreement with Polytechnic Institutions. Even most of them feel disinterested to communicate with institutions as this program may disrupt in production and won't be beneficial for the industry.

- **Awareness Regarding the Skill Development Program:**

  Through this qualitative analysis it has been found that big and medium scale industry employer & industry association members have little knowledge of diploma programs and Industrial attachment programs of polytechnic institutions of Kushtia district.

- **Providing Facilities for Industry Employer:**

  One of the respondents think Government should create a system through which industrialist can get different kinds of government facilities easily for running their business. "Government doesn't support industrialist, whereas we play enormous role in countries economy"

  If industry employers get government services easy and available for doing their business then they will feel motivated to participate in skill development program.

4.4 Qualitative Findings of policy Documents

In the National Education Policy 2010, the chapter on Vocational and Technical Education outlines several strategies to improve Technical & vocational education in Bangladesh. Two key strategies are:

Strategy 9: Introducing a nationwide apprenticeship program, with updates and revisions to the Apprenticeship Act of 1961. This would provide vocational students with practical, on-the-job training and help them acquire the skills needed for employment. The apprenticeship program can be an effective way to bridge the gap between industry and academia, by providing students with hands-on experience and allowing them to learn from experienced professionals.

Strategy 11: Making hands-on training mandatory for teachers of all levels by providing training within mills and factories. To achieve this, the number of posts and seats in VTTI (Vocational Training and Technical Institutes) and TTTC (Technical Teachers Training Centres) would be increased, and additional institutes may be established if necessary. This strategy will ensure that teachers have the necessary skills and knowledge to impart practical, real-world training to their students.

Overall, these strategies reflect a strong commitment to improving Technical & vocational education in Bangladesh, with a focus on industry-academia collaboration through on-the-job training. They also aim to provide students and teachers with access to the resources and training needed for success in the modern job market.

The National Skills Development Policy of 2022 Chapter 3 Ensuring Quality of Skills Development Training (3.6) focus on the Role of the Key Agencies (1) National Skills Development Authority (NSDA): The NSDA Act 2018 empowers this new Authority with a wide-ranging responsibilities and tasks with regard to coordination, quality assurance and certification. (3) Industry Skills Councils (ISCs): The ISCs have been established to ensure industry collaboration in skills development. Furthermore, ISCs will help in strengthening industry linkage, apprenticeship program, up-skilling and re- skilling, RPL, standard and curriculum development, assessment of trainees, trainers and assessors.

Chapter 5 of the National Skills Development Policy of 2022 focuses on the role of the industry sector in skills development. It emphasizes the importance of industry participation in skills training to increase the employability of skills graduates. The chapter highlights the formation of Industry Skills Councils (ISCs) under the Company Act of 1994 as a way to develop a linkage

between the industry and Skills Training Providers (STPs). The ISCs are expected to support the identification of occupations in demand by the industries, contribute to the development of competency standards, curriculums, and forecast the industry's demand for skills.

Moreover, the chapter discusses the need to strengthen the linkage between STPs and industries through ISCs and Industry Associations. It mentions that a sound skill development system actively promotes close collaboration between the skills training institutions and industries to ensure a steady flow of skilled and productive workers. The chapter also highlights the importance of allowing young people the opportunity to learn skills on the job and the benefits of institution-industry co-operation, which includes job placement of skills graduates, information exchange between institutions and industries on current practices, on-the-job training, work experience, apprenticeships, career guidance, counseling, and job placement support.

Overall, the chapter emphasizes the importance of industry engagement in skills training to develop human resources and supply skilled workers for quality production industry.

Chapter 17 of the (National Industrial Policy , 2022)**has two main focuses**

- Firstly, it aims to provide effective hands-on practical training in machinery technology and production lines for the workforce. To achieve this, the policy seeks to strengthen **Apprenticeship programs** in industrial establishments, enabling trainees to gain valuable experience in machinery, technology, and production lines.
- Secondly, the policy emphasizes the importance of technological innovation and development in accelerating industrialization and strengthening the country's focus. It states that industrial **entrepreneurs should establish close partnerships with educational and research institutions** to improve productivity, product quality, versatility, and skills.

Chapter 17 of the Bangladesh Labor Rules, 2015 outlines the rules and regulations regarding apprenticeship in the country. The eligible authority for this chapter is the Inspector General of the Directorate of Inspection of Factories and Establishments. A tripartite advisory committee on apprenticeship will be formed, consisting of one chairman, one member secretary, and four representative members from the government, owners, and workers. The committee will hold meetings twice a year and decisions will be made by majority vote. Its functions include providing

guidelines to the eligible authority, recommending necessary measures for training programs, and providing consultancy to the government on the quality of apprenticeships.

Owners of establishments that have provisions for apprenticeship can formulate their own apprenticeship policies, subject to approval by the government. The owner's obligations include submitting a list of eligible trades for apprenticeship and the number of employees in each category, communicating appointments in the eligible trades within 30 days, scrutinizing apprenticeship programs for approval, and providing technical advice and guidelines.

Based on the Diploma Engineering Regulations 2022, the 8th semester of the 4-year Diploma in engineering program includes a 16-week mandatory industrial training component. This training consists of 12 weeks in industry and 4 weeks in the respective institutes. The Industrial training carries a total of 12 credits and 600 marks.

During the 12-week industry placement, students will have the opportunity to gain practical experience and apply the knowledge and skills they have acquired throughout their program. The 4-week component in the respective institutes is designed to help students reflect on their experiences and further integrate their academic knowledge with their practical training. The credits and marks earned through the industrial training component will contribute to the overall CGPA of the student, making this a crucial aspect of the Diploma in engineering program. Overall, the industrial training component provides students with valuable exposure to the engineering industry and helps prepare them for their future careers.

Chapter-Five: Discussion

The quantitative analysis provides information on the demographics of the participants, the status of the students during the program, and their perception of the program's various aspects. The findings highlight that most students attached to training institutions in Gazipur City, absence of industrial attachment planning & learning topics. Additionally, the majority of respondents found the program necessary for their future career development, and their employability improved after completing the program. However, the program does not guarantee a job offer to the majority of the participant.

Chapter 5 of the National Skills Development Policy of 2022 focuses on the role of the industry sector in skills development. It emphasizes the importance of industry participation in skills training to increase the employability of skills graduates.

The findings from academia members and TVET experts highlight several challenges in the skill improvement through attachment program (SIAP) in diploma programs in Bangladesh. One of the major issues is the absence of a formal partnership agreement with clearly stated interests between the industry and institution for SIAP. Institutions must develop a partnership agreement with industries for better alignment. The government of Bangladesh should formulate policies on TVET industry linkages, defining the roles of each party in the collaboration process.

The NEP-2010 proposed a strategy to launch a nationwide apprenticeship program, which would entail updating and revising the existing Apprenticeship Act of 1961.This would provide vocational students with practical, on-the-job training and help them acquire the skills needed for employment. The apprenticeship program can be an effective way to bridge the gap between industry and academia, by providing students with hands-on experience and allowing them to learn from experienced professionals.

From the findings it has been clearly seen that Institutions completely fails to collaborate with the industries. The main reason is industry doesn't get any benefit from this collaboration process. NSDP- 2022 focuses on involving industry partners into skill development program with TVET institutions. It can be done by organizing several skill development program such as, apprenticeship program; forming Industry Skill Council (ISC) for industry relevant curriculum development; involving industry representative into academic institutions organizing several industry engagement program. But from the findings, it comes out that Industry engagement

programs cannot be arranged. The reason behind this is lack of funding as well as institutional incapacity.

Industry employer doesn't accept students into SIAP program because they think these programs as potential hindrances to their production. Again, Industry don't have any legal right to involve these students into production related job because equipment is modern and risky, so it needs more training. So, this skill development program provides no benefit to the industries. Institutions must develop strategies to ensure industry benefits and find a way to prepare students in a better way for the workforce.

Furthermore, Lack of motivation & awareness about Kushtia Polytechnic Institutions activities among industry employers was also noticed during study. Industry perception on diploma Engineers performance during job is satisfied but due to availability of B.Sc. & Diploma Engineers in our country industries feel relax in skill developments. In these circumstances, skills development for this era of fourth industrial revolution government should take some effective measures. Government should build awareness about TVET & provide incentives to the industries who participate in skills development programs. Government should also provide a comfortable business environment. If government creates a comfortable business oriented environment, this will encourage industry stakeholders to participate in government initiated skill development programs.

The monitoring and assessment process of SIAP is not adequately implemented, and there is a lack of involvement of industry personnel in the assessment process. To ensure the effectiveness of the program, it is recommended to form an assessment committee involving industry personnel and provide a dual certification. Curriculum development according to industry demand is also a challenge, and institutions must develop a more comprehensive and streamlined curriculum development process that involves industry representatives and encourages consistency in teacher participation.

In conclusion, the Industrial Attachment Program in Kushtia Polytechnic Institute can be improved by addressing the challenges identified by the study. Developing a formal partnership agreement, allocating more resources and manpower for the job placement cell, incentivizing industry engagement, improving the monitoring and assessment process, increasing financial allocation, and developing a more comprehensive and streamlined curriculum development process can strengthen the effectiveness of the program.

Chapter-Six: Recommendations

Recommendations

1. **Government Policy and Regulations:**

   1.1 The government of Bangladesh should thoroughly review and update existing policies on Technical and Vocational Education and Training (TVET) industry linkages. This should include comprehensive guidelines on collaboration types, effective methods for building collaborations, and clearly defined roles and responsibilities for job providers.

   1.2 The policies should establish legal frameworks and principles to govern the operation and development of industry-academia collaborations, ensuring equitable benefits for both parties.

2. **Manpower and Responsibilities:**

   2.1 The Directorate of Technical Education should take necessary effect to resolve the manpower issues by initiating a recruitment process to fill these positions promptly.

   2.2 It is crucial to introduce a dedicated counseling or job placement officer within the TVET manpower organogram. This officer would be responsible for facilitating student job placements, conducting career counseling, and establishing strong industry connections.

3. **Incentivizing Industry Engagement and Preparing Students for the Workforce:**

   3.1 Develop comprehensive strategies to incentivize active industry engagement, including organizing regular industry visits, providing specialized training for teachers in collaboration with industry experts, incorporating practical classes led by industry professionals, and facilitating joint workshops, seminars, and conferences.

   3.2 Establish production labs and teaching factories within TVET institutes to provide hands-on training opportunities for students and promote collaboration with industries.

   3.3 Foster strong industry-academia partnerships by offering apprenticeship programs, promoting industry-based research projects, and implementing an industry-driven project-solving system supervised and monitored by both TVET institutions and industries.

   3.4 Ensure that curriculum development is conducted in close consultation with industry representatives, aligning the curriculum with current industry demands and trends.

4. **Dual Certification System and Financial Allocation:**

   4.1 Establish an assessment committee comprising industry personnel and experts to ensure the effectiveness and relevance of the industrial attachment program. Introduce a dual certification system that recognizes the achievements and skills acquired by students during the program. Allocate more financial resources from the government budget to support the industrial attachment program.

5. **Soft Skills Training and Recruitment of Industry-Experienced Teachers:**

   5.1 Incorporate comprehensive soft skills training and content within the diploma engineering curriculum to enhance students' employability and professionalism.

   5.2 Initiate a targeted recruitment process to attract industry-experienced teachers and professionals to join the TVET system. This will bring valuable industry insights and practical expertise into the classroom.

6. **Effective Implementation of Policies:**

   6.1 Ensure the comprehensive and effective implementation of the National Education Policy 2010, particularly focusing on bridging the gap between industry and academia and improving the quality of technical and vocational education in Bangladesh.

   6.2 Strengthen the implementation of the National Skills Development Policy of 2022 by enhancing the resources and capacity of the National Skills Development Council (NSDC) secretariat. This includes recruiting qualified personnel and conducting regular council meetings to monitor progress and address emerging challenges.

7. **Strengthening Industry Linkages:**

   7.1 Industry Skills Councils (ISCs) should play a proactive role in promoting industry collaboration in skills development. This includes strengthening apprenticeship programs, facilitating up skilling and reskilling initiatives, recognizing prior learning (RPL), and actively participating in the development of industry-relevant standards and curricula.

   7.2 Align with the objectives of the National Industrial Policy 2022 to enhance apprenticeship programs in industrial establishments. This will provide trainees with valuable hands-on experience with machinery, technology, and production lines, while fostering closer partnerships with educational and research institutions.

8. **Embrace the Dual Method:**

8.1 We recommend that educational institutions and policymakers embrace the dual method as an integral part of TVET systems. This approach offers a balanced learning experience by combining theoretical knowledge with practical skills, enhancing the employability of students and their ability to meet industry demands.

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Appendix-A
A.1 Framework of Questionnaire, KII Guideline:

Main Focus	Thematic Area	Indicators
Industry Institution Collaboration	Policy Support	1. Partnership agreements 2. Workforce development initiatives 3. Funding support 4. Stakeholder engagement 5. Industry engagement programs 6. Career counseling and job placement services 7. Research and development initiatives
	Curriculum Development	1. Relevance to industry needs 2. Incorporate industry-led training and resources 3. Use of industry-specific technology and equipment 4. Teacher training 5. Industry-Based Project Work 6. Evaluate the curriculum
	Mutual Benefits	1. Improved workforce skills 2. Increased innovation 3. Enhanced reputation 4. Increased industry participation 5. Improved curriculum relevance 6. Increased job opportunities 7. Financial facilities for the industries (tax reduction,incentives etc)
	Talent recruitment	1. Provide work-ready graduates

		2. Promote the benefits of hiring TVET graduates 3. Foster alumni engagement 4. Host employer events and workshops 5. Offer customized training programs
	Collaboration Challenges	1. Lack of funding 2. Lack of communication and trust 3. Training Environment 4. Training Duration of industrial traning 5. Limited resources 6. Different work culture and processes 7. Resistance from industry employees 8. Challenges in measurement and evaluation

A.2 Questionnaire For Polytechnic Graduates

(This study information will be used for research purposes only. The personalized data will be kept confidential.)

(Please provide information and put tick marks (√) in appropriate places)

1. Name of the institute:

   ☐ Kushtia Polytechnic Institute

   ☐ Kushtia Institute of Science & Technology

   ☐ Dhaka Mohila Polytechnic

2. Name of your technology:

   ☐ Computer   ☐ Mechanical

   ☐ Civil   ☐ Power

   ☐ Electrical   ☐ Textile

   ☐ Electronics   ☐ Architecture

3. Types of your institute

   ☐ Government

   ☐ Non-government

4. Gender:

   ☐ Male

   ☐ Female

5. Age:

   ☐ 18-22

   ☐ 23-25

   ☐ Above 25

6. Your Passing Year?

   ☐ 2022

   ☐ 2021

   ☐ Before 2021

   ☐ Not yet passed

7. Name of your attached Organization:

………………………………………………………………….

8. Types of your attached organization

- ☐ Government
- ☐ Autonomous
- ☐ Training Institute
- ☐ Private Industry

9. How did you find out your organization for the Industrial Attachment?

- ☐ Arranged by your institute
- ☐ Arrange by you
- ☐ Arrange by any Alumni of your institute
- ☐ Approached by the attached industry

10. Did you get your desire organization for Industrial Attachment?

- ☐ Yes
- ☐ No

11. Location of your attached industry/organization from your institution.

- ☐ In the same city
- ☐ Outside from the district
- ☐ In Dhaka city
- ☐ In Gazipur city

12. How many days did you work per week?

- ☐ 6 days
- ☐ 5 days
- ☐ 4 days
- ☐ less than 4 days

13. How long did you work per day?

- ☐ More than 8 Hours
- ☐ 6 to 8 Hours
- ☐ 4 to 6 Hours
- ☐ Less than 4 hours

14. Did you actively participate in industrial manufacturing or service sector during your attachment program?

☐ Yes

☐ No

15. How much the Industry Attachment Program improves the graduates ability to gain employment?

☐ Very Good

☐ Good

☐ Moderate

☐ Not at all

16. How did you perform your task in the industry during your Industrial Attachment Program?

☐ did a particular job

☐ perform different types of jobs

17. How much you had access to the machines and equipment to perform your tasks during your attachment program?

☐ Very Good

☐ Good

☐ Moderate

☐ Not at all

18. How much did your industry supervisor helpful to you during industrial attachment program?

☐ Very helpful

☐ Fairly helpful

☐ Little helpful

☐ Not at all

☐ did not have any supervisor

19. How did you learn in your Industrial Attachment program?

☐ Did the task by yourself

☐ Learned by watching how to work with

☐ Learned by doing and watching

☐ did not learn anything

20. Please select the challenges that you have faced during your attachment Program.

☐ Lack of training materials in the Firms/industries

☐ do not have free access to machines and equipment to work with

☐ spend a lot money in transport, food and accommodation purpose

☐ Industry supervisor attitude was not good during training programs

☐ no special arrangement for female students and disabled students.

☐ Training environment was not helpful for learning

21. What is the similarity between the syllabus of your technology and the training task in the attachment program?

☐ (80-100) %

☐ (60-80)%

☐ (40-60)%

☐ (20-40)%

22. Did your guide teachers from your institutions visited your Industrial Attachment Place?

☐ Yes

☐ No

22(a). If yes. Please write how many times………

23. Did you have to pay any money for Industrial Attachment program to the attached industry/ organization?

☐ Yes

☐ No

23(a). If your answer is yes, please select the amount listed below.

☐ less than 3000 tk

☐ 3000-5000 tk

☐ 5000 -8000

☐ more than 8000

24. Did you get any money from your attached industry for Industrial attachment ?

☐ Yes

☐ No

24(a). If yes. Please Write Amount: …………..

25. Did you get job offer from your attached organization?

☐ Yes

☐ No

26. Did you accept the job?

☐ Yes

☐ No

27. If answer is No, Reason for not taking the job offer is... (you can select more than one)

☐ salary is low

☐ offered job post didn't match my requirements

☐ looking for higher study

☐ want to run my own business

☐ family didn't allow me

☐ job location wasn't preferable

28. In your Industrial Attachment place, was there any facility for Female and Physically desable People?

☐ Yes

☐ No

29. Please recommend a curriculum to involve industry-based project among the options.

☐ to include a industry-based project in every semester

☐ include a industry-based project in every year

☐ include a industry-based project in 4th semester

☐ no need to include any industry-based projects

30. Is the Industrial Attachment Program necessary to future career development?

☐ It is necessary

☐ Does help

☐ Possibly help

☐ Does not help

31. Please provide your suggestions on how to make the Industrial Attachment Program more effective. (you can write in Bangla or English)

……………………………………………………………

Appendix – B

(This study information will be used for research purposes only. The personalized data will be kept confidential.)

Respondents- - TVET Expert/ Principals/Head of the department

INTERVIEW GUIDELINE

B.1 General information of the respondents
   Please provide personal information or select / response to appropriate items / options

1. Name of the respondent:

2. Designation:

3. Name of the Institution:

4. Please mention your occupation name in which you have certified:

B.2 Guidelines for TVET Expert Interview
 What is your perception about Collaboration between the Polytechnic Institute & Industry?

1. How do you define Industry institution Collaboration?

2. What is the present status of collaboration including challenges & opportunities?

3. Does the present existing industry linkage increase the level of skills of TVET graduates?

4. How should an institution work with the industries for skill development of graduates & teachers? (Guideline and policy, dedicated staff etc.)

5. What should be the early preparation of Student Industrial Attachment Programs (SIAP)? (such as industry selection, learning topics, motivation etc.)

6. How should students be trained in the Attachment Program? (ex. Curriculum oriented, particular project etc.)

7. What do you think about the present attachment duration?

8. Is the industry training allowance for learners/Students sufficient?

9. How evaluation of SIAP should be done?

10. How funding of SIAP should be?

11. Except for the SIAP program what should be other industry engagement programs? (Such as industry-based projects, industry tours, teachers training, inviting industry experts, research with industry, invite in award function etc.)

12. What are the challenges of effective industry linkage in technical education?

13. What is your suggestion on making the industry-based curriculum by collaborating with industries?

14. How Institutional capacity should be built for building strong institution-industry partnership?

15. What is your opinion to make industry institute linkage more effective and fruitful through the Industrial Attachment program?

B.4 Guidelines for Polytechnic Principal

What is your perception about Collaboration between the Polytechnic Institute & Industry?

1. how industry and polytechnic institute can work together to develop graduate skills & job opportunity?

2. Can you tell me some ideal engagement programs which can be done by together.

What is the present status of collaboration including challenges & opportunities?

3. How your institution work with the industries for skill development of your graduates & teachers? (Guideline and policy, dedicated staff etc.)

4. In SIAP how attachment industries are selected for students?

5. What kind of problems that students face in attachment program?

6. Except SIAP program what is your other industry engagement programs? (Such as industry-based project, industry tour, teachers training, inviting industry experts, research with industry, invite in award function etc.)

7. What are the problems to run these engagement programs?

8. What kind of challenges that you will face, if you want to build an ideal partnership?

9. What is your suggestion on making the industry-based curriculum by collaborating with industries? (Follow up Ques.- Challenges)

10. How Institutional capacity should increase for building strong institution-industry partnership? (ex. Tax & other incentives, financial benefits, recognition with award etc.

11. to create more job opportunities for the graduates what should be done together?

12. What should be done by both the government and institutions to create interest among industries

B.3 Guidelines for Head of the Department

What is your perception about Collaboration between the Polytechnic Institute & Industry?

1. how industry and polytechnic institute can work together to develop graduate skills & job opportunity?
2. Can you tell me some ideal engagement programs which can be done by together.

What is the present status of collaboration including challenges & opportunities?

1. How your institution collaborate with the industries for skill development of graduates & teachers? (Guideline and policy, dedicated staff etc.)
2. What kind of early preparation measures you take for the Student Industrial Attachment Programs (SIAP)? (such as industry selection, learning topics, motivation etc.)
3. How students are trained in Attachment Program? (ex. Curriculum oriented, particular project etc.)
4. How evaluation of SIAP is done?
5. How funding of SIAP should be done?
6. Except SIAP program what should be other industry engagement programs?
7. What are the challenges to make an industry-based curriculum and update the curriculum as per industry demand?
8. What is your suggestion on making the industry-based curriculum by collaborating with industries?
9. How Institutional capacity should build for building strong institution-industry partnership?
10. What should be done by both the government and institutions to create interest among industries?

Appendix – C

(This study information will be used for research purposes only. The personalized data will be kept confidential.)

Respondents- - Industry Association Member/Industry Employer

INTERVIEW GUIDELINE

C.1 <u>General Information of the Respondents</u>

    Please provide personal information or select / response to appropriate items / options

1. Name of the respondent:

2. Designation:

3. Name of the Association/Organization:

4. Experience:

5. Industry name:

6. Please select the sector under which you represent:

    ð   Agro Food Processing

    ð   IT / ICT

    ð   Construction

    ð   Transport

    ð   Light Engineering

    ð   Leather and Leather Goods

    ð   Furniture

    ð   Ceramic

    ð   RMG & Textiles

7. Are you member of Industrial skill council?

    ☐ Yes

    ☐ No

8. Have you ever been attended any meetings organized by Directorate of Technical Education regrading skill development program?

    ☐ Yes

    ☐ No

C.2 Guidelines for Industry Employers

- **Background Information**
- Can you tell me about your company and its relationship with Polytechnic Institute?
- how industry and polytechnic institute can work together to develop graduate skills & job opportunity?

3. **Collaboration Process**

- What is the process for initiating an industry-academia collaboration at Polytechnic Institute?
- How your company can match with Polytechnic Institute for collaboration?
- How could the project or partnership identified and prioritized?

- **Current Status:**
- What are the current strengths and weaknesses of industry-academia collaboration at Polytechnic Institute from your perspective?
- How could the industry-academia collaboration at Polytechnic Institute may evolve over time?
- Are there any current collaborations between industry and academia that your company considers to be particularly successful?

- **Benefits and Challenges**
- What benefits has your company seen from collaborating with Polytechnic Institute?
- What are some of the main challenges that your company has faced in collaborating with academia?
- How are conflicts of interest between industry and academia managed?

- **Future Directions**:
- What are your company's goals for industry-academia collaboration at Polytechnic Institute?
- Are there any areas where you would like to see increased collaboration between industry and academia?
- How do you think industry-academia collaboration will evolve at Polytechnic Institute in the future?

C.3 Guidelines for Industry Association Member
- **Background Information**

- Can you tell me about your industry association and its relationship with Polytechnic Institute?

- Can you describe how your association involved in SIAP program of Polytechnic graduates?

4. **Collaboration Process**

- What is the process for initiating an industry-academia collaboration at Polytechnic Institute?

- How your association contribute in this collaboration between the institution and industry?

- What are the different areas that industry and academic partners can collaborate?

  Current Status:

- What are the current benefits of industry partners and institution from this collaboration process?

- What are the challenges that institutions and industries are facing from this collaboration process?

- What are the reasons that industries show less interest in the collaboration with Polytechnic Institute from your perspective?

- **Future Directions**:

- What should be done to create a strong linkage between the institution and industry from your perspective?

- What are your associations's goals for industry-academia collaboration at Polytechnic Institute?

- Are there any areas where you would like to see increased collaboration between industry and academia?

- How do you think industry-academia collaboration will evolve at Polytechnic Institute in the future?