

Challenges in Producing Competent Graduates in Government
Polytechnic Institutes of Sylhet Division



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Abstract

Technical Vocational Education and Training (TVET) is an essential component of the educational system. The goal of technical and vocational education and training (TVET) is to produce competent personnel for a country. With such a higher rate of technically skilled candidates, a country can increase its direct earnings, which can increase GDP growth. Polytechnic institutions are one of the many institutional categories of TVET. Graduates of these polytechnic institutions are large in number and work inside the country and abroad, but in the job placement, they are not competent. The main purpose of this study is to look into the problems of the students after having practical and institutional skills from three government polytechnic institutions of the Sylhet division in Bangladesh. The study was conducted using a descriptive survey using a simple random sampling technique. A total of 312 students are interviewed from the four core technologies of three government polytechnic institutions. There are several challenges identified by this study. The challenges are categories into four subgroups. These are curriculum-based challenges, institution-based challenges, challenges faced by students, and the industry demand. The curriculum is well furnished but not capable to meet the industry demand. It needs to update rapidly with the alignment of modern technology. Institutional challenges found in this study are shortage of infrastructures, shortage of laboratory instruments, inadequate skill manpower to operate the machine, etc. Effective decisions by policymakers can solve these problems to produce competent diploma engineers in this region.

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List of Abbreviation

Short Form	Full Form
TVET	: Technical Vocational Education and Training
SDG	: Sustainable Development Goal
UNDP	: United Nations Development Programme
GoB	: Government of Bangladesh
ILO	: International Labor Organization
SSC	: Secondary School Certificate
BANBEIS	: Bangladesh Bureau of Educational Information and Statistics
FGD	: Focus Group Discussion
KII	: Key Informant Interview
SPSS	: Statistical Package for Social Sciences
CT	: Civil Technology
CMT	: Computer Technology
ET	: Electrical Technology
MT	: Mechanical Technology
BTEB	: Bangladesh Technical Education Board
MoU	: Memorandum of Understanding

Chapter 1

Introduction

Technical Vocational Education and Training (TVET) are the most important education and training processes to provide skill and technical employees for development. In Bangladesh, this TVET will make a significant contribution to the formation of middle-income countries by 2021 and developed countries by 2041. There are about 7,925 public and private TVET institutions in Bangladesh [1]. The current world is rapidly changing and competitive. Technical and vocational education is playing an important role in surviving in this age of globalization. The economic and technological development of the country is possible by creating skilled manpower through technical and vocational education. Technical and vocational education and training (TVET) is understood as comprising education and skills development of occupational fields as well as livelihoods. The diploma level is the most important stage of TVET education. In a developing country like Bangladesh, diploma engineers play an important role in the line of development. Diploma degree provides knowledge and skills for every developing sector. TVET is an important tool for sustainable development and social inclusion of all elements of society. TVET provides education and training for not only the academic student but also the youths leaving academic stream of education.

Enhancement of skills development, especially for the youth, has been a point of attention globally and nationally. The Sustainable Development Goal (SDG) on education pointed to technical and vocational education in two of its 17 targets. The targets emphasized equal access for all women and men to affordable quality technical and vocational education (target 4.3) and a substantial increase of the number of youth having technical and vocational skills for employment, decent jobs, and entrepreneurship (target 4.4) (UNDP, 2015) [2]. The government of Bangladesh has considered this a national priority. Therefore, vocational and technical training has been treated as quite crucial aspects of personal and economic development in the current National Skills Development Policy (GoB, 2011) [3]. This policy refers to those skills of the youth that would be enhanced by providing sufficient vocational and technical training so that they can secure decent jobs and can contribute to the overall economic development of the country.

Through various interventions and initiatives being employed by the government of Bangladesh and other institutions for the enhancement of youth skills, expected outcomes did not appear. It is evident that in Bangladesh, over two million young people enter the labor force every year, but the youth unemployment rate has been rising during the past 25 years – from 4% in 1991 to 10.4% in 2016 (BBS, 2017) [4]. The World Bank (2010) marked this sector for its low productivity due to unskilled work-force [5]. Low level of education and skills has been identified as the prime contributor behind low productivity in most sectors of Bangladesh including the informal ones (Titumir & Hossain, 2003) [6]. One of the keys to a productive and competitive economy is a well-trained and adaptable workforce, as noted by the International Labor Organization (ILO 1999) [7].

Students in Bangladesh are supposed to be admitted for technical and vocational education and training (TVET) at the secondary education level. The scope for such education was very limited in the past, which has started to expand recently with females lagging behind males [8]. The share of TVET students in the Secondary School Certificate (SSC) examination was the lowest among various streams of education over time. It was 1.4% in 2000 which increased to 6.5% in 2010, but was recorded at 5.7% in 2018 (BANBEIS 2019) [9]. Whereas the number of SSC examinees doubled during 2000-2018, in the case of technical and vocational education it increases eight times in this time duration. The Education Watch study of 2016 shows that only 6.5% of the population with at-least nine years of schooling received Technical and Vocational Education with a significantly less proportion of girls attending those (Nath & Chowdhury, 2016) [10]. Over a quarter of them had no idea about the scope of studying TVET at the secondary level [11]. These findings clearly show that TVET, as a stream of education, did not get a mentionable priority among the youth and the broader community as the other streams of education.

A number of studies on skills development issues had been accomplished which intended to identify skills gaps (BBS, 2015b) [12], constructing youth skills profile (Ahmed et al., 2012) [13], exploring the challenges of skills development initiatives (Newaz et al., 2013) [14], evaluating the impact of skills programs (Bhattacharjee & Kamruzzaman 2016, Rahman et al. 2017) [15], [16] and so on. Despite challenges, TVET no doubt has labor market potentials (Bakar, 2011) [17], encompasses the ability to facilitate economic growth, reverse poor labor supply and underperformance, and minimize unemployment and underemployment through

the delivery of employability skills. Moreover, TVET fosters gender equality campaigns across policy documents [18].

In Bangladesh, TVET plan has been formulated considering the context of overall development of technical education. TVET system is to ensure that TVET graduates are well equipped with the requisite practical skills for the job market. But in practical our industry demand is not fully occupied by the graduates. So it's clear that there is a gap between the industrial skill demand and TVET graduate competency. However, what is the current situation of TVET concerning a quick transition to labor market? Again, if relevance is the extent to which the labor market demands were met and effectiveness evaluates achievement of objectives while efficiency explores the correlation between inputs and outputs (Park, 2005) [19], then how relevant, effective and efficient is TVET? This study, therefore, seeks to provide answers to these questions.

“The labor market is the meeting place for supply and demand of knowledge, skills, and attitude with a determined price and quantity of performance”, (Dawkins & Stromback, 1996) [20]. Technical Vocational Education and Training (TVET) has been adopted and positioned as a solution to meet current and future labor skill demands. According to Park (2005), "TVET is the systematic and orderly transmission of knowledge, skills, and values to develop a workforce that can enhance productivity and sustain competitiveness in the global economy"[19]. The linkage between labor skill and TVET are the most important for the development of a country. Finding the challenges to adopting competent graduate supply to meet the labor skill demand is the main rationale of the study.

There are several TVET institutions in Bangladesh. Polytechnics, Technical school and colleges, Youth development training academies, Different training institutes and many others under different ministry are including TVET institutions. Among them polytechnic institute produces diploma graduates which play a very important role in the technical industry in Bangladesh. We consider four government polytechnics in Sylhet division as our targeted population.

Main focus of this research is institutional challenges and curriculum based challenges. For that, we have set two aims for this research. That's as follows.

1. To identify the challenges that polytechnic graduates are facing in the process of acquiring competency.

2. To determine the gap between meeting the industry demand in producing competent graduate and polytechnic curricula.

We have set the following four research questions to successfully address the research objectives. After finding the answers to these four research questions we can be able to find the challenges to produce competent graduates for government polytechnics in Sylhet division.

RQ1: What are the challenges do exist in the existing curriculum in producing competent graduates?

RQ2: What are the challenges do exist at the institutions in producing competent graduates?

RQ3: What are the challenges do the students faces to acquire desired competency?

RQ4: What are the challenges to meet the industrial demand for govt. polytechnics in producing competent graduates?

Chapter two describes the methodology of the research. The selection of the targeted population, sample size calculation, sampling method, and analysis methods are described in chapter 2. The next chapter describes the challenges in curriculum and course materials to produce competent diploma graduates. Chapter 3 is about the challenges related course curriculum. Shortage of LAB class or inadequacies of the syllabus on practical knowledge is described in chapter 3. Chapter 4 describes various institutional challenges in supplying competent diploma graduates for polytechnic institutions. Chapter 5 is about the challenges the students face during acquiring competency in polytechnic institutions. Chapter 6 describes various industrial demands to the diploma graduate in hiring for various development projects in the country. Chapter 7 consists of a summary of all four challenges to produce competent diploma graduates. The last chapter identifies some problems and gaps between diploma graduate competency and industrial labor market demand and also formulates some policy suggestions according to the study.

Chapter 2

Methodology

The research is to identify the institutional gap between the graduate from polytechnic institutions and the industry skill demand. This study is to find out the challenges for the graduates to become competent in their job market. The study will be conducted in Sylhet division including all four districts. Three polytechnics within this area are our targeted zone. Besides these, we make Focus Group Discussions (FGDs) with the teachers and KII with different industrial officials to know their skill demands. Sylhet division is the case study for this research.

The study is a quantitative survey based social research. Data collections through KIIs and FGDs with participants have been used to make up the qualitative data. Through the questionnaire survey, we can get the actual scenario of polytechnic institutions.

The research was conducted on students, teachers of polytechnics, and industry personnel in Sylhet division. Students are randomly sampled from the outgoing batch of the institute. Key informant interview with industry personnel provides the demand related data.

Data collections are conducted through questionnaires. The questionnaires contain three sections. The first section gives the demographic and introductory information of the population like name, gender, status, etc. The second section contains several statements on the labor market potentials of polytechnic institutions in accordance with descriptive rating scales which give information about polytechnic institute challenges and intuitional gaps.

SPSS (Statistical Packages for Social Scientists) software was used for the data analysis of this study. Responses from section B of the questionnaires range from 6 to 1. Numeric rating scale is as follows: Strongly Agree = 6, Agree = 5, Slightly Agree =4, Slightly Disagree=3, Disagree (D) = 2, strongly Disagree =1. Analyzing through SPSS software we can know the percentages of the population's responses to every research question.

Three government polytechnic in Sylhet division is under this study. Four emerging technology (Civil, Electrical, Computer, and Mechanical) is considered for this research. Total student of the four emerging technology at three government polytechnic institutions in Sylhet division is 1660. The sample size has been calculated as 312 by considering the confidence level 95% and the margin of error is 5%. Three FGDs were conducted with 20

teachers from all technologies of three different polytechnic institutions. Two different industries or branches of industries are targeted KIIs in alignment with every technology. Total 8 industry officials are selected for 8 KIIs.

Table 1: Data source, sample size, and sampling method

Data Source	Sample Size	Sampling
Student	312	Simple Random Sampling
Teacher	20	Simple Random Sampling
Industry official	8	Simple Random Sampling

Sylhet is the North-East divisional city in Bangladesh. There are different technical institutions in this area. So far no such study has been conducted in the area of polytechnic institutes. Besides this, the area is close to the researcher's workstation. That's why Sylhet division has been chosen as the study area of this research.

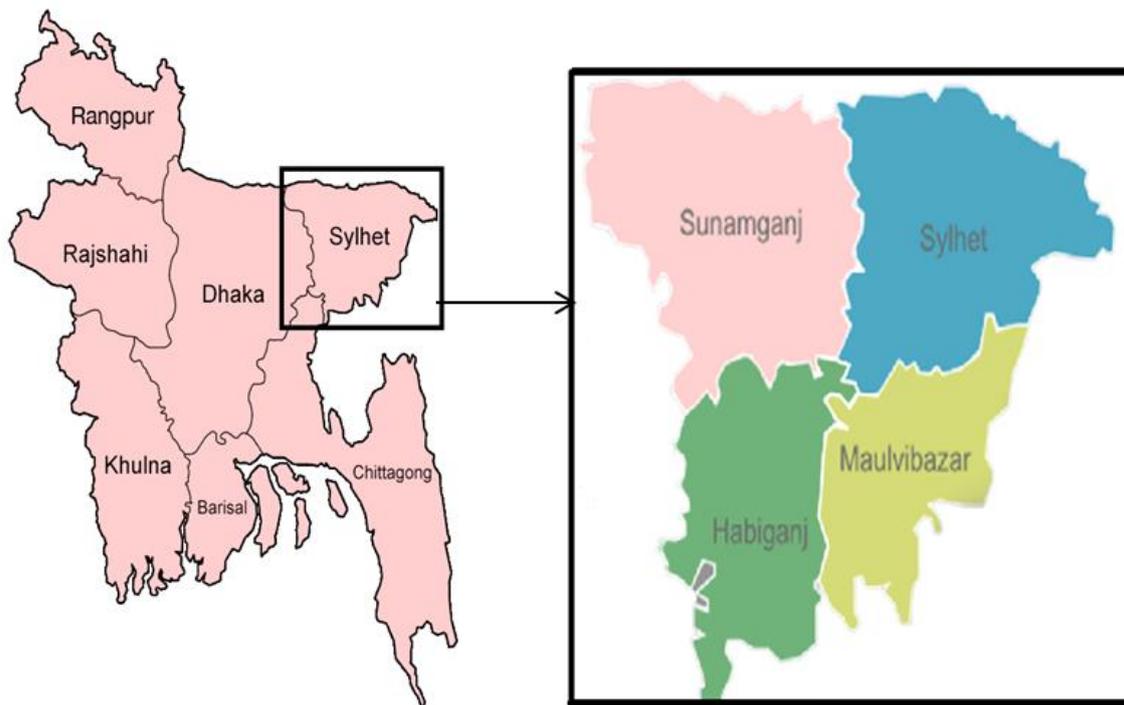


Figure 1: Study Region

Limitations of the study are as follows:

- ✓ It was difficult to find out targeted population on time.
- ✓ Needed more time for rigorous consultations and workshops with active participations.
- ✓ Resource constrains effected the number KIIs and FGDs.

Chapter 3

Curriculum and Course Materials

The course material in the diploma in engineering program is organized according to different technologies. The courses of each technology can be divided into two categories, Technical subjects, and related subjects. The total credit points allocated for the Diploma in Engineering are generally anticipated to be in the range of 150-160. About 10-15% for social skills, 15-17% for science and mathematics, 10-12% for related engineering, and 58-60% for core engineering subjects are allocated for each technology. The learning hour ratio for theory and practical is 40:60. Students spend 16 working weeks per semester and 30-40 class periods per working week. All theory class is 50 minutes period and practical class is 150 minutes period. Only 8th semester which is the final semester allocated for industrial attachment in industry and polytechnic campus.

The students are assessed through mid-term exam, class test, quiz test, assignment, presentation and final exam for theory part. For practical part students are assessed through practical experiment, report preparing and viva voce [21].

Research question 1 was prepared to identify the curriculum based challenges of the polytechnic to produce competent graduates. Under Research Question (RQ1) authors prepared five questionnaires for four mother technology that are Civil Technology (CT), Computer Technology (CMT), Electrical Technology (ET) and Mechanical Technology (MT). Questionnaires to collect data from three different governments' polytechnics are as follows.

1. The theory part of the curriculum burdens the study.
2. Curriculum is relevant to latest technology.
3. Curriculum is not capable to meet the industry demand.
4. Curriculum will not entitle you to gain a future career.
5. Curriculum and lab instrument are commensurate.

The student's thinking about the curriculum and their future competency clearly comes out through this questionnaire survey. The response is described for every question under every parameter for four emerging technology separately. This portion describes the challenges regarding curriculum or course materials that exist in different technology.

Table 2: Response of students in curriculum parameter

Statement	Response (Likert scale)	Civil Technology (%)	Computer Technology (%)	Electrical Technology (%)	Mechanical Technology (%)
The theory part of the curriculum burdens the study.	Strongly Agree	23.64	14.85	27.27	38.24
	Agree	34.55	60.40	42.05	42.65
	Slightly Agree	18.18	10.89	13.64	7.35
	Slightly Disagree	3.64	8.91	9.09	1.47
	Disagree	1.82	0.99	1.14	1.47
	Strongly Disagree	18.18	3.96	6.82	8.82
Curriculum is relevant to latest technology	Strongly Agree	25.45	15.69	23.86	33.82
	Agree	34.55	45.10	42.05	47.06
	Slightly Agree	30.91	29.41	13.64	5.88
	Slightly Disagree	1.82	1.96	7.95	4.41
	Disagree	3.64	3.92	11.36	2.94
	Strongly Disagree	3.64	3.92	1.14	5.88
Curriculum is not capable to meet the industry demand.	Strongly Agree	18.18	14.71	26.14	22.06
	Agree	27.27	50.98	36.36	35.29
	Slightly Agree	9.09	12.75	14.77	14.71
	Slightly Disagree	10.91	5.88	2.27	2.94
	Disagree	14.55	14.71	19.32	10.29
	Strongly Disagree	20.00	0.98	1.14	14.71
Curriculum will not entitle you to gain a future career.	Strongly Agree	9.09	12.75	18.18	17.65
	Agree	25.45	38.24	29.55	36.76
	Slightly Agree	7.27	10.78	13.64	8.82
	Slightly Disagree	9.09	9.80	6.82	10.29
	Disagree	30.91	27.45	27.27	10.29
	Strongly Disagree	18.18	0.98	4.55	16.18
Curriculum and lab instrument are commensurate.	Strongly Agree	10.91	9.80	20.45	11.94
	Agree	40.00	48.04	37.50	52.24
	Slightly Agree	12.73	22.55	13.64	10.45
	Slightly Disagree	5.45	9.80	14.77	2.99
	Disagree	23.64	7.84	11.36	13.43
	Strongly Disagree	7.27	1.96	2.27	8.96

From table 2 for first statement for separate technology, it has been seen that for Civil Technology 34.55% of students agree with the theory part of the curriculum burdens the study while only 1.82% disagree with the statement. However, 23.64% of total students strongly agree with the question. So the study can say that the theory part burdens the total syllabus of Civil Technology. According to the response of Computer Technology, 60.40% of students agree that the theory part of the curriculum burdens the study. However, 14.85% of total students strongly disagree with the question. So from table 2 for Computer Technology it highly appears that the theory part burdens the curriculum. In Electrical Technology it is found that 42.05% of students agree that the theory part of the curriculum burdens the study. While 27.27 % of total students strongly disagree which is almost double of slightly disagree students. The result shows that for Electrical technology the situation is almost the same as CT and CMT. According to the Mechanical Technology student responses, most of the students (42.65%) students agree that the theory part of the curriculum burdens the study which is around 4% more than those who strongly agree students. Hence the theory part burdens the total curriculum for Mechanical Technology.

Table 2 explains the result for the statement that “present curriculum is relevant to the latest technology” separately for four technologies. For Civil Technology, 34.55% of students agree that the present curriculum is relevant to the latest technology whereas 30.91% of total students’ response slightly agrees with the question. The result summarizes that the curriculum of Civil Technology is relevant to the latest technology as per student response. According to the response of Computer Technology from Table 2, it is shown that 45.10% of students agree that the present curriculum is relevant to the latest technology which is three times of strongly agree students. In addition, 29.41% of the total students' responses slightly agree with the question. The result is the same as CT. The curriculum of Computer Technology is also relevant to the latest technology as per students’ responses. For Electrical Technology Table 2 shows that 42.05% of students agree that the present curriculum is relevant to the latest technology. 23.86% of total students responded strongly agrees and 13.64% of total students' slightly agree with the question response. The students of Electrical Technology think that their curriculum is relevant to the latest technology. In Mechanical technology table 2 shows that 47.06% of students agree that the present curriculum is relevant to the latest technology. 33.82% of total students' responses strongly agree. So in bottom line, it can be said that students of Mechanical Technology think that their curriculum is also relevant to the latest technology.

Table 2 explains the result for the statement that 'Curriculum is not capable to meet the industry demand' in different technologies separately. For Civil Technology 27.27% of students agree that the present curriculum is not capable to meet the industry demand whereas 18.18% of total students' response slightly agrees with the question. However, 20.00% of the total students' responses strongly disagree with the question. These statistics show for Civil Technology that the present curriculum is not capable to meet the industry demand. For Computer Technology, 50.98% of students agree that the present curriculum is not capable to meet the industry demand whereas 14.71% of total students' response disagrees with the question. According to Computer Technology feedback, the present curriculum is not capable to meet industry demand. According to the response of Electrical Technology, 36.36% of students agree that the present curriculum is not capable to meet the industry demand whereas 26.14% of total students strongly disagree with the question. In Electrical Technology the result is the same as the previous two. The syllabus is not capable to meet present industry demand. In Mechanical Technology 35.29% of students agree that the present curriculum is not capable to meet the industry demand whereas 22.06% of total students responded strongly disagrees with the question. The result shows the same situation for mechanical Technology. The present curriculum is not capable to meet industry demand. From the above four technologies table 2 shows as per student opinion present curriculum cannot meet the industrial demand. The curriculum needs to update simultaneously.

According to table 2 for statement 4 (Curriculum will not entitle you to gain a future career), 30.91% of students of Civil Technology disagree that the present curriculum will not entitle them to gain a future career which is double of strongly disagree where 25.45% of total students' response agrees with the question. More than half of the total students of Civil Technology do not think that their curriculum will entitle them to their future careers. According to Computer Technology, 30.24% of students agree that the present curriculum will not entitle them to gain a future career whereas , 27.45% of total students' responses disagree with the question. For Computer Technology it is shown that maximum students agree that the curriculum of their technology will not be entitled to gain a future career. In Electrical Technology 29.55% of students agree that the present curriculum will not entitle them to gain a future career whereas , 27.27% of total students' responses disagree with the question. But only 18.18% of students strongly agree that the present curriculum will not entitle them to gain a future career. So the curriculum of Electrical Technology will not entitle to gain future jobs for the students. From the responses of the students of Mechanical

Technology, it shows that 36.76% of students agree that the present curriculum will not entitle them to gain a future career in Mechanical Technology. But a similar percentage of the student (around 16.50%) responded strongly agrees and strongly disagrees. The result is almost the same as the other three technologies. The present curriculum of Mechanical Technology will not confirm a student to gain a job in the future.

According to the response on 'Curriculum and lab instrument are commensurate' for Civil Technology, 40.00% of students agree that the present curriculum and lab instruments are commensurate. But 23.64% of total students' responses disagree with the question. So it can be said that the present curriculum and lab instruments are almost consistent with Civil Technology. In Computer Technology 48.04% of students agree that the present curriculum and lab instruments are commensurate. Where 22.55% of total students responded slightly agree with the question. Few portions only 9.80% of students strongly agree with that question. The result shows that the present curriculum and lab instrument are compatible with Computer Technology. 37.50% of students of electrical Technology agree that the present curriculum and lab instruments are commensurate and 20.45 students strongly agree with the question. Where 14.77% of total students responded slightly agree with the question. Few portions only 11.36% of students disagreed with the question. These statistics show the clear result that as per Electrical Technology student's opinion the present curriculum and lab instruments are commensurate. More than half of students of Mechanical technology, around 52.24% students agree that the present curriculum and lab instruments are commensurate. Where only 13.43% of total students responded disagree with the question. For Mechanical Technology it is shown that the present curriculum is compatible with lab instruments.

The theory part of the curriculum burdens your study.

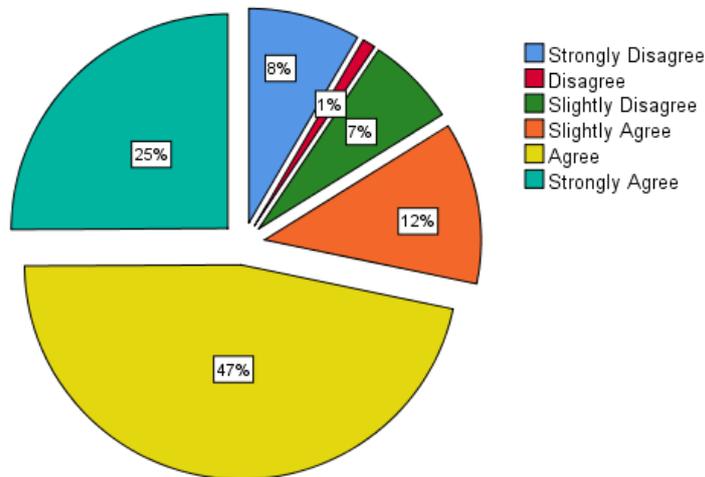


Figure 2: Student response of question 1

This pie chart (Figure 2) demonstrates the six kinds of responses to question 1 by the student of all technology of three polytechnics. 47% of students think that the theory part of the curriculum burdens their study. Only 1% of students disagree with this statement. From the above pie charts for four technologies of diploma, it is clear that the theory part of the syllabus burden the study of the students. Students prefer practical classes than theory. They can do more concentration in practical class then theory part. Either the authority should decrease the theory part or they should make the theory more attractive to the students.

Present curriculam is relevant to latest technology.

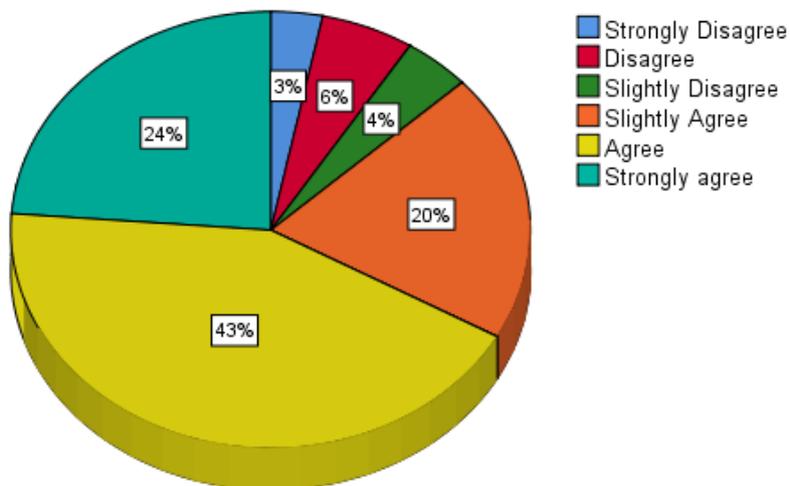


Figure 3: Student response of question 2

The above pie chart shows the data about the question “present curriculum is relevant to the latest technology”. This pie chart demonstrates the six kinds of responses to question 2 by the students. According to figure 3, 43% of students agree that the present curriculum is relevant to the latest technology whereas 20% of total students' response slightly agrees with the question. We see that students of all technology think that the curriculum is relevant to the latest technology. Almost 67% of total students think that their syllabus is relevant to the latest technology.

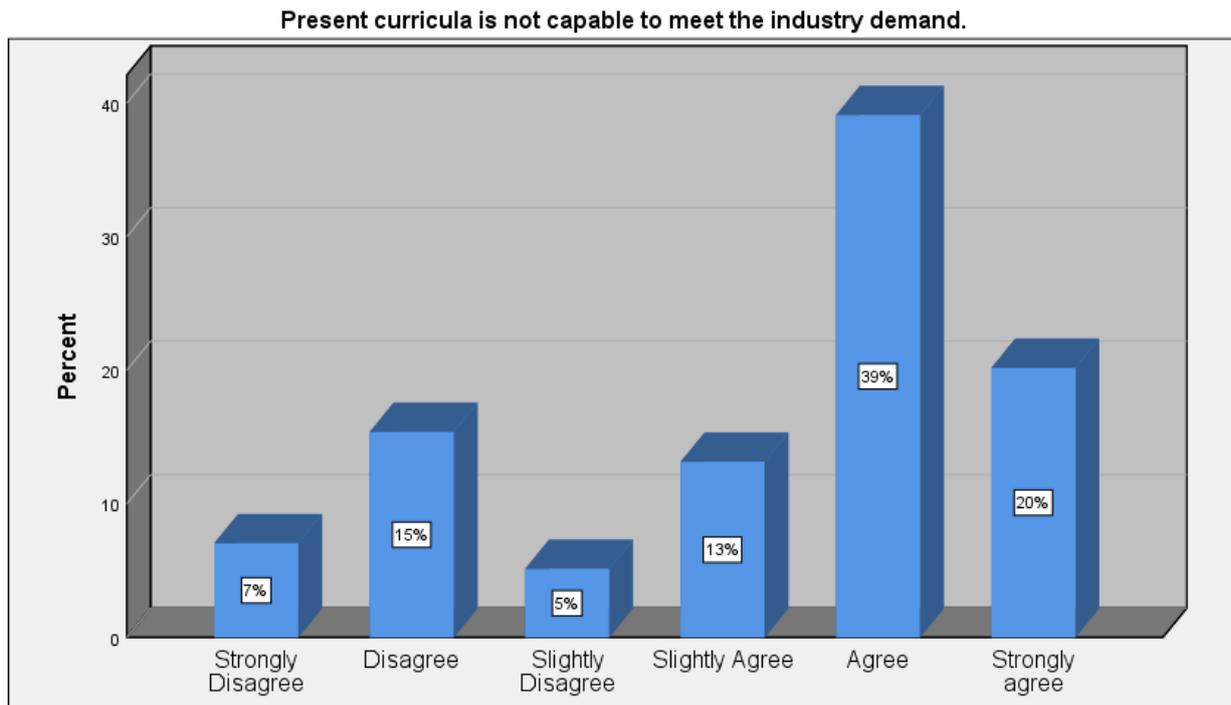


Figure 4: Student response of question 3

Figure 4 demonstrates the response to the statement that 'Present Curriculum is not capable to meet the industry demand'. The response from different technology is slightly different from each other. Figure 4 show that two-thirds of the total student agrees with the statement and the rest does not agree with this. It can be said from this result that the present curriculum is not capable to meet the industry demand. It needs more updates or reforms to meet industry demand.

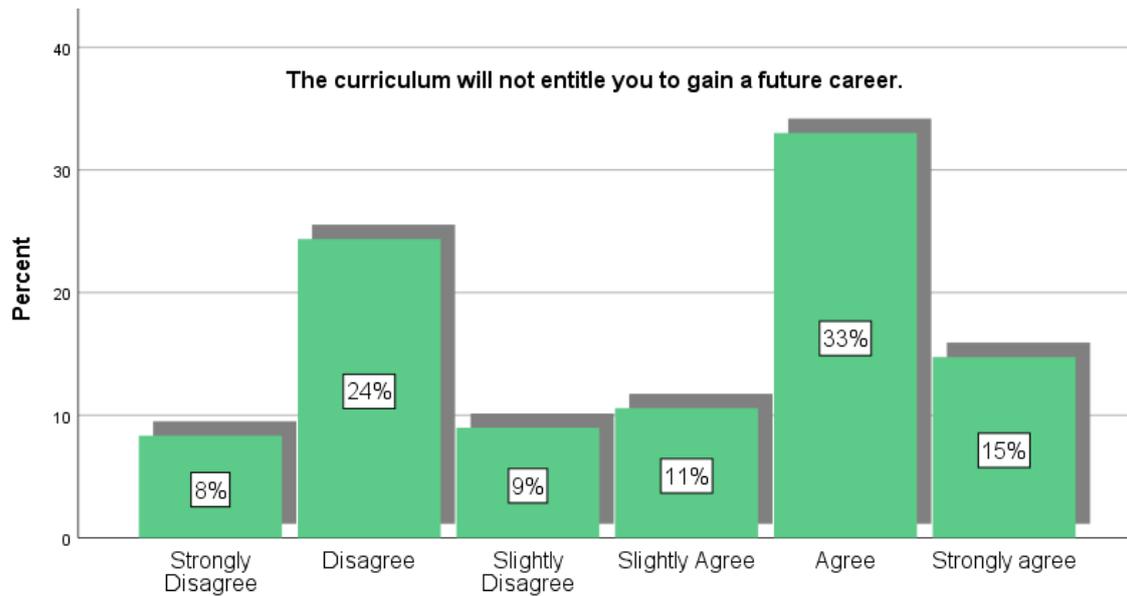


Figure 5: Student response of question 4

Figure 5 states the response against the statement that 'the curriculum will not entitle you to gain a future career'. From the response of the student, we see that slightly more than half of the total students agree with the statement. Others think that the curriculum will entitle to gain a future career for them. 33% of students agree and 15% of students are strongly agreed with this whereas 24% of students disagree and 8% of students strongly disagree with the statement. So some challenges were found in the curriculum to produce competent diploma engineers from government polytechnic in Sylhet division. The responses from separate technology are as follows.

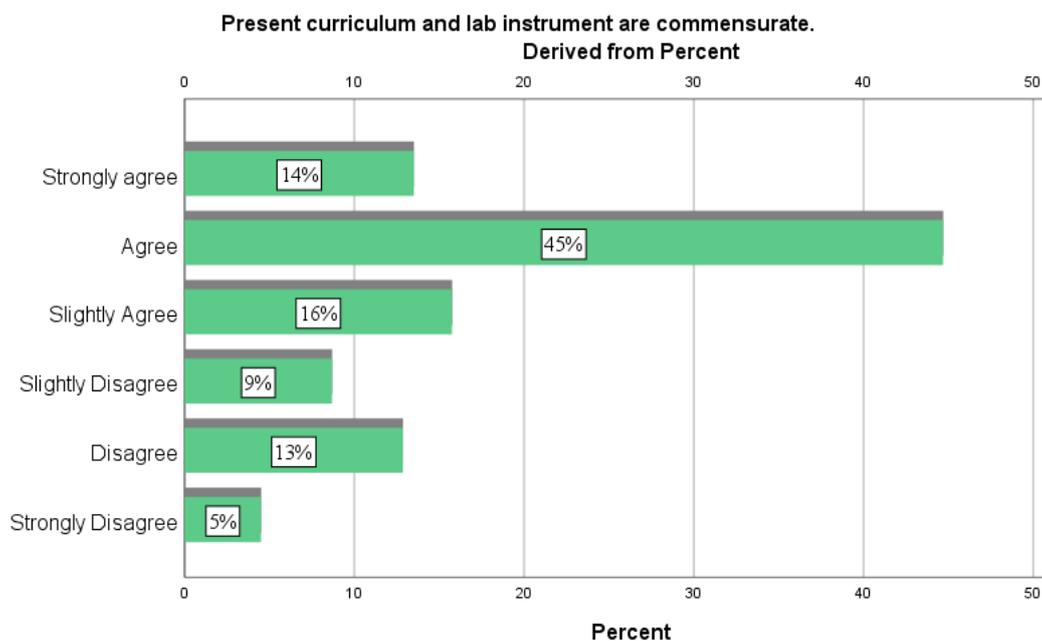


Figure 6: Student response of question 5

Figure 6 demonstrates the result of the statement that 'present curriculum and lab instrument are commensurate'. Two-thirds of students give positive responses to the statement. They think that the present curriculum and lab instruments are commensurate. Where 45% are agreeing, 13% are strongly agreed and 16% are slightly agreed. 13% of students are disagreeing with the statement and 4% of students strongly disagree with the statement. We found from the result that the present curriculum and lab instrument are commensurate. The following results are shown for each technology separately.

There are four issues which was been came out from FGDs. Questions for focus group discussions are as follows.

1. In which year the current curriculum was developed? How frequently the diploma curriculum is updating?
2. What part (Theory/Practical) dominant the curriculum and how you can make linkage between them?
3. Is the content of the curriculum is relevant with the latest technology?
4. To what extent the curriculum is commensurate with the labor market demand?

The information have been collected from these discussions are as follows.

Table 3: FGD response in curriculum parameter

Qs	FGD1	FGD2	FGD3
Q1	Last curriculum was developed in 2016. Curriculum is updated in 5 years interval by BTEB.	Last curriculum was developed in 2016. Curriculum is updated in 5 years interval by BTEB.	Last update in 2016. Curriculum updated interval is 5 years for diploma curriculum.
Q2	All participants agree with that the lab part of the curriculum is 60% of the total curriculum. Almost 90% interlinkage present between theory and practical part of the curriculum.	Theory part is 40% of total curriculum as per all participants. 60% of total syllabus. Linkage between theory and practical is adequate.	Lab part of the curriculum dominates the whole syllabus. Linkage between lab and theory is relevant.

<p>Q3 Its latest but need to update rapidly specially for computer technology. Computer technology need rapid update then others especially mechanical technology.</p>	<p>Curriculum is almost 80% relevant to latest technology as per the participants from civil technology. The participants from computer and electronics technology do not agree with this. They think that curriculum need very rapid update to be relevant with latest technology.</p>	<p>All participants agree that curriculum is not fully relevant to the latest technology.</p>
<p>Q4 All participants agree with that 50% of total curriculum is commensurate with the labor market demand.</p>	<p>All participants agree with that 60% of total curriculum commensurate with the labor market demand.</p>	<p>Not sufficient. Almost 60% is commensurate with the labor market demand.</p>

Major findings are: Curriculum is updated every five years. Volume of practical classes is larger than the theory part of the total syllabus and there is linkage between theory and lab part of the curriculum. Curriculum need to update more rapidly.

Chapter 4

Institutional Challenges

Habiganj polytechnic institute established in 2002[22], Moulovibazar polytechnic institute established in 2010[23], Sylhet polytechnic institute established in 1955[24]. All of them are quite ancient and carries some traditional value. Even after that, there are some institutional challenges in these polytechnics. At present, the number of students in these polytechnics is almost double than the number of students when those were founded. Although Sylhet Polytechnic has inadequate residential facilities for students, there are no residential facilities in Habiganj polytechnic. Although there is inadequate accommodation for the students of Moulvibazar Polytechnic, there is no provision for teachers. This study also raises some other institutional challenges. Data was collected through questionnaire survey from students and FGD was conducted with teachers.

Research question 2 was prepared to identify the institutional challenges of polytechnic to produce competent graduate. Under research question 2, there are five sub-questions which were asked to the students. These questions are as follows.

1. Equipment is enough with the number of students in the workshop.
2. You have not enough infrastructures for learning properly.
3. Your teacher is not familiar with the scientific and practical knowledge in the field of specialty.
4. Skilled manpower to operate machines is inadequate.
5. Equipment in your department is not compatible with those available in the labor market.

Responses from all technology and all polytechnics are shown separately in table 4.

Table 4: Response of students in institutional challenges

Statement	Response (Likert scale)	Civil Technology (%)	Computer Technology (%)	Electrical Technology (%)	Mechanical Technology (%)
Equipment is enough with the number of students in the workshop.	Strongly Agree	10.91	4.90	11.36	14.71
	Agree	23.64	35.29	28.41	25.00
	Slightly Agree	10.91	21.57	18.18	5.88
	Slightly Disagree	16.36	6.68	5.66	20.59
	Disagree	30.91	22.55	21.59	20.59
	Strongly Disagree	7.27	8.82	14.77	13.24
You have not enough infrastructures for learning properly.	Strongly Agree	18.18	18.63	14.77	20.90
	Agree	36.36	51.96	59.09	40.30
	Slightly Agree	3.64	12.75	12.50	8.96
	Slightly Disagree	3.64	7.84	3.41	5.97
	Disagree	34.55	7.84	6.82	22.39
	Strongly Disagree	3.64	0.98	3.41	1.49
Your teacher is not familiar with the scientific and practical knowledge in the field of	Strongly Agree	7.41	7.92	12.50	20.59
	Agree	12.96	25.75	30.68	26.47
	Slightly Agree	11.11	18.81	14.77	5.88
	Slightly Disagree	14.81	15.84	5.68	4.41
	Disagree	38.89	22.77	31.82	20.59
	Strongly Disagree	14.81	8.91	4.55	22.06
Skilled manpower to operate machines is inadequate.	Strongly Agree	20.37	13.73	18.18	17.65
	Agree	46.30	53.92	55.68	54.41
	Slightly Agree	5.56	17.65	11.36	16.18
	Slightly Disagree	5.56	6.86	4.55	2.94
	Disagree	16.67	5.88	7.95	5.88
	Strongly Disagree	5.56	1.96	2.27	2.94
Equipment in your department is not compatible with those available in the labor market.	Strongly Agree	16.36	17.73	15.91	16.18
	Agree	30.91	48.08	52.27	50.00
	Slightly Agree	7.27	16.67	18.18	10.29
	Slightly Disagree	20.00	6.86	6.82	13.24
	Disagree	20.00	14.71	8.41	8.82
	Strongly Disagree	5.45	1.96	3.41	1.47

Table 4 demonstrates for the statement ‘Equipment is enough with the number of students in the workshop’ that more than 30% of Civil Technology students disagree with the statement that equipment is enough for the number of students in the workshop while almost one-fourth of them agree with that. However, an equal amount of them (10.91%) slightly agree and strongly agree with this ask. So it is shown that for Civil Technology the equipment is not enough for every student in the laboratory. In table 4, 35.29% of students of Computer Technology agree that the equipment is enough for the number of students. Almost one-fourth of them deny this statement. However, around 22 % of them slightly agree which is greater than the total proportion of slightly disagree, strongly agree, and strongly disagree. For Computer Technology the result shows that workshop equipment is enough for every student. Table 4 illustrates that nearly 30% of total Electrical Technology students agree that the lab equipment number is sufficient for the number of students. On the other hand, around 22% of them expressed disagreement on that question. In addition, 18.18% of the students slightly agree and 14.77% strongly disagree with the question. Other categories of responses are too light to focus on. The result for Electrical Technology summarizes that the number of the instrument is not enough for every student. In table 4 most of the students (25%) in Mechanical technology agree that the number of experimental equipment is enough for the number of students. However, just above 20% of the students stated disagree with the asking which is similar to slightly disagree. Surprisingly similar numbers of students strongly agree and disagree with this question (around 14%). For Mechanical Technology it is shown that the equipment is not enough in the workshop.

Table 4 shows the response for the statement ‘You have not enough infrastructures for learning properly’ separately for each technology. In table 4 response to the question of not having enough infrastructure for learning properly, a nearly equal amount of Civil Technology students (36%) expressed agree and disagree which is almost twice the strongly agree on a figure. The other three categories are close to 10 % of the total opinion. The result shows that the infrastructure for three polytechnics is not adequate for Civil Technology. More than half of the total Computer Technology students agree that they do have not enough infrastructures for proper learning while only 1% of them strongly disagree with that. However, more than 30% of students strongly and slightly agree with this ask. Response for Computer Technology shows that infrastructures are very few learning properties. Around 60% of Electrical Technology agrees that they do have not enough infrastructures for proper learning. Very few of them (3.41%) strongly disagree with this statement. However, 12.5 %

slightly agree and 14.77% strongly agree with this question. The chart shows that the infrastructure for Electrical Technology is not enough in three polytechnic institutes in Sylhet division. In table 4, above 40% of students of Mechanical Technology agree that they do have not enough infrastructures for proper learning. Where's very few of them (1.5%) strongly disagree with this statement. However, an almost similar number of students (21%) strongly agree and disagree with this question. We find from this chart that there is a huge shortage of infrastructure for Mechanical Technology in this study area.

Table 4 shows the percentage of responses on the statement 'Your teacher is not familiar with the scientific and practical knowledge in the field of specialty' separately. According to table 4 below 40% of students of Civil Technology disagree that their teacher is not familiar with the scientific and practical knowledge in the field of specialty. However, almost similar numbers of students (14%) strongly disagree, agree, and slightly disagree with this question. The result shows that the teacher of Civil Technology is familiar with the scientific and practical knowledge. 25.74 % of Computer Technology students agree and 22.77 % disagree with the question that their teacher is not familiar with the scientific and practical knowledge in the field of specialty. So it can be said that in Computer Technology almost half of the total students think that teachers are not familiar with the scientific and practical knowledge. Table 4 also demonstrates that an almost equal number of Electrical Technology students (30%) agree and disagree with the question that their teacher is not familiar with the scientific and practical knowledge in the field of specialty. However, only 4.55 % of them strongly disagree with the response to the asked question. The result summarizes that more than half of the total students think that the teachers of Electrical Technology are not familiar with scientific and practical knowledge of specialty. Table 4 also illustrates that 26.47% of Mechanical technology students agree with the question that their teacher is not familiar with the scientific and practical knowledge in the field of specialty though 22 % of the total students strongly disagree with this statement. However, an identical amount of total students (20.59%) strongly agree and disagree with the asking.

Table 4 shows the response for the statement 'Skilled manpower to operate machines is inadequate' separately for all four technologies. Table 4 illustrates that 46.30% of Civil Technology students agree that skilled manpower to operate machines is inadequate and only 16.67% expressed disagreement against this statement. In addition, an equal number of students (5.56%) strongly agree, strongly disagree, and slightly agree in response to this

question. Most of the students of Civil Technology think that the skilled manpower is inadequate in the study area. Above 50% of Computer Technology students agree that skilled manpower to operate machines is inadequate and only around 6% expressed disagree with this statement. Also, 17.65 % of them slightly agree with this question which is greater than the sum of the other three categories. Above 55% of Electrical Technology students agree that skilled manpower to operate machines is inadequate and only around 8% expressed disagree with this statement. Also, 11.36 % of them slightly agree with this question which is 7% less than the sum of strongly agrees student's number. Around 55% of Mechanical Technology students agree that skilled manpower to operate machines is inadequate and only around 6% expressed disagreement against this statement. Also, almost 17 % of them each equally slightly agree and strongly agree with this question.

Table 4 shows for the statement 'Equipment in your department is not compatible with those available in the labor market' that around 30 % of Civil Technology students agree that equipment in their department is not compatible with those available in the labor market. However, similar numbers of students slightly and strongly disagree with this statement (20%). 16.37% and 7.27% strongly agree and slightly agree with this question respectively. From the result, it can be said that equipment in Civil Technology is not compatible with those available in the labor market. Most of the Computer Technology students (around 46 %) agree that equipment in their department is not compatible with those available in the labor market. Although around 14 % of students equally strongly agree and disagree with this question. However, 16.67% of the total figure was slightly agreed. The result is almost the same as CT. Equipment for Computer Technology is not compatible with those available in the labor market. Table 4 also shows that slightly above 50% of Electrical Technology students agree that equipment in their department is not compatible with those available in the labor market and 18.18% and 16 % of the total figure also slightly and strongly agreed respectively. Only around 3.5% of the students strongly disagree with this statement. As per the response from Electrical Technology it can be said that the equipment is not compatible with those available in the market. 50% of Mechanical Technology students agree that equipment in their department is not compatible with those available in the labor market and around 10% slightly agreed. However, only around 1.5 % of the students strongly disagree and 9% disagree with this statement. Response from Mechanical Technology is also the same as the other three emerging technology in this study area. The equipment used in the polytechnic institute is not compatible with those available on market.

Equipment is enough with the number of students in the workshop.

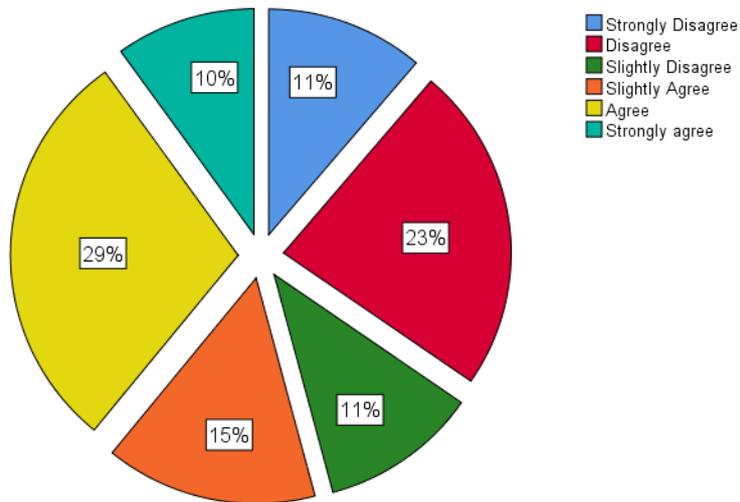


Figure 7: Response by the students for question 1

Figure 7 shows the result of the statement from all students. The statement is 'Equipment is enough with the number of students in the workshop'. 29% of students agreed with the statement and 23% are disagreeing. 10% of students strongly agreed and 15% slightly agree with this statement. 11% of the total students are slightly disagreeing as well as strongly disagreeing. Almost half of the total students think that the equipment in the laboratory is enough for every student.

You have not enough infrastructures for learning properly.

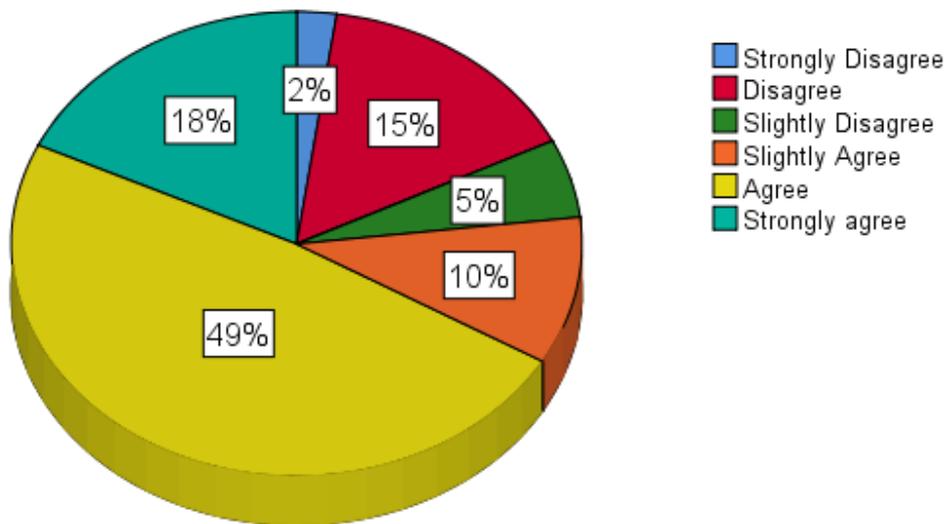


Figure 8: Response by the students for question 2

Figure 8 show that 49% of student agrees that they do have not enough infrastructures to learn properly. Again 18% and 10% of students strongly agree and slightly agree with this statement respectively. Only 15% of students disagree with the statement that they do have not enough infrastructures to learn properly. According to the figure, 2% strongly disagree and 5% slightly disagree. So the result shows that the polytechnics in the study area do have not enough infrastructures.

Your teacher is not familiar with the scientific and practical knowledge in the field of specialty.

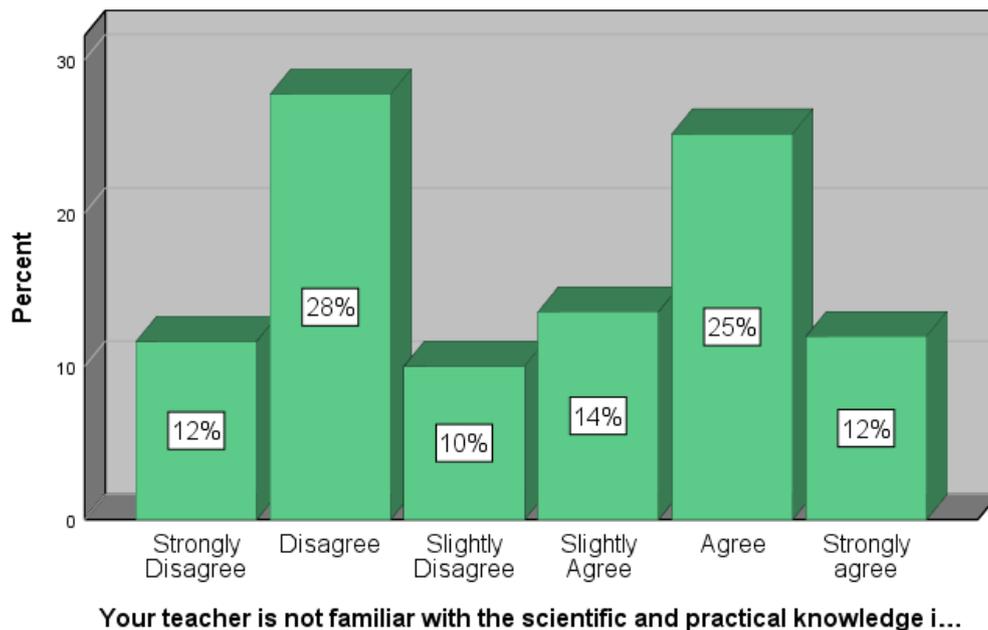


Figure 9: Response by the students for question 3

Figure 9 demonstrates the response to the statement that 'Your teacher is not familiar with the scientific and practical knowledge in the field of specialty. All sampled students represent figure 9. 25% of student agrees and 28% of student disagrees with this statement. 12% and 10% of students show strongly disagree and slightly disagree respectively with this. On the other hand, 12% and 14% of students show strongly agree and slightly agree with this complement. Finally figure 9 show that 51% of students show a positive response to this statement. From figure 9 it is difficult to identify the challenges regarding this statement.

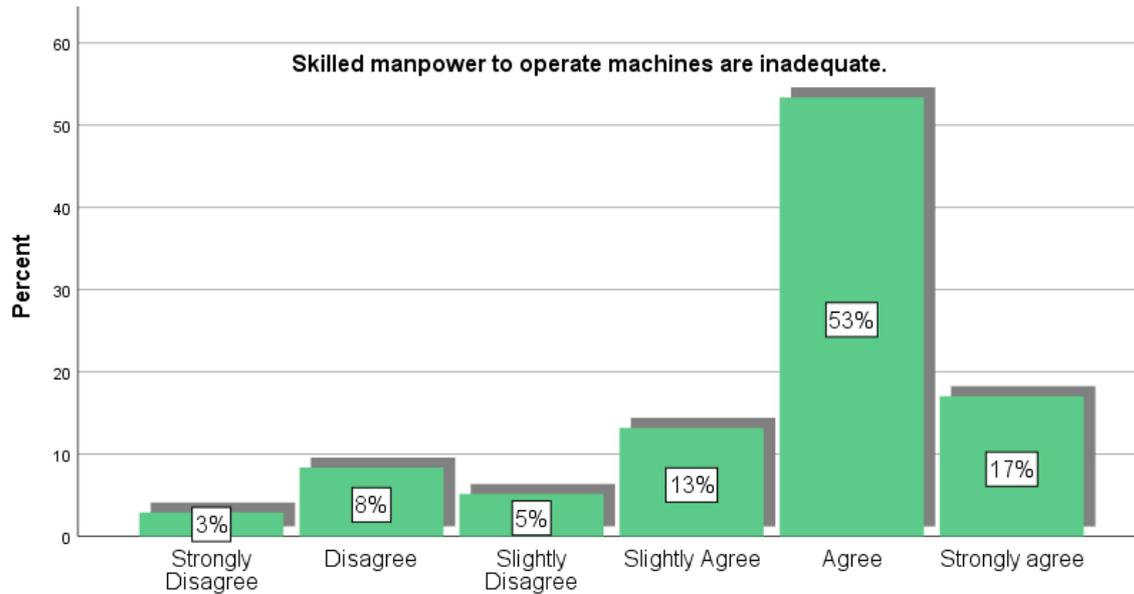


Figure 10: Response by the students for question 4

Figure 10 represents the data collected through sub-question no 4 under research question 2. The statement was 'skilled manpower to operate machines is inadequate'. 53% of students think that in their institute skilled manpower is not enough to operate the machine. Very few students (16%) give a negative response whereas 84% give a positive response to this statement. The result clarifies the challenges of this question. Skilled manpower is not enough to operate the machine in three targeted polytechnic institutes in the study area. So it is clear that there is a huge shortage of skilled manpower to operate the machine in this study area for all four emerging technology.

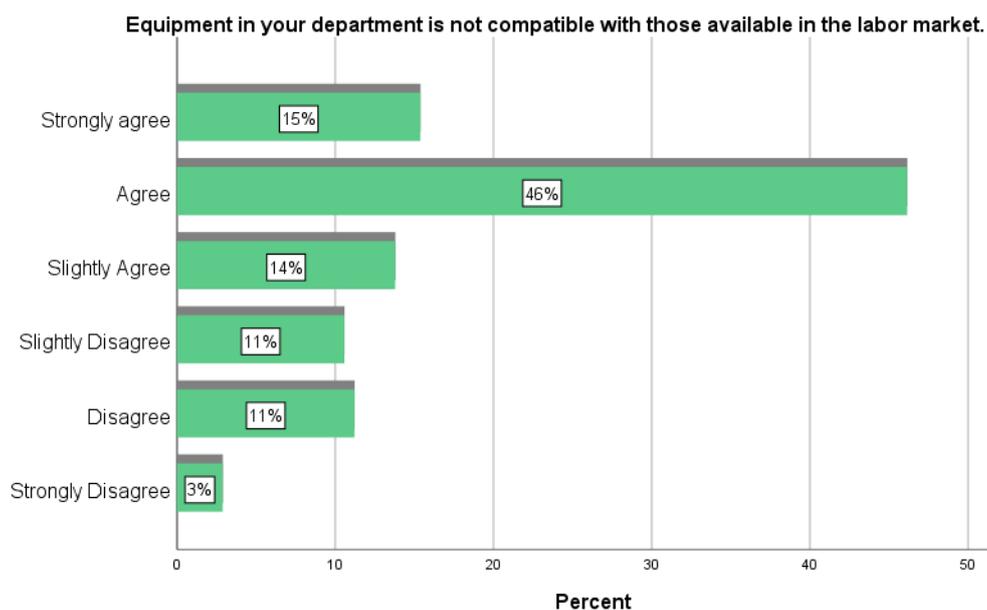


Figure 11: Response by the students for question 5

Responses to the statement 'Equipment in your department is not compatible with those available in the labor market' are represented in figure 11. 46% think that the equipment of the department is not compatible with those available in the labor market. 15% of students strongly agree and 14% of students slightly agree with this. On the other hand, only 11% disagree with the statement whereas 3% strongly disagree and 11% slightly disagree. The result shows that the equipment is not compatible with the equipment available in the labor market. Because the equipment in the institution is actually training based but in industry, all equipment is production based.

Besides the questionnaire survey to the students, three FGD were conducted with polytechnic teachers to find out the institutional challenges in producing competent diploma graduates. Under this parameter, there are four issues which was been picked from those FGDs.

Questions under this parameter for focus group discussion are as follows.

1. Is there adequate number of laboratory with enough instruments and proper lab manual?
2. How to update laboratory instruments with global technology?
3. Is the teachers address the latest technology in practical class?
4. Is there any shortage of infrastructure in the institution?
5. Is there adequate supporting staff in the institutions?

Table 5: FGD response in institutional challenges

Qs	FGD1	FGD2	FGD3
Q1	Number of laboratory and laboratory instrument is not enough. Lab manual is provided by the instructors	Number of laboratory and laboratory instrument is not enough. Lab manual is provided by the instructors.	Number of laboratory is not adequate. Lab manual is provided by the instructors
Q2	Laboratory instrument are not updating frequently. More or less 10% of laboratory instrument is updating in every year.	Laboratory instrument is updating by procurement process but very low.	Laboratory instrument is updated through proper research of teachers and market demand and financial supported by

			government.
Q3	Yes teachers address the latest technology in classes.	Teachers address latest technology through online source but not possible to address fully.	Teachers address the latest technology by training and study properly.
Q4	There is shortage of Infrastructures. Number of students is almost doubled then the present capacity.	There is shortage of infrastructure. Teachers quarter, Hostel, Dormitory are not constructed here.	Yes there is a shortage of infrastructure needs more academic building.
Q5	Supporting staff is enough.	Supporting staff is enough in laboratory but not enough in office like 4th class staff.	Supporting staff is not enough

From FGDs we find some important feedback. Some findings have been come out from the discussion is as follows:

- ✓ Lab instrument are not adequate.
- ✓ Number of laboratory is also inadequate.
- ✓ There are shortages of infrastructures.
- ✓ Supporting staff is adequate in office management but not adequate in laboratory.

Chapter 5

Challenges Faced by the Students

All the activities in the educational institution are conducted for the benefit of the students. To produce competent graduates is the main parameter. Students face different types of challenges in their student life to become competent. In last few years, a lot of students are being enrolled in technical education. So the challenges of the students increase with the number of students. This study sets five questions under challenges faced by the students' criteria. These five questions were asked to the students to know their responses.

These five questions are as follows.

1. Institute provides you the opportunity to field training in labor market institutions.
2. You can pay attention in your whole class.
3. You attend your class regularly in time.
4. You can submit your assignment/report on time.
5. You have enough confident to do lab in any industry.

Responses from all technology and all polytechnics are shown separately in table 6.

Table 6: Response of students in student's challenges

Statement	Response (Likert scale)	Civil Technology (%)	Computer Technology (%)	Electrical Technology (%)	Mechanical Technology (%)
Institute provides you the opportunity to field training in labor market institutions.	Strongly Agree	7.27	8.82	19.32	22.1
	Agree	41.82	37.25	36.36	42.6
	Slightly Agree	9.09	21.57	7.95	7.4
	Slightly Disagree	7.27	7.84	2.27	4.4
	Disagree	25.45	18.63	25.00	13.2
	Strongly Disagree	9.09	5.88	9.09	10.3
You can pay attention in your whole class.	Strongly Agree	43.64	17.65	29.55	39.71
	Agree	27.27	59.80	53.41	41.18
	Slightly Agree	12.73	13.73	11.36	10.29
	Slightly Disagree	3.64	5.88	1.14	5.88
	Disagree	10.91	2.94	4.55	2.94
	Strongly Disagree	1.82	0	0	0

You attend your class regularly in time.	Strongly Agree	54.55	32.25	51.14	50.00
	Agree	36.36	53.92	40.91	41.18
	Slightly Agree	3.64	6.86	4.55	4.41
	Slightly Disagree	1.81	3.92	2.27	4.41
	Disagree	3.64	2.94	1.13	0
	Strongly Disagree	0	0	0	0
You can submit your assignment/report on time.	Strongly Agree	47.27	37.25	48.86	52.94
	Agree	40.00	41.18	39.77	36.76
	Slightly Agree	1.82	16.67	6.82	5.88
	Slightly Disagree	5.45	4.90	1.14	2.94
	Disagree	3.64	0	2.27	1.48
	Strongly Disagree	1.82	0	1.14	0
You have enough confident to do lab in any industry.	Strongly Agree	21.82	22.55	30.68	26.47
	Agree	49.09	43.14	34.09	48.53
	Slightly Agree	16.36	24.51	21.59	10.29
	Slightly Disagree	1.82	2.94	0	0
	Disagree	4.45	5.88	6.82	8.82
	Strongly Disagree	5.45	0.98	6.82	5.88

Table 6 shows the responses to question 1 by the student of Civil Technology. According to table 6, 41.82% of students agree that the institute provides the opportunity to field training in labor market institutions whereas 25.45% of students disagree with the question. But the strongly disagree and slightly agree responses are the same almost 9.09%. The result shows that the institute provides the opportunity for the students of Civil Technology to field training in labor market institutions. 37.25% of students of Computer Technology agree that the institute provides the opportunity to field training in labor market institutions whereas half agree and responded around 18.63% of students disagree with the question. But 21.57% of the total students respond slightly agree. This chart shows that the students of Computer Technology also get the opportunity to field training in labor market institutions. For Electrical Technology 36.36 % of students agree that the institute provides the opportunity to field training in labor market institutions whereas a quarter of the total students disagree with this statement. However, around 20% of them strongly agreed with that question. The result for Electrical Technology is the same as CT and CMT. Institutions provide a huge opportunity to the students to field training in labor market institutions. From the response of

Mechanical Technology, 42.6% of students agree that the institute provides the opportunity to field training in the labor market institute. 13.2% of students disagree with this. 22.1% strongly agree and 7.4 slightly agree with this statement. On other hand, 10.3% of students strongly disagree and 4.4% of students slightly disagree with this statement. Summary for Mechanical Technology is that the institute provides the opportunity to field training in labor market institute.

Table 6 shows for the statement ‘You can pay attention in your whole class’ that slightly more than 27% of Civil Technology students agree that they can pay attention to their whole class. While only 11% disagree with that asking. However, around 13% of them slightly agree with this statement. The result gives the information that the students of Civil Technology can pay attention to in their class. Most of the students (around 60%) of Computer Technology agree with the statement of question 2. On the other hand, only 5.88% of students slightly disagree with this question. Although 17% of them strongly agree, around 14% slightly disagree with the question. As per the chart, it can be seen that the students of Computer Technology also can pay attention to their class in the study area. More than half of the Electric Technology students agree that they can pay attention to their whole class. In addition, 29.55% of the students strongly agree with this ask. However, almost 5% of the students disagree with this statement. Almost all students in Electrical Technology are attentive in their class as per the response. Table 6 demonstrates the Mechanical Technology student’s response to the statement. According to table 6, 41.18% of students agree that they can pay attention to their whole class. In addition, around 40% of students strongly agree with this question. 5.88% of them slightly disagree with that statement. As per students' responses, we can see that students of Mechanical Technology are attentive in their class. So we can say that in this study area students are very attentive in their class.

According to Table 6 for the statement ‘you attend your class regularly in time’, around 55% of students of Civil Technology strongly agree that they attend their class regularly on time. Also, 36.36% of the students agree with this statement. 3.64% of students disagree with this statement. So the summary is that the students of Civil Technology attend their class regularly. Around 53.92 % of students of Computer Technology agree that they attend their class regularly in time. Also, 32.35% of the students strongly agree with this comment. 3% of students disagree with this question. It can be said from the result that the students of Computer Technology also attend their class regularly. For Electrical Technology around

50% of the students strongly agree that they attend their class regularly on time. Also, 41% of the students strongly agree with this comment. However, a negligible portion of them disagrees with this statement. As per student response, it is clear that the students of Electrical Technology attend their class regularly. 50% of the Mechanical Technology students strongly agree that they attend their class regularly on time. Also, 41.18% of the students agree with this comment. However, 4.41% of them slightly disagree with this question. Like other emerging technology it can be seen from the responses that the student of Mechanical Technology is also very attentive in their class.

Table 6 shows for the statement 'You can submit your assignment/report on time' that around 47.27% of the Civil Technology students strongly agree that they can submit their assignments/reports on time. Also, 40 % of the students agree with this comment. However, 3.64 % of them slightly disagree with this question. The result shows that the students of Civil Technology submit their assignments timely. Around 41.18% of the Computer Technology students agree that they can submit their assignment/report on time. In addition, 41.18 % of the students agree with this comment. However, 16.67 % of them slightly agree with this question. It can be seen from the response of Computer Technology that the students submit their assignments timely. Table 6 also illustrates that around 50 % of the Electrical Technology students agree that they can submit their assignment/report on time. In addition, 39.77% of the students agree with this comment. On the other hand, 1.14% of the students disagree with this question. The result is also the same in Electrical Technology. It has been seen that the students of ET submit their assignments timely also. Around 53 % of the Mechanical Technology students strongly agree that they can submit their assignments/reports on time. Also, 36.76 % of the students agree with this statement. However, almost 3% of the total students slightly disagree with this question. The summary of the result for Mechanical Technology students is also the same as other technology in this area. They also submit assignments regularly and timely.

Table 6 shows for the statement 'You have enough confident to do lab in any industry' that around 50 % of the Civil Technology students agree that they have enough confidence to do lab in any industry. Also, 21.82 % of the students strongly agree with this question which is 5% higher than the slightly agree portion. However, an equal number of students (5.45%) strongly disagree and disagree with this question. The result shows that the students of Civil Technology gain enough confidence to do lab after conducting it in the institutions. Around

43.14 % of the Computer Technology students agree that they have enough confidence to do lab in any industry. Also, a similar figure (around 23%) can be found in the slightly agree and strongly agree portion. However, almost 6% of the total students disagree with that. So it can be said that the students of Computer Technology have also the confidence to do lab individually. Table 6 also demonstrates that around 34 % of the Electrical Technology students agree that they have enough confidence to do lab in any industry. Also, 30.68% of the total number strongly agrees with this question. However, an equal number of students (6.82%) strongly disagree and agree with this question. From the figure, it can be seen that the students of Electrical Technology also have the confidence to do lab individually in any industry. Around 50 % of the Computer Technology students agree that they have enough confidence to do lab in any industry. In addition, 26.47 % of the total number strongly agrees with this question. However, only 8.82% of the students disagree with this question. Response from the student of Mechanical Technology is also the same as the other technologies. They have also the confidence to do lab individually in any industry.

Institute provides you the opportunity to field training in labor market institutions.

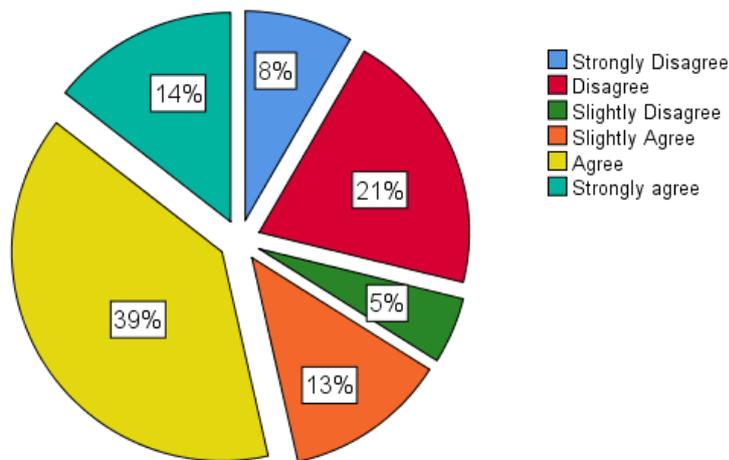


Figure 12: Student's response of question 1

Figure 12 demonstrates the response from all students to the statement that 'Institute provides you the opportunity to field training in labor market institutions. 39% of students think that the institute provides the opportunity to field training in labor market institutions. 14% of students strongly agree and 12% slightly agree with this statement. On the other hand, 21% of students think that the institute does not provide the opportunity to field training in labor market institutions. 8% of students strongly disagree and 5% of students slightly disagree with the statement. The result summarizes that the institute provides the opportunity for the

students to field training in labor market institutions. Especially for final semester students, it is named “industrial attachment”.

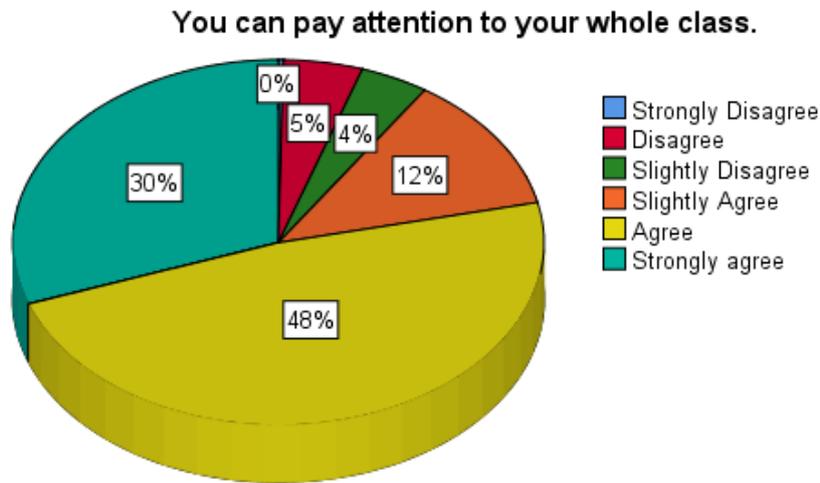


Figure 13: Student’s response of question 2

Figure 13 represents the response of all students to the statement 'you can pay attention to your whole class. 48% of students agree that they are attentive in class but 30% of students strongly agree that they are attentive in the whole class and 12% of students slightly agree with the statement. Very few students do not agree with this. 5% of students disagree with the statement. 4% of students slightly disagree and 0.3% of students strongly disagree with this statement. The data summarize that students of all technology are attentive in their class.

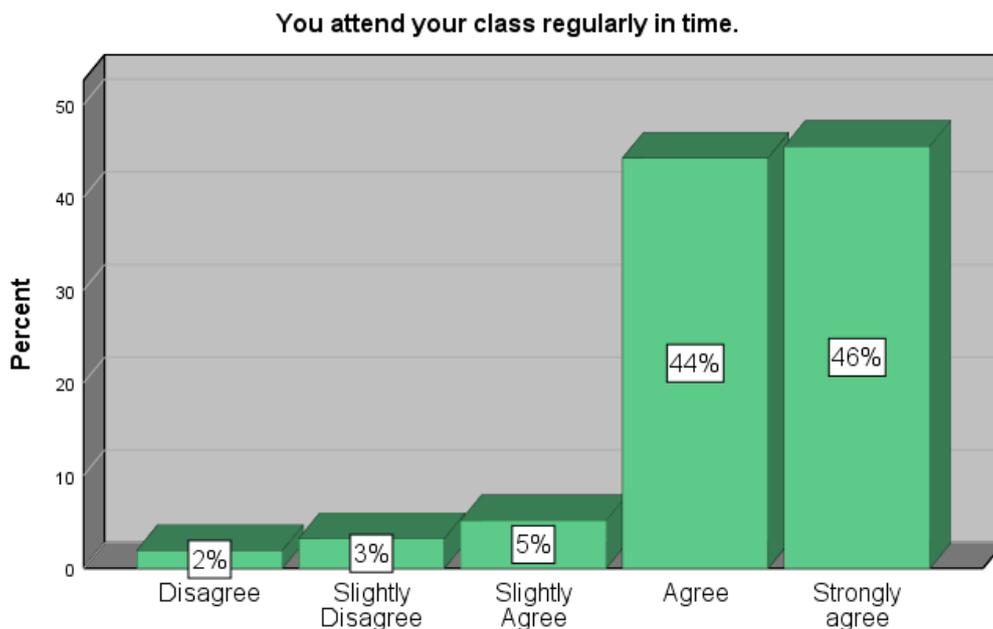


Figure 14: Student’s response of question 3

Figure 14 demonstrates the data about student attendance in the class. Of all students, 44% of students agree and 46% of students strongly agree that they attend their class regularly in time. 5% of students slightly agree with the statement. 3% of students slightly disagree and 2% of students disagree with this statement. From data, it is seen that almost 95% of total students attend their class regularly.

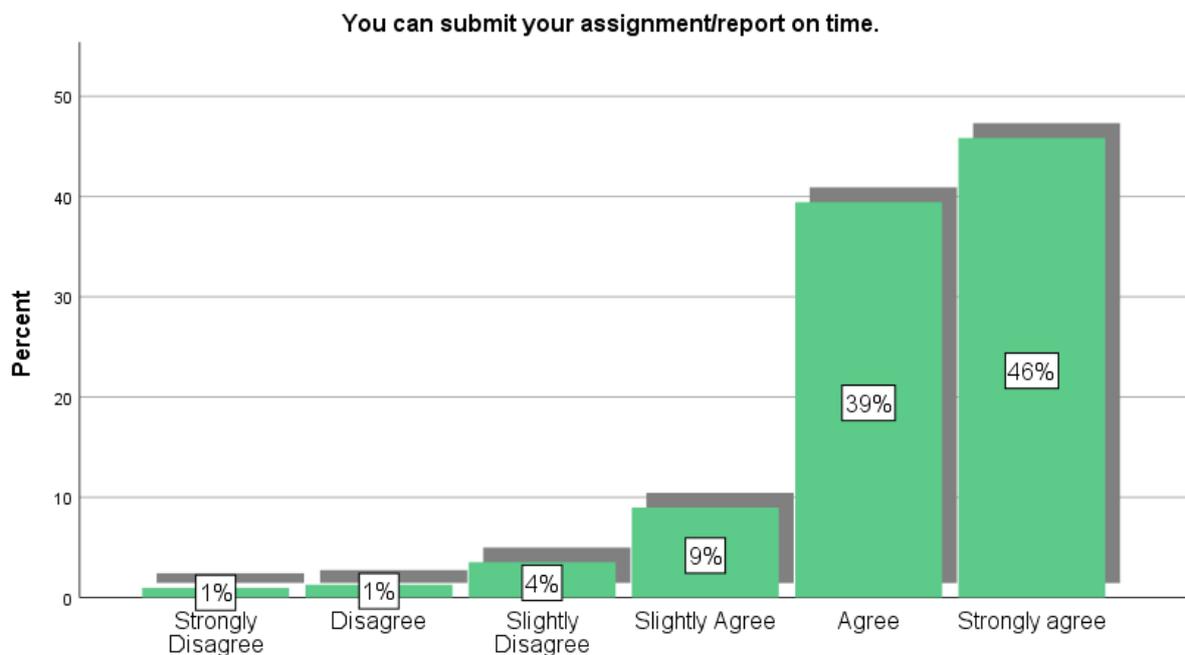


Figure 15: Student's response of question 4

Figure 15 shows the result of the responses from all students to the statement that 'You can submit your assignment/report on time'. 46% of students strongly agree and 39% of students agree with this statement while 9% of students slightly agree. A negative response to this question is very few. 1% of students disagree and 4% of students slightly disagree with this statement while only 1% of students strongly disagree with this statement. From these statistics, it is clear that students of this study area submit their reports or assignment timely.

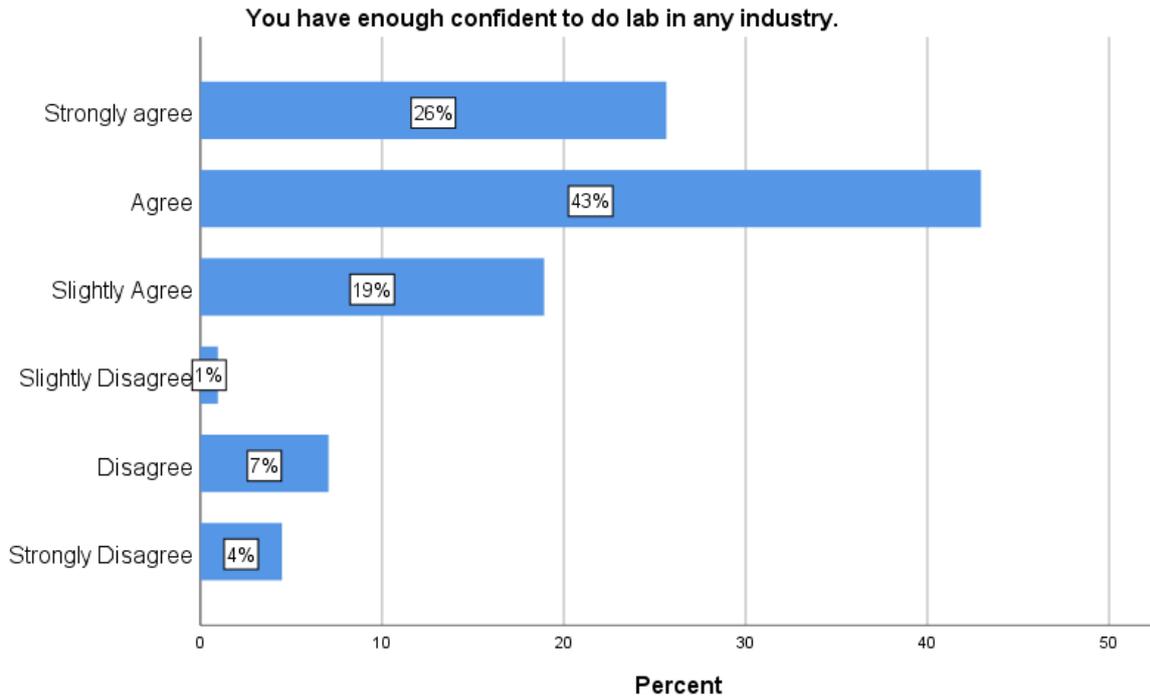


Figure 16: Student’s response of question 5

Figure 16 shows the data of responses to the statement 'you have enough confidence to do lab in industry'. 43% of students agree, 26% of students strongly agree and 19% of students slightly agree with this statement. On the other hand, 7% of students disagree, 4% strongly disagree and 1% of students slightly disagree with the statement. From the figure it can be said that more than 85% of the total students are confident to do lab in any relative industry.

Three FGDs were conducted with the following questions with teachers of all technologies’.

1. How the students are evaluated in practical exam?
2. How the students had been motivated to the TVET education?
3. Is there any learning materials shortage for every student? (Multimedia Projector, Smart Board, Internet, Computer/Laptop)
4. What are the percentages of student’s attendance in theory and lab class with concentration?

Response from FGDs is described below.

Table 7: FGD response in student’s challenges

Qs	FGD1	FGD2	FGD3
Q1	Students are evaluated by problem solving, Assignment and viva with the help of external.	Students are evaluated through several tests like job experiment, job report, viva and attendance with the help of external.	Students are evaluated by practical experiment in front of teachers, report writing and finally viva.
Q2	Students had been motivated by the teachers, the government and the local Institutional publicity.	Motivated by the local Institutions and publicity related to the TVET education by the government.	Motivated by high demand in the job market
Q3	There is 50% shortage of learning materials for every student.	Learning materials shortage is very few like 10 percent.	Yes there are learning material shortage.
Q4	Percentage of presence of the students is almost 80% in both theory and lab class.	Student percentage is 80% present in both theory and lab class.	Percentage of present students is almost 80% in both theory and lab class.

From the focus group discussions, the major findings are as follows:

- ✓ Evaluation processes of the polytechnic students are likely job experiments, report writing, attendance and viva.
- ✓ Students are motivated mainly by the high demand of technical persons in job market sometimes by the government and local technical institutional publicity.
- ✓ There is some shortage of learning materials.
- ✓ Student's attendances are 80% for all technologies.

Chapter 6

Industry Demand

It needs to know the skill required in various industries to identify the challenges in producing competent graduate. To know the skill shortage in various industries, this study conducted three FGDs with polytechnic teachers and eight KIIs with industry officials. Several issues were found from the FGDs like communication with industry, attachment of students etc.

FGDs were conducted using following five questions.

1. Is the equipment in laboratory meet the available demand in the labor market?
2. How the institutes communicate and coordinate with the private sector or any industry?
3. What are the contributions of the private sector and employers in developing the curriculum?
4. Does the institution or department invite related industry officials for assessing lab classes or field workshop?
5. Is there any MoU between different industries and the institutions?

Response from FGDs is presented below.

Table 8: FGD response in industrial skill demand

Qs	FGD1	FGD2	FGD3
Q1	The equipment in LAB not fully meets the labor market demand.	Equipment in the institute mainly training based so that instrument in laboratory cannot fully meet with the market demand.	Equipment's in laboratory are inadequate to meet the market demand. Need to update instrument frequently.
Q2	Yes the institute has connections with industry through student attachment in 8th semester.	Institute has connection with private sector through various seminars but mainly through the student's attachment.	Institute communicate through job fair, industrial attachment of student and doing Memorandum of Understand

Q3	BTEB do this.	Done by BTEB	Done by BTEB through seminar.
Q4	No, but there are opportunities to invite the industry officials.	Not, but have the opportunity to invite industry officials. Due to limited budget it is not possible to invite industry officials.	No possible due to limited budget.
Q5	Yes maximum technologies have MOU with different industry like “Alim Industry” “Khadim ceramics” etc	Yes Institute has MOU with different industry.	Maximum technologies have MOU with different industry.

From table 8 it is clear that equipment’s in laboratory of polytechnic institution are insufficient in number to meet the industry demand and need to update the present equipment frequently. Only final year students are attached in industry for practical learning but teachers are not trained up by the industry. All FGD of above table it also seen that no technical person from industry are invited in polytechnic institute for practical class assessment.

Responses from eight different sections of industries are presented below.

Table 9: KII response of industry official

No	Questions	Response
1	What are the professional skills required in your industries?	Team work, to do work under pressure, hardworking ability, to details knowledge in civil construction work, coordination and communication ability, Instrumentation, PLC programming, positive attitude, Machine operation, Maintenance, knowledge in testing equipment.
2	How do you evaluate the possession of the graduates of polytechnic for professional adequacy?	Their adequacy is good but not enough. They need more professional skill in entry level.

<p>3 To what extent you accommodate graduates of polytechnic in your work?</p>	<p>There is adequate opportunity for diploma engineers. But in entry level they are not skilled enough to meet the industry demand. If they can get competent before starting job, industry can rely on them.</p>
<p>4 Is there any coordination with polytechnic institutions?</p>	<p>Yes, there is communication with polytechnic, but in very few cases. Need more connections, HR department control this type of communication.</p>
<p>5 Do you take tests the capabilities of the graduates before starting job?</p>	<p>Industry takes some basic knowledge and technical adequacy, communication skill tests before recruitment. HR takes this test. It may be written or practical and viva.</p>
<p>6 What is the frequency of updating the instruments in the industry?</p>	<p>Instrument update is very rare in civil construction industry, but very frequent in IT or electrical as well as mechanical department. Upgradation of instruments depends on the market demand.</p>
<p>7 Do you provide any training to the polytechnic institutions in the field of technical skill development?</p>	<p>Industry provides training for polytechnic students for 3 months as intern. But the opportunity is very limited in number. 6/7 students are taking industrial attachment every year.</p>
<p>8 Do you think that polytechnic curriculum is not well furnished to fulfill the market demand? If yes, what are the ways of developing this?</p>	<p>Industry thinks that polytechnic curriculum should update more frequently than it is in line of global and local market demand.</p>
<p>9 Were you/your company members invited by technical education board to prepare course curriculum?</p>	<p>BTEB invited industry officials on seminars to prepare course curriculum. Most of them are from HR department.</p>
<p>10 Is there any commensurate of lab equipment between your</p>	<p>Industry instrument is production based but polytechnic instrument is training based. So, it is</p>

<p>industry and polytechnic institute?</p>	<p>not possible to match those instruments. Various testing machine are not available in polytechnic. Industry instruments are more up to date. A few electrical instruments are similar like multi meter, earth resistance measuring meter etc.</p>
<p>11 Does polytechnic institute teacher/department visit your industry with students?</p>	<p>Polytechnic teachers visit the industry but in very limited in number. It should be very frequent. Sometimes only students visit various industries.</p>
<p>12 Do you think that the teachers are efficient enough about the equipment used in your industry?</p>	<p>Polytechnic teachers are efficient but they need modern training time to time. Everyone has some area for improvement. Teachers should remain them up to date. Without new training, it is difficult to match with modern technology.</p>
<p>13 What do you suggest to those who are responsible of polytechnic institutions based on your experience to develop professional work and the development of students' abilities?</p>	<p>Need more and more industrial collaboration. Need expert lab instructors. Industrial training need for the lab instructors. Need to update lab instrument quickly. Need to invite the technical industry personnel for assessing the lab sessions. Should increase industrial attachment and industrial visits. Need to update curriculum on time. Need to adopt latest technology.</p>

Major findings from the KIIs are as follows.

Team work, to do work under pressure, hardworking ability, coordination and communication ability, positive attitude are some skill required by various industries which is not directly evaluated during student life. Curriculum developer should pay attention regarding this. Various industry officials are invited in curriculum preparing process but their contribution is not satisfactory. In practical evaluation process industry officials are not invited due to low budgeted.

Chapter 7

Discussion & Conclusion

Since the development of the TVET is the cradle of the overall development of a country, its problems need to be solved for the interest of TVET development. This research provides the clear idea about the main obstacles to produce competent graduate in line of industrial demand. As this research conducted on polytechnic institutions, if we find out the actual challenges and problems of polytechnic institutions and solved these problems then it will help to produce competent graduate. And this research has positive impact on TVET sector.

The present curriculum is evaluated considering five parameters: theory part impact to students, technological relation, industry demand, career prospective and workshop facilities. In case of theoretical part of the curriculum maximum number of students from selected technology of three polytechnic institutes agrees that, the theory part of the present curriculum burdens their study. Students of the polytechnic institution stated that there is a significant gap between their current curriculum and the market demand. And most of them belief this curriculum will fail to lead them to gain future career.

Institution capacity is one of the vital parameter that affect in producing competent graduates. From this study it is clear that number of instruments is not enough in the laboratory to conduct the test for all students at a time, which is an obstacle to produce competent graduates. On the other hand, though in the polytechnic institutions, a significant number of students enrollment increased, but number of infrastructure facilities is not increased accordingly.

According to this study almost half of the total respondent believes that the teachers of these technologies are familiar with scientific and practical knowledge in the field of specialty and other half believes that teachers should be more capable about scientific and practical knowledge. Skill manpower is one of the most significant parameter to produce competent graduate for each institute. But it has been seen that there is acute crisis of skilled manpower inside the institutions. More than half of total respondent of all technologies of these polytechnic institutions agree that the laboratory equipment is not compatible those are available in the market.

Students' ability and performance are considered as significant element to evaluate the competency of the polytechnic diploma graduate. This study finds that around more than one third of the students got the opportunity of field training in industries. And most of the students are confident to do sessional job individually after finishing the relevant lessons. In addition they are sincere about their class attendance. Also fifty percent of them are able to submit their assignment on time. As a result just below half of them have enough confidence to work in any industry practically.

The key informant interview from eight various industries commented over several aspects regarding polytechnic institutes, its graduates, and their entry qualification to the industry. Mainly they focused on various lacking in communication skill and team work skill. Also, very little professional adequacy found to the diploma graduates. Memorandum of understanding between polytechnic and industry are quite low in number. IT and electrical instrument are updated frequently in the industry, but for civil and construction sector takes time to update and depends on market availability and shipment. Opportunity of industrial training for diploma graduates is very low. Other finding from key informant is that, instruments in industry are based on production but in polytechnic institutions instruments is based on training purpose. Industry instrument are updated more frequently than the polytechnic institutions.

Here some suggestion for the decision making authority of technical education sector that this research can find out from the sampled respondent.

1. Need more GoB to industry Memorandum of Understand.
2. Need to increase effective linkage of polytechnic institute to private industry.
3. Teachers training are needed with modern technology.
4. Need to update instrument supply by the authority.
5. Up-gradation of the curriculum with market demand.
6. Quality text book should be supplied by authority.
7. Industrial training need for the lab instructors.
8. Need industrial attachment for teachers.

This study needs to replicate all over Bangladesh to get a representative general picture of this sector, which may be helpful for the policy making process.

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