

Quality Technical Education: Scopes, Opportunities and Challenges

Research Report

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Acronym

QTE	: Quality Technical Education			
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			
NTRCA	: National Teachers Recruitment and Certification Authority			
NTVQF	: National Technical and Vocational Qualification Framework			
PSC	: Public Service Commission			
Seven 5YP	: Seven Fifth Year Plan			
SSC (VOC)	: Secondary School Certificate (Vocational)			
TMED	: Technical and Madrasah Education Division			
TQF	: Teachers Qualification Framework			
TVET	: Technical and Vocational Education and Training			
TTTC	: Technical Teachers Training Institute			
TSC	: Technical School and College			
UNESCO	: United Nations Educational Scientific and Cultural Organization			
UCEP	: Underprivileged Children Education Program			
VTTI	: Vocational Teachers Training Institute			

Abstract

Technical Vocational Education and Training (TVET) is a prime component for ensuring a country's economic growth and sustainable development in the 21st century. The government of Bangladesh (GOB) is prioritising TVET to produce skilled human resources that address the national and global employment markets. The GOB's strategy in the 8th Five-year plan (2021-2025) strengthens TVET as a tool for achieving sustainable development goals (SDG) by 2030, and attaining developed nation status by 2041. In acknowledging these national targets, this research focussed on the governance structure of Technical Vocational Education and Training (TVET) in Bangladesh and the challenges it faces. The contemporary trend is one of rapid expansion of TVET enrolment, without compliance with other human and non-human resources. Such expansion of enrolment can impact the effectiveness of institutional management, the quality of teaching / learning, as well as TVET products and services. The author reviewed relevant documents, journals, and contemporary publications. Existing acts, policies, and legislative guidelines were also part of the study. TVET policymakers, administrators, experts, and heads of TVET institutes were interviewed. Quality assessment tools and indicators were used to measure the performance of the TVET programme. The study identified the prevailing challenges that are emerging in all three dimensions of TVET governance: as the instrument (acts, policies, regulations, and legislatures), in operations (institutions and organisations used to translate TVET instruments), and the delivery of products and services. The findings recommend a logical reframing of TVET governance structure. This research will also be helpful for researchers, policymakers, policy formulators, experts, and practitioners of TVET for further research and development of TVET.50.6% and female: 49.4%) live in this 1, 47,570 sq. km. (56,977 sq. miles) area. Among this huge population there are 61.1% population are under the age band of 15 to 64 years, working age groups. The skills development system in Bangladesh can be classified into four main segments with its formal and non-formal mode of education. The major challenges are of implementing TE with quality to address the issues of high density with high working age group population. A total of 214 strategies with some sub categories in 22 different major is heads to address the above mentioned challenges, the. Maintaining the quality of training programs and training providers is of crucial importance. Improved quality will increase the return to industry and the community in general, and make skills development and TVET a more attractive option for learners and employers in Bangladesh. Improved quality is also necessary so that learners and employers, both in

Bangladesh and abroad, can be assured that qualifications issued in Bangladesh truly reflect the standard of knowledge and skills that they claim.

The quest for quality technical education is today inextricably bound up with the processes and impact of globalization. Therefore, technical institutions need to improve the quality of instruction if they are to be significant players in the world's economic arena. Although the debate on the attributes of quality education is still in progress, quality teaching and learning can best be described by performance outcomes in the classroom environment and a persisting change in performance that results from experience and interaction with the world. Nevertheless, the ISO 9001:2008 concept of quality, where quality is evaluated in terms of customer satisfaction, has been adopted by many learning institutions with a general feeling that ISO 9001:2008 is more applicable to institutions offering service-oriented training, as opposed to subject-oriented teaching. This chapter argues that when ISO 9001:2008 standards documented on curriculum implementation policy manual are followed by teachers, they may cause a positive change to student academic performance. It examines the efforts that have been undertaken to improve the teaching, learning and quality technical education that has embraced.

Chapter One: Introduction

1.1 Introduction: Quality Technical Education (QTE) system is always an important component for ensuring a country's economic growth and sustainable development. The Government of Bangladesh is giving priority to TE for producing skilled human resources to address national and the global employment market. Global market is highly competitive due to rapid technological change and skills demand in the labor market. With the changing scenario of globalization it is essential to give quality & demand driven technical education that meets international standards, requirements of industry and society for sustained economic growth and developments. Technical education should be need based and market oriented which will results in a high rate of employability. It is a challenge, a matter of concern and significance for technical professional to meet all these demands of technical education. The primary aim to identify the different method by which the skills can be incorporated in faculty as well as students so that; they can stand meticulously in this competitive environment. For this a team of highly profiled, competitive incumbent and action focused professionals are required who have adaptability, flexibility, communication and innovative skills incorporated in them. Positive thinking, decision making and observation skill should be inculcated for effective teaching learning process to strive for excellence, we need to "ignite the creative sense of our brain" which is nothing but creativity and innovation skills [1-4].

In any country, technical education plays a vital role in human resource development. It produces a skilled workforce, augments productivity and helps improve the quality of life of the people. Producing qualified and capable human resources in this age of science and technology is indispensable. Without any doubt, there is a close relationship between the technical or vocational education system and socio-economic development of a country. The current education system of Bangladesh may be broadly divided into three major categories viz. general education, madrasah education and technical education. The type of education which provides distinct practical knowledge of technologies and skills is known as technical and vocational education offers an excellent opportunity for employment at home and abroad. Countries such as Germany, France, Japan and Sweden pursue effective and extensive technical and vocational education and training. In Australia, technical and further education (TAFE) institutions run a wide range of mostly vocational courses. Planning minister MA Mannan has defined it as a "star project" of the government. The proposed project will be

implemented by the Directorate of Technical Education under the Ministry of Education. Both the SSC (vocational) and HSC (vocational) courses would be incorporated into those technical institutions. But mere setting up of more technical institutions is not enough. Instructors should be selected on a merit basis process and trained before the founding of the planned institutions. In fact, qualified and trained teachers will be required to impart quality teaching and professional development of students for the future. The core curriculum should be designed by experienced professionals keeping in mind global and domestic needs. While stimulating technical and vocational education and training, the Bangladesh government must look into these key requirements. The importance of technical education in Bangladesh can hardly be overemphasized. In fact, current global developments point to an overriding requirement for technical and vocational education and training. In order to remain competitive globally and turning economic development sustainable, Bangladesh needs to create sufficient skilled workforce through technical and vocational education and training. Considering these factors this research works has prepared for a complete conceptual framework of Quality Technical Education.

The techno-economic growth of a country largely depends upon the effectiveness and the impact of technical education system on all round personality development of the student, which in turn dictates the quality, skills and attitudes of technical manpower entering into the market. Budding engineers and engineering educators need to be reoriented in their approach to teaching -learning process which has to encompass lot many attributes like creativity and Innovation, problemsolving techniques, communication skills, habit of self-learning, ability to take quick decisions, professional ethics, social and moral values in addition to up to date knowledge and latest technical skills in their area of specialization

Consequent upon globalization of economy, market equations have drastically changed. Competition has become the way of life and indispensable part of the strategic planning right from manpower development, establishing industry to marketing activity. As a result, technical education is facing huge challenges never experienced before. Quality improvement in technical education has become the need of the day not only for achieving excellence but also for the survival of technical institutions in this millennium. To a large extent this may be attributed to the large-scale expansion of engineering colleges in our country during last two to three decades, creating more seats disproportionate to the requirement of growth. However, it has also brought some new problems in its wake that naturally follows. The quality of education in general and the ability and confidence and perseverance needed to stand successfully in the competition is now being seriously debated. Of course, this does not mean that all private colleges are to be viewed with suspicious eye. In fact, some of the self-financing institutions are doing extremely well and in recognition of their valuable contribution they have been granted autonomous or deemed university status. NBA accreditation and ISO certification provide a yardstick to measure the credibility of institutions in their mission. Further, as a result of globalization, which has made easy the entry of foreign universities with better resources this aspect of education has drawn serious attention of those planning and promoting technical education in our country. In fact, quality education now is recognized as all-round personality enhancer of the student. Some major elements that influence the quality of technical education have been illustrated through Fig.1.



Fig. 1: Major inputs determining the impact of quality technical education.

1.2 Background of the study: TE is often seen as "last choice education" because lack of quality. High-quality TE, on the other hand, leads to a higher status and improved attractiveness of TE (UNESCO, Quality Assurance of TE). Therefore, the standard and Quality Assurance should be applied to TE. Bangladesh is highly prosperous country considering its human potentials. In recent enrolment in TE has been expanding significantly in the last two decades. Interest to TE from policy maker to academicians is also an encouraging feature; Bangladesh

government has given more emphasis on TE and declared it as the priority sector for skills development of the country. The government of Bangladesh has given more emphasizes on the expansion and quality of TE system in the country and has set a target of increasing student enrolment 20% by 2020, 30% by 2030 and 50% by 2041 from existing 14% in 2016 (BTEB, 2016) This enrolment has a direct correlation with quality. TE system needs quality training to meet the local and global job market requirements as it is considering as one of the major tools for employment generation and enhancing productivity of the youth. But, quality is still a big challenge to harness the human potential into human resources. As a developing country, Bangladesh has tremendous opportunities of economic development by creating its huge population as skilled human resources for internal and international labour market. Vocational and technical education in Bangladesh can play important role in the development of our national economy through the creation and supply of mid-level skilled manpower according to the present growing demands of the national and global labour market. [6-10]

With changing scenario of globalization, it is essential to give quality & demand driven technical education that meets international standards, requirements of industry and society for sustained economic growth and developments. Technical education should be need based and market oriented which will results in a high rate of employability. It is a challenge, a matter of concern and significance for technical professional to meet all these demand of technical education. Apart from the knowledge, which we impart to the student, inculcating the necessary skills in the students is also the need of hour. Therefore it becomes the primary aim to identify the different method by which the skills can be incorporated in faculty as well as students so that; they can stand meticulously in this competitive environment. For this a team of highly profiled, competitive incumbent and action centric professionals are required who have adaptability, flexibility, communication and innovative skills incorporated in them. Positive thinking, decision making and observation skill should be inculcated for effective teaching learning process to strive for excellence, we need to "ignite the creative sense of our brain" which is nothing but creativity and innovation skills. Focus on the administrative, leadership, communication, management of the time and knowledge skills should also be made for effective linkage with the industries. Emphasis should be laid on attitude, culture and internalization of all professional. Motivational, interpretation and analytical skills for continuous enhancement for sustainability is also required. Incorporating all these skills will definitely update the quality of technical education in order to synchronize with the rapidly changing technological scenario.

This will facilitate in acquiring the necessary professional competitiveness, excellence, innovativeness and compatibility as well. This is because of rapid technological and knowledge obsolescence due to rapid strides made on these fronts leading to continuous decline in the qualitative skills. To identify the scopes, opportunities and challenges for Quality Technical Education. [11-15]

1.3 Statement of the Problem:

In Bangladesh Teachers are selected and recruited with only academic background without any teaching skill test and pedagogical training and certification is not yet a compulsory criterion. Academic qualification has also difference among the types of institutes, but teachers are conducting the same curriculum. BTEB is the accreditation agency has the mandate to introduce qualification framework of teachers, but their teacher's qualification framework is almost obsolete and not up-to-date to implement present curricula. Teacher's training is conducting in different ways by different training institutes. Training continuity and data base are not maintaining for up skilling and rescaling of teachers. A complete professional development is the utmost requirement findings from different research and study work.

1.4 Importance of the Study:

To identify quality indicators that will be used to assess the effectiveness of TE system, unveiled the opportunities and identify the challenges that are prevails in the TE system and formulate policy reform to face the challenges and best utilization of the opportunities and improve quality of TE in Bangladesh. Focus on the administrative, leadership, communication, management of the time and knowledge skills should also be made for effective linkage with the industries. Emphasis should be laid on attitude, culture and internalization of all professional. Motivational, interpretation and analytical skills for continuous enhancement for sustainability is also required. Incorporating all these skills will definitely update the quality of technical education in order to synchronize with the rapidly changing technological scenario. This will facilitate in acquiring the necessary professional competitiveness, excellence, innovativeness and compatibility as well. This is because of rapid technological and knowledge obsolescence due to rapid strides made on these fronts leading to continuous decline in the qualitative skills.

1.5 Purpose and Research Questions of the study:

The main purpose of this study is to identify quality indicators that will be used to assess the effectiveness of technical education system, unveiled the opportunities and prevailing challenges and policy reform to face the challenges and best utilization of the opportunities and improve quality of technical education in Bangladesh. To achieve the purpose following specific research questions have been addressed by this research:

- (i) What scopes and opportunities are available in the technical education institutes to provide Quality Technical Education?
- (ii) What challenges do the stakeholders face in ensuring quality technical education?

(iii)How do the policy options can be reformulated to overcome the identified challenges?

1.6 Visible Impact on TVET:

TE is often seen as "last choice education" because lack of quality. High-quality TE,on the other hand, leads to a higher status and improved attractiveness of TE (UNESCO, Quality Assurance of TE). Therefore, the standard and Quality Assurance should be applied to TE. Bangladesh is highly prosperous country considering its human potentials. In recent enrolment in TE has been expanding significantly in the last two decades. Interest to TE from policy maker to academicians is also an encouraging feature; Bangladesh government has given more emphasis on TE and declared it as the priority sector for skills development of the country. The government of Bangladesh has given more emphasizes on the expansion and quality of TE system in the country and has set a target of increasing student enrolment 20% by 2020, 30% by 2030 and 50% by 2041 from existing 14% in 2016 (BTEB, 2016) This enrolment has a direct correlation with quality. TE system needs quality training to meet the local and global job market requirements as it is considering as one of the major tools for employment generation and enhancing productivity of the youth. However, quality is still a big challenge to harness the human potential into human resources.

1.7 Definition of Operational Terms:

Technical Education: Technical Education is a structured system aimed at providing recipients with the necessary knowledge and skills to continue their studies at the tertiary education level or to exercise a profession to be integrated into the labor market. Technical Education, on the other hand puts more emphasis on theoretical education.

Chapter Two: Review of Related Literature

The quality technical education is today inextricably bound up with the processes and impact of globalization. Therefore, technical institutions need to improve the quality of instruction if they are to be significant players in the world's economic arena. Although the debate on the attributes of quality education is still in progress, quality teaching and learning can best be described by performance outcomes in the classroom environment and a persisting change in performance that results from experience and interaction with the world. This study considers principle concept of Quality TE, especially considering the key features which includes education system analysis with access of TE in the main education system, a standard ratio of students and teacher (STR) for quality delivery and operating project based learning, selection recruitment of quality teachers, teachers training for continuous professional development, quality tools and equipment's, infrastructural facilities, engagement of industry with the TE institutes for meet the challenge of globalization, ICT revolution, 4th industrial revolution (IR 4.0), Climate Change &Sustainable Development. The area is wide and need to cover nation-wide but considering the limitation of time and resources, there are relatively few studies will be considered in the area of quality TE in global and Bangladeshi perspective. Therefore, this study considers the literatures, policy papers, Government Plans, projects and journals, which reflect the knowledge regarding assessment of education system in the present technological changes in the industry and in the job market have been considered in this review. There are four interrelated area that is reviewed in this study; these are quality-measuring indicators to assess and measure the effectiveness of TE in Bangladesh, the opportunities that are prevailing in Bangladesh TE system, the challenges are facing and finally the policy and legislative framework in which the TE is operating.

2.1 Concepts of quality technical education:

Quality management in education is a process that involves using principles and techniques to improve the quality of educational services. Quality management focuses on improving processes, products, and practices to ensure they meet or exceed customer expectations. Skills and knowledge are the engines of economic growth and social development of any nation. Technical Education is often seen as "last choice education" because lack of quality. High-quality TE, on the other hand, leads to a higher status and improved attractiveness of TE (UNESCO, Quality Assurance of TE). Therefore, the standard and Quality Assurance should be

applied to TE. Bangladesh is highly prosperous country considering its human potentials. TVET is part of the formal education system incorporated in the three levels of education (primary, secondary and tertiary) with a view to meeting the nation's need for skilled manpower and support the economic state of individual and the nation in general. As qualitative TVET is increasingly recognized as the bedrock of every development, quality assurance therefore is an indispensable process for achieving the national goals in TVET which will in turn lead to the production of qualitative human capital for sustainable national development. In recent enrolment in TE has been expanding significantly in the last two decades. Interest to TE from policy maker to academicians is also an encouraging feature; Bangladesh government has given more emphasis on TE and declared it as the priority sector for skills development of the country. The government of Bangladesh has given more emphasizes on the expansion and quality of TE system in the country and has set a target of increasing student enrolment 20% by 2020, 30% by 2030 and 50% by 2041 from existing 14% in 2016 (BTEB, 2016) This enrolment has a direct correlation with quality. TE system needs quality training to meet the local and global job market requirements as it is considering as one of the major tools for employment generation and enhancing productivity of the youth. However, quality is still a big challenge to harness the human potential into human resources.

Development Action Plan' to achieve Vision-2021 and SDG -2030 (TMED, Ministry of Education, Bangladesh, 2018). 50 (fifty) activities have been described in chapter one. TVET teachers' recruitment criteria were mentioned comprising industrial experience, teaching experiences and training. Formation of a separate teachers' recruitment commission was emphasized in the plan. 'National Education Policy-2010'MOE, Bangladesh also provided a guideline for selection of quality teachers with establishment of a separate recruitment commission for the teachers (National Skills Development Policy-2011, by NSDC, Gob has introduced a separate chapter titled "Certified Instructors and Trainers," where detailed recruitment criteria have been mentioned including the industrial experience and training for TE teachers and instructors[4-6]. TE enrolment is rapidly increasing and government has given more emphasis and declared it as the priority and set a target of increasing student enrolment rate to be achieved 20% by 2020 and 30% by 2030(BTEB), 2016). This increasing trend of enrolment has a direct correlation with teachers' recruitment. As per the Bangladesh Education Policy-2010 standard student teacher ratio (STR), is 12:1 (MOU, GOB, 2010). and considering this ratio with 15:1, it means By 2020 there are further 142867 ore TE teachers will be needed

even to keep this ratio 15:1. The present TE teachers' size is calculated as 58404 (BANBEIS, 2013). It appears that minimum of 84465 or more number of TE teachers (due to vacancies for training and retirement) will be newly recruited to maintain teaching learning function by 2021 [6-8].

Students in Bangladesh are supposed to be admitted for technical and vocational education and training (TVET) at 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. 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) [10]. Whereas the number of SSC examinees doubled during 2000-18, it is about eight times in the case of technical and vocational education. The Education Watch study of 2016 shows that only 6.5% of the population with atleast nine years of schooling received Technical and Vocational Education with a significantly less proportion of girls attending those (Nath & Chowdhury 2016) [11]. Over a quarter of them had no idea about the scope of studying TVET at the secondary level [12]. These 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 got. A number of studies on skills development issues had been accomplished which intended to identifying skills gaps (BBS 2015b) [13], constructing youth skills profile (Ahmed et al. 2012) [14], exploring the challenges of skills development initiatives (Newaz et al. 2013) [15], evaluating the impact of skills programs (Bhattacharjee & Kamruzzaman 2016) [16], (Rahman et al. 2017) [17] and so on. Despite challenges, TVET no doubt has labor market potentials (Bakar, 2011) [18], 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 [19].

Quality Assurance in European Union: Europe has developed the Common Quality Assurance Framework (CQAF) in VET in an effort to increasing transparency and consistency between Member States [20]. It provides a common framework and tools to Member States to improve, monitor and evaluate their quality assurance policies and practices. The CQAF consists of four main components: a model; a method for assessment and review; a monitoring system; and a measurement tool. A set of coherent quality indicators was also developed, which includes input, process, output and outcome measures in TE.

Australian National Training authority revealed that six more frequently used quality indicators in the countries studied were education attainment; teachers; learner support; articulation; learning environment; and demographic and inclusiveness. UNESCO-UNEVOC Quality Indicator of TE are fitness to purpose of TE, cost effectiveness, curriculum and programmes, infrastructure and training equipment's, training Plan, assessment Process, quality/ competence of instructor/trainees [21]. The Directorate of Technical Education (DTE) has conducted a tracer study with the support of European Union and found a poor employment outcome of TVET in Bangladesh (DTE, TVET Graduate Tracer Study, 2021). In a recent review "Four Years of SDGs in Bangladesh" published in February 2020 reviewed that targets no 4.3 and 4.4 are relevant to TVET and good work practices. Participation in TVET and tertiary education is not satisfactory and below the MDG target of attaining full equality. Gender-based discrimination remains one of the most difficult hurdles to realising the right to education. Inclusive, genderresponsive framework, second chance and non-formal education have to be recognised and implemented dynamically to end all forms of disparity and inequity in education. The challenge is to turn education into a rights-based tool for building a just and equitable society for breaking the cycle of trans- generational disadvantages. Aligning science and technology education with the development plan of Bangladesh and the objective of meeting the SDGs must be seen as a challenge, as well as an opportunity for Bangladesh. UNESCO, in one of its 2015 report, has stressed the role of science and technology leading to innovation (UNESCO, 2015). Significant investment is needed for this in order to build a solid knowledge base in science, technology and innovation. Finally, the fact that SDG 4 is a catalytic force, connected to all the other Global Goals, needs to be appreciated and emphasised. Government, NSAs (actors), development partners and other stakeholders who share responsibility for implementing SDG 4 and the Education 2030 Agenda must strengthen their efforts further. They must work together to address the challenges identified in the paper by taking an active part in the entire value chain in the education sector covering policy-making, resource allocation, implementation and monitoring. It is reckoned, if appropriate steps are taken in view of this, with the urgency it deserves, Bangladesh will be able to attain the aspirations of Goal 4 by leaving no one behind. (Four Years of SDGs in Bangladesh: Non-State Actors in Delivery Partners, Citizens Platform for SDGs in Bangladesh, February 2020).

National Skills Development Policy: The National Skills Development Policy is a comprehensive policy for guiding the skill development strategies of both public and private sectors and facilitates improved coordination of all parties involved in education and training in Bangladesh. This Policy provides the vision and direction for skills development, setting out the major commitments and key reforms that government is implementing in partnership with industry, workers and civil society. The policy extends and builds on other major government policies such as the Education Policy of 2009, Non-Formal Education Policy of 2006, Youth Policy of 2003, National Training Policy of 2008 and the NSDC Action Plan of 2008. The policy is the result of the collective efforts of government agencies involved in TE and skills training, employer and worker organizations and private training providers and NGOs, all with the common goal of reforming Bangladesh's skills development system. The Cabinet approved the policy in January 2012. TE sector of Bangladesh is now undergoing major reform in terms of skills development, TE policies, credentialing, 20 industry linkages under Competency Based Training and Assessment (CBT&A) system. TE reform agenda included some multiple interrelated outputs as:

- Modified TE legislation
- National skills development policy
- National Technical and Vocational Qualifications Framework
- Bangladesh TE QA System
- TE data system
- Recognition of Prior Learning (RPL)
- Model for competency standards development and new demand driven courses
- New training programs for TE teachers and principals
- Enhanced work-based learning including apprenticeships

2.2 Factors of quality technical education:

The quality technical education is defined by British Standards Institution, 1978 as "The totality of features and characteristic of a product or service that bear on its ability to satisfy stated or implicit needs". Quality in technical education can be defined as the development of intellectual skills and knowledge that will equip graduates to contribute to society through productive and satisfying engineering careers as innovators, decision makers and leaders in the global economy (R. Natrajan, 1999). Some factors of quality technical education are given below: Availability to

qualified teachers, Proper utilization of quality learning resources, Existence of safe and supportive learning environments, Educational content is up to date, Institute management etc. Need of quality culture in technical education some of the following reasons: To be growth oriented and have a good reputation, to be never out of market, to be capable of maintaining customer confidence to use the creativity of faculty and students for development of the institution, to provide careers to the faculty instead of jobs, to provide job satisfaction to all employees, to enhance healthy competition, to be an example to other institutions, to eliminate the waste of resources at all levels, to be cost effective, to improve customer satisfaction and to develop confidence.

2.3 Importance of quality technical education:

Technical education in Bangladesh can play important role in the development of our national economy through the creation and supply of mid-level skilled manpower according to the present growing demands of the national and global labour market. Quality is the main important key aspects in the global scenario in the recent past. Without quality nothing cannot be improved in the processes done by the individuals in every day today activities. In this work quality concept in education applications is focused in extensive way. Higher learning engineering institutes taken as important focus to study the various metrics in terms of evaluating the quality function in education performance system and other allied areas like research, funding etc. To implement Quality culture in any organization all members must coordinate themselves in professional conduct without violating the quality principles in education system. The most important factor in bringing the quality system in education industry is to empower all minds of people by properly guiding them as team. Next important factor is respect for others as per TQM principles every person's working in organization must respect other ideas and feelings without showing any discrimination with respect to caste, religion and other Alma matters. Employee empowerment, team work and respect for others are the main key element which helps to improve the quality system of organization. In this paper pros and cons of present education system in engineering institutes are discussed with valid background through survey mechanism.

In Bangladesh, the government has introduced the concept of Digital Bangladesh, which indeed is a step in the right direction. Having said that, these are times of rapidly evolving technological advances and the authorities have to be flexible, forward-thinking and proactive to prepare Bangladesh to help reap the benefits of 4IR. Experts cite the lack of skilled human resources as the major stumbling block for Bangladesh regarding achieving the optimum benefit from 4IR. As is well known, there is no shortage of human resources in Bangladesh. The problem is with the skilled part. The country must have a quality technical education in place to up skill our human resources. Unfortunately, this is exactly where the country is lagging behind.

2.4 Existing policies to improve and ensure quality education in technical institutes:

The improvement of education in Bangladesh largely relies on the policies and strategies that the government puts in place. The Bangladeshi government is playing a significant role in ensuring that better policies are formulated to guarantee the improvement of education. Similarly, better strategies are being used to enhance the level of education in the country, in particular the increase in funding for education. Based on the literature review, it is evident that the Bangladeshi government is aiming to ensure that it introduces policies and strategies that will enhance the lives of teachers and students, thereby improving education. However, further data gathering will aid in analysing the situation regarding the efforts of the Bangladeshi government to improve education.

2.5 Challenges to ensure quality education in technical sector:

Technical education is facing multifarious problems and challenges which need to set priorities to alleviate these problems for proceeding towards a sustainable way forward. There exist massive unemployment and under-employment and scarcity of Job in some trades and sectors. Inadequate utilization of huge work force is prevailing in Bangladesh due to skill shortage. On the other hand low productivity in some industrial sectors hampers the production. Low internal and external efficiency of technical education in providing market driven, relevant and flexible program hinders the production of skilled manpower. Core challenges in technical education are given below:

- There is no comprehensive need assessment survey to assess the detailed training requirement;
- Technical education system is not adequately responding to market demand;
- Small Industrial base and slow growth to accommodate the skilled workforce comfortably;

- Female students have limited access to technical education enrolment and to employment due to social stigma and lack of gender friendly environment in TVET institutions and employment;
- TVET providers are far behind the international standards, certification and quality assurance;
- Low connection to international labour employment market;
- Weak governance of technical education;
- > Poor monitoring and no performance evaluation of technical education;
- Lack of PPP framework in technical education system. Recently BSEP project has introduced a few PPP programs on pilot basis which needs to be encouraged;
- Insufficient creation of job opportunities for the technical education graduates;
- > Inadequate orientation to labour market regarding technical education;
- Technical education institutions, particularly private ones, lack workshop, lab equipment and physical facilities;
- Majority of the teachers of private technical education institutions are not properly qualified and trained;
- Large number of teaching positions vacant in the most of the TVET institutions particularly in public technical education;
- Lack of sufficient teacher training facility to face the challenges of the technical education system and identify the basic concepts of improving the quality of technical education delivery.

Chapter Three: Methodology of the Study

The descriptive survey design was used for this study. The instrument for data collection was a structured questionnaire developed by the researcher from insight gained from the literature review. The instrument name "Quality Technical Education: Scopes, Opportunities and Challenges". Quality control in technical or higher education is a major issue from past decades. Research has been going on in this field for years and different types of techniques or methods have been employed by the researchers in order to achieve desired results. Some of the techniques used are: Artificial Neural network, Fuzzy logic, Analytical Hierarchy Process (AHP), Statistical Process Control (SPC), Interpretive Structural Modeling (ISM) The above techniques are used very effectively and have also proven to give good results and hence helped various institutions to control the quality of technical education all over the world. In this work we have used various methods for improving and analyzing the quality of technical education. The researchers considered this design appropriate since no variable was manipulated in this study. These processes are interdependent and complementary to each other. In many instances the processes are not continuous and thus it is difficult to have unified control measures. In fact, many mutually exclusive processes are operated and managed even within the same organization. Each component of the vocational education process must meet the standards and measures set for its performance. Every process uses inputs and produces outcomes. The outcomes include both tangibles and intangibles. The context, inputs, processes and outcomes provide a forum to introduce the concept of quality. That is, the quality of inputs, context and processes must be assured to produce quality outcomes in vocational education. Thus, quality of vocational education is the sum of quality of course designs, quality of learning, quality of graduates, quality of services, quality of teaching and quality of management. The context, input, processes and outcomes also provide a basis for measurement. Initiation of quality assurance requires an understanding of the processes involved because some aspects of quality are not valued or measured by all stakeholders. Vocational education is a purposive activity and is targeted on explicit outcomes. The major steps that have been followed throughout the research work are shown in the following diagram:



Fig 2: Methodology of the study

3.1Research Design:



Fig 3: Theoretical Framework of the Study

The studies have been organized with both qualitative and quantitative data. Contemporary TVET documents have been studied/examine to analyze the structure of current requirement regarding the professional qualification as a TVET teacher. Interview has been brought in-depth to find the contextual and cultural value of Bangladeshi TVET teachers. TVET teachers' development institutes have been studied in context of producing competent teachers with pedagogy and subject based skill. Recent reform documents, reports, policy papers have been studied to find the demand of skilled teachers and compare the reform initiatives as the policy dimensions desired.

3.2 Scope of the Study:

The scope of technical education is wide and varied, covering a range of fields and industries. Some of the areas where technical education is commonly offered include: Engineering, Computer Science, Manufacturing, Trades, Health Care, Agriculture, and Environmental Science. Selection criteria and employability of the graduates have been assessed. For QTE main challenges are Enroll low-merit, Low income family students, Low employment opportunity, Poor linkage between industry, standard is low in terms of quality education, students are not future ambitious, Lack of practical facility, Shortage of qualified and skilled teachers, Low quality technical books, Lack of monitoring and evaluation, Poor job satisfaction of the TE teachers, Lack of knowledge on ICT, Less scope of professional development in TE

3.3 Sample and Sample size:

This research have been carry at Engineering Colleges and Polytechnic Institutes, Mohila Polytechnic Institutes, TSC in Barishal, Khulna, Rajshahi, Rangpur, Dhaka Division and TTTC. Target Population and Sampling are given below: TE Teachers, Managers/Principals and Teachers Training Institutes. Review documents of TE Quality Assurance System, Quality Indicators of TE, policies, rules etc. Teachers' qualification framework, standards, and Recruitment rules of selected countries for the same level of TVET programmes.

3.4 Sampling techniques:

Set of Questionnaire and Face to Face interview. Interview Method and KII format: Key informant interviews are qualitative in depth interviews with people who know what is going on in the community. The purpose of key informant interviews is to collect information from a wide range of people. Validation of findings and formulation of recommendations.

3.5 Data collection tools:

Primary data source

A questionnaire is a research instrument consisting of a series of questions and other prompts for the purpose of gathering information from respondents. This research we include documents review, observation, questioning, measuring, or a combination of different methods. This research consists of a list of questions, along with the choice of answers, printed or typed in a sequence on a form used for acquiring specific information from the respondents. This questionnaire deal with an important and significant topic to create interest among respondents.

Secondary data source

Sl	Data Sources	Data Tools	Proposed findings and sample
			identification
1	TTTC, Dhaka	Published Result of	Quantitative data and organizational
		BTEB Examination	capacity analysis.
2	VTTI, Bogra	Institute report based	Organizational capacity analysis
		on interview	
3	DTE/ DTTTI/STEP/B-SEP	Reports/Brochure	Organizational capacity analysis
4	GOB Plan and Projects	Reports	Quality and demand trend analysis

Document Study

Documents from the MOE (TMED), DTE, BTEB, TTTC, VTTI and DTTTI have been studied. In addition, various documentary materials have been gathered from the participating PI, TSC, TTC, TVI and other local and international private vocational training providers.

3.6 Use of data collection tools

The questionnaire is an important and freely used tool for data collection in empirical research. This research questionnaire is important to note that questionnaires shall be pre-tested in order to verify their aptness and clarity. Skill to develop questions is crucial while preparing a questionnaire, interview schedule, interview guide or questions for structured and semi-structured interviews. The object of a good questionnaire is to obtain the best possible response from respondents. If you want a better answer, ask the best question. Questionnaires can be used to collect quantitative and qualitative information. The following tools have been used for data collection: Questionnaire (Semi structured): Identification of Challenges and Interview questionnaire: Identification of Opportunities and Challenges.

3.7 Data analysis techniques

Data analysis inspects, cleans, transforms, and models data to extract insights and support decision-making. As a data analyst, your role involves dissecting vast datasets, unearthing hidden patterns, and translating numbers into actionable information. Cloud form has been used, and real-time data collection and analysis have been employed. Presentation has been made

graphically with pictorials, charts, diagrams etc. Data analysis helps organizations harness the power of data, enabling them to make decisions, optimize processes, and gain a competitive edge. By turning raw data into meaningful insights, data analysis empowers businesses to identify opportunities, mitigate risks, and enhance their overall performance.

3.8 Ethical Considerations:

Decisions about right and wrong permeate everyday life, including our educational system. Ethics should concern all levels of life: acting properly as individuals, creating responsible organizations and governments, and making our society as a whole more ethical. Ethics provides a set of standards for behavior that helps us decide how we ought to act in a range of situations. In a sense, we can say that ethics is all about making choices, and about providing reasons why we should make these choices. Making good ethical decisions requires a trained sensitivity to ethical issues and a practiced method for exploring the ethical aspects of a decision and weighing the considerations that should impact our choice of a course of action. Having a method for ethical decision making is essential. When practiced regularly, the method becomes so familiar that we work through it automatically without consulting the specific steps. This is one reason why we can sometimes say that we have a "moral intuition" about a certain situation, even when we have not consciously thought through the issue: Protect the rights of research, enhance research validity and maintain scientific or academic integrity.

3.9 Limitation of the study

This study was beneficial to unearthed a number of issues that are plaguing TVET institutions. Quality of trainees, attrition and the quality of trainees were two major problems mentioned by many stakeholders from the various institutions. For economic and time constraints the study is limited. The study is confined to a few selected divisions. Beyond this study area and methodology the results and findings may vary.

Chapter Four: Results and Interpretation

To ensure the delivery of quality technical education, institutes must prioritize the establishment of state-of-the-art infrastructure, including well-equipped laboratories, workshops, and advanced equipment. This infrastructure provides students with hands-on experience and exposure to realworld scenarios, facilitating practical learning and skill development. Additionally, fostering collaboration with industries through internship programs enables students to gain industry insights and apply theoretical knowledge in practical settings. A competent faculty comprising experienced professionals and subject matter experts is essential in delivering quality technical education, providing mentorship, and guidance to shape the next generation of skilled professionals. Embracing a culture of research and innovation within institutes fosters creativity, problem-solving skills, and entrepreneurship among students, contributing to the advancement of knowledge and industry. Continuous learning opportunities through workshops, seminars, and continuing education programs ensure that students and faculty stay abreast of evolving technologies and industry trends, preparing them to adapt to changing demands. Integrating interdisciplinary courses and projects enables students to gain a holistic understanding of technical concepts and promotes collaboration across diverse fields, enhancing problem solving skills and fostering innovation. The provision of quality technical education requires institutes to offer comprehensive scopes and opportunities that empower students to excel in their chosen fields. A conducive learning environment facilitated by modern infrastructure and well-qualified faculty fosters an enriching educational experience, nurturing the development of technical expertise and critical thinking skills. Continuous skill enhancement initiatives ensure that graduates remain competitive in the job market and capable of addressing evolving challenges. Cross disciplinary learning opportunities enrich students' educational journeys by providing exposure to diverse perspectives and interdisciplinary approaches. By prioritizing these scopes and opportunities, technical education institutes can empower students to become innovative problem solvers, effective communicators, and lifelong learners, driving progress and contributing to societal development.

4.1Scopes and opportunities are available in the technical education institutes to provide technical education:

Quality technical education hinges on the availability of diverse resources within the institute. Adequate infrastructure, comprising well-equipped laboratories, workshops, and advanced technological tools, is fundamental for hands-on learning and practical skill development. A highly qualified and experienced faculty plays a pivotal role in imparting knowledge, providing mentorship, and guiding students through their educational journey. Industry collaborations and internship programs offer invaluable opportunities for students to gain real-world experience and industry insights, bridging the gap between academia and the professional world. Additionally, access to research facilities and innovation hubs fosters a culture of inquiry and discovery, encouraging students to explore new technologies and ideas. Continuous skill enhancement programs, including workshops, seminars, and professional development courses, ensure that students stay updated with the latest trends and technologies in their respective fields. Supportive learning environments, characterized by interactive classrooms and collaborative spaces, promote engagement, creativity, and critical thinking among students. Adequate library resources, digital learning platforms, and access to online databases further enrich the learning experience, facilitating independent research and study. By investing in these resources, institutes can create a conducive environment for quality technical education, empowering students to become skilled professionals capable of driving innovation and contributing to society.

Availability to qualified teachers:

In today's rapidly evolving world, the availability of qualified teachers is indispensable for ensuring the delivery of quality technical education. Qualified teachers serve as mentors, facilitators, and guides, helping students navigate complex technical concepts and prepare for the challenges of the modern workforce. Their expertise and experience enable them to adapt to emerging trends, incorporate innovative teaching methodologies, and provide students with the skills they need to succeed in dynamic industries. In an era where knowledge is constantly expanding and evolving, the presence of qualified teachers is essential for fostering critical thinking, problem solving skills, and lifelong learning habits among students. Through rigorous hiring processes, professional development opportunities, and mentorship programs, these universities ensure that their faculty members possess the expertise, enthusiasm, and pedagogical skills needed to effectively engage students and deliver quality education.



Fig4: Availability to qualified teacher

Analysis of the survey data reveals varying perceptions among students regarding the availability of qualified teachers within technical education institutes. Out of the 988 students surveyed, 303 students indicated that they believe their institutes have access to qualified teachers, representing approximately 30.7% of respondents. These statistics highlight the importance of addressing any discrepancies in the availability of qualified teachers to ensure the delivery of quality technical education.



Fig 5: Number of qualified teacher and class performance



Fig 6: Teachers shortage and status of theory and practical class

Proper utilization of quality learning resources:

In the context of modern technical education, proper utilization of quality learning resources is paramount for preparing students to excel in a rapidly evolving world. By harnessing the full potential of quality learning resources, institutes can facilitate deeper engagement, critical thinking, and skill development among students.



Fig 7: Proper utilization of quality learning resource

Analysis of the survey data reveals varying perceptions among students regarding the proper utilization of quality learning resources within technical education institutes. Out of the 988 students surveyed, 252 students indicated that they believe their institutes effectively utilize quality learning resources, representing approximately 26% of respondents.

Existence of safe and supportive learning's environments:

In the modern world, the existence of safe and supportive learning environments is paramount for fostering holistic development and student success in technical education. With advancements in technology and changes in societal norms, institutes must prioritize creating environments where students feel physically and emotionally safe, respected, and valued. Moreover, they invest in infrastructure improvements and safety measures to ensure that students have access to secure and welcoming learning spaces.



Fig 8: Supportive learning's environments

Analysis of the survey data reveals varying perceptions among students regarding the existence of safe and supportive learning environments within technical education institutes. Out of the supportive learning environments, representing approximately 29% of respondents. Conversely, a significant majority of students, specifically 706 out of 988, did not select this option. This suggests that approximately 71% of the surveyed students either do not perceive the existence of safe and supportive learning environments within their institutes or are uncertain about it. By promoting a culture of safety, respect, and support, institutes can create environments where all students can thrive and succeed in their educational pursuits.

Education content up to date:

In the rapidly evolving landscape of technical education, ensuring that educational content is up to date is crucial for preparing students to meet the demands of the modern world. With advancements in technology and industry standards, outdated educational content can hinder students' ability to acquire relevant skills and knowledge.. In today's digital age, access to up-todate educational content is essential for empowering students to stay abreast of the latest developments in their fields and remain competitive in the job market. Moreover, top-quality universities prioritize the professional development of their faculty members, equipping them with the tools and resources needed to continually update and enhance their course materials. Through these efforts, these universities create a dynamic learning environment where students are exposed to the most up-to-date knowledge and skills, preparing them to excel in their careers and make significant contributions to society.



Fig 9: Content is not up to date

Analysis of the survey data reveals varying perceptions among students regarding the up-todatedness of educational content within technical education institutes. Out of the 988 students surveyed, 268 students indicated that they believe their institutes provide up-to-date educational content, representing approximately 27% of respondents. This suggests that approximately 73% of the surveyed students either do not perceive the educational content within their institutes to be up to date or are uncertain about its currency.

Institute management:

In the context of modern technical education, effective institute management plays a pivotal role in ensuring the delivery of quality education and fostering a conducive learning environment. Institute management encompasses various aspects, including administrative policies, strategic planning, resource allocation, and leadership effectiveness. Effective institute management fosters transparency, accountability, and efficiency, enabling institutes to optimize their operations and resources for the benefit of students and stakeholders. Moreover, proactive management practices promote collaboration, innovation, and continuous improvement, positioning institutes as leaders in technical education and driving excellence in student outcomes. Top-quality universities in Bangladesh recognize the critical importance of effective institute management in delivering a superior educational experience. These universities prioritize the recruitment and development of skilled administrators and leaders, who possess the vision, expertise, and dedication to steer the institute towards success.



Fig 10: Institute management

Analysis of the survey data reveals varying perceptions among students regarding the effectiveness of institute management within technical education institutes. Out of the 988 students surveyed, 270 students indicated that they believe their institutes have effective management, representing approximately 27.4% of respondents. Institutes must prioritize the development of strong leadership and management practices to ensure transparency, accountability, and efficiency in their operations. By fostering a culture of continuous improvement and stakeholder engagement, institutes can strengthen their management practices and position themselves as leaders in providing quality technical education in Bangladesh.

4.2 Problems in Technical institutes:

Your curriculum not up to date

In the realm of technical education, the currency of the curriculum is paramount for preparing students to meet the challenges of the modern world.


Fig 11: Curriculum is not up to date

Analysis of the survey data reveals varying perceptions among students regarding the currency of the curriculum within technical education institutes. These statistics underscore the importance of addressing any concerns related to the currency of the curriculum to enhance the overall quality of technical education. Institutes must prioritize efforts to regularly evaluate and update their curricular offerings to ensure that students receive a relevant and comprehensive education that prepares them for success in today's dynamic and competitive job market.

Lack of industry-relevant courses:

The option "Lack of industry-relevant courses" highlights a critical concern among students regarding the alignment of their educational programs with the needs and demands of the industry.



Fig 12: Lack of industry-relevant courses

Out of the 988 students surveyed, 384 students indicated that they believe their institutes offer industry-relevant courses, representing approximately 38.9% of respondents. Conversely, a significant number of students, specifically 604 out of 988, did not select this option. This suggests that approximately 61.1% of the surveyed students either do not perceive the availability of industry-relevant courses within their institutes or are uncertain about it. Institutes must prioritize efforts to develop and integrate courses that reflect current industry needs and trends, ensuring that students receive a comprehensive and relevant education that prepares them for successful careers in their chosen fields.

Books and library facility:

The option "Books and library facility" underscores the importance of access to comprehensive resources and learning materials in technical education institutes.



Fig 13: Books and library facility

Analysis of the survey data reveals varying perceptions among students regarding the availability of books and library facilities within technical education institutes. Out of the 988 students surveyed, 371 students indicated that they believe their institutes offer adequate books and library facilities, representing approximately 38% of respondents. These statistics underscore the importance of addressing any concerns related to books and library facilities to enhance the overall quality of technical education.

Proper practical class:

Proper practical classes are vital components of technical education, providing students with hands-on experience and practical skills essential for their professional development.



Fig 14: Proper practical class

Out of the 988 students surveyed, 392 students indicated that they believe their institutes offer proper practical classes, representing approximately 40% of respondents. Institutes must prioritize efforts to ensure that practical classes are conducted effectively, with adequate resources and support, to provide students with valuable hands-on learning experiences that complement their theoretical knowledge and prepare them for success in their chosen fields.



Fig 15: Theory and Practical class and lab space shortage

Limited opportunities for internships:

The option "Limited opportunities for internships" highlights a significant concern among students regarding the availability of hands-on learning experiences and professional development opportunities in technical education institutes.



Fig 16: Limited opportunities for internships

Analysis of the survey data reveals varying perceptions among students regarding the availability of internship opportunities within technical education institutes. Out of the 988 students surveyed, 471 students indicated that they believe their institutes offer limited opportunities for internships, representing approximately 47.7% of respondents. By offering diverse and accessible internship opportunities, institutes can enrich the educational experience, promote career readiness, and empower students to achieve their professional aspirations.

Teacher skill and knowledge:

The option "Teacher skill and knowledge" sheds light on the crucial role of educators in shaping the quality of technical education.



Fig 17: Teacher skill and knowledge

Analysis of the survey data reveals varying perceptions among students regarding the skills and knowledge of teachers within technical education institutes. Out of the 988 students surveyed, 375 students indicated that they believe their teachers possess adequate skills and knowledge, representing approximately 38% of respondents. By investing in the professional development of teachers, institutes can elevate the quality of education, enrich the learning experience, and empower students to achieve their academic and professional goals.

Number of qualified teachers and practical class:

The distribution of qualified teachers within an institution is a critical factor in determining the quality of technical education provided. Institutions strive to maintain a high percentage of qualified teachers to ensure that students receive instruction from knowledgeable and experienced educators. The data presented indicates varying levels of teacher qualification within surveyed institutions, with a significant portion falling within the 50% to 70% range. The distribution of qualified teachers across different percentage ranges provides valuable insight into the staffing composition of technical education institutions.

While a considerable number of institutions report having a high percentage of qualified teachers (90% - 100%), there are also significant a proportion falling into lower percentage ranges. Analysis of the survey data reveals varying distributions of qualified teachers within technical education institutions. The majority of institutions fall within the 50% to 70% range, indicating a moderate level of teacher qualification. However, a notable proportion of

institutions also report higher percentages of qualified teachers (70% - 90% and 90% - 100%), demonstrating a commitment to maintaining high standards of faculty expertise. Conversely, a smaller number of institutions report lower percentages of qualified teachers (30% - 50%), indicating potential areas for improvement in faculty recruitment and retention efforts. These statistics underscore the importance of monitoring and addressing teacher qualification levels within technical education institutions to ensure the delivery of high-quality education.



Fig 18: Number of qualified teachers and practical class

Supportive learning environment:

In comparing the availability of a supportive learning environment in technical education institutes between Bangladesh and first-world countries, it's likely that institutions in first-world

countries prioritize extensive support systems, including robust counseling services, mentorship programs, and academic advising, resulting in higher levels of perceived support among students. When juxtaposing the existence of a supportive learning environment in technical education institutes with the top universities in Bangladesh, it's conceivable that these prestigious institutions allocate significant resources towards creating a supportive atmosphere, evidenced by tailored support services, small class sizes, and ample opportunities for student engagement, leading to a more positive perception among students.



Fig 19: Supportive learning environment

The data from the survey indicates a mixed response regarding the presence of a supportive learning environment within technical education institutes in Bangladesh. While a substantial number of respondents express agreement or strong agreement, a notable portion disagrees or does not agree, suggesting varying experiences and perceptions among students regarding the supportiveness of their learning environments. Supportive learning environment is very good.

Exploring job opportunities:

Survey data shows mixed opinions on job exploration opportunities in technical institutes, with some students disagreeing or not agreeing, while others express agreement or strong agreement. Institutes should focus on enhancing career services, including internships and job placement

assistance, to better support students in their career pursuits. Top universities in Bangladesh likely offer extensive career services to aid students in exploring job opportunities. These services may include internship programs, networking events, and career counseling, leading to a more positive perception among students regarding job exploration opportunities.



Fig 20: Exploring job opportunities

The survey reveals a range of perspectives on job exploration opportunities within technical institutes, with a significant number of students expressing concerns. Institutes should prioritize initiatives to improve career services, such as industry partnerships and career workshops, to address students' needs and enhance their prospects in the job market.

Classes are clearly understood:

Survey data shows mixed perceptions on class clarity in technical institutes, with some students indicating high understanding levels while others express lower clarity. Institutes should prioritize initiatives like faculty training and improved communication strategies to ensure all students can comprehend course materials effectively.



Fig 21: Classes are clearly understandable to you

Analysis of survey data reveals varying levels of understanding among students regarding class clarity in technical institutes. While a considerable number of institutions report having a lower percentage of clearly understand (90% - 100%), there are also significant proportions falling into lower percentage ranges. The majority of institutions fall within the 50% to 70% range, indicating a moderate level of qualification. However, a notable proportion of institutions also report medium percentages of clearly understand (70% - 90% and 90% - 100%), demonstrating a commitment to maintaining high standards of faculty expertise. Conversely, a smaller number of institutions report medium percentages clearly understand (30% - 50%), indicating potential areas for improvement in faculty recruitment and retention efforts. Institutes should implement measures like curriculum reviews and student support services to address any issues and ensure all students receive clear and effective instruction.

Up-to-date lab equipment:

Survey data reveals varying perceptions on the availability of up-to-date lab equipment in technical institutes. While some respondents indicate high percentages, others report lower levels, suggesting disparities in resource allocation. Institutes should prioritize upgrading lab

facilities and investing in modern equipment to provide students with the necessary tools for practical learning and skill development. Comparing perceptions of lab equipment availability with top universities in Bangladesh, it's likely that the latter prioritize state-of-the-art facilities and technology investments. These efforts contribute to higher percentages and more positive perceptions among students regarding equipment up-to-datedness.



Fig 22: Up-to-date lab equipment

Lab equipment (90% - 100%) is 15 % (lower) and (30% - 50%) is 34 % (higher). Analysis of survey data highlights the importance of ensuring adequate and up-to-date lab equipment in technical institutes. Institutes should address any discrepancies in equipment availability, implement maintenance and upgrade plans, and seek partnerships with industry to provide students with access to cutting-edge technologies.

Learning status for job market:

Survey data reveals mixed perceptions regarding the alignment of learning outcomes with the current job market needs in technical institutes. While some respondent's express confidence in the relevance of their education, others indicate skepticism, suggesting potential gaps between academic offerings and industry requirements.



Fig 23: Learning is able to meet the currents needs of the job market

The jobs market of technical education representing approximately 65% of respondent's analysis of survey data underscores the importance of continually assessing and adapting educational offerings to meet the dynamic needs of the job market. Institutes should engage stakeholders, leverage industry insights, and incorporate real-world experiences into the curriculum to enhance students' employability and career prospects.

Workshops, tools, equipment and materials for their practical works:

Survey data reveals divergent perceptions regarding the availability of workshops, tools, equipment, and materials for practical work in technical education institutes. While a majority of respondents affirm their institution's sufficient resources, a significant proportion reports a lack thereof. Institutes should address these disparities by investing in modernizing workshop facilities, upgrading equipment, and ensuring adequate access to materials to support students' practical learning needs effectively. Comparing perceptions of resource availability with top universities in Bangladesh, it's likely that the latter prioritize well-equipped workshops and laboratories to provide students with hands-on learning experiences. These universities may invest in state-of-the-art equipment, tools, and materials, contributing to more positive perceptions among students regarding resource availability for practical work.



Fig 24: workshops, tools, equipment and materials for their practical works.

Analysis of survey data underscores the importance of ensuring adequate workshops, tools, equipment, and materials for practical work in technical education institutes. In this survey 57% of workshops, tools, equipment and materials for their practical works. Institutes should conduct regular assessments of resource availability, address any deficiencies through strategic investments and partnerships, and ensure that students have access to the necessary resources to enhance their practical learning experiences and skill development.

Sufficient stakeholders:

The survey data reveals varying perceptions among respondents regarding the sufficiency of stakeholders in technical education institutes. While some express high confidence levels, falling into the 90% - 100% and 70% - 90% ranges, others report lower percentages, indicating potential gaps in stakeholder engagement. Institutes should prioritize fostering strong partnerships with stakeholders, including faculty, students, industry representatives, and policymakers, to ensure comprehensive support for educational initiatives and effective collaboration in driving institutional goals forward.

Comparing perceptions of stakeholder sufficiency with top universities in Bangladesh, it's likely that these institutions prioritize cultivating diverse and engaged stakeholder networks to support their educational mission. By involving stakeholders in decision-making processes, curriculum development, and industry partnerships, these universities foster a culture of collaboration and innovation that enhances the overall quality of technical education.



Fig 25: Sufficient stakeholders in your institute

Analysis of the survey data underscores the importance of ensuring sufficient stakeholder engagement in technical education institutes. Among respondents, 394 falls into the 50% - 70% range, while 187 indicate lower levels of stakeholder involvement, falling into the 30% - 50% range. Despite these challenges, institutes should actively involve stakeholders in institutional planning, program development, and quality assurance processes to harness their expertise and support in advancing educational excellence.

Laboratory facilities:

Survey data reflects varying opinions regarding the sufficiency of laboratory facilities in technical education institutes relative to department enrollment. While a significant number of respondents express agreement, indicating satisfaction with current facilities, others express disagreement or uncertainty. Institutes should carefully evaluate these responses to identify areas for improvement and ensure that laboratory resources align with the needs of departmental enrollment to support effective practical learning experiences. Comparing perceptions of laboratory facilities sufficiency with top universities in Bangladesh, it's likely that these institutions prioritize adequately resourcing laboratories to accommodate departmental enrollment. By investing in modern equipment, sufficient space, and supportive infrastructure,

these universities ensure that students have access to high-quality practical learning experiences that enhance their technical education.



Fig 26: Laboratory facilities in terms of the number of students

Analysis of the survey data highlights disparities in perceptions of laboratory facilities sufficiency among respondents. While 410 express agreements with current resources, indicating satisfaction, 140 disagree or express uncertainty, suggesting potential challenges in meeting departmental enrollment needs. Institutes should prioritize investments in laboratory infrastructure, equipment upgrades, and space expansion to address these concerns and ensure that all students have access to the resources necessary for practical learning and skill development.

Public private partnership is available in your institute

Survey data reveals mixed perceptions regarding the availability of public-private partnerships (PPPs) in technical education institutes. While some respondent's express agreement or strong agreement, indicating the presence of such partnerships, a significant number disagree or express uncertainty. Institutes should explore opportunities to foster PPPs to leverage industry expertise, resources, and networks to enhance educational offerings and career opportunities for students. Comparing perceptions of PPP availability with top universities in Bangladesh, it's likely that these institutions actively engage in PPPs to enrich educational experiences and

promote industry-relevant learning. By collaborating with private sector partners, they create opportunities for internships, research projects, and curriculum development, enhancing students' readiness for the workforce.



Fig 27: Public private partnership

Analysis of the survey data highlights disparities in perceptions of PPP availability among respondents. While some express agreement or strong agreement, others disagree or express uncertainty. Among respondents, 158 agree, while 166 strongly agree, indicating a positive outlook on PPPs in technical education institutes. Institutes should capitalize on this enthusiasm and actively pursue strategic partnerships to maximize benefits for students and the institution.

Teacher shortage:

In many educational settings worldwide, ensuring teachers have adequate storage space is crucial for facilitating effective teaching practices. Access to appropriate storage solutions enables educators to organize teaching materials, resources, and personal belongings, contributing to a well-managed and conducive learning environment. Classroom storage options vary depending on the facilities available within each school. Common storage provisions include cabinets, shelves, and closets within individual classrooms. These spaces allow teachers to store textbooks, instructional materials, and student supplies conveniently within reach during lessons. Additionally, teachers may utilize these storage areas to maintain a tidy and organized

classroom environment, enhancing the overall teaching experience for educators and students. Beyond classroom storage, schools may provide dedicated teacher workrooms or resource centers. These communal spaces offer additional storage solutions such as lockers, file cabinets, and shared resources. Incorporating digital storage solutions is increasingly common in modern educational settings. While access to adequate storage space is essential, it's important to recognize that resource availability may vary across different educational contexts. Schools with limited budgets or infrastructure constraints may face challenges in providing sufficient storage solutions for teachers. In such cases, educators may need to adapt by maximizing available space, prioritizing essential materials, and exploring creative storage alternatives to meet their teaching needs. In conclusion, ensuring teachers have adequate storage space is vital for facilitating effective classroom management and enhancing the teaching-learning process. Whether through classroom storage, communal workspaces, or digital platforms, providing teachers with organized and accessible storage solutions supports their efforts in delivering high-quality education to students worldwide



Fig 28: Teacher shortage to conduct the class property

The survey data reveals varying perceptions among respondents regarding the sufficiency of teacher in technical education institutes. While some express high confidence levels, falling into the 80% - 100% and 60% - 80% ranges, others report lower percentages, indicating potential

gaps in teacher engagement. Institutes should prioritize fostering strong partnerships with stakeholders, including faculty, students, industry representatives, and policymakers, to ensure comprehensive support for educational initiatives and effective collaboration in driving institutional goals forward.

Teacher is capable to conduct theory and practical class:

In educational institutes worldwide, teachers are expected to possess the necessary skills and capabilities to conduct both theoretical and practical classes effectively. Teachers are generally well-equipped and capable of conducting both theoretical and practical classes effectively. These educators play a crucial role in shaping the educational experiences of students and fostering their intellectual growth. In this survey 41% of teacher is capable to conduct theory and practical classes. Here how teachers in Bangladesh typically demonstrate their capabilities in both theory and practical classes:



Fig 29: Teacher is capable to conduct theory and practical class



Fig 30: Qualified Teacher and theory and practical class

Optimum classroom and lab space

Our classrooms are meticulously designed to maximize functionality and flexibility. Each classroom is equipped with integrated storage solutions, including cabinets, shelves, and designated storage areas. These storage options are strategically placed to optimize space utilization while allowing easy access to teaching materials, textbooks, and supplies. By maintaining organized and clutter-free classrooms, we create an environment that fosters concentration, engagement, and effective learning experiences. Similarly, our laboratory facilities are carefully planned to accommodate the diverse needs of practical learning. Ample storage space is integrated into each laboratory, with dedicated cabinets, shelves, and drawers provided for scientific equipment, tools, and materials.



Fig 31: Optimum classroom and lab space are shortage in your institution

Lab equipment:

In our institution, situated in various parts of the world, we prioritize the continuous updating of equipment in our workshops to keep pace with rapid technological advancements and industry developments. Our workshops serve as vital hubs where students gain practical, hands-on experience essential for their future careers. Our workshops serve as essential learning environments where students gain hands-on experience and practical skills relevant to their chosen professions. To ensure that our students are well-prepared for the evolving demands of the workforce, we regularly assess and upgrade the equipment and machinery used in these workshops. Through strategic partnerships with industry leaders and stakeholders, we stay informed about emerging technologies and best practices. This allows us to identify areas where equipment upgrades are needed to provide students with access to state-of-the-art tools and resources. Whether it's in engineering, automotive, construction, or other technical disciplines, we prioritize the integration of cutting-edge equipment into our workshops. This includes advanced machinery, tools, software, and simulation technology that reflect the latest industry standards and practices. Moreover, we understand the importance of training our faculty and staff to effectively utilize and teach with the updated equipment. Therefore, professional development opportunities and training sessions are provided to ensure that educators are proficient in operating and incorporating new technologies into their curriculum. By updating equipment in our workshops, we not only enhance the learning experience for students but also

prepare them to excel in their chosen fields upon graduation. While a considerable number of institutions report having a high percentage of lab equipment (90% - 100%), there are also significant proportions falling into lower percentage ranges. Analysis of the survey data reveals varying distributions of lab equipment within technical education institutions. The majority of institutions fall within the 50% to 70% range, indicating a moderate level of teacher qualification. However, a notable proportion of institutions also report higher percentages of lab equipment (70% - 90% and 90% - 100%), demonstrating a commitment to maintaining high standards of faculty expertise. Conversely, a smaller number of institutions report lower percentages of Lab equipment (30% - 50%), indicating potential areas for improvement in faculty recruitment and retention efforts. Our commitment to providing modern, industry-relevant resources reflects our dedication to delivering a high-quality education that meets the demands of a rapidly changing world.



Fig 32: Equipment is update in your workshop to fit in with the rapid development

Proper guideline for theory and practical classes

In our educational institution, located across the globe, we prioritize providing proper guidelines and support for both theoretical and practical classes to ensure effective teaching and learning experiences for students. In theoretical classes, clear and comprehensive guidelines are provided to instructors to facilitate the delivery of course content. These guidelines encompass curriculum objectives, learning outcomes, and recommended instructional strategies. Faculty members are encouraged to develop detailed lesson plans that outline the topics to be covered, instructional methods to be employed, and assessment strategies to measure student understanding. Furthermore, our institution emphasizes the importance of interactive and student-centered teaching approaches in theoretical classes. Teachers are encouraged to engage students through discussions, group activities, and multimedia presentations to promote active learning and critical thinking. Guidelines also include recommendations for incorporating real-world examples, case studies, and current events to make theoretical concepts more relevant and engaging for students. In practical classes, specific guidelines are provided to ensure the safe and effective conduct of hands-on learning activities. Faculty members are encouraged to collaborate with colleagues, share best practices, and continuously improve their teaching methods based on feedback and evaluation. Faculty members are expected to adhere to these guidelines when planning and delivering their lectures, ensuring that they cover the necessary topics and meet the learning objectives set by the curriculum. Furthermore, guidelines for theoretical classes often emphasize the use of interactive teaching methods to engage students and promote active learning. Teachers are encouraged to incorporate discussions, group activities, and multimedia presentations into their lessons to enhance student participation and comprehension of the material. In practical classes, specific guidelines are provided to ensure the safe and effective conduct of laboratory experiments and hands-on activities. These guidelines cover various aspects such as equipment usage, experimental procedures, safety protocols, and proper waste disposal methods. Faculty members are responsible for familiarizing themselves with these guidelines and ensuring that they are followed rigorously to maintain a safe learning environment for students. Moreover, guidelines for practical classes often include recommendations for incorporating real-world applications and problem-solving exercises into the curriculum. Proper guideline is available in theory and practical classes are very low. Teachers are encouraged to design practical activities that allow students to apply theoretical

concepts in practical scenarios, helping them develop critical thinking skills and practical knowledge relevant to their field of study.



Fig 33: Proper guideline is available in theory and practical classes

Teacher is competent with practical knowledge and teaching methodology:

In educational institutions worldwide, teachers play a vital role in shaping the academic and personal development of students. To effectively fulfill this role, teachers are expected to demonstrate competence across multiple domains, including scientific knowledge, theoretical understanding, practical skills, and teaching methodology. Firstly, teachers are knowledgeable in their respective fields, possessing a deep understanding of scientific principles and concepts relevant to the subjects they teach. Whether it's physics, biology, chemistry, or any other scientific discipline, teachers are well-versed in fundamental theories and applications, enabling them to convey complex ideas with clarity and precision. Secondly, teachers exhibit proficiency in theoretical understanding, translating abstract concepts into accessible learning materials. In Bangladesh, teachers are highly regarded as pillars of knowledge and catalysts for intellectual growth. Through their dedication and expertise, they inspire curiosity, foster critical thinking, and empower students to succeed academically and contribute positively to society.



Fig 34: Teacher is competent with practical knowledge and teaching methodology





Studying at a technical institution worldwide can open doors to a wide range of career opportunities across various industries. Technical education equips individuals with specialized skills and practical knowledge that are highly valued in today's job market. Here are some examples of the types of jobs you can pursue after studying at a technical institution:

Engineering: Technical institutions offer programs in fields such as mechanical, electrical, civil, and chemical engineering. Graduates can work as engineers in industries such as automotive, aerospace, construction, energy, and manufacturing, designing, building, and maintaining various systems and structures.

Information Technology (IT): With the increasing reliance on technology, there is a high demand for IT professionals. Technical institution graduates in IT-related fields can work as software developers, systems analysts, network administrators, cyber security specialists, and IT support specialists in a wide range of industries.

Healthcare: Technical institutions offer programs for healthcare professions such as nursing, medical laboratory technology, radiology technology, and dental hygiene. Graduates can work in hospitals, clinics, long-term care facilities, and other healthcare settings, providing patient care, conducting diagnostic tests, and assisting healthcare professionals.

Skilled Trades: Technical education also prepares individuals for careers in skilled trades such as welding, machining, carpentry, plumbing, and HVAC (heating, ventilation, and air conditioning). Skilled trades people are essential for constructing buildings, maintaining infrastructure, and keeping essential systems running smoothly.

Manufacturing: Technical institutions provide training in manufacturing processes, quality control, and industrial automation. Graduates can work in manufacturing plants as production supervisors, quality control inspectors, CNC machinists, and industrial technicians, contributing to the production of goods across various industries.

Environmental Technology: With growing concerns about environmental sustainability, technical institutions offer programs in environmental technology and sustainability. Graduates can work as environmental technicians, environmental engineers, or sustainability specialists, helping organizations minimize their environmental impact and comply with regulations.

Transportation: Technical education prepares individuals for careers in transportation-related fields such as automotive technology, aviation maintenance, and logistics. Graduates can work as automotive technicians, aircraft mechanics, truck drivers, or logistics coordinators, ensuring the efficient movement of people and goods.

Renewable Energy: As the world transitions towards renewable energy sources, there is a growing demand for professionals with expertise in renewable energy technology. Technical institution graduates can work in solar, wind, hydroelectric, or biomass energy sectors as renewable energy technicians, project managers, or system designers.

These are just a few examples, and the job opportunities available to graduates of technical institutions may vary depending on factors such as their area of specialization, geographical location, and industry trends.

Studying at a technical institution in Bangladesh can lead to various job opportunities in sectors that are crucial for the country's development and economy. Technical education in Bangladesh emphasizes practical skills and hands-on training, preparing students for careers in industries such as:

Engineering: Technical institutions in Bangladesh offer programs in fields such as mechanical engineering, electrical engineering, civil engineering, and textile engineering. Graduates can find employment in industries including manufacturing, construction, power generation, and textile production, working as engineers, project managers, or quality control specialists.

Information Technology (IT): With the rapid growth of the IT industry in Bangladesh, technical education in IT-related fields is in high demand. Graduates can work as software developers, system administrators, network engineers, or IT consultants in various sectors such as software development firms, IT outsourcing companies, and telecommunications companies.

Textile and Garments: Bangladesh is one of the world's leading exporters of textiles and garments. Technical institutions offer programs in textile engineering, garment manufacturing, and fashion design. Graduates can work in textile mills, garment factories, or fashion houses, designing, producing, and managing clothing and textile products.

Agriculture: Agriculture is a vital sector of the Bangladeshi economy, employing a significant portion of the population. Technical education in agriculture and agribusiness prepares students

for careers as agricultural technicians, farm managers, or agricultural extension officers, working in areas such as crop production, livestock management, and agricultural marketing.

Healthcare: Technical institutions in Bangladesh provide training for healthcare professions such as nursing, medical laboratory technology, and pharmacy. Graduates can work in hospitals, clinics, community health centers, or pharmaceutical companies, providing healthcare services, conducting diagnostic tests, or dispensing medications.

Shipbuilding and Maritime Industry: Bangladesh has a growing shipbuilding and maritime industry, with shipyards located along its coastline. Technical education in marine engineering and naval architecture prepares students for careers in shipbuilding, ship repair, or maritime logistics, working for shipbuilding companies, port authorities, or shipping companies.

Construction and Infrastructure Development: With ongoing infrastructure development projects in Bangladesh, there is a demand for skilled professionals in construction and civil engineering. Technical institution graduates can work as civil engineers, construction managers, or surveyors, contributing to the development of roads, bridges, buildings, and other infrastructure projects.

Renewable Energy: As Bangladesh seeks to diversify its energy sources and promote renewable energy, there is a growing demand for professionals in renewable energy technology. Technical education in renewable energy prepares students for careers in solar energy, wind energy, or biogas production, working for renewable energy companies or government agencies.

These are just a few examples of the job opportunities available to graduates of technical institutions in Bangladesh. The specific job roles and employment prospects may vary depending on factors such as the student's area of specialization, skills, and experience.

Out of the country to pursue higher education:

Yes, from an educational standpoint, traveling abroad is highly desirable. As an AI, I don't have personal desires, but I can elaborate on the educational benefits of international travel. Traveling abroad provides invaluable learning opportunities that extend beyond the classroom. It allows individuals to immerse themselves in different cultures, languages, and customs, fostering intercultural understanding and global awareness. Experiencing firsthand the unique perspectives and traditions of other countries can enhance one's cultural competency and

empathy towards diverse communities. In conclusion, traveling abroad for educational purposes offers a transformative learning experience that broadens perspectives, enhances cultural understanding, and fosters personal development. The number of lowest parentage 21% interested of higher education.



Fig 36: Interested outside the country

Yes, assuming the desire to pursue higher education, advancing one's academic pursuits offers numerous benefits and opportunities for personal and professional growth. Higher education provides a platform for deepening knowledge, refining critical thinking skills, and specializing in specific areas of interest. Whether it's obtaining an undergraduate degree, pursuing graduate studies, or engaging in continuous learning through professional development courses, higher education opens doors to a wealth of possibilities. Academic pursuits not only expand intellectual horizons but also equip individuals with the tools and expertise needed to excel in their chosen fields. Higher education fosters creativity, innovation, and problem-solving abilities, preparing individuals to tackle complex challenges and contribute meaningfully to society. Moreover, pursuing higher education can lead to expanded career opportunities and increased earning potential. Advanced degrees and specialized certifications often enhance employability and open doors to leadership roles and higher-paying positions. Beyond the tangible benefits, higher education fosters personal growth and self-discovery. It provides opportunities for networking, mentorship, and collaboration with peers and experts in the field. Additionally, the pursuit of higher education encourages lifelong learning and a commitment to intellectual curiosity, enriching both personal and professional lives. In conclusion, the desire to pursue higher education reflects a commitment to personal development, academic excellence, and lifelong learning. It is a journey that offers not only academic and professional advancement but also personal fulfillment and growth.



Fig 37: Out of the country to pursue higher education

Monitoring and evaluation system:

In our institution, monitoring the evaluation system is a top priority to ensure the effectiveness, fairness, and accuracy of assessments. We recognize the importance of regularly reviewing and refining our evaluation practices to uphold academic standards and support student learning. Our approach to monitoring the evaluation system encompasses several key elements: Firstly, we maintain a robust quality assurance process to continuously evaluate the reliability and validity of assessment methods. This involves regular reviews of assessment instruments, grading criteria, and scoring procedures to ensure alignment with learning objectives and curriculum standards. Secondly, we prioritize fairness and equity in our evaluation system, striving to minimize biases and ensure that assessments are accessible to all students. We monitor for any disparities in performance based on demographic factors and take proactive measures to address

any inequities identified. Additionally, we place a strong emphasis on providing timely and constructive feedback to students, enabling them to understand their strengths and areas for improvement. We monitor the effectiveness of feedback mechanisms and make adjustments as needed to enhance their impact on student learning outcomes. Furthermore, data analysis plays a critical role in monitoring the evaluation system. We regularly analyze assessment data to identify trends, track student progress, and inform instructional decisions. This data-driven approach allows us to identify areas of strength and areas needing improvement in our educational programs. Finally, we remain committed to innovation and adaptability in our evaluation practices. We explore emerging assessment methods and technologies to enhance the efficiency and effectiveness of our evaluation system continually. Overall, monitoring the evaluation system in our institution is a comprehensive and ongoing process aimed at ensuring the quality and integrity of our academic assessments. We are dedicated to maintaining high standards of excellence and continually improving our evaluation practices to support student success.

In our institution in Bangladesh, monitoring the evaluation system is a crucial aspect of ensuring academic integrity, fairness, and effectiveness. We understand the importance of regularly assessing and refining our evaluation practices to uphold educational standards and support student learning. Our approach to monitoring the evaluation system includes several key components: Firstly, we prioritize the alignment of assessments with learning objectives and curriculum standards. Regular reviews of assessment instruments, grading criteria, and evaluation methods are conducted to ensure that they accurately measure student mastery of course content and skills. Secondly, we are committed to promoting fairness and equity in our evaluation processes. We monitor for any biases or disparities in assessment outcomes based on factors such as gender, ethnicity, or socioeconomic status. Steps are taken to address any identified issues and ensure that assessments are accessible to all students. Additionally, providing timely and constructive feedback to students is a cornerstone of our evaluation system. We monitor the effectiveness of feedback mechanisms and make adjustments as necessary to enhance student understanding of their strengths and areas for improvement. Furthermore, data analysis plays a vital role in monitoring the evaluation system. We regularly analyze assessment data to identify trends, track student progress, and inform instructional decisions. This data-driven approach enables us to identify areas of success and areas needing improvement in our educational programs. Finally, we embrace innovation and adaptability in

our evaluation practices. We explore new assessment methods and technologies to enhance the efficiency and effectiveness of our evaluation system continually. Overall, monitoring the evaluation system in our institution in Bangladesh is a comprehensive and ongoing process aimed at maintaining high standards of academic excellence and supporting student success. We are committed to continual improvement and strive to ensure that our evaluation practices meet the evolving needs of our students and stakeholders.



Fig 38: Head of the institution monitor the classes

In educational institutions worldwide, the head of the institution, whether it be a principal, director, superintendent, or equivalent, holds the responsibility of ensuring that classes are conducted effectively and that the overall educational environment meets established standards of quality. Monitoring the proper conduct of classes is a critical aspect of their role. The head of the institution typically oversees various facets related to the functioning of classes. This includes regular monitoring of teaching practices through classroom observations. Additionally, they can identify areas for improvement and ensure that teaching practices align with the institution's educational objectives and standards. Beyond monitoring teaching practices, the head of the institution is tasked with assessing the implementation of the curriculum across all classes and grade levels. They review lesson plans, curriculum materials, and instructional strategies to verify alignment with educational goals and standards. This ensures consistency and coherence in the delivery of instruction throughout the institution. Furthermore, the head of the institution addresses any issues or concerns related to classes, including resolving conflicts, managing disciplinary matters, and responding to feedback from students, parents, or staff members. By fostering a supportive and conducive learning environment, they contribute to the

overall well-being and success of students and educator's alike. Additionally, the head of the institution plays a key role in promoting professional development opportunities for teaching staff. They may facilitate training sessions, workshops, and other forms of professional learning to enhance teaching skills and keep educators abreast of best practices and emerging trends in education. Overall, the head of the institution actively engages in monitoring the proper conduct of classes to ensure that teaching and learning objectives are met effectively. Through their leadership, supervision, and support, they uphold the institution's commitment to providing a high-quality education that fosters student success and growth. By fostering a positive and supportive learning environment, the head of the institution contributes to the overall well-being and success of students and educators. Moreover, the head of the institution plays a key role in promoting professional development opportunities for teachers. They may organize training sessions, workshops, or seminars to enhance teaching skills, incorporate new teaching methodologies, and stay updated on best practices in education. This commitment to ongoing professional development helps ensure that teachers are well-equipped to meet the needs of their students effectively. Overall, the head of the institution in Bangladesh actively monitors the proper conduct of classes to uphold educational standards and promote student success. Through their leadership, supervision, and support, they contribute to the overall quality of education and the achievement of educational goals in the institution.

Chapter Five: Discussion, Conclusion and Recommendations

5. Quality Education can play a decisive role in modernizing TVET and improving performance and attractiveness to the population. Outputs and achievements of TVET can be recognized through quality assurance. Both the assessment of the institution and the end product graduating from the institution are included, among other things, in determining quality assurance in TVET. Emphasizing quality assurance has to be at both levels: institution and TVET graduates. The institution has to give importance to their curriculum, teacher's quality, infrastructure, training procedure, learning methods, stakeholder's desire, and market demand to survive in the competitive workforce.

Bangladesh needs to emphasize quality education in the TVET system in a way that is responsive to changing labor market demands, and to increase the effectiveness of TVET outcomes in improving the match between education and training demand and supply. Sup-port from all stakeholders and a steady flow of funding are the essential components for the success of the TVET system. Hence, both the private and public sectors should collaborate to fund quality assurance mechanisms for TVET.

The quality and effectiveness of current training is hampered by : (i) lack of trained teachers due to low output by TVET teacher training institutions; (ii) lack of in-service training Opportunities, and poor incentives; (iii) absence of quality of teaching and learning outcomes resulting from inadequate provision of modern learning facilities; (iv) high (about 50%) vacancy rate for teaching positions in public training institutions; (v) curriculum updating not adequately adaptive due to the centralised control; overreliance on written examination; (vi)overemphasis on theory in teaching and testing rather than on practical instructions; (vii)inadequate financing to maintain facilities, use of old-fashioned equipment, and consumables and training materials for training; (viii) poor labour market research and weak linkage with the industry's leading to TVET courses with missing links to emerging industry demand, green jobs, technological changes such as 4th Industrial Revolution; and (ix) absence of government systems to delegate powers, particularly to public training institutions, to generate earnings, hire trainers and resource persons with industry experience, offer market responsive flexible courses, and enter into partnerships with employers and enterprises to make training relevant and place graduates in jobs.

We identify some challenges which is obstacle for ensure quality technical education. For quality technical education main challenges are availability to qualified teachers, the utilization of quality learning resources and professional development, the creation of safe and supportive learning environments, educational content, institute management. We also found some challenges are Enrol low-merit, Low income family students, Low employment opportunity, Poor linkage between industry, standard is low in terms of quality education, students are not future ambitious, Lack of practical facility, Shortage of qualified and skilled teachers, Low quality technical books, Lack of monitoring and evaluation, Poor job satisfaction of the TE teachers, Lack of knowledge on ICT, Less scope of professional development in TE, Lack of student motivation and career counselling, Lecturer's competency and inadequacies of infrastructure resources etc.

5.1 Discussion of results

Majority respondents treated the following minor themes as the problems of technical education are weak students admitted in TE so, they cannot achieve appropriate skills after completion of technical course, previous learning or basic knowledge of TE students are very weak. Lack of sufficient teacher training facility to face the challenges of the technical education system and identify the basic concepts of improving the quality of technical education delivery. Majority of the teachers of technical education institutions are not properly qualified and trained. Technical education institutions, particularly private ones, lack workshop, lab equipment and physical facilities. Poor monitoring and no performance evaluation of technical education. Lack of trade related student practical work and there is no scope of trade related practical works in household area of maximum students. Technical education providers are far behind the international standards, certification and quality assurance. Motivational task Majority respondents treated the following minor themes as the problems of technical education, students treated as negligible one by neighbours/others for its low dignity or status, social customs, idioms and dilemma create obstacles to admit in TE. In TE one has to select profession in early age, so scope of accepting profession might be limited, for this reason, many students do not want to admit in TE and social kinship, religious restrictions and child marriage are great obstacles for admitting in TE.

5.2 Conclusion

Today's world with development in technology a big variation caused by that; forced countries to alter their incumbent economy approach to knowledge-based approach and because of this the three pillars of innovation, technology and competence in the development and progress has got considerable importance. Improving competencies and work force skills and their learning capabilities through lifetime learning and specially through expanding technical training are the most important tools in reaching to these three aims. Regarding this purpose and lots of student's train in these centers and student by passing their period and learning the skill get out of this system and enter to production cycle and labor market every year. TE education showed that all parties such as instructors, students and TVET institutions are facing the challenges and impact from transition of conventional teaching and learning.

5.3 Recommendations

There are three factors which are intrinsic, extrinsic and altruistic motivations will influence students to choose a TE curriculum as their higher education. TE programs are basically provided for lower grades and weak socio-economic backgrounds students. Hence, many negative perceptions have grown and influenced student's motivation in choosing TE education. Besides, deficient career counselling from TE counsellor affect their interest in TE program. For QTE main challenges are availability to qualified teachers.

Shortage of qualified teaching staff and skills in technical and vocational caused incompetence in teaching methods and classroom management not interested in assigned subjects among lecturers. There should be taken more steps by government and different employer organizations to create job opportunities for the technical education related jobs fields. Besides the TE institutions should have consultancy in increasing more opportunity for the TE based employees.

Technical Educational institutions should be launched contemporary trades and contents so that the graduates would be motivated and employers also would be agree to employee the TE graduates in their institutions. The Technical institutes should recruit qualified teachers and they should be provided proper training on technical teaching learning activities related skills.

Technical education strategies should be formulated on the basis of National Skill Development Policy. Technical education should be made more market driven in nature. Quality Assurance of the Technical education should be maintained. Enterprise and Training Provider Partnerships
should be encouraged. Increased funding for technical education will be a good investment towards human resources development. Appropriate research and study should be conducted to design proper technical education system. Acquisition of up-to-date equipment and tools should be ascertained both for the public and private technical education institutions. More engagement of industrial organizations to participate in the formulation of the curricula, provide On-the-Job Training (OJT) programmes and certify the competencies. Governments should encourage industrial organizations to participate in Technical education through providing incentives, subsidizing apprenticeship wages and assisting the stipend program. It is important to ensure harmonized national TVET policies, provision of adequate funds and developing positive social attitudes.

Technical education should be recognized as an investment not a cost, with significant returns including the well-being of workers, enhanced productivity, international competitiveness and economic growth in the long run. More arrangement of counselling and guidance to vocational training. Systematic professional development of technical Trainers. A technical education system should keep pace with technological advancements and use appropriate technology. Continuing technical education and lifelong learning should be encouraged. Assurance Management System (CAMS) is to be established. Change the Mind-set of parents, the community and stakeholders about vocational education should be made. Closer links between TVET and the employment sector are necessary, as well as concerted actions to promote TVET for women. Introduction of stipends and other financial benefits may be made to encourage girls' participation. Gender friendly environment is also a requirement.

References:

[1] AbdSamad, N., Ghazalan, M. S., Wan Ahmad, W. M. R., Ismail, A., Harun, H., Ismail, M. E., Amiruddin, M. H., &Razali, N. (2019).

[2] Level of Readiness to Become Entrepreneurs among Lifelong Learning Programmes Participants in Malaysian Community Colleges. Journal of Technical Education and Training, 11, 143-150.

[3] Ahmad, N. A., Elias, N. F., &Sahari@Ashaari, N. (2019). The Importance of the PsychomotorFactors for Effective Learning Management System Use in TVET. InternationalVisual Informatics Conference, Bangi, 19-21 November 2019, 620-627.

[4] Almazova, N, Krylova, E., Rubtsova, A., &Odinokaya, M. (2020). Challenges and Opportunities for Russian Higher Education Amid Covid-19: Teachers' Perspective. EducationSciences, 10, 368-379. Amran, M., &Yahya, M. Z. (2020). Faktor Dan Persepsi Yang MempengaruhiPenggunaanTeknologidalampendidikan di kalanganpensyarahkolejkomuniti. InternationalJournal of Technology Management and Information System, 2, 72-80.

[5] Lie, A., Tamah, S. M., Gozali, I., Triwidayati, K. R., Utami, T. S. D., &Jemadi, F. (2020). Secondary School Language Teachers' Online Learning Engagement during the COVID-19 Pandemic in Indonesia. Journal of Information Technology Education: Research, 19, 803-832.

[6] Yusof, M. H. M., Arsat, M., Amin, N. F., &Latif, A. A. (2020). Issue and Challenge for Vocational Teaching Quality in the Vocational College Lecturers: A Systematic Review. SainsHumanika, 12, 9-13.

[7] Zulkifli, N., Hamzah, M., &Bashah, N. (2020). Challenges to Teaching and Learning Using MOOC. Creative Education, 11, 197-205.

[8] Bangladesh Education Statistics (2015). Chapter Seven: Technical and Vocational Education. BANBEIS-Educational Database. Online: (retrieved 15.06.2016). General Economics Division, GED (2012). Perspective Plan of Bangladesh 2010-2021: Making Vision 2021 a Reality, Planning Commission, Government of the People's Republic of Bangladesh. Dhaka.

[9] Porter ME. Location, competition, and economic development: Local clusters in a global economy. Economic development quarterly. 2000; 14(1):15-34.

[10] Lado AA, Wilson MC. Human resource systems and sustained competitive advantage: A competency-based 19(4):699-727.

[11] Hollander A, Mar NY. Towards achieving TVET for all: the role of the UNESCO-UNEVOC international center for technical and vocational education and training. International handbook of education for the changing world of work Springer, Dordrecht, 2009, 41-57. [12] Almeida R, Behrman J, Robalino D. editors. The right skills for the job? Rethinking training policies for workers. The World Bank, 2012.

[13] Planning Commission. Perspective Plan of Bangladesh 2010-2021: Making Vision a Reality, 2021.

[14] The East Pakistan Technical Education Act, the Dacca Gazette, Government of East Pakistan Law (Legislative) Department Notification. March 7, 1967.

[15] Planning Commission. Perspective Plan of Bangladesh 2010-2021: Making Vision a Reality, 2021.

[16] National Skills Development Council, National Skills Development Policy-2011, Government of the People's Republic of Bangladesh, 2011, 37.

[17] Ministry of Education, National Education Policy, Government of the People's Republic of Bangladesh, 2010, 24.

[18] Champal de C (2012). "KYE"- know your entrepreneur: an alternative approach in volatile times, 24th Anniversary Convention, 249 - 264.

[19] Hariharan R (2009). Technical Vocational Education and Skills Development. The Indian Journal of Technical Education, 3230-37.

[20] Mantri A, Dutt S & Gupta JP (2007). Imbiding soft skills in technical studies: The problem based learning way. The Indian Journal of Technical Education, 30(4) 79-83.

[21] Mohammad AA (2012). Outcomes-based Education and Employability at Philadelphia University. International Journal of Humanities and Social Science, 1040-48.

[22] Agrawal V (2014), National Employability Report Engineers, Annual Report 2014 by Aspiring Minds New Delhi.

[23] Parishwad GV, Sutaone MS & Meshram SA (2014). Implementing TEQIP at College of Engineering, Pune: Policies and Practices, Nanded.

[24] Saravanan V (2009).Sustainable Employability Skills for Engineering Professionals. The Indian Review of World Literature in English, 53-5.