RESEARCH REPORT

ON

EFFECTIVENESS OF THE TVET TEACHERS' EDUCATION IN BANGLADESH

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Acronyms

BAC	Bangladesh Accreditation Council
BTEB	Bangladesh Technical Education Board
BMET	Bureau of Manpower, Employment and Training
BNQF	Bangladesh National Qualifications Framework
BSCO	Bangladesh Standard Classification of Occupation
BScTE	Bachelor of Science in Technical Education
BPSC	Bangladesh Public Service Commission
CBE	Competency Based Education
CBT&A	Competency Based Training & Assessment
CPD	Continuous Professional Development
CVE	Certificate in Vocational Education
DACUM	Developing a Curriculum
DTE	Directorate of Technical Education / Diploma in Technical Education
DTTTI	Dhaka Technical Teachers Training Institute
DU	University of Dhaka
DUET	Dhaka University of Engineering and Technology
DVE	Diploma in Vocational Education
FGI/D	Focus Group Interview / Discussions
ICTVTR	Islamic Centre for Technical and Vocational Training and Research
ILO	International Labour Organization
IMT	Institute of Marine Technology
ISCO	International Standard Classification of Occupation
ICT	Information and Communication Technology
IUT	Islamic University of Technology
KII	Key Informant Interview
MPO	Monthly Pay Order
MoEWOE	Ministry of Expatriates' Welfare and Overseas Employment
MScTE	Master of Science in Technical Education

NEP	National Education Policy
NGO	Non-governmental organization
NTVQF	National Technical and Vocational Qualification Framework
NSC	National Skill Certificate
NSDP	National Skills Development Policy
OBE	Outcome Based Education
OER	Open Educational Resources
OIC	Organisation of Islamic Cooperation
PGDTE	Post Graduate Diploma in Technical Education
PhTE	Doctor of Philosophy in Technical Education
QAM	Quality Assurance Manual
RTO	Registered Training Organization
SSC(VOC)	Secondary School Certificate (Vocational)
SDG	Sustainable Development Goals
STEM	Science Technology Engineering Mathematics
STEAM	Science Technology Engineering Arts Mathematics
STR	Student Teacher Ratio
TMED	Technical and Madrasah Education Division
TEC	Technical Education College
TPACK	Technological Pedagogical Content Knowledge
TVE	Technical Vocational Education
TSC	Technical School and College
TNA	Training Need Analysis / Assessment
TTC	Technical Training Center
TTTC	Technical Teachers Training College
TTF	TVET Teacher for Future
TVET	Technical and Vocational Education and Training
VTTI	Vocational Teachers Training Institute
UNESCO	United Nations Educational, Scientific and Cultural Organization

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Executive Summary

This research report is prepared based on the study "Effectiveness of the TVET Teachers Education in Bangladesh". This study has been conducted emphasizing the formal TVET teachers' education programs and excluded the informal discrete training initiatives for TVET teachers. The formal trainers' training CBT&A methodology under qualification framework is reviewed only as a part of literature review. The results of the study showed that two public TVET teachers' education and training institutes under ministry of education in Bangladesh almost failed to produce qualified TVET teachers and other educators both in terms of quantity and quality. 38% average student enrollment rate against only 80 seat capacity per year both in preservice and in-service teachers' education program of TTTC since last 14 years and no enrollment in diploma in vocational education of VTTI, since last 25 years is the prime parameter of ineffectiveness of the TVET teachers' education programs. Inadequacy of education programs (only diploma and undergraduate degree in technical education), very limited number of technical departments since its' establishment (03 against at least requirements of 12), old traditional method of education and obsolete teaching delivery approaches visualized the other constraints of the teachers' education. The 2-year duration degree program (BSc in Tech. Ed.) under DU itself is not considered for recruitment or employment by the BPSC and not recognized by foreign universities for higher education, made it a valuable teachers' education. 73% vacant faculty positions, somehow alive the teachers' education and training organizations by hired teachers from polytechnics as well as lack of qualified professional teaching faculties made those institutes nonfunctional and isolated from the mainstream goal of the organizations. The absent of strategic teachers' development plan, made it detach from long educational programs. This inefficiency, weakness and non-recognition of the degree are extremely noticeable for both in-service and pre-service teachers' education programs of TTTC and VTTI, except the provision of offering non-regular formal training for trainers and assessors' certification under NTVQF /BNQF system.

Currently number of TVET teachers and other educators in formal TVET sector are 54,942 (2022)**.** The actual TVET teaching positions and requirements are at least double in Bangladesh. So statistical gap of TVET teachers are almost 50%. The study projected the categorical demand of TVET trainers and implementers by 2041, where requirements of trainers and assessors will be 3,00,000. Proportionately the requirements of master trainers and training managers are projected as 3,000 and 30,000 respectively. On the other hand, the requirement of total TVET educators will be at least 4,54,254 by 2041 estimated based on existing 54,942 TVET teachers. The projected categorical TVET educators are TVET

instructors 4,16,954, TVET specialist 5,500, TVE institute managers 31,500 and TVET directors 200. The requirements of policy makers and top-level managers will be about 100 by 2041.

A total of 495 TVET teachers having professional diploma or degree in technical education which is about 1% of the total existing TVET teachers. So, the average demand supply gap of qualified TVET teachers in Bangladesh is now 99%. The gap of qualified teachers in polytechnics and TSC under DTE is 93.89% where only 276 teachers have professional diploma or degree in education. 12 private RTOs under BTEB including 02 existing dedicated public teachers & trainers training institutes (TTTC & VTTI) providing 3 to 6-month teacher training in CBT&A level 4, 5 and 6 with the capacity of maximum 1000 participants per year.

The study shows that average student's enrollment rate against the seat capacity of teachers' education program since 2010 were 37.81% in TTTC. So, the student enrollment in teachers' education programs are far below the requirement of providing education and training for more than 54,942 existing TVET teachers. The demand of categorical TVET teachers and other educators' and the supply status proofed the enormous gap between demand and supply of qualified teachers. Consequently, reflecting the ineffectiveness of the teachers' education programs. The immense gap between demand and supply and incremental demand of TVET educators up to 2041, given a clear picture of potentiality of TVET teaching profession. It's also proofed the career prospects in TVET sector that actually expanding and driven by the nation's economic aspirations and demographic trends.

Three Departments (Civil, Mechanical and Electrical & Electronics) under only two teachers' education programs (Dip. in Tech Ed. and BScTE) are not sufficient in current TVET enrollment context. 95.3% respondents give consent for introducing other higher teachers' education programs specially MScTE in TTTC or in upcoming teachers' education colleges under TTF project. The respondents proposed to establish a TVET university as mentioned in NEP 2010 and introduce PhD in Technical Education.

The contents on modern teaching methodology, strategies and approaches like **OBE** or **CBE** method of education, **STEAM** or **didactic** approach of teaching delivery and **TPACK** integration in courses are completely absent in the curricula. The existence of **soft skills, employability skills, and transversal skills as contents** in syllabus are not focused. The course contents do not reflect the requirements of 21st century skills and not aligned with **4.0 or 5.0 IR** technology. The **proportion of STEA/(P)M contents** in the syllabus are slightly deviated from the distribution principle of TVET teacher's education curricula, need to be adjusted as per local context of Bangladesh. The existence of work-based learning (**Practice teaching**) provision in the BScTE program is one of the good aspects of the curriculum.

Poor institutional capacity like the absence of own policy, act, regulations and or mandate and highly controlled autonomy are some of the constrains of innovation and made the institute authority and the teaching faculties very reluctance and free from thinking out of box. On the other hand, inadequacy of infrastructure and space and dual ownership of campus building as well as the noisy environment specially from vehicle horn hampering the learning environment of TTTC. Regarding the organizational capacity of TTTC, 68.2% alumni agreed that machine, tools and equipment, consumable materials and teaching aids in the labs and workshop of TTTC were available and usable. 63.8% alumni said that learning materials and other facilities in laboratory, workshop and classroom were adequate. No study circle under the supervision of teaching faculties and no Open Educational Resource **(OER)** platform were established in TTTC yet. The weakness of networking with industries and employers as well as no collaborations with the international accrediting organizations were envisaged. No graduate tracking system is established and not a strong alumnus was found in TTTC for taking feedback and exchanging new knowledge and experiences. Culture of research or any practice of innovation were yet established in TTTC and no such financial allocation or capacity building supports yet provided from the higher authority. The alumni shown their moderate satisfaction (55.8%) on the relevancy and quality of the curricula, teaching learning delivery and the student evaluation system but the same alumni urged their dissatisfaction with the adequacy of education programs and number of technical departments, duration of the programs and valuing as well as recognition of the degree by the recruiting authority.

67.5% teachers deprived from the facilities to enroll in teachers' education program either in TTTC or elsewhere in Bangladesh. On an average 76.8% non-alumni tech and non-tech TVET teachers and the KI agreed and urged to introduce one-year mandatory D**ip. In Tech Ed.** as a professional qualification. 67.5% respondents believed that both pre-service and in-service provision of education need to be continued, offering by the teacher's education institutes for the accomplishment of more qualified teachers according to the teachers' development and recruitment target of 8th five years plan by the government. 95% tech and non-tech TVET teachers agreed that a minimum academic qualification in the respective subjects / technology, industrial attachment or industry experience, regular upskilling training and at least one teachers' education qualification are equally important for continuous professional development (CPD) of a TVET teachers for assuring quality and sustainability in teaching profession.

The negligible students enrollment rate in teachers' education programs against the seat capacity, both in TTTC (27.5%) and VTTI (0%), only 6.11% TVET teachers having diploma / degree in Tech. Ed. are

qualified as per definition under directorate of technical education, very less number of faculties against number of approved designated positions in TTTC (27.11%) and VTTI (7.00%) , only one but hired qualified teaching faculty in TTTC having teachers' education qualification and no qualified teachers in VTTI at all, are the actual and weakest statistical scenario of the TVET teachers education in Bangladesh. The TVET teachers' education graduation rates, non-recognition of the diploma and degree in teachers' education to the government employment authority as well as negligible employment of the graduates in TVET institutes are the critical challenge in teachers' education field. The recruitment barriers and constraints of employments and promotions, poor salary status of the graduates in teaching positions always de-motivating the graduates as well as the existing and upcoming teachers' education students. Program accreditation, recognition of the certificate and constraints to admit in higher education are also the big issues in teachers' education, consequently confirmations the ineffectiveness of the programs and courses and failure of the TVET teacher's education providing institutes.

Lacks in student learning and weak performance of the teaching faculties, low preparedness and less competences of the graduates**,** absent of practice for professional development and growth**,** gaps of teachers' education curricula, it's courses and contents lacks of teachers' education providing institutes and overall dissatisfaction of the alumni on the performance and quality of teaching learning activities leading the overall ineffectiveness of the TVET teachers' education programs and failure of the teachers' education institutions. Very low enrollment rate in teachers' education program, negligible number of qualified teachers and multidimensional employment constraints of the pre-service and in-service graduates of TTTC, gradually weaken the effectiveness of the teacher's education program in Bangladesh.

These gaps and lacks, weakness, failures and ultimately ineffectiveness need to be mitigated through a holistic approach of solutions and actions. For mitigating the issues and problems the study recommended obtainable 07 macro and 22 micro agenda within 03 actionable terms (Short term, midterm and long term) possible to complete by 2035 and urged to accelerate the teachers' development, minimizing the acute shortage of qualified TVET teachers by recruiting and professional development of recruited and upcoming TVET teachers by establishing a new TVET teachers recruitment commission as suggested in TMED TVET action plan. The existing TTF project as well as taking other expansion initiatives in alignment with the research recommendation need to be accelerated as soon as possible for rescuing the system and establishing a sustainable quality teaching learning environment in Bangladesh TVET sector.

CHAPTER ONE: INTRODUCTION

1.1 Background

TVET being high on the agenda of the Bangladesh government, aiming to promote the effectiveness and relevance of education and training provision, there is an increased focus on the quality of TVET pedagogue like educators, teachers, trainers, assessors, curriculum & learning materials developer, education specialist etc. On the other hand, UNESCO's 2015 recommendation concerning TVET recognizes the crucial role of teaching staff in assuring TVET quality and relevance, and states that 'policies and frameworks should be developed to ensure qualified and high-quality TVET staff, including teachers, instructors, trainers, tutors, managers, administrators, extension agents, guidance staff and others'.

The education thinkers realizing the lack of such professionals as well as the necessity of improving the structure, tools and enabling environment for their pre-service and in-service education and training program. In general, TVET teachers and trainers are responsible for designing learning pathways, content and tools; for transferring the occupational and employability skills to students; for preparing students for the transfer from education to work; for providing sufficient and high-quality industry attachments and other forms of practical learning; and for properly assessing students on the basis of predefined expected learning outcomes. Within the national TVET systems, teachers, trainers and assessors and other related professionals should be well prepared and facilitated in complying with these responsibilities.

Government of Bangladesh given highest priority for developing the nation by producing classified skilled workforce. The visionary plan SDG-2030, 8th five years plan, vision 2041 and the perspectives Delta Plan 2100 are the prime developing agenda of the government. 7th FYP stated that low-skill-low -productivity of the employed workforce in all the 13 sectors stands as the daunting challenge to develop and growth acceleration of the country. The only way to escape from this daunting challenge is the produce competent human resource specially in the arena of TVET.

From preliminary investigation and perception of the TVET practitioners it is assumed that more than 92% so called existing TVET teachers, educators and other related professionals working in TVET institutes and related organizations specially in Polytechnic, TSC, TTC, MPO Vocational Schools and private TVET institutions, without any formal professional qualification in Bangladesh whereas worldwide there is no provision exist for being a teacher and others related educators without any teacher's training certificate/diploma/ degree in TVET institutes of secondary and post-secondary level.

1.2 Statement of the Problem

The effectiveness of TVET teacher education programs in Bangladesh's faces grave challenges. Despite the presence of two public teacher education and training institutes, Bangladesh faces a critical shortage of qualified TVET teachers, struggling to produce qualified educators. Stakeholders perceive these institutions as ineffective, lacking in producing professional teachers. TVET Teacher education qualifications are neither popular nor widely recognized, leading to unstructured teaching methods and assessment practices. The absence of standardized teacher education program, courses and relevance curricula hampers quality assurance in TVET. Furthermore, there's a lack of incentives for talented individuals to pursue teaching careers. The absence of a TVET teacher's qualification framework and a comprehensive plan for professional TVET teacher development is deteriorating the quality of TVET implementation. This situation disappoints TVET practitioners, development partners, and policymakers, necessitating urgent intervention in TVET sector for building a prosperous future Bangladesh.

1.3 Rationale of the Study

TMED targeted TVET enrollment 30% by 2030 in its National TVET action plan and announce that it will be reached to 41% by 4041. Government already uplift this enrollment from 3% in 2010 to 17.88 % in 2023 which were targeted 20% within 2020. But without sufficient number of qualified teachers, this increment could not serve the purpose of quality TVET, quality graduate and decent employment which is already visualized a horrible situation, going to face a quality disaster in the TVET sector. As per NEP-2010, in TVET, STR should be 12:1 in TVET institutes whereas it is now 51:1 to 81:1 in reality, varied from institute to institutes and department to departments.

Again, quality of teaching-learning as well as assessment in TVET subsector are still substandard, disputed and unexpected. Two public teacher's education and training institutes are almost nonfunctioning in the operation of mainstream teachers' education and training program offering diploma and degree in technical Education, with total of 240 trainee enrollment capacity without any standard vision, mission and operating procedure. The non-standard, non-recognized curricula, huge vacancies as well as non-trained existing teaching faculties and unplanned routine operations without any development thoughts, made the teachers' education and training institutions as white elephant except the provision of non-regular project based training for trainers and assessors for certification under NTVQF system. The above mentioned disappointing situation is vital to get rid of, getting productive novel and professional TVET

teachers, need to be addressed systematically in a data driven logical manner through methodological study and research. Hopefully this study initiatives will provide such a directional guide for the nation.

1.4 Research Questions

Considering the statement of the problems and rationale of the study, the following research questions have been addressed:

i. What is the present status and future demand of TVET educator's by2041 in Bangladesh?
ii. Are the TVET teachers' education programs and respective curricula relevant and fit to produce qualified TVET Educators for 21st century?
iii. Is the Technical Teachers Training College (TTTC) of Bangladesh have the capacity to meet the demand of producing qualified TVET educators?
iv. What are the gaps in TVET teachers' education programs, lacks in teacher education institutes, consequents of the gaps and lacks in TVET sector?

1.5 Visible Impact of the Research on TVET

The research finding on the effectiveness of the teachers' education program will be a great tool for the policy makers and TVET specialist to decide and frame a national TVET teachers and educator's qualification pathway, adapting 21st century skills, formulating new effective recruitment rules with inclusive skills-based promotion and incentives criteria, accreditation of TVET teachers training institutions and recognition the graduates. If the forthcoming research outcome properly addressed and taken in place for remedial actions, hopefully quantity and quality of TVET teachers, TVET graduates and TVET institutes will be enhanced and shall be reached into a national benchmark. If research findings are properly addressed and implemented, the graduates will also get the scope of works / contribute in professional and management position of TVET sector as well as with corporate level skills development partners locally and globally.

1.6 Definition of Terms

Competence and Competency:

Competence is the proven or demonstrated individual capacity to use know-how, skills, qualifications or knowledge in order to meet the usual, and changing, occupational situations and requirements (UNESCO 1984). As per ILO definition competence refers to the ability, encompassing knowledge, skills and attitudes of an individual to perform adequately in a job (ILO 2006). On the other hand, competency is the ability

to apply and use a set of related skills, knowledge, and abilities to successfully perform functions or tasks in a defined work setting (Commonwealth of Learning, TVET Professional Development Toolkit for the Pacific). An Individual's demonstrated ability to undertake tasks and duties to the standard expected in a job or in an occupation is called competency (ILO, 2006).

Didactic

Didactics refers to the science of teaching (in relation to aims, subject matter, methods, and frameworks) within a specific field. Didactics is based on multiple theories of teaching, and in a wider sense, theory and the practical application of teaching and learning methods. From a teacher-centred approach and based on a philosophical foundation, Meyer (2007) explains that "the German didactic tradition focuses on teaching aims, subject matter, methods and the organisational frame of teaching and learning"

Technical and vocational education and Training (TVET):

UNESCO-UNEVOC (Year???) defines TVET as "comprising education, training and skills development relating to a wide range of occupational fields, production, services and livelihoods," "as part of lifelong learning," and that it "can take place at secondary, post-secondary and tertiary levels and includes work based learning and continuing training and professional development which may lead to qualifications"

In other way, as per UNESCO definition, TVET is a comprehensive term referring to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life. Technical and vocational education is further understood to be: (a) an integral part of general education;(b) a means of preparing for occupational fields and for effective participation in the world of work;(c) an aspect of lifelong learning and a preparation for responsible citizenship]; (d) an instrument for promoting environmentally sound sustainable development;(e) a method of facilitating poverty alleviation (UNESCO, 2001).

'Technical and vocational education' refers to all forms and levels of the educational process involving, in addition to general knowledge, the study of technologies and related sciences and the acquisition of practical skills, know-how, attitudes and understanding relating to occupations in the various sectors of economic and social life (UNESCO, 1989).

TPACK:

TPACK, or Technological Pedagogical Content Knowledge, is a framework that identifies the knowledge, teachers need to teach effectively with technology. It integrates three primary forms of knowledge: content (CK), pedagogy (PK), and technology (TK). The intersection of these knowledge domains represents the complex interactions between them and highlights the importance of context in technology integration in teaching.

In precise, Mishra & Koehler (2006) define TPACK as “a framework that highlights the complex interplay of three primary forms of knowledge: Content (CK), Pedagogy (PK), and Technology (TK). Effective technology integration for teaching specific content or subject matter requires understanding and negotiating the relationships between these three components".

Practice Teaching:

Practice teaching, also known as teaching practicum or teaching internship, refers to a period of practical training in teaching where individuals, typically students pursuing education degrees or aspiring teachers, gain hands-on experience in a classroom setting under the guidance of a mentor teacher. Through practice teaching a student of education department gains experience in a classroom setting. It's essentially an apprenticeship under the guidance of a qualified teacher During this time, student teachers get to: 1) Apply educational theories learned in their coursework to real-world situations. 2) Develop and refine their teaching skills, including lesson planning, classroom management, and instructional delivery. 3) Gain experience interacting with students from diverse backgrounds and 4) Receive feedback and guidance from a mentor teacher.

Qualified TVET teacher:

A qualified TVET teacher is "an individual who has obtained the required academic credentials, professional teaching qualifications, and industry-specific experience necessary to deliver effective vocational and technical education and training" (UNESCO, 2015).

Educator:

Educator is an inclusive term referring to teachers at schools; lecturers at colleges, traditional universities, comprehensive universities, and universities of technology; trainers in workplaces; facilitators, assessors, moderators, and people teaching, educating, training, facilitating or assessing learners across the board.

Source: SAQA (South Africa), TVET Standard Glossary of Terms, 2013. As per International Standard Classification of Occupations (ISCO) the other designated educationist like curriculum specialist, learning material developers, education researchers, education administrators, Education institute managers and education directors are also treated as educators.

STEM Education, STEM Skills and STEM Graduates:

STEM Education refers to education curriculum that focuses heavily on the subjects of science, technology, engineering and mathematics (Midrack, 2022).

STEM Skills refers to the skills that expected to be held by people with a tertiary-education level degree in the subjects of science, technology, engineering and mathematics (European Commission (2016)

STEM graduate is someone who has earned a college degree in a field related to science, Technology, Engineering, or Mathematics (STEM). These fields are all considered to be important for innovation and economic growth, and STEM graduates are in high demand for many different jobs.

STEAM approach of Education:

In STEAM instructional approaches, teacher uses the techniques based on pre-determined STEAM contents considering context disciplinary instructional approaches during teaching learning process which help the students to achieve the learning outcomes through scientific inquiry. It enables students to use the proper steps and procedures while discovering innovative way of solving the problem using new self-generated knowledge based on previous experiences of learning from the learner.

1.7 Chapter and Section Outline of the Report

The research report is outline in major six chapters and quite a few sections in chapter five. **Chapter one** comprises the **introductory feature of the research** like background and rationale of the research, statement of the problem, research questions, visible impact of the research on TVET and definition of operational Terms

Chapter two and three illustrated by related **literature review** and encompasses **methodology of the research** including population, sampling procedure, scope and limitation of the study, tools of data collection and procedure of data analysis and a conceptual framework for conducting the study.

Chapter four stands the **result and interpretation**, presented in four parts-(i) present status and future demand of the categorical TVET educators in Bangladesh**, (ii)** program and course relevancy for producing qualified TVET educators, (iii) Institutional and organizational capacity of TTTC and (iv) professional development scenario of the non-alumni TVET teachers and the educators.

Chapter five, the most important part, is the **summary of the findings** of the research are presented in an organized manner includes **demand supply gaps of qualified TVET educators.** Gap in teachers' education **programs,** gap in teachers' education **course and contents,** lacks in **teachers' education institutes, consequents of the gaps & lacks** in TVET sector and the way out of mitigating the gaps & lacks for producing adequate qualified TVET educators and training implementers in Bangladesh.

Chapter six illustrated with the general **discussion, recommendation and conclusion** of the study including requirement of further study. This chapter also included a time bound **actions** as per recommendations followed by reference and appendix.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Technical and Vocational Education and Training (TVET) plays a crucial role in developing skilled workforce, boosting economic growth, and reducing unemployment. Bangladesh prioritizes TVET to equip individuals with industry-relevant skills and bridge the skills gap. However, the effectiveness of TVET hinges on qualified educators who can deliver practical knowledge and foster student employability. Among the 2030 agenda for sustainable development goals, quality education (SDG 4) is highlighted, urging nations to "ensuring inclusive and equitable quality education and promote lifelong learning opportunities for all. For achieving the SDG4, a big pool of trained, active, and committed teaching workforce is required. Only the competent teachers/educators who can play the key role in facilitating and providing a transformative and meaningful learning experiences that helps learners achieve their full potential as skilled productive workforce. This review examines the effectiveness of Bangladesh's TVET teacher education program, focusing on its capacity to meet future demands and the requirement for equipping educators with 21st-century competencies.

UNESCO education conference 2004 in its declaration stated – "if we consider education is the key for sustainable development than TVET is the master key for alleviation of poverty, promotion of peace and conservation of environment in order to quality of life and promote sustainable development". But the success of using this master key mostly depends on TVET teachers, trainers and other educators. TVET educators are the most influencing living elements, responsible to manipulate other components and actors. So TVET educators and training implementers are central to the success of TVET programs, responsible for imparting relevant skills and knowledge to students and trainees. This literature review explores existing research and other related scholarly remarks on the effectiveness of TVET teachers' education programs in Bangladesh considering the key research questions outlined in the study.

2.2 Summary of Literature Review

TVET programs, courses and implementing Institutes under BTEB:

There are 29 type of TVET programs and courses (Annexure V), offering by BTEB under its affiliated and accredited TVET institutes. The academic achievements of TVE students are recognized through trade certificate and various diploma. The recognition of training are provided by certificates. The trade courses in alignment with ISCED levels are-

1. Pre-vocational trade course like Junior (lower) Secondary School Certificate namely JSC (VOC) from grade VI to VIII.
2. Secondary School Certificate-SSC(VOC) comprising grade IX and X and
3. Higher Secondary School Certificate-HSC (VOC) / HSC (BMT) comprising grade XI and XII.

These secondary level academic programs like SSC (VOC) and HSC (VOC) are offered by BTEB in 52 different trade titles. Beside these academic courses there are other training programs and courses in certificate level comprising 121 different trades.

The **occupational training** under TVET and skills sector of BNQF also offering by different public and private registered training organization. These training organizations are fully equipped with certified trainers, required machine, tools and equipment, consumable materials, teaching aids, learning resources, furniture and other physical resources like infrastructure, lab / workshops, classroom and libraries. The number of such registered training organization (RTO) are 675 till now. The Number of occupational standards is 490, designed and placed in different BNQF levels from 1 to 6 under 256 occupations of 13 different sectors.

Two diploma programs for teaching professions are currently offering by BTEB. The programs are diploma in technical education (DTE) and diploma in vocational education (DVE). These two post diploma teachers' education programs of one-year duration in professional category run by TTTC and VTTI respectively in Bangladesh.

Trainers and Implementers' Training Program under NTVQF / BNQF in level 4, 5 and 6 are the most formal and effective trainers training program run by TTTC and VTTI as well as at least 1**2** other public and private RTOs. The trainers training courses are CBT&A methodology level-4 for the trainers and assessors, CBT&A methodology level-5 for master trainers and CBT&A methodology level-6 for the training managers /

implementers. This is the only structured trainers training program where more than 1600 trainers in level 4, 19 master trainers in level 5 and 10 TVET managers in level 6 are certified. This certification is awarded as per the structure of NTVQF / BNQF levels.

Diploma in engineering, diploma in textile engineering, Diploma in agriculture. Diploma in forestry, Diploma in marine technology are the main 4 years duration program offering by 50 public and more than 558 private polytechnics, SSC (VOC) and HSC (VOC) program is implementing through 141 public technical school and colleges. SSC (VOC) and Dhakhil (VOC) also offered by 2924 vocational Schools and 408 Dhakhil Madrasah. The HSC (VOC) program is running only by 64 public TSC and 01 company owned technical institute. The HSC (BMT), another popular program is implementing by 1913 private BMT college and 11 public TSC. A total of 34 type of programs and 346 type of courses/ specializations are implementing by 11118 TVET institutes. Against these 11,118 TVET institutes and huge number of programs and courses, only 01 teachers' education institute namely TTTC with 03 technical departments and 01 vocational teachers' training institute (VTTI) with 9 trade is **really a big and critical shortage of teachers education and training gap** in Bangladesh.

TVET teaching positions as per enrollment target:

Government of Bangladesh targeted TVET enrollment towards 30% by 2030 and 41% by 2041 from its current enrollment of 17.88%. Currently number of TVET teachers in Bangladesh are 51 thousand (Mak Khan, 2019). The number of existing TVET teachers are 3396 (DTE, 2020). After recruiting 1120 new teachers in 2022, number of TVET teachers in polytechnic and TSC become 4516. In addition, recently government created 12607 new positions of TVET teachers for public polytechnic and TSC under Directorate of Technical Education in revenue budget (TMED, 2020). Beside these public teaching positions more than 47 thousand TVET teachers are working in other 11,118 public and private polytechnic, technical institutions and vocational Schools in all over Bangladesh (BTEB, 2022-23).

Qualification of existing TVET teachers:

In Bangladesh teachers' education is not mandatory nor is it encouraged for being a TVET teacher. Unlike schools and colleges where to teach certain subject, a certificate or diploma or even a degree is encouraged through extra incentives in Bangladesh and mandatory in polytechnic and vocational institute or colleges of other countries, unfortunately Bangladesh do not have this provision in TVET sector. In this context there is a greater need for mandatory teacher's education and training programs which aim at equipping the teacher with new approaches to teaching, breakthroughs in pedagogy and providing insights into learning and teaching styles (Pillai, 2012).

The quality and effectiveness of current education and training is hampered by : (i) lack of trained teachers due to supply of very low number of graduates by TVET teacher education and 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 (51% in 2019) vacancy rate for teaching positions in public training institutions; (Mak Khan, 2019). The report on "Situation Analysis of Bangladesh TVET Sector: A background work for a TVET SWAp" suggested in its action plan that (1) the imparting teacher training to have more TVET certified trainers and (2) Rendering professional training and competency-based training (CBT) to teachers of technical education. In 2022, the teacher student ratio (TSR) for DTE institutes were 89.35, with a higher TSR of 108 for polytechnic institutes and corporately lower TSR of 63.36 for Technical School and College (TVET ASPR, 2023).

According to the recruitment rules of major TVET providers, one having academic diploma or degree in related technology or subject are eligible for being a TVET teachers in Bangladesh. The diploma and degree holders in technical education may also apply for the teaching positions but in most case, those are not prevailed during the recruitment or not recognized by the recruiting authority. The quality of TVET and its relevance for the national and international labor market is still behind expectations (Bibhuti Roy, 2020).

STEAM Instructional Approaches:

STEAM is an educational approach for learning that uses science, technology, engineering, the arts and mathematics as access points for guiding student inquiry, dialogue, and critical thinking- Susan M. Riley (2012). According to the definition of Fitria et al. (2018), STEAM is one of the most preferred interdisciplinary integrated curriculum to be taught in the last two decades. The five STEAM areas have

common and similar relationships, concepts, and rhythms. They can be taught based on interdependent ways of learning. They share very similar scientific and cognitive processes, critical thinking, problem solving, inquiry, and reasoning (Balague et al., 2016). Real life situations can be very beneficial to apply these areas and to discover new phenomenon (Pang & Good, 2000).

In STEAM instructional approaches, teacher uses the techniques based on pre-determined STEAM contents considering context disciplinary instructional approaches during teaching learning process which help the students to achieve the learning outcomes through scientific inquiry. It enables students to use the proper steps and procedures while discovering innovative way of solving the problem using new self-generated knowledge based on previous experiences of learning from the learner.

Thibaut et al. (2018) summarized the instructional categories used and emphasized in the majority of STEM education. The nine instructional categories are:

i. Integration of STEM disciplines,
ii. Focus on Problems,
iii. Inquiry,
iv. Design,
v. Cooperative Learning,
vi. Student-centered
vii. Hands-on,
viii. Assessment, and
ix. 21st century skills.

These instructional approaches are used as the guiding conceptual framework in the design of the STEM activity. The major advantages of this scientific inquiry-based learning are- opportunity of avoiding possible mistakes, eliminating wastage of time, and ensure practice of achieving the knowledge and skills mastery.

Through practicing this instructional approach, the students can synthesize different types of knowledge pieces in an organized way to be able to use them later when needed. When scientific inquiry is applied in teaching, learning can last for a long time. Long-term learning becomes a meaningful learning through transferring knowledge and performance to find solutions and take decisions (Sayuti & Rahiem, 2020). It also covered the learning achievement cognitive, psychomotor, affective domain of learning and ensured social constructivism and behaviorism in learner's mind.

Present Status and Future Demand of Categorical TVET Educators:

Understanding the present status and future demand of TVET educators requires a comprehensive analysis of the evolving needs of Bangladesh's workforce. Hossain and Alam (2018) emphasize the importance of aligning TVET teacher's education and training programs with the demands of TVET providers and ensure relevance and effectiveness of the program and courses. They argue that forecasting future demands for TVET educators is essential for strategic planning and resource allocation. Several studies highlight the rising demand for TVET educators in Bangladesh. The International Labour Organization (ILO) emphasizes the need for skilled workforce to achieve middle-income status and economic diversification. Research by Khan suggests that TVET graduates have higher employment rates, indicating a growing need for qualified trainers. However, forecasting specific categorical TVET educator demands by 2030 and 2041 requires further research.

Studies explore the international landscape of TVET educator career prospects. Researching international trends in skilled labor migration and industry demands alongside national development plans in Bangladesh can provide insights into future career opportunities for TVET educators (Hasan, 2023).

Competencies for 21st Century TVET Educators

The competencies for 21st-century TVET educators are multifaceted, reflecting the evolving demands of the modern workforce and educational landscape. To keep pace with the changes and prepare students for successful careers, TVET teachers and other educators require a unique skillset. Research by Bingimlas highlights the importance of integrating technology (ICT) into TVET teaching. Additionally, Khan emphasizes the need for a pedagogical model that integrates pedagogical content knowledge (PCK) with technological pedagogical content knowledge (TPCK). Studies exploring effective teaching methods for practical skills development and fostering innovation in TVET settings would also be valuable.

World Federation of Colleges and Polytechnics, in 2018, identified a list of competencies for a 21st century TVET educator, illustrated as the strong foundation in STEA(P)M principles. This includes a solid understanding of Subjective proficiency including Science, Technology, Engineering, Arts (including pedagogy), and Mathematics relevant to the specific TVET field.

Pedagogical expertise: Mastery of instructional techniques tailored to vocational subjects, including hands-on learning, project-based learning, workplace simulations, and effective assessment methods

Technological proficiency: The ability to integrate technology tools for lesson planning, presentations, demonstrations, assessments, and online learning methodologies where applicable.

Industry knowledge and currency: A strong grasp of engineering principles, industry-standard practices, troubleshooting techniques, and safety protocols specific to the TVET domain

Curriculum development skills: The ability to design and develop TVET programs that align with industry standards and prepare students for workplace requirements

Effective communication and collaboration: The ability to communicate complex technical concepts clearly, collaborate with industry partners, and foster a positive learning environment for diverse learners

Lifelong learning mindset: A commitment to continuous professional development to stay updated with advancements in technology, pedagogy, and industry practices

Relevance of TVET Teacher Education Program:

The relevance and effectiveness of TVET teacher education programs are critical for producing educators equipped with the competencies needed for the 21st century workforce. Rahman and Islam (2020) highlight the importance of updating curricula and pedagogical approaches to meet the changing needs of industries and technologies. They stress the need for a shift towards competency-based education to ensure graduates are equipped with practical skills and knowledge.

Capacity of Public TVET Teachers' Education Institutes

Historical background of the public TVET teachers' education:

The establishment of the Technical Teachers Training College (TTTC) dates back to 1960 as the teachers' wing of the Dhaka Polytechnic Institute. It underwent rapid growth and development and in 1964 emerged as a separate college called the Technical Education College (TEC). In 1967 the college was renamed the Technical Teachers Training College. In 1981, with opening of a separate Engineering College (Presently DUET) on the campus of TTTC it suffered a break in its activities. TTTC was reborn in 1986 with renewed philosophy and naturally with activities in tune with modern trends in the arena of training of the technical teachers internationally. TTTC owes it growth and development since its rebirth mostly to the technical assistance provided by ODA of UK. (https://tttc.edu.bd/) . On the other hand the only Vocational Techers Training Institute in Bogura was established in 1976 for the professional training of the vocational teachers.

The capacity of this unique public TVET teachers education institutes in Bangladesh is fundamental in meeting the demand for qualified TVET educators. Kabir and Haque (2019) conducted a study evaluating the infrastructure, faculty expertise, and resources of TTTCs in Bangladesh. They identified challenges such as inadequate funding, outdated facilities, and a shortage of qualified faculties, which hinder the institutes' capacity to produce competent educators. However, studies by Islam highlight broader challenges within the TVET system, including a lack of trained teachers and inadequate resources. Further research is needed to assess the capacity of TTTCs in terms of faculty expertise, curriculum alignment with 21st-century skills, and infrastructure to accommodate potential increases in teacher training needs.

Views and Expectations of TVET Teachers

Understanding the perspectives of TVET teachers who lack access to formal teacher education programs is crucial for identifying areas of improvement. Hasan et al. (2017) conducted interviews with practicing TVET instructors in Bangladesh to explore their experiences and challenges. They found that many teachers expressed a desire for professional development opportunities and access to advanced training programs to enhance their teaching effectiveness. Research on teacher professional development aspect in Bangladesh, by Hasan, suggested for conducting surveys or interviews with the existing TVET teachers on their needs and challenges, can reveal their experiences, preferred training methods, and expectations from TVET teacher education programs.

Career Prospects of TVET Educators

Exploring the potentials and career prospects of TVET educators both nationally and internationally provides insights into the attractiveness of the profession and opportunities for growth. Rahman (2019) conducted a survey of TVET graduates in Bangladesh to assess their career trajectories and aspirations. The study found that while many graduates found employment in various TVET institutes, there were concerns about limited upward mobility and professional recognition.

Gaps in TVET Teachers' Education Programs

Identifying gaps in TVET teachers' education programs and institutes is essential for improving the overall effectiveness of the TVET sector. Ahmed et al. (2021) conducted a comprehensive review of existing literature to identify common challenges and shortcomings. They highlighted issues such as outdated curricula, inadequate practical training opportunities, and a lack of coordination between education providers and industries. Several potential gaps in the TVET teacher education program can be identified

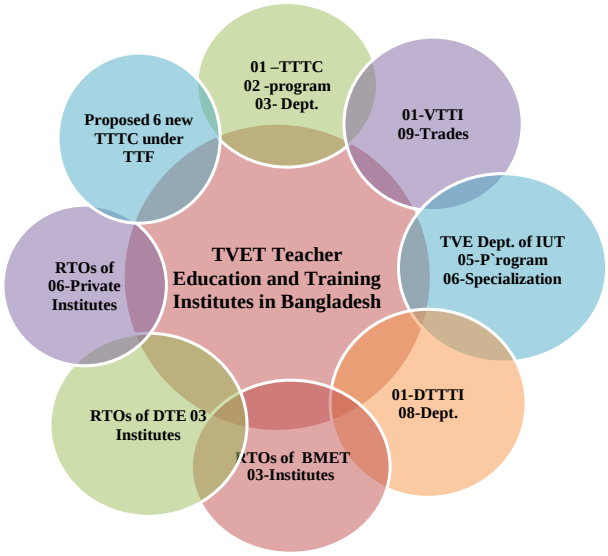
based on the existing literature. These include: A potential mismatch between the curriculum and 21st-century skills required by TVET educators, A lack of collaboration between TVET teacher's education institutions and the TVET institutes where the graduates of teacher's education programs might be employed including the industries, potentially resulting in programs not aligned with market demands and A shortage of trained TVET teacher / trainers and limited in-service training opportunities for existing instructors

Frameworks for addressing these gaps might include Curriculum Reform: Developing TVET teacher education programs that integrate 21st-century skills, pedagogical approaches for practical skills development, and effective use of technology in TVET classrooms. Industry Partnerships: Establishing stronger partnerships between TVET institutions and industries to ensure curriculum development reflects current industry needs and facilitates internship opportunities for trainees. Enhanced Teacher Training: Investing in training programs for current and future TVET teacher trainers and promoting continuous professional development for existing instructors.

TVET teacher's education and Training Institutes in Bangladesh:

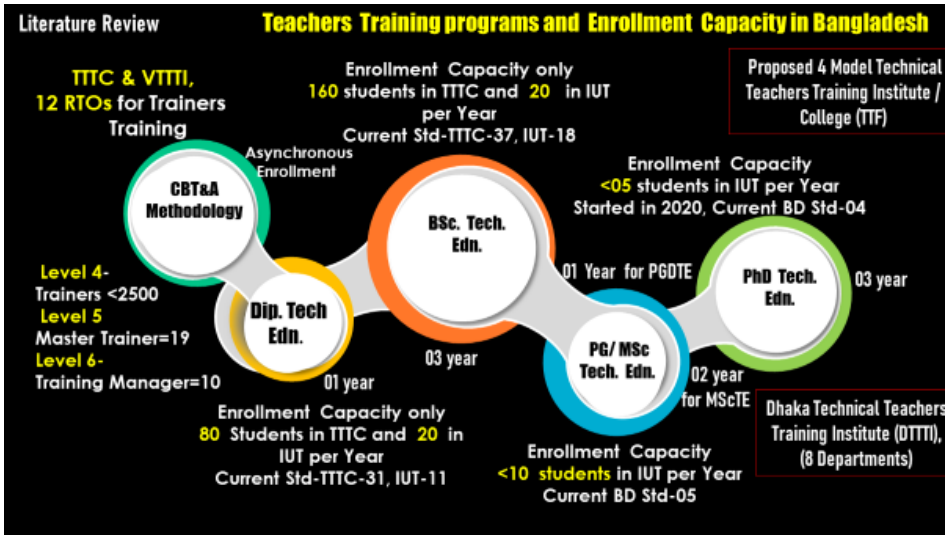
There are two public technical and vocational teachers training institutes exist in Bangladesh. One is Technical Teachers Training College (TTTC) and another is vocational teachers training institute (VTTI). TTTC established in 1966 for providing teachers education and training in the area of pedagogical aspect of teaching and learning and related technical subjects. Initially this specialized teacher training college was dedicated only for the polytechnic teachers but now it is open for all in two separate batch, in service for the employed teachers and pre-service for those whom want to be a TVET teachers in future. There are two academic teacher's education programs now offering in TTTC. (a) 01 years diploma in technical education and (b) 02 years bachelor of technical education. Both the programs offering under 3 different ongoing departments- namely (i) civil engineering, (ii) electrical and electronic engineering and (iii) mechanical engineering. The accrediting and certificate giving authority for diploma in technical education and bachelor of technical education are Bangladesh Technical Education Board and University of Dhaka respectively.

Figure 2.01: TVET Teachers Education and Training Institutes in Bangladesh



Enrollment capacity of 02 academic programs within 03 ongoing departments of TTTC is 240 per session in a year. On the other hand, Vocational Teachers Training Institute (VTTI) established in 1979 in Bogura but formally inaugurated in 1982. Initially this institute was established with 08 academic trainers training trade course of one year duration focusing the pedagogy as well as trade course training of vocational teachers. This certificate course in vocational education was affiliated by BTEB but it is not in operation since last two decade.

Figure 2.02: Summary of literature review on TVET teacher education and training programs including enrollment capacity.



TVET Teachers Education and training programs and corresponding enrollment status in Bangladesh

HR (Teacher and staff) Strength of TTTC and VTTI:

According to the annual report 2021-2022 published in DTE website the status of teachers and staffs in TTTC and VTTI are illustrated as

Table 2.01: Status of the teaching faculties and staff in TTTC and VTTI

Sl. No	Institute	Approved Positions			Occupied Positions			Vacant positions		
		Cadre	Non-Cadre	Total	Cadre	Non-Cadre	Total	Cadre	Non cadre	Total
1	TTTC	16	179	195	6	24	30	10	155	165
2	VTTI	19	177	196	1	40	41	18	137	155

TVE department of IUT an Organization of Islamic Conference (OIC) is an intergovernmental organization initially established namely ICTVTR focusing the teacher training for TVET sub sector but now mostly offering engineering programs in different faculties alone with teachers' education program namely DTE, BScTE, MScTE and PhD with capacity of maximum 20 teachers from Bangladesh. Government also taken different initiative to establish more teachers training college / institutes for continuous professional development of the TVET teachers under TVET Teacher for Future (TTF) project. Recently a teachers'

training institute namely Dhaka Technical Teachers' Training Institute (DTTTI) is established for the capacity building of the teachers / trainers of TTC and IMT under BMET of Ministry of Expatriates' Welfare and Overseas Employment (MoEWOE).

Government in Bangladesh given highest priority on TVET. Different projects and programs have been taken for improving the quality of teaching learning environment. In education policy 2010 chapter-5, it is stated that student teacher ratio (STR) in TVET will be 12:1 whereas current STR in TVET is more than 50:1. According to the study report current estimated TVET Teachers are 0.051 million, projected TVET teacher's requirement by 2021 will be 0.122112 million and it will be increased to 0.4 million by 2030 based on STR 20:1 (estimated by TVET Task force Committee). No holistic TVET Teachers Qualification Framework exist in Bangladesh except provision only for NTVQF.

Currently, the professional development of TVET teachers in Bangladesh is flowing in two separate streams. One is the mandatory certification of the existing and upcoming trainers through structured training program in different level of trainers' qualifications under NTVQF / BNQF system and another is the achievement of traditional academic qualification of education like diploma in technical education (DTE) and Bachelor of Science in technical education (BScTE) through the conventional TVET teachers' education qualification programs. The programs and courses of these two streams are illustrated below.

TVET Trainers Training Qualification Stream under Qualification Framework:

The trainers and training implementers qualification stream was introduced in Bangladesh since 2012. The qualifications are offering by BTEB / NSDA registered Training Organization (RTO) in 3 different BNQF / NTVQF levels. The qualifications are specified for the 3 group of TVET trainers and training implementers. The groups are (i) Trainers & assessors (ii) Master trainers and (iii) Training managers. The nomenclature of the qualification for the trainers & assessors, the master trainers and the training managers are respectively CBT&A methodology level 4, CBT&A methodology level 5 and CBT&A methodology level 6. The competency list with duration and levels of the units for those 03 separate qualification levels are illustrated in the table's xx, xx, xx.

Table 2.02: Course Structure for National Certificate in CBT&A Methodology for Trainers & Assessors, Level-4

Sl. No.	Units of Competency (UoC)	BNQF Level	Nominal Hours
1	Work effectively within Bangladesh TVET sector	4	40
2	Promote inclusive learning in a CBT&A environment	4	20
3	Apply OSH practices in a CBT&A environment	4	15
4	Use ICT to Facilitate Teaching and Learning	4	45
5	Maintain training equipment and facilities	4	15
6	Maintain and enhance professional &technical competency	4	30
7	Design and modify CBT learning materials and resources	4	40
8	Organize competency-based training sessions	4	20
9	Deliver competency-based training	4	40
10	Design competency-based assessment	4	25
11	Develop competency Based assessment tool	4	40
12	Organize and conduct competency-based assessment	4	30
			360

Table 2.03: Course Structure for National Certificate in CBT&A Methodology for Trainers & Assessors, Level- 5

Sl. No.	Units of Competency (UoC)	BNQF Level	Nominal Hours
13	Conducting training need analysis (TNA)	5	40
14	Design and develop competency-based learning program	5	30
15	Validate competency-based assessment	5	20
16	Coordinate training and assessment arrangements	5	30
17	Evaluate competency-based training and assessment	5	30
18	Facilitate training of TVET teachers and trainers	5	40
19	Facilitate and develop competency standards	5	40
20	Develop digital contents for face to face delivery	5	40
Total hours of mandatory unit of competency			**270**
21	Facilitate e-learning (elective)	5	30

Table 2.04: Course Structure of National Certificate in CBT&A Methodology for TVET managers and Implementers, Level 6

Sl. No.	Units of Competency (UoC)	BNQF Level	Nominal Hours
1	Work effectively within Bangladesh TVET sector	4	40
2	Promote inclusive learning in a CBT&A environment	4	20
3	Implement competency-based training & assessment	6	60
4	Facilitate quality assurance through Accreditation	6	30
5	Perform TVET institution management	6	70
6	Work in partnership with industry, enterprises and community groups	6	50
	Total hours of mandatory unit of competency		**270**
7	Conduct Research & Extension Activities (Elective)	6	50
8	Facilitate e-learning (Elective)	5	30

TVET Teachers' Education Qualification Stream:

Under the conventional teacher's education stream, there are 5 levels of teachers' education program currently providing by TTTC and TVE Department of IUT in Bangladesh. These are Diploma in

Technical Education (DTE) , Bachelor of Technical Education (BScTE), Post Graduate diploma in Technical Education (PGDTE) , Masters in Technical Education (MScTE) and PhD in Technical Education.

First two programs are offering by both TTTC and TVE department of IUT but rest 3 higher teachers education programs are currently providing by only by TVE department of IUT in Bangladesh. A new TVET teachers' education and training institute under BMET is established recently, completed the development of the curricula for offering DTE, BScTE and PGDTE programs. Those teacher's education and training programs will be offered for the professional development of the pre-service trainers and instructors of different TTC and IMT respectively. The teacher's education providers, their programs, duration of the programs, entry qualification, seat capacity, number of current students of different programs are illustrated in the following table.

Table 2.05: Teachers education providers, programs, duration, entry qualification, seat capacity, number of students of different programs

Sl. No	Teachers Education Providers	Program Name	Duration	Seat Capacity	Number of Current Students		Remarks
					In-Service	Pre-Service	
1	TTTC	DTE	01 year	15 seat x 03 dept. x 2 shift =90	E2+M2+ C2 Total -06	E6+M12+C 7 Total -25	31 students out of 90 seats
		BScTE	02 year	15 seat x 03 department x 2 shift x 2 years =180	E00+M4+C 3 Total-07	E13+M11+ C6 Total-30	37 students out of 180 seats
2	TVE dept. of IUT	DTE	01 year	10	07		Shown seat capacity is only for BD students
		BScTE	03 year	<10	05		
		PGDTE	01 year	<10	00		
		MScTE	02 year	<10	05		
		PhDTE	03 year	<05	03		
3	DTTTI	DTE	01 year	-	00		Curricula developed, yet started
		BScTE	02 year	-			
		PGDTE	01 year	-			
4	VTTI	CVE	01 year	-	00		
Total Seat Capacity				315	Total Current Students		88

Legends: CVE-Certificate in Vocational Education, DTE- Diploma in Technical Education, BScTE- Bachelor in Technical Education, PGDTE- Post Graduate in Technical Education, MScTE- Master of Science in Technical Education, PhDTE- Doctor of Philosophy in Technical Education, E-Electrical and electronics , M-Mechanical , C-Civil

So, some of the major issues and challenges in conventional TVET teachers' education stream are identified as -

- Professional teachers' education qualification and certification are not the requirement for being a teacher in TVET sectors of Bangladesh.

- Teachers are always recruited based on their qualification on specific engineering / technology like diploma or degree in engineering or specific general subjects like physics.
- Separate diploma or degree in education or subject didactic pedagogical qualification is not either the requirement or encouraging in Bangladesh TVET system.

So, the teachers are teaching and assessing their students based on their subjective knowledge and experiences gained during the study period of their technical course or general subjects only. Although a mandatory certification in 3 qualification levels has been adopted for the training system of Bangladesh for the trainers and assessors, master trainers and the training managers under NTVQF since 2012 but no such teachers' qualification framework or teachers' licensing provision has yet been developed for the TVE teachers and other related educators. Even this TVET teachers' education program as well as the qualifications are not practically encouraging or incentivizing by the recruiting authority through there was a provision that the graduates having diploma / degree in technical education will be given preference during the recruitment process practically it was never taken under consideration.

As a result, teachers' education programs like diploma and degree in technical education are not either demanded nor becoming popular among the TVET teachers. The image of this qualification is declining in the society, even in the TVET institutes. Consequent of this non-acceptability and image crisis the teachers' education and training institute like TTTC and VTTI could not met the national requirements both in quantity and in quality. These constraints of TVET teachers' education program also discourages the talents TVET graduates for becoming a TVET teacher which also declining the enrollment in teachers' education programs. So now a days the enrollment in TVET teachers' education are becoming very negligible comparing with the requirements in TVET teaching positions. In this circumstances reformation of TVET teacher's education and training system is high demand as government given highest priority on TVET. So, the recruitment and entry qualification for being a TVET teacher need to be changed for making it an effective and popular course.

2.3 Conclusions of The Literature Review

This review highlights the need for a study of the effectiveness of Bangladesh's TVET teacher education program. This literature review gives a comprehensive idea on research requirement to forecast the demand of TVET educators, identify the key performance indicators to assess the effectiveness of a TVET teachers education program, broad area of skills and competences required for a 21st century educator as well as the way out of assessing the capacity of the teacher's education institutes. By addressing and

referencing the identified education and training issues for TVET teachers, considering the context of literature review and based on the researcher's experiences in the field, a conceptual framework of the study is developed as a guide for conducting the whole research shown in figure 2.03.

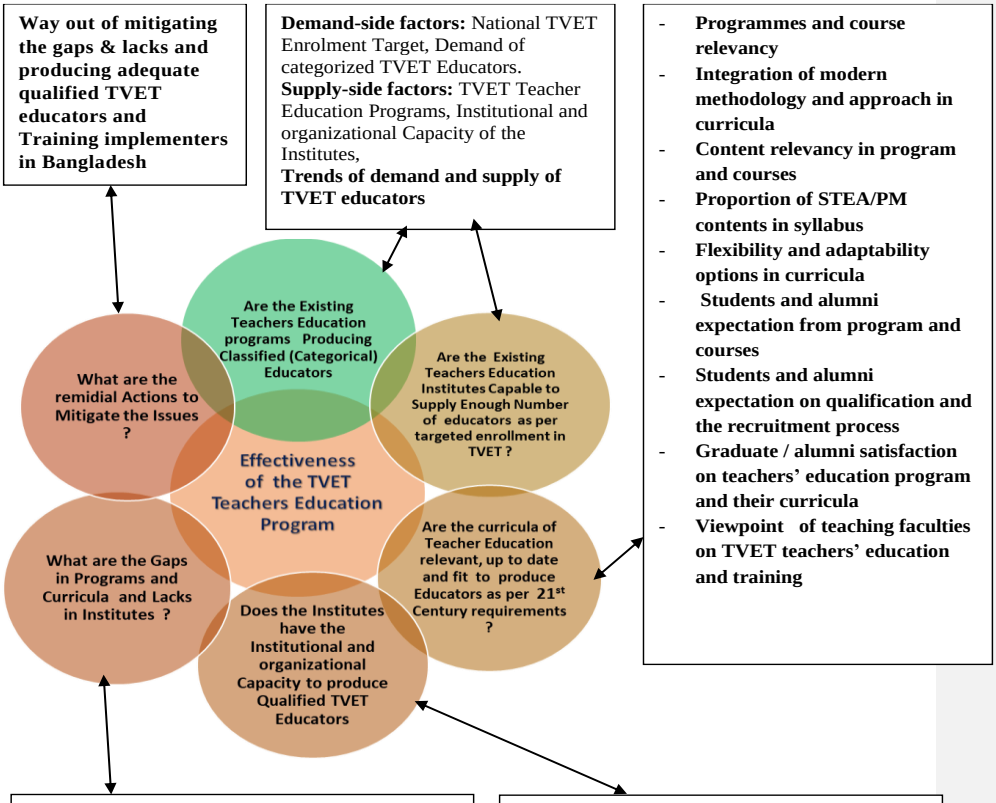
2.4 Conceptual framework of the study

The research is guided by a **conceptual framework** that considers the following key elements.

The conceptual framework of the study was designed based on the key questions like –
Are the existing teacher's education programs producing classified / categorical educators? Are the existing teacher's education institutes capable to supply sufficient number of TVET educators as per targeted enrollment requirement in TVET? Are the curricula of teacher education programs relevant, up to date and fit to produce educators as per 21st century requirements? Does the institute have the institutional and organizational capacity to produce qualified TVET educators? and What are the gaps in education program and the curricula and lacks in institutes.

Based on the 04 research questions a total of 29 key issues were determined. Then 82 Key performance indicators (KPI) of the research were taken out by analyzing the key issues and design a research matrix (Appendix-. Considering the research matrix, a conceptual framework of the study was developed as shown in figure 2.03.

Figure 2.03: Conceptual framework of the study



CHAPTER THREE: METHODOLOGY

In order to achieve the objectives within the scope and limitation of the research, a methodology combining desk review, field investigation, survey, FGD and face to face / online key informant interviews with heads of departments / institutions are conducted. Both quantitative and qualitative methods are used for the study. Desk review with analysis of secondary data and use of survey questionnaire for collecting primary data were the main technique of data collection. Observation checklist and structured data collection form are used to collect real time and secondary data during the field visit and site observation respectively.

The research was started with a desk review of the documents available in relevant organizations and documents retrieved from other sources like public authorities, internet search, online libraries of research institutes and international organisations like ILO, OECD, World Bank, ADB, etc. An engaged open discussion with world renown TVET experts in UNESCO UNIVOC TVET Forum is conducted for collecting and formulating opinion, experiences and expertise on TVET teachers' qualification and required competencies. The type of documents like Bangladesh standard Classification of Occupations (BSCO), teacher training and assessment standards, program and course curricula, legislative documents and policies, BNQF level descriptions, recruitment rules student's entry requirements in teacher's education program, functional profiles of TVET teachers, national and international quality assurance policies, regulations and teachers' certification procedures are accessed and analysed. Based on that study information a research design matrix was formed and prepared the research instruments. The used instruments were survey questionnaires, FGD guide and the KII guideline.

Survey questionnaires were used for data collection from both alumni and current students of TTTC and the alumni of TVE department of IUT. Data collection was also undertaken through survey questionnaire from non-alumni tech and non-tech teachers of polytechnics. For better understanding and clarifications an FGD had been conducted with selected potential teaching faculties of technical teachers training college (TTTC).

The findings from the desk research and survey questionnaire were checked and validated by related stakeholders. A focus group interview (FGI) followed by Focus Group Discussion (FGD) with faculties of TTTC was conducted for collecting qualitative data. The primary quantitative data collected as preliminary findings through survey questionnaires are also discuss in FGD for further clarification. Other qualitative data are extracted by on-line and face to face interviews with the related key informants were completed

where the critical issues are raised and clarified. First findings from desk review and field survey were also clarified during the KII. Triangulation of analyzed data are made for remedial solutions of the problem found in primary survey. Fortunately, two unplanned but very effective FGDs were conducted at the directorate of technical education presided by director general with his team and at technical and madrasah education division of ministry of education presided by the secretary with his team. The preliminary findings were presented in the FGDs and very insightful data, information and suggestions were informed from the FGDs and incorporated in the report.

3.1 Research Design Considerations

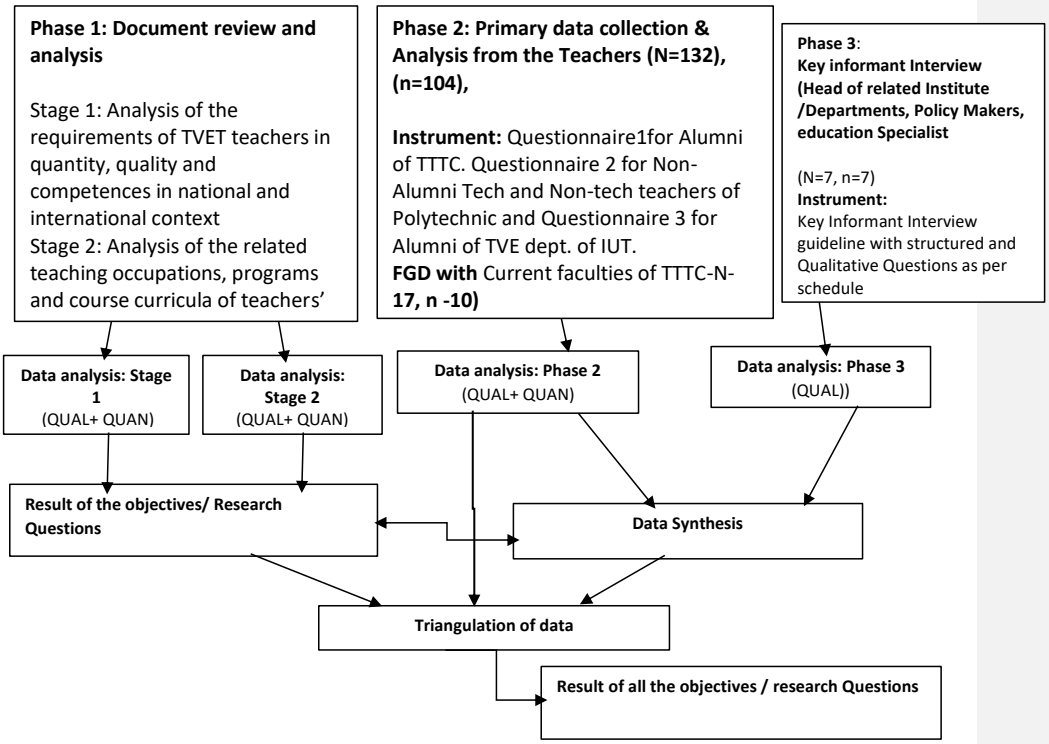
The research was planned based on a sequential mix method design approach. For making the research worthwhile and purposeful, both quantitative and qualitative method of study is used. On the basis of planned methodology, the following points are considered during the design of research activities-

a) National policy review on TVET enrolment target, category of existing TVET educators & training implementers and their categorical demand and trends of increasing teachers, projection of teacher's requirements up to 2041, way out for quantifying them in alignment with the group of Bangladesh Standard Classification of Occupations (BSCO) and challenge as well as the prospect of preparing categorical TVET educators and training implementers.
b) Existence of TVET teacher qualifications providing organizations in Bangladesh (TTTC, VTTI, TVE department of IUT and DTTTI), their current status and functionality.
c) Availability of teacher education and Training programs with different levels of qualifications and the barrier of exploring the formal teacher's education in Bangladesh.
d) Challenge in continuous professional development of TVET teachers, issues related to build career pathway in TVET teaching profession including the potentiality of being TVET teacher in near future.
e) Impact of nonexistence of a holistic TVET teachers / educators qualification framework in Bangladesh.
f) Government's recent initiatives for the development of TVET teachers and trainers through pre-service and in-service education and training programs and projects.

Considering the above criteria and on a quick scan of some good practice countries offering teacher education program, those have established and strong TVET system is used for determining benchmarking key performance indicator in the research. The importance has been given to the quantity of categorical TVET educators, training implementers, their professional qualifications, quality of teachers' education program, the present status of TVET educator's qualifications at different levels and categories. TVET teacher's education structure, and the availability of sufficient documentation on TVET teacher

development are also taken under consideration. On the basis of research, students of teacher education, alumni, faculties, specialist, TVET managers and policy makers in the sector are engaged for opinion. Research questions are used for conducting the study which includes different type of research instruments.

Figure 3.01: Research Design



3.2 Sample and Sample Size

The total population in the study were 139. Both stratified as well as purposive sampling method are used in the study. Whole population will be classified in five categories. (a) TVET policy makers, principals, TVET experts and professionals, (b) alumni of TTTC, (c) alumni of TVE department of IUT, (d) Non-alumni tech and non-tech teachers and (e) teaching faculties of TTTC are the main categorical respondents of the research. The total identified population were 138 and the sample size was 111.

During stratifying the sample size while selecting respondents it was ensured that all categories are adequately represented. Within the sample size at least 10% female representation from each category are ensured. Slovin's Formula: Sample size (n) = N / ($1+Ne^2$)), Where N=Population size, e= margin of error. with 10% margin of error(e) is used for determining the sample size.

Table 3.01A:Category of population and sample for survey questionnaire (Stratified Purposive Sampling)

Category of Respondents		Population (N)	Sample size(n)
Alumni	Alumni of TTTC	40	32
	Alumni of TVE dept. of IUT	40	32
Non-Alumni Teachers	Tech Teachers	20	16
	Non-Tech Teachers	20	16

Table 3.01B: Category of respondents for FGD and KII

Respondent Categories	Number of Targeted Respondents (N)	Number of Participants (n)	Purposive Sampling	
			Res-Type-1	Res-Type-2
Teaching faculties of TTTC	13	10	Tech Faculties 08	Non-Tech Faculties - 02
Director planning of DTE, Head of TTTC, Curriculum Director of BTEB, Expert of VTTI and Special Alumni (SA) of TTTC	05	05	DTE- 01 BTEB-01 TTTC-01	VTTI-01 Special Alumni-01

3.4 Data Collection Tools

A total of 03 data collection instruments were used in the research. (i) Survey questionnaires, (ii) Focus Group Interview / Discussion Guide and (iii) Key Informant Interview guideline. Three separate survey questionnaires are used for collecting primary data from alumni of TTTC, alumni of TVE department of IUT and the Non-Alumni TVET teachers of polytechnics respectively. Both the quantitative and qualitative questions are used in all three type of survey questionnaires. The pattern of questions comprising close as well as open ended questions. Some important rating scale questions / statements are also included in the survey questionnaires for extracting the degree of views, expectation and satisfaction.

An FGI/D guide is used for collecting data and information from faculties of TTTC. KII guideline is used to gather qualitative data from key informant as well as clarifying about the drafted result of the preliminary study.

Source and technique of collecting secondary data:

Secondary data and information are collected from related TVET teacher's education and training organization, related national documents and reports produced by the organizations and development partners. National and international journals also be accessed for related information. Data and information also collected through field visit as well as other convenient ways from archives of academic and administrative authority. Documents of other selected countries are collected by searching Google and Google Scholars. Some related documents are accessed through Scopus. Both desk and desktop review are made for literature review as well as analysis of secondary data.

Source and technique of collecting primary data:

Distribution and collection of the hard copy of semi structured questionnaires to the individual respondents are the main technique of primary data sourcing. The technique of sending and receiving softcopy to and from the respondents through mail and WhatsApp are also applied for collecting primary data. Qualitative primary data are collected using FGI/ FGD guide and KII guideline mostly asking qualitative questions and also clarifying the issues raised during the collection and analysis of other primary and secondary data found through desk review and survey questionnaires. A research matrix has been illustrated where source of data and methods of data collection including tools, issues and key performance indicators / variable are drafted against the individual research questions. The data source,

population size, sample size, sampling methods, criteria of selecting respondents and corresponding data collection instruments are shown in following Matrix.

3.5 Data Analysis tools and techniques

Data entry and data analysis for the survey questionnaires are made using SPSS. Quantitative data were analyzed by the statistical tools of the mentioned software. Spreadsheet analysis and word processing software also used to create graph/ chart and writing the report. For analyses of the data and information from the FGD guiding questions and KII, a cognitive analytical framework was made with matrix of higher order cognitive statement.

3.5.1 Analysis of secondary data

A systematic approach was used for analyzing the secondary data. First, clearly define the related research question to ensure the secondary data is relevant. Next, thoroughly evaluate the data sources and placed in tabular form with maintaining the reliability and validity. Utilize statistical software to manage and analyze the data, employing techniques such as trend analysis, factor analysis, or meta-analysis, depending on the nature of the data and objectives. Triangulate findings with multiple sources are made to enhance credibility. Finally, interpret results in the context of existing literature, noting limitations in the secondary data.

3.5.2 Analysis of quantitative data

The primary data collected through semi-structured questionnaires were entered into a pre-structured, coded format in SPSS and analyzed using statistical tools. For Analyzing quantitative data, first of all data were cleaned and prepared for analysis, ensuring accuracy and consistency. Then the descriptive statistics, such as summarizing the data's characteristics in the form of means and median were made. This provides an overview of the dataset. The inferential statistics like trend analysis were also employed to see the relationships or differences between variables. The qualitative data were organized in a sequential and logical manner. To draw conclusions from the qualitative data, consensus was reached through detailed discussions with TTTC faculties and key informants. This approach ensured that the qualitative insights were thoroughly examined and validated. By combining statistical analysis for quantitative data with consensus-driven conclusions for qualitative data, a comprehensive understanding of the survey results was achieved. This method allowed for a robust analysis that integrated multiple perspectives and provided a nuanced view of the findings. These analyses help draw conclusions about the population

based on the sample data. Additionally, data visualization techniques, such as chart and graphs were made as the aid in understanding patterns and trends within the data. Finally, interpreted the results in the context of the research objectives and draw a meaningful conclusion for informing decision-making or further research endeavors.

3.5.3 Analysis of qualitative data

The analysis of data from the focus group interview and discussions (FGI/D) with the teaching faculties of the technical teachers training college reveals several key insights. 10 Participants, representing each department, provided written responses and engaged in open discussions, highlighting both individual and collective perspectives. The analysis of data from the focus group interview and discussions (FGI/D) with the teaching faculties involved written responses and recorded discussions were transcribed verbatim to ensure accuracy. Next, a thematic analysis was conducted: the data were systematically coded to identify recurring themes and patterns. These themes were categorized under major headings such as career development opportunities of the faculties, quality of teaching-learning environments and activities, program and course relevancy, promotions of graduate recruitment, salary and graduate's satisfaction. Within each category, sub-themes were identified to capture specific issues and insights. Comparative analysis was then performed to highlight commonalities and differences among departments. Triangulation was used by comparing the primary data collected from survey questionnaires and individual written answers from FGD with open discussion points to validate findings. Finally, the data were synthesized to propose actionable solutions, ensuring that the analysis was grounded in the participants' perspectives and addressed the identified challenges comprehensively.

Five key informants were interviewed to discuss the cross-cutting issues identified in the research findings. The intent of the Key Informant Interviews (KII) was to gather their opinions, suggestions, answers to queries, and related insightful recommendations. The key informants included the principal of TTTC, the Curriculum Director of BTEB, the Director of Planning of DTE, and a special alumnus of TTTC. These informants were directly involved in planning teachers' education programs, developing courses, or program implementation. Additionally, a special deprived alumnus, who graduated with a BScTE from TTTC, was interviewed as a case study to address issues regarding the recognition of the two-year teachers' education degree program implemented under the University of Dhaka. Their expert opinions were recorded through pre-scheduled, structured individual interviews.

3.6 Ethical Considerations

During the whole study phase and process, we demonstrate our highest commitment to ethical research practices considering the following ethical point of views

Informed Consent: We obtained informed consent from all participants in the study, explaining the purpose of the research, the data collection methods, potential risks and benefits, and participants' right to withdraw at any time. We also ensured the consent forms were written in clear and understandable language, appropriate for the participants' educational background.

Confidentiality and Anonymity: We described the measures taken to protect the confidentiality of participants' data including anonymizing data during collection and analysis, using pseudonyms in reports, and storing data securely. We also clarified whether we obtained completely anonymous data or confidential data We discussed the potential benefits of the research for TVET teacher education programs and the wider educational community in Bangladesh and acknowledged that there are no potential risks associated with the research. We also described the methods used to collect data and how these methods ensured participants' well-being and privacy

Voluntary Participation: We emphasized that participation in the study was voluntary and participants faced no pressure or coercion to participate and explained how we ensured participants understood their right to withdraw from the research at any point without penalty.

Ethical Review: We mentioned the respondents that the research protocol received ethical approval from the relevant organization and encountered no ethical challenges during the research because we briefly mentioned the ethical codes or guidelines we followed throughout the research process. We maintained all the research principles and ensured the transparency and trustworthiness of the findings.

3.7 Scope and Limitation of the Study

Due to the constraints of time and cost and jurisdiction to work in a specific geographical area, the research works have been kept under some scope and limitation. This study is focused only to the teachers' education program under TTTC and purposively excluded the area of trainers training, other training initiatives under CPD and discrete short teachers training programs. No enough related in-depth research study was found for secondary data collection and analysis. Again scope of getting secondary

data and information for the proposed study in Bangladesh through journal is very limited. Some related but discrete study, workshop reports and conference proceeding are accessed through paper books, in the site of development partners and newspapers. A number of international sources of such type of information are accessed through online search. The UNESCO-UNIVOC TVET forum is a good scope and opportunity to discuss the issues and getting data, information and suggestion on the related topics of other countries. For investigating the primary data from the related organizations, alumni, faculties and TVET teachers mostly in and surrounding Dhaka were accessed and got collaborative support from the respondents. Other information and data are collected through online communication. Initially the students of the teachers' education program were taken under the study but due to unavailability of enough data from the trainee students, this group of respondents were excluded in the study.

CHAPTER FOUR: RESULTS AND INTERPRETATION

This chapter stands the result and interpretation, presented in four parts-(i) present status and future demand of the categorical TVET educators in Bangladesh**, (ii)** program and course relevancy for producing qualified TVET educators, (iii) Institutional and organizational capacity of TTTC and (iv) professional development scenario of the non-alumni TVET teachers and the educators.

Part one included national TVET enrollment target and corresponding enrollment trends in Bangladesh. Since 2008. Category of TVET educators and occupation wise projected number of TVET educators and training implementer's requirement by 2041. Enrollment status of students in corresponding TVET teachers' education programs. This part also included the non-inclusive accessibility of TVET teachers in teachers' education program and career prospect of TVET educators

Part two included the program and contents relevancy in courses, integration of modern methodology and approach in curriculum, existence of soft skills, employability skills, and transversal skills as contents in syllabus, didactic methods of teaching and TPACK approach as well as twenty first century skills sets in courses. This chapter also deals with proportion of STEA/(P)M contents in the existing syllabus, teachers views on different aspects, adoption of modern strategies and techniques of education certification systems, and alumni expectation from program and courses. Proposed new departments and the clustered technologies need to be included under the proposed technical department. Duration of Teachers' Education Programs, Justification of Year System Educational Programs, Transformation of Year system program to semester system, title of the Teachers Education Programs, duration of degree (BScTE) program and the alumni expectation regarding recruitment, promotion and incentivization.

Part three interpreted the institutional capacity like existence of acts, rules, mandate, authority and autonomy to works freely and impact of rigid control and absence of autonomy. The other part of this chapter includes organizational capacity like infrastructure and education friendly environment, Lab /Workshop related facilities, Learning materials and other facilities in Lab, workshop and classroom, available study circle and OER facilities, Networking and collaborations, Research and Innovation, status of teaching faculties and qualification of teaching faculty and faculty development opportunities:

Part four analyzed the weakness of the professional development issues of non-alumni TVET teachers. It includes available training facilities of those TVET teachers, having no teacher education qualifications, identification of the reasons, why they were not received or enrolled in TVET teacher's education

programs, suitable options and provisions might be developed and recruited qualified TVET teachers, teacher's views and expectations on the continuous professional development.

4.1 Present Status and Future Demand of TVET Educators in Bangladesh

4.1.1 TVET Enrolment

Based on different source of TVET data like TVET action plan 2020 of TMED, 8th Five years plan (8FYP) and the perspective plan 2021-2041, government targeted to increase the current TVET enrolment rate from 17.88% (2023) to 30% by 2030 and 41% in 2041. Currently there are 11118 TVET institutes under BTEB and the total students and trainees of those institutes are 15,81,485 (BTEB annual report, 2022-2023).

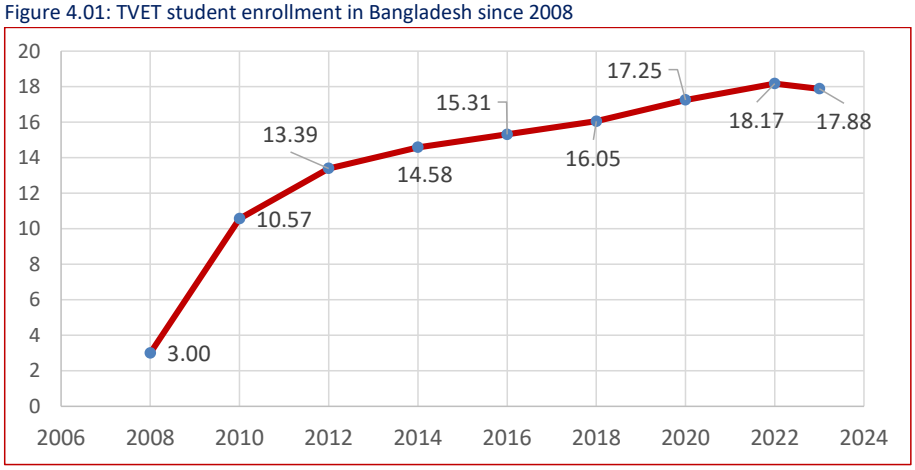
Table 4.01: National TVET enrolment Target

Before 2010	In 2010	By 2020	by 2030	by 2041	Targeted by	Source of data
03%						NSDP-2011
	10.57%					BTEB Annual report 2011
		20%	30%		TMED	TVET action plan-2018
				41%	Planning Ministry	Perspective Plan of Bangladesh 2021-2041

TVET Enrollment trends since 2010 in Bangladesh:

The line graph shows TVET enrollment in Bangladesh from 2010 to 2024 according to the annual report of BTEB. The Y-axis represents the enrollment percentage while the X-axis shows the years. It appears that before 2010 the TVET enrollment was 3% then significant increase in 2010. The data point from 2010 to 2022 showing that enrollment was increased in a steady manner from 2010 to 2022, reached from 10.57 to 18.17%, then decreases somewhat to 17.88 in 2024.

Figure 4.01: TVET student enrollment in Bangladesh since 2008

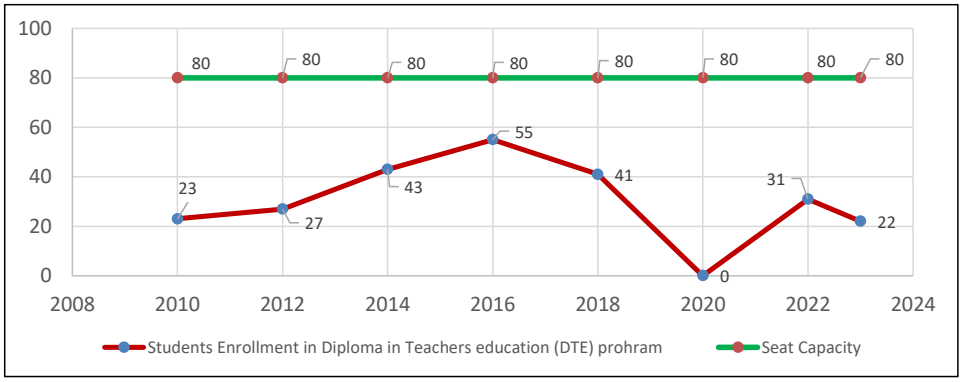


Source: Annual reports of BTEB since 2010 to 2023, NSDP -2011

TVET Teachers Education enrollment in Bangladesh:

The figure shows the number of students enrollment (combined pre-service and in-service) against the total seat capacity of 80, in Diploma in Teachers education Program (DTE) at TTTC since 2010. From the figure it is visible that the students' enrollment in DTE program never filled up fully as per requirements since 2010 and it is fluctuating session to session where highest enrollment was 55 in 2016. In 2020, student admission was zero due to corona virus outbreaks.

Figure 4.02: TVET Teachers Education enrollment (capacity 80) since 2010 in Bangladesh



Source: Annual reports of BTEB and Collected Data of TTTC 2010 to 2023

4.1.2 Demand of categorized TVET educators and training implementers by 2041.

The existing public TVET teachers' training institutions under TTTC and VTTI and other RTOs under BTEB together able to provide short teachers training for less than 4,000 in-service and preservice trainee per year. From the current study, it is found that the seat capacity of two teachers education programs (Dip. in Tech. Ed. and BScTE) under three technical department in TTTC are 240 per session in a year. Unfortunately, the total actual enrollment of teacher education programs in 2024 was only 68 which was supposed to be 400. This is far below the requirement of more than 55,000 TVET teachers currently working nationwide. The feasibility study report of TTF program stated that the student enrollment is increased 148.8% in the last ten years (2011-20). Proportionately demand of the TVET teachers has also increased to 135.7% from within this period of time. By 2041 the number of student enrollment in TVET will be increased from 14,63,230 of the year 2020 to 54,51,053 by 2041. Likewise, the number of teachers also should increase from 54,942 in the year 2020 to 4,54,254 by the year 2041. The projected student enrollment and student-teacher ratio (STR) are recommended based on key assumptions of 8th FYP, vision 2041 and NEP 2010. Considering the factors, it is found that there is huge gap between the supply and demand of TVET educators / teachers.

Following table outlines the various categories of TVET educators and training implementers along with their corresponding occupations/designations and the sources of data. The name of the occupations is cited as per BSCO code published by BBS in 2020 and from the designations used in major public TVET directorates, authorities, certification bodies and the private organizations.

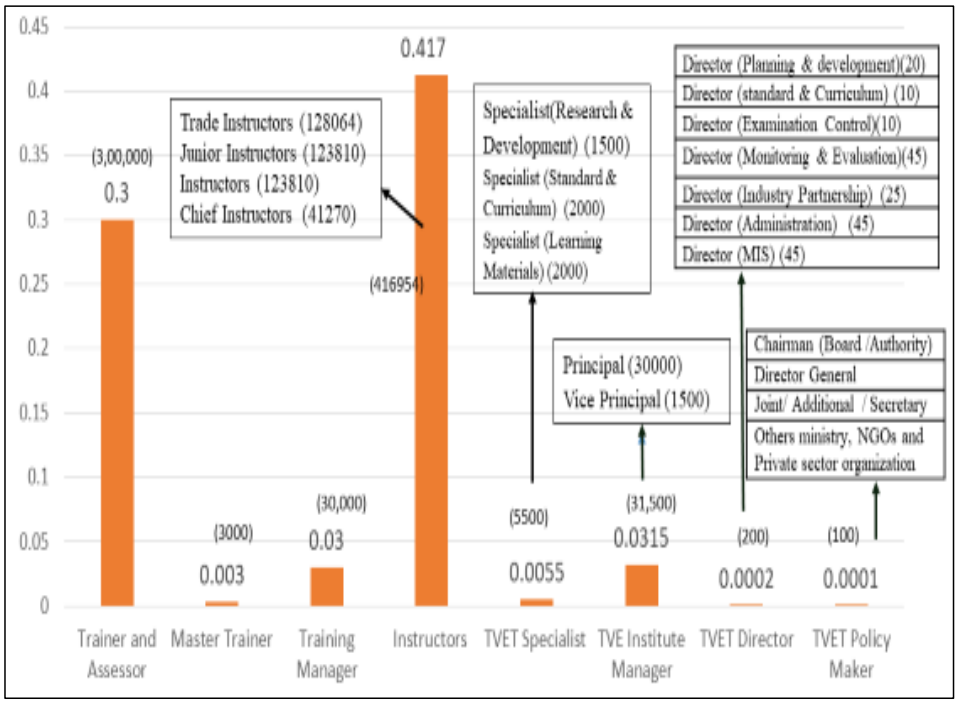
Table 4.02: Category of TVET educators and training implementers

TVET Educators and Trainers	Occupations/Designation		Source of Data and Basis of Analysis
Training Implementers (333000)	Assessor		BTEB Quality Assurance Manual (QAM) of CBT&A Implementation system under NTVQF /BNQF
	Trainer		
	Master Trainer		
	Training Manager		
TVET Educators (4,54254)	TVET Instructors	Trade Instructor	DTE organogram for Polytechnic and TSC teachers and BMET organogram for TTC & IMT, Organogram of Tex. and agriculture & fisheries department and Pattern of MPO vocational Schools.
		Junior Instructor	
		Instructor	
		Chief Instructor	
	TVET Specialist	Specialist (Research & Development)	BTEB Quality Assurance Manual (QAM) of CBT&A Implementation system under NTVQF. Organogram of BTEB, NSDA, BNFE, TTTC, VTTI, UCEF,
		Specialist (Standard & Curriculum)	

		Specialist (Learning Materials)	BRAC, Ahsania Mission, Plan International etc.
	TVE Manager	Vice Principals	DTE organogram for Polytechnic and TSC teachers, BMET organogram for TTC & IMT. Agriculture, Textile, Fisheries, Forestry, Health, NGO, Industry based Institutes, Private Institutes and etc.
		Principals / Institute level directors	
	TVET Directors	Director (Planning & development)	Organogram of DTE and BTEB, BMET, NSDA, Directorate of Agriculture, Textile, Fisheries, Forestry, Health etc. NGOs- UCEF, BRAC, Muslim aids, Ahsania Mission etc
		Director (standard & Curriculum)	
		Director (Examination Control)	
		Director (Monitoring & Evaluation)	
		Director (Industry Partnership)	
		Director (Administration)	
		Director (MIS)	
	TVET Policy Makers	Chairman (Board /Authority)	TMED, DTE, BTEB, BMET/ BNFE and other related/ directorates / ministries' organogram and their rules of business
		Director General	
		Joint/ Additional / Secretary	
		Top level related positions of others ministries, NGOs and employers and private sector organizations	

N.B: Number of categorized educators estimated using thumb rules based on the existing structure in organograms, TVET teachers' and other educators recruitment pattern and trends, total number of approved and accredited training center of BTEB and NSDA, teachers recruitment guideline of BTEB for private TVET providers, analysis of the related data of other TVET providers and researchers experiences in the field.

Figure 4.03: Projected categorical TVET educators and training implementers by 2041 in Bangladesh

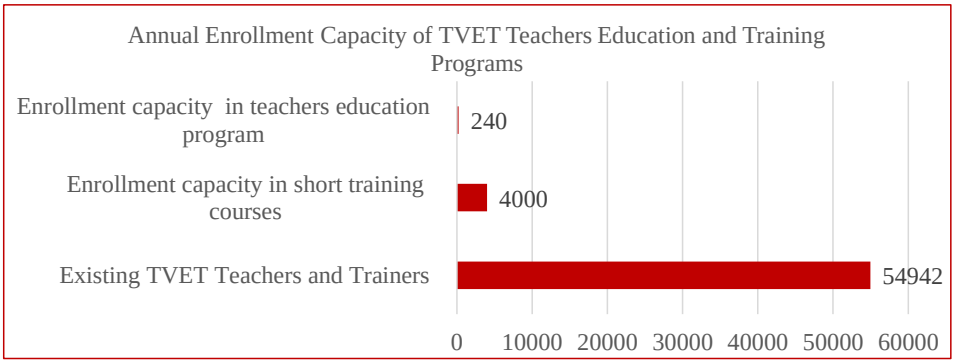


N.B: Number of categorized educators estimated considering the existing teachers', trainers' and other educators' designations, Bangladesh Standard Classification of Occupation(BSCO) code, recruitment trends and job pattern of public and private organizations, analysis of the related data of TVET providers using thumb rules based on researcher's experiences in the field.

4.1.3. Students and Trainee Enrollment in Teachers' Education and Training program.

According to the feasibility study report on TVET Teachers for future program, two existing TVET teachers' training institutions under TMED of MoE are able to train less than 4,000 in-service TVET teachers for short-term programs and only 240 in-service and pre-service teachers in long-term programs annually.

Figure 4.04: Annual TVET teacher's enrollment capacity in technical education and Training



Source – Feasibility Study Report of TTF project and TTTC website

From the current study, it is found that the seat capacity of two programs (DTE and BScTE) under three technical department in TTTC are 240 per session in a year. Unfortunately, the total actual enrollment of teacher education programs in 2024 was only 68 which was supposed to be 400 in this year. This is far below the requirements where currently more than 54,942 TVET teachers working in major formal TVET institutes. The seat capacity and actual students' enrollment in teacher education program of TTTC are illustrated in table-4.03.

Table-4.03: Seat capacity and number of students in teacher education program in TTTC

Program Name	Duration	Seat Capacity	Number of Current Students		Total Students
			In-Service	Pre-Service	
Diploma in Technical Education (DTE)	01 year	80	06	25	31
BSc in Technical Education (BScTE)	02 year	160	07	30	37
Total		240	13	55	68

Source: https://tttc.edu.bd/students-information-ce/-eee/-me/ (May 2024)

Student enrollment in VTTI against the seat capacity:

The enrollment in one-year duration "Diploma in Vocational Education (DVE)" and six-month duration "Certificate in Vocational Education (CVE)" were stopped just after introducing SSC(VOC) and HSC(VOC) when the vocational training institutes (VTIs) were renamed as Technical School and College. As per statement of one key informant *"the enrollment capacity of VTTI, the then was 480 per year, for the in-service trade instructors only where that was 160 seat for DVE and 320 for CVE in eight different trades. Per trade enrollment capacity was 20. Unfortunately, the enrollment of students / trainee in these two programs were stopped since last more than 20 years.*

Inclusive accessibility of TVET teachers in Teacher education programs:

Table 4.04: Accessibility and non-accessibility status of TVET teachers in related technology of teachers' education programs in TTTC

Program Name	Technologies having accessibility to Teachers Education Program	Technologies having no accessibility to Teachers Education Program	Number of Technologies having no accessibility	Type of teachers having no accessibility in teachers' education programs
TTTC (DTE and BScTE)	Civil	-		• Non-Tech Teachers • Qualification with HSC stream BSc. Engineer • MPO and Non MPO Vocational Teachers • Instructors of TTC and IMT under BMET • BMT teachers • Instructors of textile Institutes • Instructors of Agriculture Training Institute • Instructors of Forestry Institute • Instructors of Fisheries Training Institute • Trainers of other ministries, Directorate & departments
	Mechanical	-		
	Electrical & Electronics	*Very limited number of course / subjects for Electronics	1	
		Architecture, Construction, Civil Wood, Environmental, Surveying	4	
		Mechatronics, Automobile, RAC, Power /Agri Machineries, Aeronautical,	4	
		Telecommunication, Electro-medical	2	
		Computer Science & Technology	1	
		Garments and Appeal Manufacturing	1	
		Textile, Apparel Manufacturing, Wet Processing, Yarn manufacturing, Fashion Design, Merchandising and Marketing,	6	
		Merin, Ship Building,	2	
		Chemical, Glass, Ceramic, Food	4	
		Agriculture, Livestocks, Forestry, Fisheries	4	
		Business Management Technology	1	
Total No. of department, technology, trade having no accessibility			30	

Source: Web site of the related institutes, directorates, departments and ministries

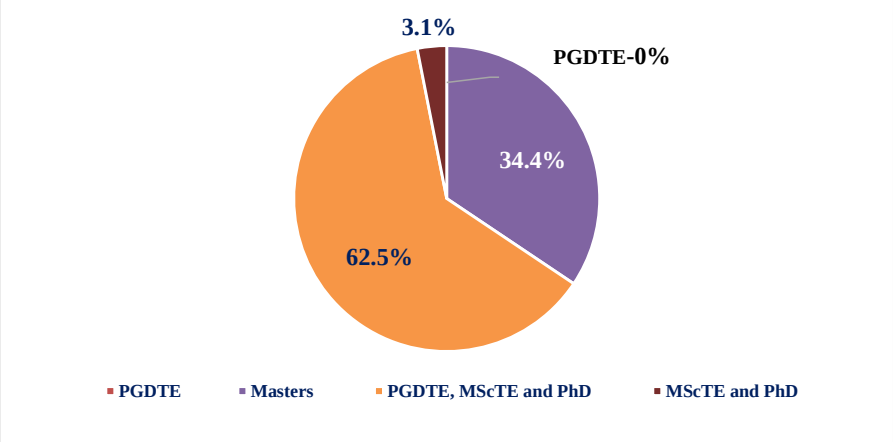
4.2 Program and Course Relevancy for Producing Qualified TVET Educators

4.2.1 Program Relevancy of the Teachers' Education

There are only two teachers' education programs offering by the TTTC. The existing teachers' education programs are - Diploma in technical education (DTE) and the BSc in technical education (BScTE). Regarding the question about the adequacy of existing two teachers' education programs in TTTC, 95.3% respondents said that these two programs is not adequate for fulfilling the demand and requirement of existing and upcoming qualified TVET teachers and other educators in Bangladesh.

In view of this, among the alumni, both from TTTC and TVE department of IUT, 62.5 % alumni proposed to open all the possible higher teachers' education degree programs like MScTE, PGDTE and PhD in Technical Education, whereas 34.4% suggested for only MScTE and 3.1% want to introduce both MSc and PhD in Technical Education but not PGD in Technical Education.

Figure 4.04: Alumni's view to introduce new teachers' education programs in TTTC



Regarding the issues on the facility to study in the candidate's own subject area of teachers' education program, 56.3% alumni said that they got the opportunity but a large portion (43.8%) could not take the opportunity due to the absence of aligned courses of their own study area or technology at which they are teaching in TTTC. The reasons of not getting opportunities or did not enrol in their own desired area

of interest because the related course or department were not exist in TTTC or the offered technology was not attractive to them.

4.2.2 Contents Relevancy in Programs and Courses

Integration of modern methodology and approach in curriculum:

As per KI interview curriculum director of BTEB, the syllabus of DTE is updated last in 2003. So, the curriculum of DTE program under BTEB implementing by TTTC was not updated and so old to use. Similarly, the curriculum of BScTE is also older than the DTE and not known to anybody, when it was last updated. The DTE course curricula is somehow in the form of behavioral objective and structured in two steps called general objectives (GO) and specific objectives (SO). The 01-year duration diploma in technical education (DTE) implementing in semester system. Unfortunately, 02-years BScTE program of education under Dhaka university still implementing the program according to the out dated year system. Both the curriculum yet touch the flavor of Outcome Based Education (OBE) or Competency Based Education (CBE). The most modern and effective **teaching delivery approach STEAM** is not either included not practice in the teacher's education program in TTTC. According to the KI interview with principal, there is an internal assessment mechanism, practice by the teacher of TTTC but no written validation and accuracy system manual is yet prepared for ensuring the validation and accuracy of assessment. The authority of TTTC usually conducted meeting for **evaluating** the final result published by BTEB and DU. But no standard program evaluation was conducted formally since its long educational program implementation. This dedicated teacher training college have **no graduate tracing system**, even there is no formal alumni association exist here for gathering and sharing the views and experiences.

Existence of soft skills, employability skills, and transversal skills as contents in syllabus:

The current TVET teacher education curriculum at TTTC lacks essential elements like the generic competencies such as soft skills, employability skills, and transversal skills which is required for being a well-rounded educator. While technical expertise is crucial, excluding soft skills, employability skills, and transversal skills creates a gap. These skills empower teachers to effectively communicate with students, navigate diverse learning environments, and foster a growth mindset. Equipping TVET educators with these competencies will not only enhance student engagement and learning but also prepare graduates for success in the dynamic job market.

After comprehensive analysis of the curriculum of TTTC, it is found that neither these soft skills related competencies are incorporated as a subject nor these are reflected in any related other subjects in the

current teacher's education programs. Incorporating these competencies into the Diploma in Technical Education and BSc in Technical Education programs is essential for producing qualified 21st century teacher and educators.

Existence of didactic methods of teaching and TPACK approach in courses:

Incorporating the concepts of didactic and Technological Pedagogical Content Knowledge (TPACK) into the TVET teacher education curriculum for Dip. in Tech Ed. and BScTE programs is essential for modernizing teaching practices and improving educational outcomes. After extensive analysis of the existing curricula, it is found that the teachers education curricula of TTTC never address these contemporary approaches, limiting the educators' ability to deliver effective and relevant instruction. Didactic methods provide structured, foundational teaching strategies crucial for clear and efficient knowledge transfer. TPACK integrates technology, pedagogy, and content knowledge, enabling educators to utilize digital tools and innovative teaching techniques effectively. This integration is vital for preparing students with the skills required in todays technologically. Updating the TVET curriculum to include didactic and TPACK approaches will equip educators with the necessary tools to enhance student engagement, foster critical thinking, and ensure students are well-prepared. This shift is not only beneficial but necessary to align education with current and future workforce needs, ensuring TVET graduates are competitive and proficient in a rapidly evolving job in TVET sector.

Existence of twenty first century skills sets in courses:

Integrating 21st-century skills, including digital literacy and Industry 4.0 technologies, into the TVET teacher education curriculum is crucial for aligning with contemporary educational and industry standards. After accessing and analyzing the curricula, it is found that over the past two decades, these essential skills have been glaringly absent from TVET teacher education courses, resulting in a significant gap between the curriculum and the evolving demands of the modern workforce. Digital literacy and familiarity with Industry 4.0 technologies, such as automation, artificial intelligence, and the Internet of Things (IoT), are fundamental for preparing students to thrive in a technology-driven economy. By incorporating these skills into the curriculum, TVET educators will be better equipped to deliver relevant, up-to-date instruction, ensuring students acquire the competencies needed for the future job market. This integration will not only enhance teaching effectiveness but also foster innovation, critical thinking, and problem-solving skills among students. Modernizing the TVET teacher education curriculum is essential to bridge this gap, thereby enhancing the employability and productivity of graduates in a rapidly changing industrial landscape.

4.2.3 Proportion of (STEAPM) Contents in Syllabus

Designing a teacher education curriculum based on the STEA(P)M principles involves ensuring that each component (Science, Technology, Engineering, Arts including pedagogy, and Mathematics) is adequately represented to provide a holistic and interdisciplinary approach.

After analyzing the combined contents of the syllabus of DTE and BScTE based on credit hours of the subjects, the proportion of STEA/(P)M contents in the existing syllabus are found as-

Science	:07%
Technology	:28%
Engineering	:12%
Arts & pedagogy	: 42%
Mathematics	:11%

Based on review of the curriculum of home and aboard it is found that the average proportion of STEA/(P)M contents for the K-12 students enrolled in a Bachelor degree of general teachers' education program (B.Ed.) are usually set as-

Science	(S): 20-25%
Technology	(T): 10-15%
Engineering	(E): 05-10%
Arts and Pedagogy	(A): 40-50%
Mathematics	(M):10-15%

A balanced and well-integrated STEA(P)M curriculum for teacher education would include substantial content in each area, with emphasizing on arts and pedagogy to ensure that teachers are not only knowledgeable in their subject areas but also skilled in teaching methods and fostering creativity in their students. Considering the entry qualification of a TVET teachers for entering in a Bachelor of Technical education (BScTE) degree program, reviewing the curriculum of home and aboard, forum discussion in UNESCO UNIVOC TVET forum, FGD with faculty members of TTTC and interview with key informants, a justified proportion of STEA/(P)M contents may be suggested for diploma graduates, enrolled in BScTE program as-

Science	(S): 10-12%
Technology	(T): 25-30%
Engineering	(E): 10-15%
Arts and Pedagogy	(A): 45-50%
Mathematics & Statistics	(M):10-15%

This proportion are slightly deviation from the distribution principle of content in curriculum of teachers' education. So a change requirement need to be initiated by the authority for justifying the STEA/(P)M (Science, Technology, Engineering, Arts (Pedagogy) and Mathematics) contents distribution principle will be followed during the content analysis and formation of subject. But it will be varied or deviate for program to program and provider to provider considering the targeted trainee, level of education / training and type of course.

4.2.4 Adopting modern strategies and techniques of teachers' education certification

Worldwide ease entry and exist in teacher's education program and courses with promotion of partial achievement of the courses like **micro credential certification** is bring under recognition and becoming popular. But no such provision is existing in the curriculum of teachers' education program of TTTC. Though there is a part time short course / workshop training mode certification provision exist in the curriculum of Dip. in Tech Ed. but yet, it executed. It may be a potential option of incorporating CBT&A methodology level 4 and 5 into Dip-in-Tech Ed. program and implement as a unitized training and micro credential certification workshop / part time basis short training for the existing or upcoming TVET teachers.

Again, there are **no online education and certification provision** yet offering by TTTC. It is also observed that this teachers' education institutes yet not developed or not taken any such capacity building initiatives. Neither BTEB nor DU also taken any initiatives in its curriculum for online certification system.

There is a work-based learning (**Practice teaching**) provision in the BScTE program of TTTC. The course contents of this subject include preparation of scheme of work, lesson plan and other curriculum materials for designated classes on departmental technological subjects. The work-based learning or practice teaching is usually conducted at polytechnic institute under guided supervision. Duration of practice teaching is 4 weeks out of which one week is allotted for simulation class at TTTC. Around 12 to 16 classes per week are to be taken by an individual students / trainee. This is a unique good strategy for developing teachers' competency in the area of core subjective content knowledge, use of teaching aids and modern ICT based technology applying pedagogy aspects in lesson. This strategy of **Practice teaching** in teaching learning process might be incorporated in the teachers' education curricula in the form of TPACK.

4.2.5 Alumni Expectation from Program and Courses

Sufficiency of Technical Departments, Education Programs and courses in TTTC and VTTI:

TTTC offering two teachers education program DTE and BScTE under 03 technical department since its establishment in 1964. The departments are civil, mechanical and electrical and electronics. As per organogram it is found that beside the 03 existing technical departments, recently government introduced two new departments namely- (i) Department of computer science and engineering and (ii) department of education. The CSE department is completely a new birth of a technical department whereas education department is actually a reformation and reorganization of existing non-tech teachers. The new departments are just creation of some new teaching positions for both in paper & pencil, without any new infrastructure, new recruitment and other additional facilities.

In this circumstance 96.9% alumni urged that this three technical / engineering department including the two new initiatives are not adequate to cover and met the requirement of TVET sectors. It does not cover the diploma and certificate programs of more than 34 technologies and huge number of different trades courses implementing in different TVET institutes like polytechnic, textile institutes, Institute of Marine Technology (IMT) and other similar institutes for diploma programs.

Again 9 different vocational trades courses offering by VTTI are not sufficient, even can be say zero for covering the teachers and trainers' education and training against BTEB operated 29 types of TVET programs and courses, 43 different trade courses under certificate level vocational education programs, 121 trade courses under certification of traditional training system and 256 occupational training courses of 16 different sectors under NTVQF / BNQF.

New Technical Departments for Accommodating Other Technology / Trades in Teachers Education:

The researcher proposed following 11 technical and one related subject department need to be introduced for ensuring the accessibility of all technology / trade teachers of polytechnics, TSCs and MPO vocational schools in teachers' education program. 96.9% alumni were agreed with the proposed departments and clustering criteria and said that the proposal was justified.

Table 4.05: Proposed new departments and the clustered technologies need to be included under the proposed technical department

Sl. No	Proposed Technical Department for Teachers Education Program	Clustered Technologies to be included under the proposed technical department

1.	Civil Engineering	Civil, Civil Wood, surveying, Construction and Environmental
2.	Mechanical Engineering	Mechanical, Mechatronics, Marine and Ship Building, Printing
3	Electrical and Electronic Engineering	Electrical, Electronics, Electro-Medical, Telecommunication, Instrumentation and process control.
4.	Computer Science and Engineering	Computer Science & technology, Computer Science, Data Telecommunication and Networking
5.	Architecture	Architecture, Architecture and Interior Design
6.	Chemical Engineering	Chemical, Glass, Ceramic, Food
7.	Automobile Engineering	Automobile, RAC
8.	Agri-Engineering	Power, Agri Machineries
9.	Textile Engineering	Textile, Apparel Manufacturing, Wet Processing, Yarn manufacturing, Fashion Design, Merchandising and Marketing, Jute
10.	Agriculture	Agriculture, Forestry, Livestocks etc.
11	Fisheries	Fisheries
12	Non-Tech	Mathematic & statistics, Physics, Chemistry, language and literature, Accounting and Business
13	Education	Pedagogy, Educational Research, Education administration, Education phycology and Education Technology

According to the importance, immediate requirements and priority of the alumni insights and adoption of the suggestions from alumni and KI, beside the existing 03 old and 01 new (CSE) technical departments, the new proposed other technical departments for the teachers' education programs are mentioned as-

i) Architecture
ii) Textile Engineering & Garments Manufacturing
iii) Agri Engineering
iv) Chemical Engineering
v) Food and Nutrition Engineering
vi) Refrigeration and Air Condition Engineering
vii) Automobile Engineering
viii) Industrial Production Engineering
ix) Agriculture & Fisheries
x) Business Management Technology

They suggested to cluster the departments considering the similarity of the technical subjects, technology, trade and occupations. The KI suggested to **introduce those new department in the proposed newly established technical teachers' education institutes under the ADB supported TTF projects**. The teaching faculties and the key informants were strongly agreed with the demand to establish the new teachers' education institutes nearby the renown TVET institutes and or industrial zone

where the related technology, trade or subjects are offering by TVET institutes, so that the student/ trainee teachers may easily conduct the practice teaching and industrial attachment.

Regarding the question about the requirement of a separate teacher education department in every teachers' education institutions, 96.9% respondents said that a separate TVE department need to be established like the department of TVE of IUT for conducting the pedagogy class and research on pedagogy, andragogy and education subjects. This demand is already partially fulfilled by establishment of education department instead of proposed TVE department at TTTC.

Duration of Teachers' Education Programs

Technical teachers training college offering a one-year education program under BTEB namely "Diploma in Technical Education. Usually, the existing junior instructors of different technology of polytechnics enroll in this education program for perusing the diploma. This 01-year duration program (where the total year of schooling is 15) is basically a professional course for getting the first impression on teaching methodology for the diploma holders and was intensified in recruitment rules as well as providing a special increment if achieved. Recently, question is being raised about the feasibility of this 01 years program. 68.8% alumni believe that this 01-year duration program is feasible and need to be continued adding some new strategies in its structure, pattern and implementation. 31.3% alumni express different individual opinions with some related issues and suggestions like.

- This post diploma education program is not aligned and matched with Bangladesh National qualification framework
- Dip. in Tech Ed. is not popular either to the existing and upcoming TVET teachers, neither acceptable to the society and the employers
- This programs' time duration is too short to develop a professional teacher
- It is not feasible for the non-tech as well as degree holders in engineering subjects

A majority of them urged that diploma in technical education should be the part of BScTE or need to merge and integrate with BScTE and provided differently with flexibility of exist provision after completion of DTE part.

On the other hand, 82.8% alumni said that offering 02 years duration of the program "BSc in Technical Education" under University of Dhaka is not justified currently because –

- The 02 years duration degree program (though the prerequisite year of schooling is 14 years) is not feasible as a degree qualification in current context of Bangladesh.
- The Bangladesh Public Service Commission (BPSC) do not recognize the degree due to this short duration
- Internationally the degree is dubious and usually not acceptable for higher education (N.B: Case study of special alumni) and equivalency with foreign university yet not established and no mutual recognition with other countries
- No other degree program under DU, offering such course within 02 years duration
- 95.5% alumni suggested that the duration of Bachelor of Science in Technical Education (BScTE) should be 3 years or at least 3 years after 4 years diploma. Only 4.5% of them suggested for 4 years course for the diploma graduates.

Justification of Year System Educational Programs:

Most of the (92.2%) respondents said that current academic calendar term- 'Year System Education' for BSc in Technical Education program running under University of Dhaka is not justified. This "Year System" in education, where students progress through their studies on a rigid annual schedule, is becoming less feasible and increasingly obsolete in the institutes and the universities for several reasons as mentioned by the alumni are summarized below-

- Year system education concept is very old and outdated, time consuming, allow to accommodate a smaller number of subjects.
- It usually brings lathyrism and demotivate the students in continuous day to day learning due to spend a long duration of study time.
- Waiting for final examination up to the end of the year made the students lazy and idle.
- The year system does not accommodate variations in individual progress, making it difficult for students who need more time in certain areas or wish to accelerate their studies.
- A rigid year system offers little flexibility for those needing to balance these responsibilities.
- Flexible scheduling for learning in own pace like online courses or learning through digital platforms usually do not permit in traditional year system and make it less relevant.
- Modular or credit-based systems that allow students to earn credits as they complete courses, rather than waiting for the end of an academic year.

- The traditional year system can be a barrier to international study programs. Universities are moving towards systems that facilitate easier credit transfer and student mobility.

Transformation of Year system program to semester system:

Regarding the proposed transformation of existing BScTE program from year system to the semester system, 87.3% respondents strongly and 11.1% respondents were agreed with the proposal. They also suggested that the curricula of all upcoming teachers' education programs should be transformed to the semester system instead of current practice of year system in Bangladesh for local and foreign recognitions. All (100%) alumni agreed that the curricula of teachers' education program should be redesigned and updated considering the need of 21st century teacher's qualification

Title of the Teachers Education Programs:

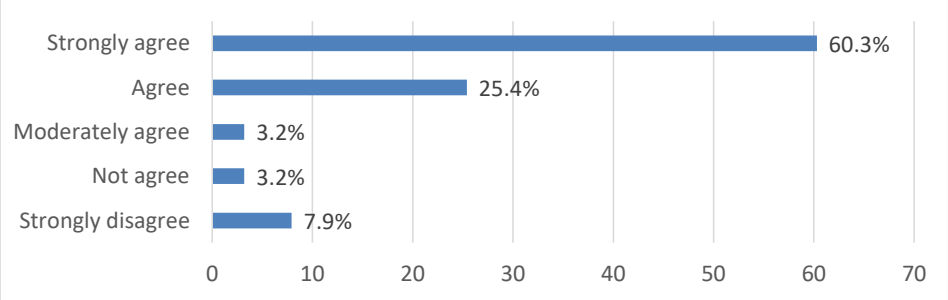
Regarding the suggestion for changing the nomenclatures of the program Diploma in Technical Education (DTE) and BSc in Technical Education (BScTE), 53.1% alumni do not agree to rename the program name as Diploma in Technical and Vocational Education (DTVE) and BSc in Technical and Vocational Education (BScTVE) respectively. The reasons they mentioned are summarized in the following statements -

- The philosophy of introducing the technical and vocational education programs respectively in two different teacher's education and training institutes will be a contravention if the name of the programs is mixed as per proposal. Two different institutes for different level of program were established based on this philosophy. If it will be mixed together, a number of complexity and conflicts may be raised in the system among the teachers of technical (polytechnic) and vocational (TSC).
- The goal of technical teacher's education emphasizes basically to the academic aspects whereas the objectives of the vocational education mainly focus on training aspects. Again, technical education usually handles the technological and engineering area, whereas vocational education deals with trade or occupational contexts.
- So, the difference in aspects, difference in organizational set up and different sectoral levels may create social conflict among two group of teacher's communities. So, the change of nomenclatures of the program for mixing together should not be a wise decision and the separate program should be run in two different venue using two different curricula.

Duration of degree (BScTE) program:

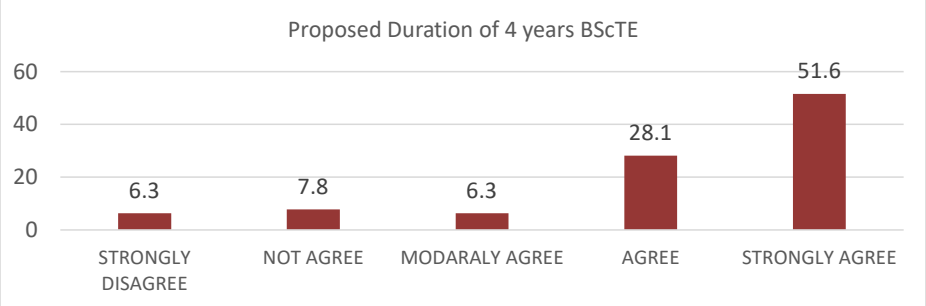
Regarding the expectation of the alumni on the duration of BSc in Technical Education (BScTE) program, 88.9% alumni said that the duration of BScTE should be at least a 3 years degree program for diploma graduates with options to exit after completion of one-year diploma in technical education (DTE) where the DTE will be the integrated part of BScTE. Among the agreed respondents 60.3% express their strong support on it., 25.4% were agree and 3.2% were moderately agree with the proposed duration.

Figure 4.05: Alumni opinion on the proposed 3 years duration of BScTE after 4 years diploma



On the other hand, regarding the proposed 4 years duration of BScTE after completion of HSC(VOC) with lateral entry of diploma graduates in second year and exit provision after completion of the one-year Dip. in Tech. Ed. were strongly supported by 51.6% alumni whereas 28.1% were agreed and 6.3% were moderately agreed with the proposed duration including entry and exist provision for diploma graduates.

Figure 4.06: Alumni opinion on the proposed 4 years duration of BScTE



But regarding this particular issue, the teaching faculties of TTTC and key informants suggested for introducing 4 years BScTE program by establishing a separate teachers education institutes for the HSC(VOC) graduates.

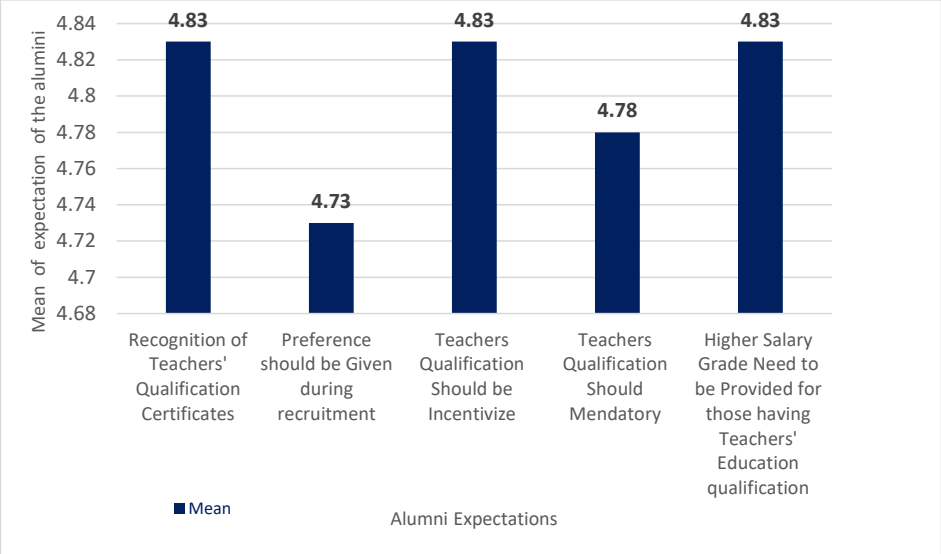
Alumni Expectation Regarding Recruitment, Promotion and Incentivize:

Regarding the change of recruitment rules 100% alumni strongly agreed and urged that the recruitment rules need to be changed for harmonizing and justifying TVET teaching as a profession. They demand for ensuring the popularization of TVET teaching and employability of the graduates by recognition of the diploma and degree of education and by given preference teacher education qualification during recruitment. The alumni also demand for separate salary scale for those, having teachers' education qualification and given special increments for those having excellence in academic as well as teacher education qualification to attract the talents in TVET.

The alumni expectation regarding the teachers' recruitment process are illustrated as-

- The TVET teachers' education qualifications (Certificate, diploma and degree in technical education) should have recognition to related recruiting authorities and be popular to the TVET educators
- The employment of the pre-service graduates in teachers' education qualification need to be encouraged, prevailed and ensured during teachers' recruitments by the government for attracting talents in teaching profession
- The in-service TVET teachers having education qualification should be incentivized by giving special increment / allowances and be prevailed during promotion
- Teachers education qualification (Dip.in Tech. Ed. / BScTE / MScTE / PhD in Technical Education) should be imposed in recruitment rules of public and private TVET providers and gradually it should be mandatory for different level of educators.
- TVET Teachers salary should be at least one step higher grade for those having diploma / degree in teacher education program.

Figure 4.07: Alumni expectation regarding recruitment and promotion of the TVET teachers' education graduates



b.

4.3 Institutional and Organizational Capacity of TTTC

The institutional and organizational capacity of TTTC is illustrated below in two separate sections. the institutional capacity includes existence of acts, rules and mandate, authority and autonomy and the impact of rigid control and absence of autonomy of TTTC. On the other hand, organizational capacity includes the Infrastructure and education friendly environment, Lab /Workshop related facilities, learning materials and other facilities in Lab, workshop and classroom, Study Circle and OER facilities, capacity of Networking and Collaborations, research and innovation, Strength of teaching faculty, Qualification of teaching faculty, Faculty Development Opportunity and overall Satisfaction of the alumni with the capacity of TTTC.

4.3.1 Institutional Capacity

Existence of Acts, Rules, Mandate:

No separate instruments like policy and acts exist for the Technical Teachers Training College (TTTC) in Bangladesh. Like other government controlled TVET institutes, this teachers' education organization, doing

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its' functions and other activities under the direct administrative control of Directorate of Technical Education, a purview of Technical and Madrasah Education Division (TMED), Ministry of Education. The academic programs like diploma in technical education run by TTTC, under the regulations of the Bangladesh Technical Education Board (BTEB). The other academic program, BSc in Technical Education regulated academically by the University of Dhaka where the principal of TTTC works as a dean of this technical education faculty. DTE delegate-controlled mandate to run the educational programs under the rules of business of TMED.

Authority and autonomy

According to the opinion of the management the degree of authority for the principal himself is very low and for any sort of developmental change, managerial decision or academic innovation, TTTC management just and must seek the decision from its higher authority like DTE, BTEB and Dhaka University. There is no autonomy exist to change or update in TVET Teachers education programs / courses when required but have the right to suggest for changing or updating the courses to the higher the administrative or academic authority. The conventional curricula of BTEB and DU are the actual teachers' guide for the programs and courses in TTTC. No special and dedicated quality assurance manual were found in TTTC. Though the academic programs and courses are developed and update by either BTEB or DU, TTTC have no authority to make any change in its curricula or have no right for developing any quality assurance system manual itself.

Impact of rigid control and absence of autonomy:

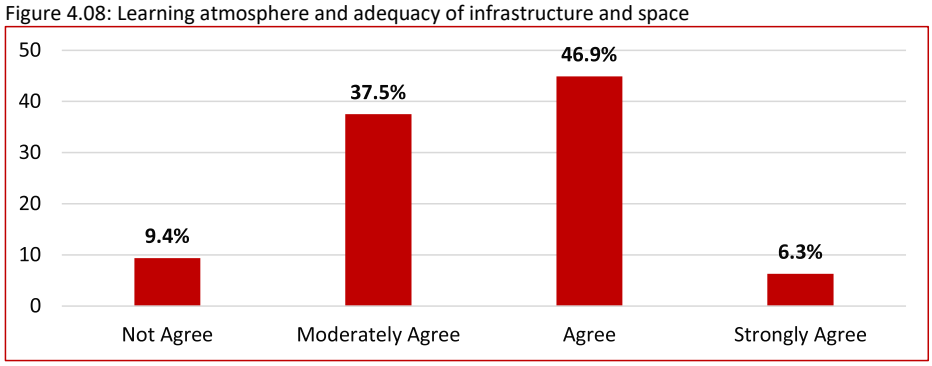
The absence of separate policy, act, regulations and or mandate for this special teachers' education organization made the authority and the teaching faculties very much reluctance and free from thinking out of box. The teaching faculties and authority function within the purview of their defined responsibilities. As a result, lack of motivation for innovation of new teaching learning strategies or culture of create new knowledge are usually not undergoing here. So, the authority and teachers usually like to be unwillingness to take any challenge in change and functioning as a carrier of routine operation. In this case the authority could not take any dynamic decision itself, if otherwise government given any direction for administrative or academic change.

4.3.2 Organizational Capacity

Infrastructure and education friendly environment

Regarding the question on the adequacy of infrastructure and space of TTTC, highest 46.9% alumni were agreed that, the infrastructure and the space of TTTC were sufficient followed by 37.5% alumni were moderately agreed on it. 6.3% strongly agreed that infrastructure and space were sufficient and adequate. On the other hand, **9.3% alumni disagreed with the adequacy of infrastructure and space and** shown extreme negative reaction on the given statement. This few alumni (9.3%) in their response in survey, the teaching faculties in their FGD and one of the key informant provided some important insights on the sufficiency of infrastructure. *As per their opinion the technical teacher training college is situated nearby a crowdy and noisy main road of Dhaka city in the second floor of the campus building of Bangladesh Glass and Ceramic Institute where the ground floor of the premises is using by Glass and Ceramic Institute. This dual ownership of one building and the noisy environment specially from vehicle horn hampering the learning environment of TTTC. They suggested for transferring the campus to a quiet and calm environment in a separate campus. They also recommend for reestablishing the campus within Tejgaon industrial area so that the students of teachers' education programs can easily attached in practice teaching to other surrounding TVET institutes as well as getting internship facilities in the nearby industries.*

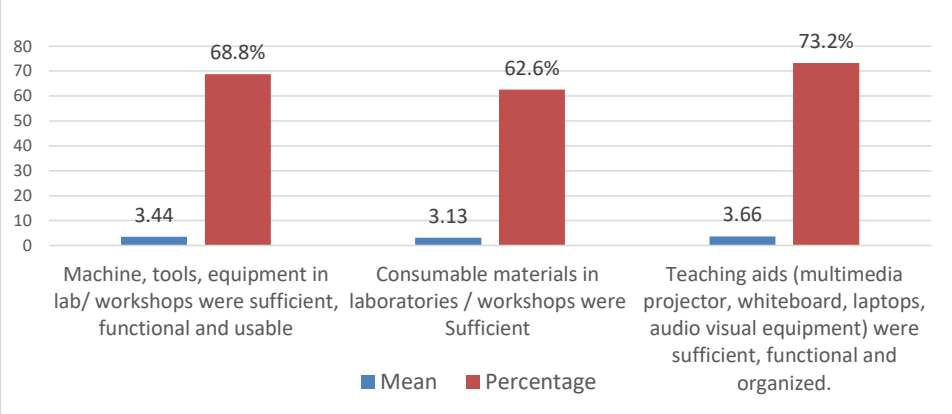
Figure 4.08: Learning atmosphere and adequacy of infrastructure and space



Lab /Workshop related facilities:

Majority (70%) alumni agreed that they enjoyed the availability and facilities of adequate laboratories and workshops during their study period. According to the respondents' opinion on an average, the availability of machine; tools; equipment, consumable materials and teaching aids in lab & workshops were 68.8%, 62.6% and 73.2% respectively. The mean value and the corresponding agreed percentage of the respondents are illustrated in figure 4.10.

Figure 4.09: Availability of machine, tools, equipment, consumable materials and teaching aids in lab/ workshops



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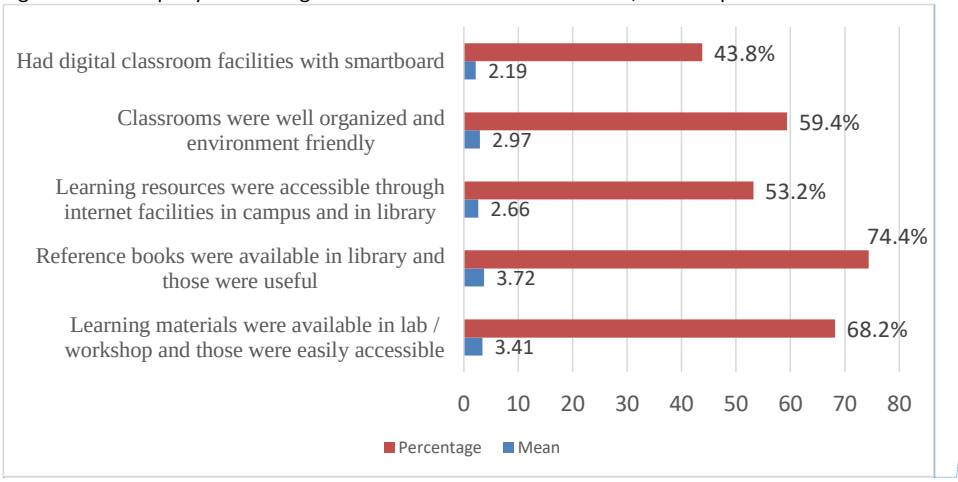
Learning materials and other facilities in Lab, workshop and classroom

Figure 4.10: Adequacy of Learning materials and other facilities in Lab, workshop and classroom



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Study Circle and OER facilities

No study circle under the supervision of teaching faculties and no Open Educational Resource (OER) platform were established in the TTTC and there is no any plan, they have for establishing such innovative initiative yet.

Networking and Collaborations

The only teacher education college TTTC, usually do not arrange any knowledge sharing seminar or conference neither locally nor internationally by its known initiatives but take part if its' mother organizations like DTE, BTEB or any other professional organization organized such events. The ministry or DTE organize discussion meeting or workshop or arrange seminar workshop in collaboration with international partners like CPSC and usually use the venue of TTTC. No international collaboration was yet signed but recently the authority taking initiative for MoU with local industries as stated by the authority in the KII. No initiatives yet taken by TTTC for recognizing its diploma or degree with other similar local or foreign organization or with any recruiting authority for promoting higher education or employments of its graduates.

Research and Innovation

As a tertiary level teachers education institute and is supposed to be a powerhouse of knowledge for producing qualified teachers and other educators like specialists, experts and education managers or administrators, this institute should have a culture of research practice. Unfortunately, these are absent of research activities in TTTC. Though the authority and the faculties shown their positive intension and interest on research but no financial allocation or capacity building supports yet provided from the higher controlling authority to the TVET teachers education college.

Strength of Teaching faculties:

According to the organogram retrieved from website, there are 55 teaching faculty positions. in TTTC. Beside the mentioned 55 positions, 04 other administrative and academy related positions are- principal- 01, vice principal- 01, training specialist- 01 and education specialist- 01. As per organogram, the number of faculty positions, the existing faculties and vacant positions in 4 technical and 01 education departments are illustrated in the table 4.07.

Table 4.07: Teaching faculty strength in TTTC

Dept.	Teaching Faculty positions				Teaching Faculty Exist				Vacant faculty positions			
	Prof	AssP	AstP	Lec	Prof	AssP	AstP	Lec	Prof	AssP	AstP	Lec
EEE	1	2	4	4	0	1*	2	2	1	1	2	2
CE	1	2	4	4	0	0	2+1*	0	1	2	1	4
ME	1	2	4	4	0	1*	1*	2	1	1	3	2
CSE	1	2	4	4	0	0	1*	0	1	2	3	4
Edn.	1	2	4	4	1	1	0	1+1*	0	1	4	2
Total	5	10	20	20	1	3	7	6	4	7	13	14
GT	55				17				38+4**=42			

Source : Website of TTTC.

Legend: Pro-Professor, AssP- Associate professor, AstP- Assistant Professor, Lec-Lecturer, EEE-Electrical & Electronic Engineering, CE-Civil Engineering, ME-Mechanical Engineering, CSE- Computer Science and Engineering, Edn. -Education, Dept.-Department. *Depuration from Polytechnics (total 6* position out of existing 17 teachers are under deputation), **Material Development specialist.

From the above table it is clear that that against 59 education and teaching related positions 42 are vacant. Again, out of 17 existing teaching faculty, 06 of them including the principal are hired from polytechnics and working as attached or in deputation. The teacher student ratio of this teacher education institutes is 4:1, **very low and encouraging, not due to the standard setting but lack of student enrollment in teachers' education programs.**

Qualification of teaching faculty:

None of the teaching faculty have the teachers' education qualification except one chief instructor working at TTTC in deputation have the BScTE, achieved the degree from this college under DU. Out of 17 teaching faculty 13 of them are BSc. engineer, one of them have MSc. engineering and rest of the 3 from education department have masters in their respective non-tech subjects but not in education. Fortunately, 04 teaching faculty of technical departments achieved master trainer certificate in CBT&A level -5 under NTVQF. In this circumstances most of the alumni (68%) strongly agreed, 23.4% agreed and 7.8% moderately agreed that all teaching faculties of teacher's education program in TTTC should be academically qualified in his / her own technical subject / technology / discipline as well as must have the teacher's education qualification like diploma in technical education or Bachelor of Science in Technical education.

Faculty Development Opportunities:

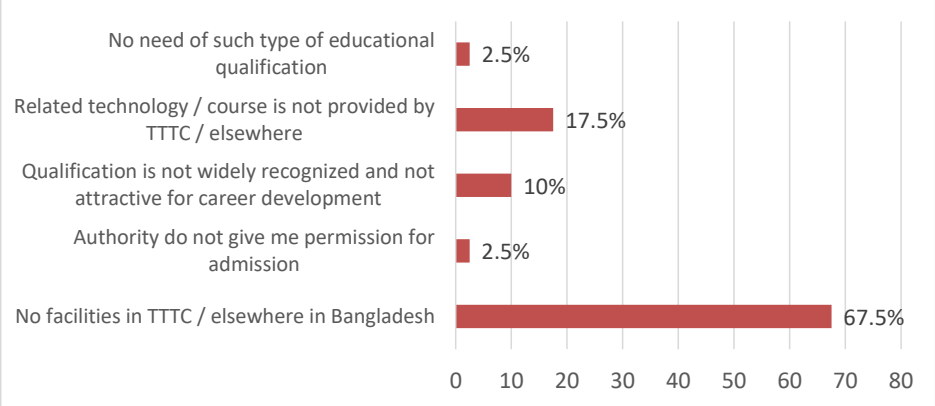
Initially the teaching faculties of TTTC enjoyed many type foreign scholarships for higher education specially in the field of education and pedagogy and pedagogical technology. Those highly educated faculties were contributed in planning for TVET system development, research, training and developing new curricula or introducing new strategies in technical education with high order cognitive perception and experiences. Another very successful initiative was to develop the faculties as well as the teachers of polytechnic through the association and engagement of foreign expert in TTTC. The ODI project is an example of such initiatives where the teaching faculty of TTTC and polytechnic teachers were got the hands-on training in association with foreign experts. Unfortunately, since last two decade this culture is totally stopped and now there are no such visionary initiatives for developing the teaching faculty of TTTC. Again, for producing professional educators every faculty member should have a professional affiliation with related professional organization, but this is also not under practice in this special teacher's development organization.

4.4 Professional Development Status of Non-Alumni TVET Teachers

4.4.1 Reasons why TVET Teachers are not enrolling in Teachers' Education programs

In Bangladesh as a whole 99.01% TVET teachers working in teaching profession without any formal professional teachers' qualification. The study shown that both the tech. and non-tech. TVET teachers recruited with academic degree like BSc in engineering or with honours / masters in non-tech. subjects never get the opportunity to enroll in TVET teacher's education programs of TTTC. The only provision is for the teachers having and recruited with academic diploma qualification. Regarding the question - why the non-alumni teachers are not enrolling in TVET teacher's education program, most (67.5%) of them said that there was no such facility for them in TTTC or elsewhere in Bangladesh. 17.5% teachers mentioned that their technology related course was not offered by TTTC. A very few of them (10%) entered in teaching profession with academic diploma stated that they might take the opportunity to enroll in TVET teachers' education program but they feel no interest for admission because teachers' education qualification is not attractive, not acceptable to the society, have no career prospect or will not bring any extra benefits for them. It is not compulsory and not encouraged by the recruiting authority to do it, government is not providing any incentives or having no promotional mechanism for this professional qualification. They also urged that this qualification is not widely recognized and not attractive for career development as a teacher in the existing system.

Figure 4.11: Reason why teachers are not enrolling in TVET teacher's education programs



A few (2.5%) teachers complained that authority did not give them permission for admission in the teachers' education program and other 2.5% urged that this type of formal teachers education is not the requirement for being a qualified and professional TVET teachers.

4.4.2 Training Facilities for TVET Teachers having no Access in Teachers' Education Programs

Training status and continuous professional development (CPD) opportunities for the tech and non-tech TVET teachers, recruited with minimum degree qualification in engineering or honours / master degree in non-tech subjects are illustrated below.

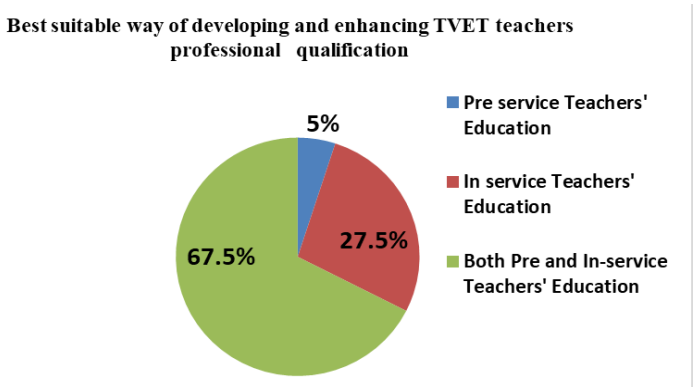
The study shows that 32.5% such tech and non-tech teachers never get any dedicated pedagogical teachers training in their whole teaching life. 37.5% got only one short training on pedagogical aspect in his whole life where the training duration was equal to or less than one-week. 22.5% teachers received only one pedagogy training of less than or equal to 15 days duration. Only 5% teacher got equal to or less than 3 months training. Regarding the questions on subjective or technological training 55% tech and non-tech teachers under study never received any subjective training in their whole teaching life. Among the rest 45% teachers, only 10% got subjective training, highest in three subjects.

4.4.3 Suitable Provisions for Developing and Recruiting Qualified TVET Teachers

Regarding the question to know about the suitable provisions for developing and enhancing the TVET teacher's professional qualification through attending teacher's education program, the respondents suggested three options - **(i) Pre-service teachers education-** The professional education qualification

achievement before entering in teaching profession **(ii) In-service Teachers Education-The p**rofessional education qualification achievement after recruitment in teaching profession and **(iii) Both pre-service and in-service provision of teachers education** where professional education qualification achievement keeping both systems open like before and after recruitment of the teachers. According to the views of non-alumni TVET teachers, 67.5% respondents believed that both pre-service and in-service provision of education need to be continued, as offered by the technical teachers' training college for the accomplishment of more qualified teachers according to the teachers' development and recruitment target of 8th five years plan by the government.

Figure 4.12: Provisions to develop TVET teachers' professional qualification



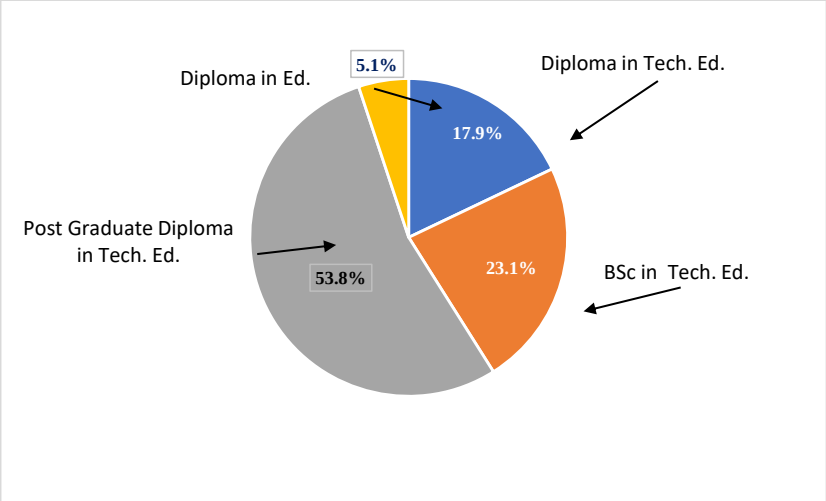
4.4.4 Non Alumni TVET Teachers View and Expectation on their Professional Development

Most (90%) of the tech and non-tech TVET teachers those neither get opportunity nor attended in teachers' education program, believed that only the academic qualification (diploma/ degree in engineering/ technology/ non-tech subjects) in the respective subject area, could not ensure the effective teaching and learning. The KI and faculties urged that every teacher in TVET sector should have also at least one formal teachers' education qualification like diploma or degree in technical education. They said that the culture of professionalism only can be established when all the teachers come under the umbrella of professional teachers' education program. Other 10% respondents like to enhance their professional development through separate pedagogy and subjective training courses.

More than half (53.8%) of TVET teachers under study recruited as TVET instructors with at least an academic bachelor degree in particular technology or subjects, believe that the initial level (first level) of teachers' education program should be post graduate diploma in technical education (PGDTE). Around

one-fourth (23.1%) respondents suggested to introduce professional bachelor degree in education like BScTE for ensuring actual professionalism in teaching. 17.9% teachers believe that diploma in technical education should be the initial level of education qualification for both type of teachers having either diploma or degree in engineering or in a particular non-tech subject. Only 5% of non-tech teachers, suggested for Diploma in Education (Dip.Ed.) program for their professional development instead of diploma in technical education.

Figure 4.13: Techers interest on achieving initial compulsory professional qualification



Majority (76.8%) of non-alumni tech. and non-tech teachers agreed for introducing one-year mandatory professional diploma in technical education (Dip-in-tech. Ed.) for all type of newly recruited TVET teachers, whatever their entry qualifications either diploma / degree in technology / engineering or masters in non-tech. subjects. The level of this professional education program might be 7 for Dip. in Tech. Ed. and 8 for the Post Graduate Dip. in Tech. Ed.

The related experts in KII also supported the views of respondents for introducing one year compulsory TVET teachers' education program and suggested for designing the course contents considering the modern teachers' education principles, methods and approaches. As per their opinion, the professional Dip-in-Tech. Ed. course contents should be comprised with 50% of pedagogy subjects, 30% of respective technical / non-technical subjects, 15% of TPACK with practice teaching and rest 5% of course for industrial attachment.

Regardless the tech or non-tech TVET teachers, 89.7% teachers want to get opportunity to achieve at least a professional teacher's education qualification after recruitment and then continuous professional development by skilling, upskilling and reskilling throughout their professional life through training programs or further education. Only 10.3 % of them like to get the opportunity of continuous professional development (CPD) by pedagogy and subjective training facilities throughout the professional service.

Regarding the proposal for establishing a Quality Assurance Unit (QAU) in every TVET institutes for continuous professional development of the teachers and other educators, 82.5% teachers welcomed the proposal and urged that it will bring a significant change and development of TVET teachers with equal opportunities and rationale of CPD. It may be the hub of knowledge and experience sharing among the seniors and juniors for collaborative learning.

4.4.5 Alumni's Views on the Way out of Recruitment and Professional Development of the TVET Teachers

Most (92.5%) of the alumni, non-alumni tech and non-tech. teachers agreed that by applying one-dimensional approach like industry experience or industrial attachment might not be the only effective way for developing the competency of TVET teachers. 82.5% respondents said that the industrial attachment or internship will enhance only the subject related technical competency (What to teach only) of the teachers but do not cover the pedagogy aspect (How to teach and assess the students). *The respondents as well as the key informants urged that only industry experiences or industrial attachment might not be brought any significant achievement of knowledge and skills for the non-tech teachers. Almost all (95%) tech and non-tech TVET teachers, agreed that minimum academic qualification in respective technology/subjects, industrial attachment or prior industry experience, regular upskilling training and at least one professional teachers' qualification in education are equally important for continuous professional development (CPD) of a TVET teachers.* For attracting the meritorious and talents in teaching profession quality assurance in teaching learning process and ensuring the sustainability in teaching profession, above mentioned four dimension of CPD must be taken under the consideration.

The faculties in FGD and key informants in their interview suggested a three dimensional teachers' recruitment and incentivized model for attracting the meritorious and talents in teaching profession as well as ensuring effective professional development of the TVET teachers-

(i) *Recruiting TVET teachers having both industrial experience and at least a pre-service professional diploma / degree in technical education, providing them one grade higher salary in advance under existing pay scale or providing them upper grade salary under a separate pay scale*

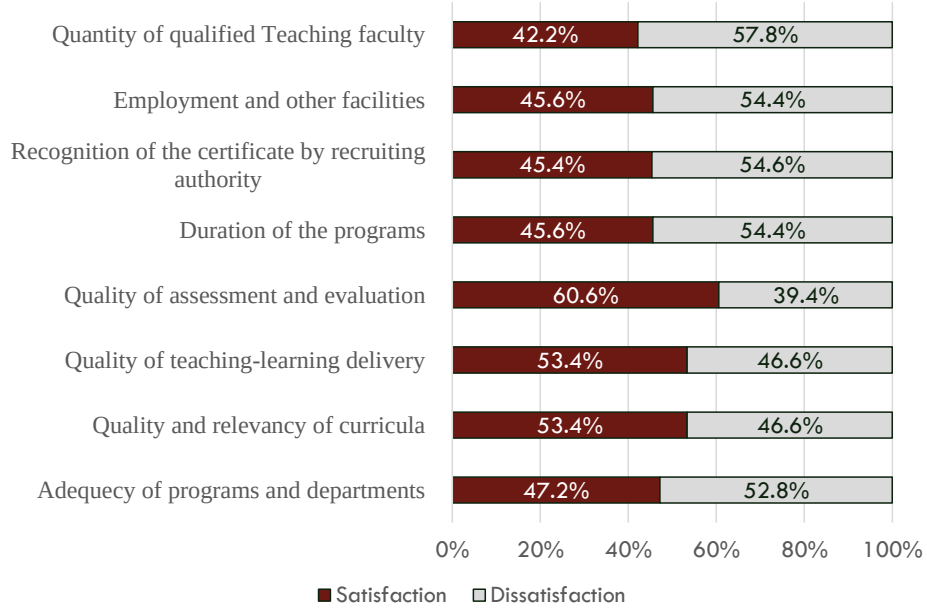
(ii) *Recruiting fresh graduate with academic diploma / degree in respective engineering / technical field or in a specific non-tech subject, with relevant industrial experience, offering them one advance increment for the experiences but providing one grade higher salary in advance under existing pay scale or providing them upper grade salary under a separate pay scale after successful completion of the professional diploma / degree in technical education*

(iii) *Recruiting fresh academic diploma / degree holders in respective engineering / technical field or in a specific non-tech subject, enrolling them in Dip. in Tech. Ed. program where industrial attachment / internship will be the part of in-service professional diploma / degree in technical education. After successful completion of the professional diploma / degree in technical education, providing them one grade higher salary in advance under existing pay scale or providing them upper grade salary under a separate pay scale.*

4.4.6 Gaps Between Alumni Expectation and Their Satisfactions Level

After analyzing the whole study, it is Regarding the alumni's overall satisfaction

Figure 4.14 : Overall alumni satisfaction levels of the alumni on teachers' education program and the implementing institutes



From the above analysis, it is clear that the alumni shown their moderate satisfaction (55.8%) on the relevancy and quality of the curricula, the teaching learning delivery and the student evaluation system but the same alumni urged their dissatisfaction with the adequacy of programs and the narrowest coverage of the technical departments in TTTC. They are highly dissatisfied regarding the 2 years duration of BScTE, negligence regarding valuing and recognition of the diploma / degree of teachers' education by the recruiting authority. The stakeholders also shown their reaction and disappointing on the recruitment policy, rules and regulation where practically no encouragement or incentives are promoted. The unemployment and under employment in private sector TVET institutes are the other important causes of dissatisfaction raised from the teachers' education graduates. They urged for the change of recruitment rules and demand for privilege during recruitment.

CHAPTER FIVE: SUMMARY OF THE FINDINGS

Chapter five, the most important part, is the summary of the findings of the research are presented in an organized manner includes present status and future demand of TVET educators comprise the statistics of existing teaching positions and vacancies in TVET institutes, future demand of categorized TVET educators and training implementers, supply status of TVET educators in Bangladesh, gaps and lacks between demand and supply of TVET educators and demand supply gaps of qualified TVET educators. Gap in teachers' education programs, gap in teachers' education course and contents, lacks in teachers' education institutes, consequents of the gaps & lacks in TVET sector and the way out of mitigating the gaps & lacks for producing adequate qualified TVET educators and training implementers in Bangladesh.

5.1 Present status and future demand of TVET educators

5.1.1 Existing Teaching Positions and Vacancies in TVET institutes

Currently there are 11,118 TVET institutes exist under BTEB and the total students and trainees of those institutes are 15,81,485 (BTEB annual report, 2022-2023). Against those formal institutes and organizations, a total of 54,942 (2022) TVET teachers and other educators are working in formal TVET sector in Bangladesh. In spite of that vacancy of teachers and other educators in TVET sector is very high. 82% teaching positions are vacant in polytechnics and TSC under the directorate of technical educations. Similar condition exists in other formal public TVET providers since long period of time. The vacant positions in TTC and IMT under BMET are 78%, Textile Institutes under directorate of textile 75%, Agriculture Training Institutes under directorate of agriculture 70%, fisheries Institutes under department of fisheries and livestock 48% and forestry institutes 50%. (Source: respective website and analysis of the collected data from representatives of respective organizations). The requirement of trainers in the other public training providers like directorate of youth & sports, women affairs, social welfare, ministry of industry etc. are remain unknown because workforce pattern of those organizations are not structured. No statistics are available for the formal NGO lead and private institutes, but situation is worse than the public TVET providers. The actual TVET teaching positions are at least double and present requirements are three times than the existing 54942. So statistically gap between current designated positions and the working teachers in TVET sectors are almost 75% to 80% in Bangladesh. Among the existing TVET teachers working in polytechnics, TSC, TTC, vocational schools, Dhakhil vocational madrasah and in other TVET institutes under BTEB, only 495 (0.90%) of them are qualified, having professional diploma or degree in

technical (teachers) education. So, the average demand supply gap of qualified TVET teachers in Bangladesh is now 99.10% whereas it was estimated for the particular year in 2022 as 97.23%. The gap of qualified teachers in polytechnics and TSC is 92% where only 8% (276) TVET teachers were certified in professional diploma or degree in education

5.1.2 Future Demand of Categorized TVET Educators and Training Implementers:

Based on different source of TVET data like TVET action plan 2020 of TMED, 8th Five years plan (8FYP) and the perspective plan 2021-2041, government targeted to increase the current TVET enrolment rate from 17.88% (2023) to 30% by 2030 and 41% in 2041. The study projected the categorical demand of TVET trainers and implementers by 2041, where requirements of trainers and assessors will be three lacs. Proportionately the requirements of master trainers and training managers are projected as three thousand and thirty thousand respectively.

On the other hand, the requirement of total TVET educators will be at least 4,54,254 by 2041 estimated based on existing 54,942 TVET teachers. The projected categorical TVET educators are classified as TVET Instructors (Trade instructor, Junior Instructor, Instructor and Chief Instructor)

TVET Specialist (Research & Development, Standard & Curriculum, Learning Materials), TVE Manager (Principal. Vice Principal), TVET Directors (Administration, Planning & development, Standard & Curriculum, Assessment & Examination, Monitoring & Evaluation, Industry Partnership, Management Information System), TVET Policy maker (Chairman (Board /Authority, Director General, Ministry level secretary, top level related post of others ministries, NGOs / employers and private sector organizations.

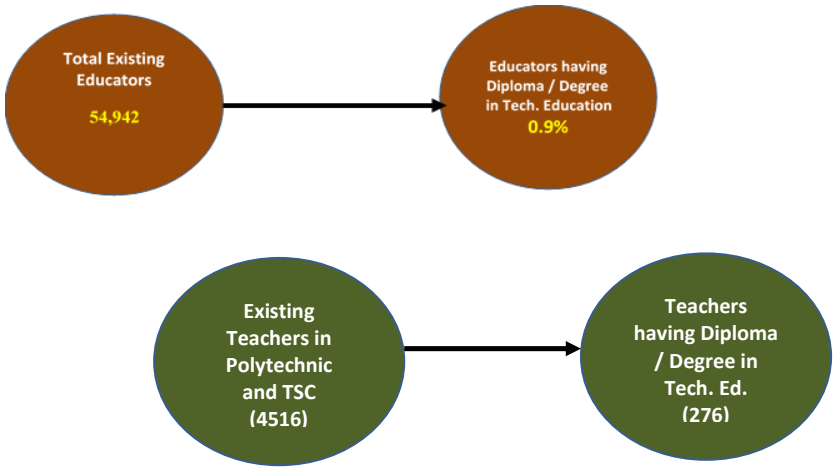
5.1.3 Supply Status of TVET Educators in Bangladesh

Existing 02 dedicated public teachers & trainers training institutes (TTTC & VTTI) and other 15 RTOs under BTEB established for providing short-term trainers training in CBT&A, able to train only 4,000 in-service TVET teachers and trainers annually. Current study shows that only 17% of the students is now studying against its intake capacity of TTTC. This year (2024) the enrollment of students in diploma in technical education program is 22 (27.5%) against its seat capacity of 80. This is far below against the requirement to provide education and training for more than 54,942 TVET teachers. The enrollment capacity in short training courses (4000 per year) includes all the formal and informal training initiatives duration of one weeks to 6 months oversees by DTE and BTEB provided by RTO of BTEB and the purview of different govt. organizations like BIAM, BIM, and Engineering Staff College etc.

5.2 Gaps and Lacks between demand and Supply of TVET educators:

Beside the 54,942 existing TVET teachers' and other educators, on an average more than 80% designated positions are vacant in different formal public TVET provider's operated institutes like DTE, BMET, directorate / department of textile, agriculture, fisheries, forestry, youth & sports, women affairs, social welfare, ministry of industry etc. The vacant positions of teachers and staffs under the institute of DTE is 69.52% where the vacancy of only teachers' positions in polytechnic and TSC is 82%. A significant number of positions of educators like specialists, experts and directors are also remain vacant in national organizations like BTEB, NSDA and BNFE due to various constraints in the system or those positions are holding by non-relevant professionals. Those organizations are suffering from lack of qualified teachers and other educators. Out of existing 54942 TVET teachers only 0.9% fall under the category of qualified teachers having the diploma or degree in technical teachers' education.

Figure 5.01: Qualified TVET educators having teachers' education qualification



This negligible number of qualified teachers having professional qualification in education shows the actual scenario of qualified professional in TVET sector in Bangladesh, is very disappointing. Among the other indicators for measuring the effectiveness of education and training, sufficient number of "qualified teacher" is the most impactful indicator. The fewest and negligible number of qualified teachers, give a clear picture about the quality of the TVET and its impact in TVET sector.

Figure 5.02 : Gaps and Lacks of TVET teachers and other educators in polytechnics and TSC under Directorate of Technical Education(DTE).

The above figure clearly shown demonstrates the scenario of vacancies in TVET institutes under DTE.

5.3 Relevancy of TVET Teachers' Education Programs and Respective Curricula

5.3.1 Adequacy of Programs and Technical Departments

In alumni's point of views and considering national aspects two programs (Dip. in Teck. Ed. and BSc in Tech. Ed.) and only three technical departments (Civil, Mechanical and Electrical & Electronics) are not sufficient in the context of national demands as well as wideness of the area of technology and trades. Almost all (96.9%) alumni were not satisfied with this narrowest scope and opportunities. They urged to introduce more eight technical, one education and one non-tech. department. *The KIs suggested to introduce those proposed new department either in existing TTTC by it's expansion or in the new technical teachers' education institutes proposed by TTF project. The new department should be introduced in different proposed teachers' education colleges / institutes considering the local need and having related departments in TVET institutes in the catchment area.*

5.3.2 Duration and recognition of the Diploma and Degree programs:

Most of the alumni (68.8%) believe that one-year duration diploma in technical education program is still feasible and need to be continued adding some new strategies in its structure, pattern and implementation. *The alumni as well as KIs expressed that Dip. in Tech. Ed. is not popular either to the teachers, neither acceptable to the society and not recognized to the employers. To make it acceptable to all stakeholders, all type of respondents urged to redesign the Dip. in Tech. Ed. program in a universal pattern, considering the requirement of all tech. and non-tech teachers having either diploma or degree in engineering or non-tech. subjects.*

A majority of the respondents (78%) said that diploma in technical education should be merged with BScTE as a part of degree program as TVE department of IUT had done it recently. *But the alumni and the KI suggested to offer this program differently with flexibility of exit provision after completion of Dip. in Tech. Ed. part. They suggested to run this teachers' education program under the academic affiliation a university, not by the board. Dip. in Tech. Ed. should be considered as a post diploma short cycle tertiary professional education program. They also urged to align this program with Bangladesh National qualification framework and place it in level 7 of BNQF.*

On the other hand, most of the (82.8%) alumni said that offering 02 years duration of the technical education program "BSc in Technical Education" under Dhaka University is not justified currently because- the two years duration degree program (though the prerequisite year of schooling is 14 years) is not feasible as a degree qualification in current context of Bangladesh and Bangladesh Public Service Commission (BPSC) do not recognize the degree due to this short duration. Internationally the degree is dubious and usually not acceptable for higher education (N.B -Case study of an alumni). The alumni said that equivalency or mutual recognition agreement with foreign university yet established due to this short duration. Even no other degree program under university of Dhaka, offering such year system education program within two years duration.

almost all (95.5%) alumni suggested that the duration of Bachelor of Science in Technical Education (BScTE) should be 3 years or at least 3 years after 4 years diploma. Only 4.5% of them suggested for 4 years course for the diploma graduates. 92.2% of them said that current academic calendar term- 'Year System Education' for BSc in Technical Education program is not justified. This "Year System" in education, where students progress through their studies on a rigid annual schedule, is becoming less feasible and increasingly obsolete in the universities for several reasons as mentioned by the alumni is summarized below

- Year system education concept is very old and outdated, time consuming, allow to accommodate a smaller number of subjects.

- It usually brings lathyrism and demotivate the students in continuous day to day learning due to spend a long duration of study time.

- Waiting for final exam up to the end of the year made the students lazy and idle.

- The year system does not accommodate variations in individual progress, making it difficult for students who need more time in certain areas or wish to accelerate their studies.

- A rigid year system offers little flexibility for those needing to balance these responsibilities.

- Flexible scheduling for learning in own pace like online courses or learning through digital platforms usually do not permit in traditional year system and make it less relevant.

- Modular or credit-based systems that allow students to earn credits as they complete courses, rather than waiting for the end of an academic year. The traditional year system can be a barrier to international study programs. Universities are moving towards systems that facilitate easier credit transfer and student mobility.

5.4 Gap in Teachers' Education Course and Contents

5.4.1 Accommodation of Modern education methodology and approach:

The curricula of Dip. in Tech Ed. is too old and syllabus is behavioral objective type since 2003. Similarly, the curriculum of BScTE is older than the DTE and syllabus is in the form of topics, too vague to use Though the program Dip. in Tech Ed. is implementing in semester system, unfortunately the curricula of BScTE is implementing in the form of out dated year system. BAC and UGC continuously advising for introducing Outcome Based Education (OBE) in higher education and BTEB is aligning its curricula with Competency Based Education (CBE), unfortunately both the curricula of these teachers' education programs yet touch the flavor of either OBE or CBE. The most modern and effective **teaching delivery approach STEAM** is not included in the courses.

The other major gaps in curricula and the syllabuses are-

- No written validation and accuracy measurement system manual yet prepared
- No standard program evaluation was conducted formally since its long educational program implementation
- No graduate tracing system exist in the curricula or in theirs related activities and
- There is no formal alumni association exist for gathering and sharing the views and experiences to update and modernize the curricula and courses

5.4.2 Gap of Soft skills, employability skills, and transversal skills as contents in courses :

The **generic competencies** such as soft skills, employability skills, and transversal skills, required for being a well-rounded educator are critically absent in the syllabus of teachers' education courses. While technical and pedagogical expertise is crucial, excluding of soft skills, employability skills, and transversal

skills creates big gap for being a professional educator. These skills empower teachers to effectively communicate with students, navigate diverse learning environments, and foster a growth mindset. Equipping TVET educators with these competencies will not only enhance student engagement and learning but also prepare graduates for success in the dynamic job market.

These soft skills related competencies are not incorporated as a subject nor these are reflected in any related other subjects in the current teacher's education program. Incorporating these competencies into the Diploma in Technical Education and BSc in Technical Education programs is essential for producing qualified 21st century teacher and educators.

5.4.3 Non-existence of didactic and TPACK approach in courses:

After extensive analysis of the existing curricula, it is found that the teacher's education syllabi and courses never address these contemporary approaches, essential for enhancing the educators' ability to deliver effective and relevant instruction. The integration of either didactic or TPACK is vital for preparing students with the skills required in today's technologically enabled workforce. Incorporating the concepts of didactic and TPACK into the TVET teachers' education curriculum for Dip. in Tech Ed. and BScTE programs is essential for modernizing teaching practices, improving educational outcomes and producing smart teachers/ educators for sustainability at jobs in TVET sector.

5.4.4 Insufficient existence of twenty first century skills sets in courses:

Digital literacy and familiarity with Industry 4.0 technologies, such as automation, artificial intelligence, and the Internet of Things (IoT), are fundamental for preparing students to thrive in a technology-driven economy. Though digital literacy in the form of a course is found, namely- computer application and programming but integration of 21st-century skills and industry 4.0 / 5.0 technologies as most essential skills have been glaringly absent from TVET teacher education courses, resulting in a significant gap between the course contents and the evolving demands of the modern workforce. Modernizing the TVET teacher education curricula with 4.0 and 5.0IR, specially use of AI tools in education and students learning is essential to bridge this gap, thereby enhancing the employability and productivity of graduates in a rapidly changing industrial landscape.

5.4.5 Imbalance of STEA(P)M contents in syllabus:

After analyzing the combined contents of the syllabus of B.Ed. degree of some national and international universities, Dip-In-Tech Ed and BScTE program of TTTC, estimating based on credit hours of the courses),

the average proportion of STEA/(P)M existing contents for B.Ed., BScTE and the proposed contents for BScTE) on the basis of forum discussion in UNESCO UNIVOC TVET Forum are illustrated in the table 5.01.

Table - 5.01 : Existing and proposed proportions of STEA(P)M contents in syllabus

STEA(P)M area	Contents in B.Ed. of other Universities	Existing Contents of DTE and BScTE of TTTC	Proposed proportion of STEA(P)M contents for DTE and BScTE of TTTC
Science	20-25%	07%	10-12%
Technology	10 -15%	28%	25-30%
Engineering	00-10%	12%	10-15%
Arts & Pedagogy)	40-50%	42%	45-50%
Mathematics and Statistics	10-15%	11%	10-15%

The contents vary from program to program due to the prerequisite qualifications as well as duration of the educational program. This proportion of STEA/(P)M combined contents in Dip. in Tech Ed. and BScTE are slightly deviated from the proposed contents based on distribution principle of technical teachers' education curriculum. So, a change requirement needs to be initiated by the academic authority (BTEB and DU) for justifying the STEA/(P)M (Science, Technology, Engineering, Arts (Pedagogy) and Mathematics) contents. The STEA(P)M distribution principle should be kept in mind during the content analysis and formation of subjects. But it will be varied or deviate for program to program and provider to provider considering the targeted students / trainees, level of education or training and type of courses.

5.4.6 Lack of flexibility and adoption of new strategies in curricula.

One of the significant provisions in teachers' education program is the work-based learning (Practice teaching) in the BScTE program. Beside this the other important flexibility and adaptability provisions, usually practiced in worldwide were critically absents in the course of TVET Teachers' Education program of Bangladesh. Technical teachers' education program offering in TTTC is very rigid and remain strict in only one option of vertical entry and exit after completing the whole course curriculum at a time. Ease horizontal entry and exit provision and promotion of partial achievement of the course like micro credential certification is absent in the curriculum of BTEB and DU. Other flexibility and adoption constraints in the courses includes non-accessibility into the provisions of Learning Management System (LMS), blended Learning. no online education and certification provision like MOOC exist in the formal teachers' education in Bangladesh. Ease vertical and horizonal entry and exit provisions, formal online and blended teachers' education and training, use of LMS and micro credential certification need to be included in courses. Introducing of such innovative system of education for all upcoming and existing

teachers and microcreditial certification should be recognized by the government and private recruiting authority. If so, this microcreditial certification provision might be easier to bring all existing in-service teachers under the teachers' education certification and create possibility to find a database of qualified teachers/ educators in TVET sector.

5.5 Lacks in Institutional and Organizational Capacity of TTTC.

5.5.1 Lacks in Institutional capacity:

The institutional capacity of TVET teachers' institutes in Bangladesh is very poor and controlled. The administrative authority of TTTC is the directorate of technical education (DTE) , a purview of technical and madrasah education division (TMED) under the ministry of education. On the other hand, the academic programs of these TVET teachers' organization run under the regulations of the Bangladesh Technical Education Board (BTEB) for Dip. in Tech Ed. and University of Dhaka for BSc in Tech. Ed. The DTE delegate a controlled mandate to TTTC for running the teachers' education programs under the rules of business of TMED. The degree of authority of the head of teachers' education and training institutes are very low and limited. For any sort of developmental change, unpredictable managerial decision or academic innovation, TTTC / VTTI management must seek the decision from its higher authority like DTE, BTEB and Dhaka University. There is no autonomy exist to change or update in TVET Teachers education programs / courses when required but have the right to suggest for changing or updating the courses to the higher the administrative or academic authority. Though the academic programs and courses are developed and update by either BTEB or DU, TTTC have no authority to make any change in its curricula or have no right for developing any quality assurance system manual itself

5.5.2 Lacks in Organizational capacity

Technical teacher training college is situated nearby a crowdy and noisy main road of Dhaka city in the second floor of the campus building of Bangladesh Glass and Ceramic Institute where the ground floor of the premises is using by Glass and Ceramic Institute. This dual ownership of one building and the noisy environment specially from vehicle horn hampering the learning environment of TTTC. They suggested for transferring the campus to a quiet and calm environment in a separate campus. They also recommend for reestablishing the campus within Tejgaon industrial area so that the students of teachers' education programs can easily attached in practice teaching to other surrounding TVET institutes as well as getting internship facilities in the nearby industries. The availability of machine; tools; equipment, consumable materials and teaching aids in lab & workshops were 68.8%, 62.6% and 73.2% respectively. The mean value

and the corresponding agreed percentage of the respondents proofed that machine; tools; equipment, consumable materials and teaching aids in lab and workshops of TTTC were moderately adequate and usable.

No special and dedicated quality assurance manual were found in TTTC. No study circle under the supervision of teaching faculties and no Open Educational Resource (OER) platform were established in the TTTC. The networking and collaboration in TTTC are very weak and no international collaboration was yet signed but recently the authority taking initiative for MoU with local industries. The TTTC currently doing no research and innovation activities, though the authority and the faculties shown their positive intension and interest on research but no financial allocation or capacity building supports yet provided from the higher controlling authority to the TVET teachers education college. The faculty strength of TTTC is very much disappointing. Against 59 education and teaching related positions 42 were vacant. Again, out of 17 existing teaching faculty, 06 of them including the principal are hired from polytechnics and working as attached or in deputation. All teaching faculties of teacher's education program in TTTC have the required degree in his / her own technical subject / technology / discipline but did not have the professional teachers' education qualification. None of the teaching faculty have the teachers' education qualification except one chief instructor working at TTTC in deputation have the BScTE, achieved the degree from this college under DU. Since last two decade the faculty of TTTC did not get any scholarship or any higher education facilities in home and aboard officially and yet no such visionary initiatives has been taken for developing the teaching faculty of TTTC.

5.6 Gaps Between Expectation and Satisfactions of TVET teachers:

From the above analysis, it is clear that the TVET teachers were not satisfied with the narrowest scope of teachers' education programs in TTTC. The alumni shown their moderate satisfaction (55.8%) on the relevancy and quality of the curricula, the teaching learning delivery and the student evaluation system but the same alumni urged their dissatisfaction with the adequacy of programs and the narrowest coverage of the technical departments in TTTC. They are highly dissatisfied regarding the 2 years duration of BSc in Tech. Ed, negligence regarding valuing and recognition of the diploma / degree of teachers' education by the recruiting authority. The stakeholders also shown their reaction and disappointing on the recruitment policy, rules and regulation where practically no encouragement or incentives are promoted in favour of teachers' education. The unemployment and under employment in private sector TVET institutes are the

other important causes of dissatisfaction raised from the teachers' education graduates. They urged for the change of recruitment rules and demand for privilege during recruitment. All type of respondents, discussant and the key informants agreed that only separate pay scale and higher grade of salary for the qualified professional teachers can attract the talents on TVET teaching profession.

5.7 Career Prospect OF TVET Educators in Bangladesh

After analyzing the secondary data, government target of TVET enrolment and trends of students' admission in TVET and FGD as well as KII experiences Shows that *"potentiality and career prospect as TVET educators (Trainer and assessor, Master Trainer, Training Manager, Instructors, TVET Specialist, TVE Institute Managers, TVET directors and TVET Policy makers) are very bright in Bangladesh, becoming prospective in near future and also expanding in global context everywhere in the world".* The rationale of the potentiality and prospect are discussed below.

In Bangladesh, career prospects for TVET educators are robust and expanding, driven by the nation's economic aspirations and demographic trends. As Bangladesh advances towards becoming a middle-income country, committed to build her a developed nation by 2041, there is an escalating demand for a skilled workforce to sustain and enhance its industrial and economic growth. TVET educators are pivotal in this process, equipping students and trainees with practical skills and competencies that are directly aligned with industry needs. The government's strong commitment to vocational education, reflected in policies and investments aimed at upgrading TVET institutions, further amplifies career opportunities for educators in this field.

Government of Bangladesh targeted TVET student's enrollment 30% by 2030 and 41% by 2041. In 2041, the total TVET enrollment will reach to 54,51,053 and corresponding TVET teachers and educators' requirements will be 4,54,254 in 2041.

To fulfill the enrollment targets of the government and the corresponding requirements of new TVET teachers and educators in TVET institutes created, creating and continually will create unique career opportunity for thousands of young and talents in Bangladesh.

Moreover, partnerships between educational institutions and industries are being strengthened to ensure curriculum relevance and to provide hands-on training experiences. The development partners, NGOs and

donner agencies are shifting their funds as well as other technical and logistic support from the literacy focused education to the skills development program and projects. The industries given attention to the quality of workforce, and they are establishing enterprise based TVET institutes in their industries. This huge private sector and NGO activities also create new job opportunities in the TVET sectors.

In these circumstances and consequents of expansion of TVET institutes, shaking hands the young towards TVET in Bangladesh will not only enjoy the satisfaction of contributing to national development and poverty alleviation but also will benefit from increasing job opportunities as well as job security in teaching profession by the contribution of TVET educators.

Due to the huge expansion of TVET, day by day the start up as well as edu-preneurship in TVET becoming very prospective. It is also ensuring the professional growth opportunities, and competitive salaries in the sector. Middle East, Africa and the OECD countries are suffering the lack of adequate number of qualified TVET teachers.

TVET teachers and other educators easily can find their job opportunities in this sector. As the country continues to prioritize skills development to achieve its Vision 2041 goals, the role of TVET educators becomes increasingly critical, making this a highly attractive and impactful career choice.

CHAPTER SIX: DISCUSSION, RECOMMENDATIONS AND CONCLUSION

Chapter six illustrated with the general discussion on finding, consequence of the gaps of teachers' education programs and courses and lacks of teachers' education providing institutes, recommendation and conclusion of the study including requirement of further study. This chapter also included a time bound actions obtainable within three terms (short term, midterm and long term) as per recommendations followed by reference and appendix.

6.1 Discussion on findings

The above findings, insights and analysis of the parameters of the teachers' education program reflecting the efficiency, strength and effectiveness status of the teacher education program. From the result and summary finding it is clear that-

Number of TVET Teachers' education graduates (495) among a total of 54,942 TVET teachers is a big gap between demand and supply of qualified TVET teachers. Enrollment rate in teachers' education program (27.5%) of seat capacity is very negligible and rate of qualified TVET teachers (6.11%) in polytechnic and TSC under DTE is too poor. The rate of qualified teachers' is zero in other public TVET providers. The faculty strength against number of approved teaching positions both in TTTC (27.11%) and VTTI (7%) is disappointing.

- Non-recognition of the diploma and degree in technical education to the employment authority specially by BPSC as well as a very negligible employment outcomes are some of the important parameter of proofing the ineffectiveness of the teachers' education program in Bangladesh.

- The constraints of employments and promotions, poor salary status of the graduates in teaching positions de-motivates the graduates as well as the existing and upcoming teachers' education students' causes of very poor enrollment in TVET teachers education programs.

- Program accreditation, recognition and constraints in admission to higher education are also disappointing situations for the graduates and alumni.

-Lacks in student learning and weak performance of the teaching faculties, low preparedness and competence of the graduates**,** absent of practice for professional development and growth**,** gaps and lacks in quality of curriculum and dissatisfaction of the alumni on the overall performance and quality of

teaching learning activities as well as the identified lacks of the teachers' education institutions indicating the ineffectiveness of TVET teachers' education programs.

6.2 Discussion on the Consequents of Gaps and Lacks

The identified gaps in TVET teachers' education programs and lacks of teachers' education providing institutes in Bangladesh have significant repercussions as found from the study on the teaching-learning process, quality of TVET teachers as well as implementation of TVET in the country. These consequences and impact of the gaps and lacks in TVET include:

1. Staggering disparity between demand and Supply of TVET Educators:

Bangladesh TVET sector suffering from a catastrophic teacher shortage. The staggering disparity between the demand for qualified TVET teachers and the supply of a mere from teacher training colleges is a crisis of immense proportions. It will have profound and detrimental consequences for the teaching-learning process and the overall quality of TVET education in Bangladesh. The consequences on teaching and learning include -

- **Severe Teacher Shortages:** The acute shortage of TVET teachers is leading to grossly overcrowded classrooms and student-teacher interaction.
- **Acute shortage of qualified Professional teachers:** The whole TVET system running without qualified professional teachers and educators by compromising the quality of instruction and inclusion of pedagogy.
- **Negligible Practical Training:** TVET's emphasis on hands-on learning demands specialized competent teachers with industry experience. The dearth of qualified educators is severely hinder the provision of adequate practical class, crippling students' skill development without considering the pedagogy aspects of teaching learning process.
- **Compromised Curriculum Delivery:** A very few number of qualified (trained) teachers and 99% non-qualified teachers' working in TVET sector, are overburdened and struggling to deliver the curriculum, resulting in students acquiring insufficient knowledge and skills.

- **Deteriorating Learning Environment:** The absence of qualified professional teachers is creating a substandard learning environment, impacting student engagement, motivation, and overall learning outcomes.

2. Low Quality of Education and Training:

- **Inadequate Instruction:** Most of the existing regular teachers & part time teachers who are not adequately qualified struggling to deliver instructions, leading to a lower quality of education and defective student's assessment in the field of TVET.
- **Outdated Teaching Methods and approaches:** A poor alignment of teacher education programs as well as course contents with current standards of TVET, resulting practice of outdated teaching methods and approaches and uses of obsolete machine, tools and equipment thrown the whole TVET system in a disappointing and disaster condition.

3. Poor Student Outcomes:

- **Insufficient Skills:** Due to the absent of qualified teachers, students are graduating without acquiring the necessary skills and knowledge required by the job market, reducing their employability and acceptability in home and aboard
- **High Dropout Rates**: The lack of engaging and relevant teaching due to the absent of qualifies professional educators, whom supposed to be act as motivators, facilitators and mentors demotivated the TVET students to stay in TVET, leading to higher dropout rates among students.

4. Reduced Motivation and Satisfaction:

- **Teachers' Dissatisfaction:** The gap between teachers' expectations and their actual experiences are leading them to low morale, decreased motivation, higher turnover rates among TVET teachers and further exacerbating the shortage of qualified teachers.
- **Student Disengagement:** Students disengagement and lower attendance in the class are the result of poor teaching quality delivered by the non-qualified teachers

- **Lack of Professional Growth**: Teachers are feeling undervalued and unsupported, leading to a lack of professional growth and development opportunities in TVET sector.

5. **Institutional Weaknesses:**

- **Ineffective Educational Management:** Institutional and organizational capacity gaps led to ineffective management and administration in teachers education institutes, impacting the overall efficiency and effectiveness of TVET institutions.
- **Resource Constraints:** Lack of resources and support for teachers and institutions hindering the implementation of quality education programs both in teachers' education institutes and the field level TVET institutes.

6. **Misalignment of the qualification with occupational Needs:**

- **Skills Mismatch:** Poor relevancy of TVET programs, curricula and the course contents are the result in a mismatch between the skills taught and the skills needed for a TVET teachers', affecting the development of qualified and competent teachers and educators.
- **Lack of Innovation:** absence of promotions of research and development initiatives as well as allocation of funds for the application and practice of new teaching methodologies and innovations, hindering the growth and adaptation of TVET as per the demand of TVET institutes.

6.3. Summary of Discussion

These gaps and lacks, weakness and consequences of ineffectiveness need to be mitigated through a holistic approach actions and solutions. After analyzing the all secondary and primary data, a conclusion may made that the teachers' education programs implementing in TTTC and VTTI are not effective and impactful at all in TVET sector.

The research finding and result need to be taken as a serious agenda for developing professional qualified teachers and other educators. Creating facilities and other favorable environment for teachers' education as well as attracting talents in teaching profession should be the prime agenda for quality assurance of the TVET sectors. Despite the initiatives of TTF project establishing more TVET teachers education and

training institutes, enhancing the promotional activities for TVET teaching professions, increasing and ensuring the enrollment of meritorious TVET graduates in teachers education programs, enhancing the institutional and organizational capacity of the existing teachers education and training institutes, immediate change of the curricula , durations of the programs and transform the year system to semester system should be prime action for reactivating the institutes and making the program effective. Modernizing the TVET teacher education curricula with 4.0 and 5.0IR, specially use of AI tools in education and in students learning is essential to bridge this gap, thereby enhancing the employability and productivity of the TVET teachers in a rapidly changing industrial landscape. Incorporating these competencies into the Diploma in Technical Education and BSc in Technical Education programs is essential for producing qualified 21st century teachers and educators. The concepts of didactic and TPACK need to be integrated into the TVET teachers' education curriculum for diploma and degree programs is essential for modernizing teaching practices, improving educational outcomes and producing smart teachers/ educators for sustainability at jobs of TVET sector. The proportion of STEA/(P)M combined contents in Dip. in Tech. Ed. and BSc in Tech. Ed. are slightly deviated from the proposed contents of the study based on distribution principle of technical teachers' education curriculum. So, a change requirement needs to be initiated by the academic authority (BTEB and DU) for justifying the STEA/(P)M (Science, Technology, Engineering, Arts (Pedagogy) and Mathematics) contents. The STEA(P)M distribution principle should be kept in mind during the content analysis and formation of subjects. But must be considered, the variation of contents in program to program and provider to provider based on targeted students / trainees, level of education or training and type of courses.

Ease vertical and horizontal entry and exit provisions, formal online teachers' education and training and micro credential certification need to be included in curricula. Introducing of such innovative system of education for all upcoming and existing teachers and microcreditial certification should be recognized by the government and private recruiting authority. This provision will bring all existing in-service teachers under the database of qualified teachers/ educators

Considering this big gap and incremental demand of TVET educators up to 2041, given a clear indication of the potentiality of TVET teaching profession. It's also proofed the demand of career prospects in TVET sector that robust and expanding, driven by the nation's economic aspirations and demographic trends.

So. the lack of qualified TVET teachers as the prime indicator of quality, affecting the quality of TVET implementation, student assessment and program evaluation, resulting production of unskilled TVET

graduates, leading to decreased productivity and competitiveness, hampering the country's economic growth and increasing the social inequality.

6.4. Recommendations

Based on literature review on secondary information and analysis of primary data collected through survey questionnaires, discussion with focus groups and interview with key informants and meeting with policy makers, the researchers concluded the following macro recommendations of the study.

i) **The Policy makers (TMED)** need to take the study report in cognizance with high attention, for giving a visionary strategic direction of separate policy formulation on the development of classified TVET educators considering the principle of BSCO, policy of BNQF and NEP-2010.

ii) **The Planers and administrative authority (DTE)** need to take this report as a statistical tool for-

- preparing a holistic and inclusive missionary action plan to recruit and develop the upcoming mega amount of TVET educators considering the identified gaps of existing and future requirements of TVET teachers as well as expectations of the categorized TVET educators and training implementers
- Giving inclusive access opportunity for achieving professional qualification (diploma / degree in technical education) for all category of TVET teachers and other educators, making professional qualification mandatory for the TVET teachers.
- Attracting meritorious and the talents toward TVET teaching profession by providing separate pay scale / upper grade salary as incentives for those having professional teacher' qualification (diploma / degree in technical education) might be achieved either before or after the recruitment.
- Reforming the existing teachers' education degree program (BSc in Tech. Ed.) by promotion of existing two years degree program to three years in the form of semester system, integrating diploma in Tech. Ed. as a part of three years professional degree with provision of exit after successful completion of diploma part and ease entry in second year when required.
    - Rebirthing the TTTC as an affiliating university for TVET sector as mentioned in NEP 2010, in an independent new campus to make it as a hub of higher technical, technological and TVET teachers education and research for Bangladesh considering the existing issues and problems identified in study like affiliation and accreditation issues of programs and courses

for TVET sectors, inadequate infrastructure, crowdy and noisy atmosphere and dual ownership of the campus of TTTC, negligible students' enrollment in teachers' education program, inadequacy of education programs and department, lack of qualified teaching faculties, other constraints related to institutional and organizational capacity as well as low financial allocation for research & development.

iii) **The academic authority (University and BTEB)** need to consider the inadequacy of TVET teachers' education programs, unrealistic duration and outdated curricula, obsolete course contents, methodology and approach of teaching-learning system and twenty first century requirements of teachers' education as identified in the study for introducing more teachers' education programs, modernizing the course contents as per BNQF implementation policy.

For better interpretation and cognizance, the macro recommendations are break down within three actionable term and obtainable micro agenda possible to complete by 2035.

The Short-term (2025-2027) recommendation agenda includes -

1) Preparing an action plan for producing categorical TVET Trainers, Teachers and other educators based on a separate study on a related forecasting report.
2) Revival of the Teachers Education Programs and Courses in TTTC and VTTI with new look as suggested in the study by accommodating the twenty first century requirements of classified TVET Teachers
3) Reactivate 132 Trainee Teachers' positions of TTTC, Recruit TVET Teachers against those positions and enroll them in Dip. In Tech Ed. (99) and BScTE (33) programs.
4) Designing and developing new curricula for Dip. in Tech. Ed. program incorporating the related findings of the study report (The newly developed curricula of Dip. in Tech. Ed. program of DTTTI might be reviewed)
5) Including online teachers' education and training provision as well as micro credential certification in teacher's education (Dip. in Tech. Ed). Curricula.
6) Introducing diploma in technical education as the mandatory professional education for the newly recruited all type of TVET teachers having diploma, degree in engineering and honours / master degree in non-tech. subjects and making it open for all TVET teachers (Junior instructors and the instructors of tech. and non-tech. technology / departments)

7) Designing and developing new curriculum for BScTE Program aligning with BNQF as per recommended findings from the study (3 years, transforming the year system to semester **system,** integrating Dip. in Tech as a part of BScTE) for accommodating more courses and recognitions of the degrees locally and globally)

8) Exploring the potentiality of being a qualified teacher rather than other profession for the talents and meritorious students in the sector

9) Developing an integrated pathway of Teachers Education Programs incorporating the existing Trainers qualification (CBT&A methodology level 4, 5 and 6) in different level of Education through designing a Holistic TVET Trainers and educators Qualification Framework aligning the programs (Dip. in Tech Ed. to PhD) with BNQF. Ease vertical and horizontal entry and exit provisions need to be in consideration during the design of teacher's education career pathway.

10) Starting the activities of the already approved new department CSE and Education of TTTC by recruitment teaching faculties , students' admission and related other activities based on an action plan.

11) Reintroducing Dip. in Technical / Vocational Education at VTTI

12) Changing the recruitment rules, incentives and promotion criteria for attracting talents toward the profession of TVET educators

13) Establishing research and innovation cell in TTTC and VTTI and allocate financial and logistic supports for research and development of TVET

The Midterm (2025-2030) recommendation agenda includes –

1) Transferring the existing TTTC to an independent new campus with latest teachers' development facilities

2) Introducing at least **08 new departments** for covering the diversified departments, technology and trades under the proposed TTTC of TTF project (The newly developed curricula of different 08 department of DTTTI may be reviewed for the actions)

3) Introducing MScTE in Technical Education for producing TVET specialist, curriculum and material developers, TVET managers and other TVET experts

4) Establishing an Open Educational Resource (OER) platform at TTTC for collaborative learning, resource development and recognition for TVET sector.

5) Implementing the holistic TVET Teachers Qualification Framework, start practicing international benchmark standard of teachers' qualification for establishing the culture of teaching profession.

The Long-term (2025-2035) recommendation agenda includes –

1) Establishing the affiliating TVET University (as mentioned in NEP-2010) by reorganizing and renovating the existing TTTC and bring all the undergraduate and graduate programs (TVET Teacher Education programs, Technological Education programs and Engineering Education program) operated by DTE under the purview of TMED for ease governance and management.

2) Introducing PhD in Technical Education for producing TVET researchers and the Policy Makers under the TVET University.

3) Make diploma/ Degree in Technical Education compulsory for the TVET teachers and other educators

4) Providing separate salary scale (higher grade) for the qualified TVET teachers, for those having teacher's education qualification (diploma / degree in Technical education)

6.5. Concluding Remarks and Requirements for Further Study

The study shows that existing structure and course contents of the curricula, institutional and organizational capacity of TVET teachers' education and training providers could not meet the vision, mission and goal of the nation. For producing productive graduates, we need qualified professional TVET teachers and other educators. To fulfill the goal of the government (TVET enrollment 41% by 2041 and SDG4-quality education & qualified teachers) and the corresponding demand for new TVET teachers and educators in different newly established TVET institutes will create a unique career opportunity for thousands of young and talents in Bangladesh.

A variety of scope of further study are created and identified from the current study works. Some of the recommended actions and suggestions may require conducting further study before going to the actions. The categorical requirements of different educators and training implementers in different levels with different roles is an important BSCO aligned statistical tool for occupational classification. The policy makers could use it for planning the structure of teachers' education as well as CPD of TVET teachers.

A study on developing the TVET teachers' qualification framework aligning with BNQF is the prime immediate requirement for structuring and harmonizing the TVET teachers' education and training in Bangladesh.

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6.7. Appendix:

TOOL A **:** Questionnaire-1 for Alumni of TTTC,

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
কারিগরি শিক্ষা অধিদপ্তর
আগারগাঁও, ঢাকা ১২০৭।

Survey Questionnaire for the Research Work
on
Effectiveness of the TVET Teachers Education Programs in Bangladesh

তথ্যদাতার সম্মতিপত্র

সম্মানিত তথ্যজ্ঞ,
*আন্তরিক শুভেচ্ছা ও সালাম। কারিগরি শিক্ষা অধিদপ্তর এর রিসার্চ এন্ড নলেজ ম্যানেজমেন্ট সেল কর্তৃক "***Effectiveness of the TVET Teachers Education Programs in Bangladesh***" শীর্ষক একটি গবেষণা কার্যক্রম পরিচালনা করা হচ্ছে। গবেষণাটির প্রধান উদ্দেশ্য হচ্ছে।*

2. To forecast the demand and the prospect of categorized TVET educators and training implementers in Bangladesh; (বাংলাদেশে বিভিন্ন শ্রেণীর টিভিইটি শিক্ষাবিদ এবং প্রশিক্ষণ বাস্তবায়নকারীগণের চাহিদা এবং সম্ভাবনার পূর্বাভাস দেয়া)
3. To determine the expected competency area of the 21st century qualified TVET educators and training Implementers; (একুশ শতকের যোগ্য টিভিইটি শিক্ষাবিদ ও প্রশিক্ষণ বাস্তবায়নকারীদের প্রত্যাশিত দক্ষতার ক্ষেত্র নির্ধারণ করা);
4. To unveil the capacity of public TVET teachers' education institute;
(টিভিইটি শিক্ষকগণের শিক্ষা কার্যক্রমের জন্য প্রতিষ্ঠিত সরকারি প্রতিষ্ঠানটির সক্ষমতা উন্মোচন করা);
5. To examine the overall effectiveness of the TVET teachers' education programs in Bangladesh (বাংলাদেশে টিভিইটি শিক্ষকগণের শিক্ষা কার্যক্রমের কার্যকারিতা পরীক্ষা করা)

গবেষণা সফলভাবে সম্পাদনের জন্য আপনাকে এই গবেষণার একজন বিজ্ঞ তথ্যজ্ঞ হিসেবে নির্বাচন করা হয়েছে এবং এজন্য আপনাকে অভিনন্দন জ্ঞাপন করছি। আমরা আপনার নিকট থেকে কারিগরি ও বৃত্তিমুলক শিক্ষা ও প্রশিক্ষণ(টিভিইটি) ক্ষেত্রসমুহের শিক্ষকদের শিক্ষা বিষয়ক ডিপ্লোমা। ডিগ্রি প্রদানকারী বিদ্যমান প্রতিষ্ঠানটির প্রশাসনিক কর্তৃত্ব, অবকাঠামোগত সুযোগ সুবিধা, বস্তুগত সম্পদ ও দ্রব্যাদির প্রাচুর্যতা, মানব সম্পদের সামর্থ, উক্ত প্রতিষ্ঠানসমুহে পরিচালিত শিক্ষা সংশ্লিষ্ট প্রোগ্রাম ও কোর্সসমুহের শিক্ষাক্রম ও পাঠ্যসূচি, পাঠদান পদ্ধতি, শিক্ষকদের পেশাগত মান উন্নয়নের সার্বিক কার্যকারিতা এবং শিক্ষার্থী ও অ্যালামনিগনের প্রত্যাশা ও সন্তোষ্টি সম্পর্কিত মূল্যবান মতামত সংগ্রহ করব। এ উদ্দেশ্যে আমরা তথ্য ছক, চেকলিস্ট, জরীপ প্রশ্নমালা, আলোচ্যসূচি ও সাক্ষাৎকার নির্দেশিকা তৈরি করেছি।

নির্ধারিত তথ্য ছক। চেকলিস্ট। জরীপ প্রশ্নমালা। আলোচ্যসূচি। সাক্ষাৎকার নির্দেশিকাটি এতদ্বসংগে যুক্ত করা হলো। আমরা আশা করি, আপনি তথ্য ছক। চেকলিস্ট। জরীপ প্রশ্নমালা। আলোচ্যসূচি। সাক্ষাৎকার নির্দেশিকাটি মনোযোগ সহকারে পড়ে আপনার মূল্যবান মতামত দেবেন। আপনার দেওয়া তথ্য শুধু গবেষণার কাজেই ব্যবহার করা হবে। গবেষণা প্রতিবেদনের কোথাও আপনার নাম বা পরিচয় উল্লেখ করা হবে না। আমরা আপনাকে নিশ্চিত করছি যে, তথ্য প্রদানের কারণে আপনার কোনো ক্ষতি হবার সম্ভাবনা নেই, উপরন্তু এদেশের কারিগরি শিক্ষার গবেষণা এবং যোগ্য শিক্ষক তৈরির ক্ষেত্রে আপনার দেয়া তথ্য মূল্যবান অবদান রাখবে। আপনি যদি আমাদের প্রস্তাবে সাড়া দিয়ে প্রয়োজনীয় তথ্য প্রদান করতে সম্মত থাকেন, তবে নিচে আপনার সম্মতিসূচক স্বাক্ষর প্রদান করার অনুরোধ করছি।

নিবেদক

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আমি কারিগরি শিক্ষা অধিদপ্তর এর রিসার্চ এন্ড নলেজ ম্যানেজমেন্ট সেল কর্তৃক পরিচালিত "**Effectiveness of the TVET Teachers Education Programs in Bangladesh**" *শীর্ষক গবেষণায় প্রয়োজনীয় তথ্য দিয়ে সহায়তা করতে সম্মত আছি।*

স্বাক্ষর: .....

তারিখ: .....

মোবাইল নম্বর:.....

ইমেইল:.....

Research Instruments 02:

Survey Questionnaires-01

for

Alumni of TVET Teachers' Education Program (TTTC)

(Having diploma / degree in Technical Education)

Background of the study:

The preliminary observations make a perception to the researchers that more than 98% existing TVET educators (Instructors, specialists, principals, directors and Policy Makers) and the training implementers (trainer, master trainer and head of the training institutes) are working in Polytechnic, TSC, TTC, MPO Vocational and private vocational and training institutes, directorates, Boards and ministries without any formal teachers' qualification in Bangladesh. The perception of TVET stakeholders is that the TVET teachers' education and training programs run in public institutions (TTTC and VTTI) could not met the requirements of qualified educators, through their education and training programs, both in consideration of quantity and quality. Consequently, way of teaching delivery and assessment, the design of TVET standards and the curricula as well as development and use of teaching learning resources, the quality of TVET planning, implementation monitoring and program evaluation are becoming substandard day by day and is disputed in Bangladesh. The issues need to be critically analyzed for mitigating based on research recommendation, which stimulated the researcher to choose the research title.

Objectives of the survey questionnaire-1

1. To assess the organizational capacity of the teachers' education institute of Bangladesh
2. To know the sufficiency of the education programs and the relevancy of the curricula in the TVET teachers' education institute.
3. To understand the graduate's satisfaction on teachers' education programs, curricula, quality of teaching learning activities and related issues.
4. To understand the expectation of the alumni and current students' from teachers education programs, courses of the two programs and the recruiting authorities.

Confidentiality of personalized data and general Instruction:

This study information will be used for research purpose only. The personalized data will be kept as confidential. Please provide information and / or put tick marks (√) in appropriate places.

I. General information of the respondents

Please provide personal information or select / response to appropriate items / options putting tick marks (√) or writing information in appropriate places.

1. Type of respondent : ◯Current student ◯Alumni
2. Name of the Organization/ Workplace you are working now : .....
   ◯ Not Applicable
3. Programs you attended in the institute : ◯ Diploma in Technical Education Degree
   ◯ BSc. in Technical Education
4. Department of your Educational program : ◯Civil ◯Mechanical ◯EEE
5. Your highest academic technical qualification :
   ◯Diploma ◯Degree ◯PGD ◯Masters ◯PhD

II. Organizational Capacity of the Teachers' Education Institute:

6. Please rank the related statement regarding the infrastructure and resources availability in the institute you are studying / studied under the teachers education and training program ***(STRONGLY AGREE-5, AGREE-4, MODARATELY AGREE-3, DISAGREE – 2, STRONGLY DISAGREE -1),***
   The respondents are requested to respond considering availability of infrastructure and physical resources.

Key Issues	The organization you are studying / graduated	5	4	3	2	1
Infrastructure and education friendly environment	1) Has adequate infrastructure and space					
	2) Are situated in favorable location, learning atmosphere is appropriate and quite					
Adequacy of lab and workshop resources	3) Have adequate number of lab and workshop and are / were accessible					
	4) Machine, tools, equipment in lab/ workshops are / were sufficient, functional and usable					
	5) Consumable materials for laboratories / workshops are / were available					
Availability of teaching aids	6)Teaching aids (multimedia projector, whiteboard, laptops, audio visual equipment) are / were sufficient and functional and organized.					

Adequacy of learning materials	7)Learning materials are / were available in lab / workshop and easily accessible					
	8) Reference books are / were available in library and useful					
	9) Learning resources are accessible through internet facilities in campus and in library					
Adequate Classroom facilities and e-learning platform	10) Classrooms are / were sufficient, well organized and environment friendly					
	11) Has digital classroom facilities with smartboard					
	12) Has / had study circle in supervision of teachers / mentors					
	13) Has / had e-learning platform like open educational resources (OER)					
	17) Others (if any,please specify)					

7. Are you satisfy with the overall capacity of your TVET teacher's education institute-TTTC)?

Yes ◯ No ◯

III. Programs and course relevancy

8. Do you think that the existing two TVET teachers education programs (Diploma and degree) running in the Technical Teachers Training College (TTTC) are adequate for fulfilling the demand and requirement of existing and upcoming TVET educators in Bangladesh ?

Yes ◯ No ◯

if No. please mentioned which other following programs need to be introduced in your teachers' education institutes?

PGD ☐ Masters ☐ PhD ☐ All three of them ☐

Others ☐ Please mention the name of the program) .....

9. Have you have / had the opportunity to study in your own / desired teachers' education study area / courses (department / Technology / Trade)

Yes ◯ No ◯

if No, please mention the reason (s)

☐ Related department / technology / trade course of my own choice is /was not provided by my Teachers Education / Training Institutes.

☐ Department / technology / trade run by the institute is / was not attractive to me for my career development

☐ Both of above mentioned reasons applicable for me

☐ Others (Please mention the reason) .....

10. Do you think that the existing 03 technical / engineering departments (Civil, Mechanical, EEE) are enough to cover the field level technology and trade courses running in different institutes (polytechnic, textile institute, IMT, TSC, TTC and other equivalent institutes)

Yes ◯ No ◯

if No. please mentioned which other one department may introduce in priority basis for you?

.....

.....

IV. Students and alumni expectation

IV.1. Expectation on Techers Education Programs and courses

11. The researcher proposed following 11 technical / engineering and one related subject department need to be introduced for ensuring the accessibility of all technology / trade teachers of polytechnics, TSCs and MPO vocational schools in teachers' education program

Sl. No	Proposed TVET Teachers' Education Department	Clustered Technologies in Diploma level
1.	Civil Engineering	Civil, Civil Wood, surveying, Construction and Environmental
2.	Mechanical Engineering	Mechanical, Mechatronics, Merin and Ship Building, Printing
3.	Architecture	Architecture, Architecture and Interior Design
4.	Computer Science and Engineering	Computer, Computer Science Data Telecommunication,
5.	Electrical and Electronic Engineering	Electrical, Electronics, Electro-Medical, Telecommunication.
6.	Chemical Engineering	Chemical, Glass, Ceramic, Food
7.	Automobile Engineering	Automobile, RAC
8.	Agri-Engineering	Power, Agri Machineries

9.	Textile Engineering	Textile, Apparel Manufacturing, Wet Processing, Yarn manufacturing, Fashion Design, Merchandising and Marketing, Jute
10.	Agriculture	Agriculture, Forestry, Livestocks etc.
11	Fisheries	Fisheries
12	Non-Tech	Mathematic & statistics, Physics, Chemistry, language and literature, Accounting and Business

Do you think the proposed above departments for related clustered technologies / subjects shown in the table by the researchers is justified?

Yes ◯ No ◯

If No. Please proposed your suggestion / insights / other department(s)

.....

.....

12. Do you think that Education / Technical Education should be a separate department in TTTC like the TVE department of IUT for teaching and research on pedagogy / andragogy subjects?

Yes ◯ No ◯

.....

.....

13. Do you think that the 01 year **duration** of the program "Diploma in Technical Education" under BTEB is justified?

Yes ◯ No ◯

if No please state the reason and mention what should be the duration of diploma in technical education program

.....

.....

.....

14. Do you think that the **02 years duration of the program "BSc in Technical Education**" under Dhaka University for the graduates of Diploma in Technical education is justified?

◯ Yes No ◯

if No Please state the reason and mention what should be the duration of BSc in technical education program

.....

.....

15. Do you think that the current academic calendar term-'Year System Education' for BSc in Technical Education program running under Dhaka University is justified?

◯ ◯

Yes No

if No Please mention the reason and put your suggestions

.....

.....

16. Do you think that the Nomenclatures of the programme Diploma in Technical Education (DTE) and BSc in Technical Education (BScTE) should be renamed as Diploma in Technical and Vocational Education (DTVE) and BSc in Technical and Vocational Education (BScTVE) respectively ?

Yes ◯ No ◯

if No. Please mention the reason and put your suggestions

.....

.....

17. Please rank the statement regarding the expectation from the TVET teachers education programs (STRONGLY AGREE-5, AGREE-4, MODARALY AGREE-3, NOT AGREE-2, STRONGLY DISAGREE -1)

Sl. No.	The expectation from the TVET teacher's education programs	5	4	3	2	1
1	BSc in Technical Education (BScTE) should be a 3 years degree program for diploma graduates with options to exit after completion of one year Diploma in Technical Education where DTE will be the integrated part of BScTE.					
2	BSc in Technical Education (BScTE) should be a 4 years degree program for HSC(VOC) graduates with lateral entry of diploma graduates in second year and exit option after completion of Diploma in Technical Education (DTE) where DTE will be the part of BScTE					
3	The curricula of all teachers' **education programs should be transformed to the semester system** instead of current practice of year system in Bangladesh					
4	The curricula of teachers' education program should be redesigned and updated considering the need of 21st century teacher's qualification					
5	The teaching faculties of teacher's education program in TTTC should be academically qualified in his own subject / technology / discipline as well as must have the teacher's education qualification like diploma in technical education / Degree in Technical education					
6	Others (if any,please specify)					

III. Alumni Expectation from recruitment authority:

18. Do you think that the recruitment rules need to be changed for harmonizing and justifying TVET teaching as a profession ?

Yes ◯ No ◯

if No. Please state the reason and mention what should be the other way of establishing it as a profession ?

.....
.....
.....

19. Please rank the following alumni expectation regarding the teachers recruitment process and related qualifications.

(STRONGLY AGREE-5, AGREE-4, MODARATELY AGREE -3, NOT AGREE-2, STRONGLY DISAGREE -1)

Sl. No	TVET teachers' expectation from the teachers' education program	5	4	3	2	1
1	The TVET teachers' education qualifications (Certificate, diploma and degree in technical education) should have recognition to related recruiting authorities and be popular to the TVET educators					
2	The employment of the pre-service graduates in teachers' education qualification need to be encouraged, prevailed and ensured during teachers' recruitments by the government for attracting talents in teaching profession					
3	The in-service TVET teachers having education qualification should be incentivized by giving special increment / allowances and be prevailed during promotion					
4	Teachers education qualification (DTE / BScTE / MScTE / PhD in Technical Education) should be imposed in recruitment rules of public and private TVET providers and gradually it should be mandatory for different level of educators.					
5	TVET Teachers salary should be at least one step higher grade for those having diploma / degree in teachers education program.					
6	Others (if any,please specify)					

IV. Graduate / alumni satisfaction on teachers' education program

20. Please rate the degree of satisfaction in the following issues of teachers education at TTTC .(Highly Satisfied- 05 ----------01 - Highly dissatisfied)

Sl. No	Issues in teachers' education program, curricula and provides	5	4	3	2	1
1	Programs and departments adequacy *(Two program-diploma and bachelor degree and 3 departments-Civil, Mechanical and EEE)*					
2	Quality and relevancy of curricula					
3	Quality of teaching-learning delivery					
4	Quality of assessment and evaluation					
5	Duration of the programs *(01 year for DTE and 02 years for BScTE)*					

6	44. Recognition of the certificate by recruiting authority					
7	51. Employment opportunities					
8	Quantity of qualified faculties / teachers in TTTC					

24. Please provide your overall insight regarding the quality improvement and enhancing proficiency of the TVET educators and related education program

Mobile :

Signature of the respondent with date

Thank you so much for your valuable time and providing insight which will be used for national policy decision as well as input of resource development activities.

Signature of the data collector with date

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
কারিগরি শিক্ষা অধিদপ্তর
আগারগাঁও, ঢাকা ১২০৭।

Survey Questionnaire for the Research
on
Effectiveness of the TVET Teachers Education Programs in Bangladesh /

তথ্যদাতার সম্মতিপত্র

সম্মানিত তথ্যজ্ঞ,

*আন্তরিক শুভেচ্ছা ও সালাম। কারিগরি শিক্ষা অধিদপ্তর এর রিসার্চ এন্ড নলেজ ম্যানেজমেন্ট সেল কর্তৃক "***Effectiveness of the TVET Teachers Education Programs in Bangladesh***" শীর্ষক একটি গবেষণা কার্যক্রম পরিচালনা করা হচ্ছে। গবেষণাটির প্রধান উদ্দেশ্য হচ্ছে।*

6. To forecast the demand and the prospect of categorized TVET educators and training implementers in Bangladesh; (বাংলাদেশে বিভিন্ন শ্রেণীর টিভিইটি শিক্ষাবিদ এবং প্রশিক্ষণ বাস্তবায়নকারীগণের চাহিদা এবং সম্ভাবনার পূর্বাভাস দেয়া)
7. To determine the expected competency area of the 21st century qualified TVET educators and training Implementers; (একুশ শতকের যোগ্য টিভিইটি শিক্ষাবিদ ও প্রশিক্ষণ বাস্তবায়নকারীদের প্রত্যাশিত দক্ষতার ক্ষেত্র নির্ধারণ করা);
8. To unveil the capacity of public TVET teachers' education institute;
(টিভিইটি শিক্ষকগণের শিক্ষা কার্যক্রমের জন্য প্রতিষ্ঠিত সরকারি প্রতিষ্ঠানটির সক্ষমতা উন্মোচন করা);
9. To examine the overall effectiveness of the TVET teachers' education programs in Bangladesh (বাংলাদেশে টিভিইটি শিক্ষকগণের শিক্ষা কার্যক্রমের কার্যকারিতা পরীক্ষা করা)

গবেষণা সফলভাবে সম্পাদনের জন্য আপনাকে এই গবেষণার একজন বিজ্ঞ তথ্যজ্ঞ হিসেবে নির্বাচন করা হয়েছে এবং এজন্য আপনাকে অভিনন্দন জ্ঞাপন করছি। আমরা আপনার নিকট থেকে কারিগরি ও বৃত্তিমুলক শিক্ষা ও প্রশিক্ষণ(টিভিইটি) ক্ষেত্রসমুহের শিক্ষকদের শিক্ষা বিষয়ক ডিপ্লোমা। ডিগ্রি প্রদানকারী বিদ্যমান প্রতিষ্ঠানটির প্রশাসনিক কর্তৃত্ব, অবকাঠামোগত সুযোগ সুবিধা, বস্তুগত সম্পদ ও দ্রব্যাদির প্রাচুর্যতা, মানব সম্পদের সামর্থ, উক্ত প্রতিষ্ঠানসমুহে পরিচালিত শিক্ষা সংশ্লিষ্ট প্রোগ্রাম ও কোর্সসমুহের শিক্ষাক্রম ও পাঠ্যসূচি, পাঠদান পদ্ধতি, শিক্ষকদের পেশাগত মান উন্নয়নের সার্বিক কার্যকারিতা এবং শিক্ষার্থী ও অ্যালামনিগনের প্রত্যাশা ও সন্তোষ্টি সম্পর্কিত মূল্যবান মতামত সংগ্রহ করব। এ উদ্দেশ্যে আমরা তথ্য ছক, চেকলিস্ট, জরীপ প্রশ্নমালা, আলোচ্যসূচি ও সাক্ষাৎকার নির্দেশিকা তৈরি করেছি।

নির্ধারিত তথ্য ছক। চেকলিস্ট। জরীপ প্রশ্নমালা। আলোচ্যসূচি। সাক্ষাৎকার নির্দেশিকাটি এতদ্বসংগে যুক্ত করা হলো। আমরা আশা করি, আপনি তথ্য ছক। চেকলিস্ট। জরীপ প্রশ্নমালা। আলোচ্যসূচি। সাক্ষাৎকার নির্দেশিকাটি মনোযোগ সহকারে পড়ে আপনার মূল্যবান মতামত দেবেন। আপনার দেওয়া তথ্য শুধু গবেষণার কাজেই ব্যবহার করা হবে। গবেষণা প্রতিবেদনের কোথাও

আপনার নাম বা পরিচয় উল্লেখ করা হবে না। আমরা আপনাকে নিশ্চিত করছি যে, তথ্য প্রদানের কারণে আপনার কোনো ক্ষতি হবার সম্ভাবনা নেই, উপরন্তু এদেশের কারিগরি শিক্ষার গবেষণা এবং যোগ্য শিক্ষক তৈরির ক্ষেত্রে আপনার দেয়া তথ্য মূল্যবান অবদান রাখবে। আপনি যদি আমাদের প্রস্তাবে সাড়া দিয়ে প্রয়োজনীয় তথ্য প্রদান করতে সম্মত থাকেন, তবে নিচে আপনার সম্মতিসূচক স্বাক্ষর প্রদান করার অনুরোধ করছি।

নিবেদক

মো: শাহ আলম মজুমদার, বিশেষজ্ঞ(কোর্স এ্যাক্রিডিটেশন)
গবেষক দলের দলনেতা
বাংলাদেশ কারিগরি শিক্ষা বোর্ড, মোবাইল: ০১৮১৫৪২৪৮৫৫
ইমেইল : ehlam1999@gmail.com

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*আমি কারিগরি শিক্ষা অধিদপ্তর এর রিসার্চ এন্ড নলেজ ম্যানেজমেন্ট সেল কর্তৃক পরিচালিত "***Effectiveness of the TVET Teachers Education Programs in Bangladesh***" শীর্ষক গবেষণায় প্রয়োজনীয় তথ্য দিয়ে সহায়তা করতে সম্মত আছি।*

স্বাক্ষর: .....
তারিখ: .....
মোবাইল নম্বর:.....
ইমেইল:.....

Research Instrument 2:

Survey questionnaire-2

for

Non-alumni tech and non-tech teachers

Objectives of the survey questionnaire-2

1. To identify the professional development opportunities for tech and non-tech teachers
2. To know the views of tech and non-tech teachers having no teachers' education qualification
3. To know the expectation of the tech and non-tech teachers having no facilities for studying in teachers' education programs

Confidentiality of personalized data and general Instruction:

This study information will be used for research purpose only. The personalized data will be kept as confidential. Please provide information and / or put tick marks (√) in appropriate places

A. General information of the respondents

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

1. Type of respondent :

◯ Tech. Teacher ◯ Non-Tech. Teacher

2. Name of the Organization/ Workplace you are working now : .....

3. Department / Technology / Trade / Occupation / Subject you are teaching : .....

4. Experiences in teaching profession: .....

5. Highest Educational Qualification:

◯ Diploma ◯ Degree ◯ Masters ◯ Post Graduate Diploma ◯ PhD

B. Professional Development Opportunities of the TVET teachers :

6. Have you ever got / done any dedicated pedagogical teachers training in your teaching life?

Yes ◯ No ◯

If yes, please tick the duration of the course mentioned below

< = One week ☐ < = 15 days ☐ One month ☐

< = 3 months ☐ < = 6 months ☐ > 6 months ☐

7. Have you ever taken any subjective or technology related teachers training in your teaching life?

Yes ◯ No ◯

if yes, please tick the number of the training course(s) mentioned below

One ☐ Two ☐ Three ☐ More than three ☐

C. Views of TVET teachers having no facilities to enroll in teachers' education program:

8. Do you believe that besides the related academic qualification (Diploma/ degree in engineering/ technology/ Non-Tech subjects), every teacher in TVET sector should have also the formal teachers' education qualification (Certificate / Diploma / Degree in Technical / Vocational Teachers Education) for being a professional TVET teacher?

◯ Yes ◯ No

9. If Yes What should be the **initial level** (First level) of teachers' education program might be introduced for a TVET teachers already achieved /have bachelor / Master degree in Engineering / technological / Non-Technical subjects?

◯ Diploma in Technical Education
◯ Bachelor of Science in Technical Education
◯ Post Graduate Diploma in Technical Education
◯ Diploma in Education (Dip. Ed.)
◯ Bachelor in Education (BEd).
◯ Masters in Education (MEd.)

If No. What should be the other way of Continuous Professional Development (CPD) of TVET teachers in Bangladesh?

◯ Through separate pedagogy and or subjective short training course

◯ TPACK-Through subject didactic short training course

10. What may be the best suitable way of developing and or recruiting professional TVET teachers in TVET sector

◯ (Pre-service Teachers Education) -Professional education qualification achievement before entering in teaching profession

◯ (In-service Teachers Education) - Professional qualification achievement through teacher's education program after recruitment in teaching profession

◯ (Both pre-service and in-service provision of education)- Professional qualification achievement provision through teacher's education program, both before and after recruitment

11. Do you think that industry experience or industrial attachment is enough for the TVET teachers to develop the teachers' competency?

◯ Yes ◯ No

If No , please tick the following best suitable answers (you can choose more than one) as per your opinion

☐ t will enhance only the subject related technical competency (What to teach only) and

not cover the pedagogy aspect (How to teach and assess)

☐ It will not bring any significant outcome for the non-tech TVET teachers

☐ Both of above

12. Do you think that (a) minimum academic qualification in subjects / technology (b) industry experience or industrial attachment (c) regular upskilling training and (d) teachers qualification in education are equally important for Continuous Professional Development (CPD) of TVET teachers?

◯ Yes ◯ No

If No , please mention your opinion

……
……
……

13. Please mention the reason – Why you yet taking / enrolling in TVET teachers education program for achieving qualification in Technical Education

(Please read all the options first and then rank your preference)

◯ No facilities in TTTC / elsewhere in Bangladesh

◯ Authority do not give me permission for admission

◯ Qualification is not widely recognized and not attractive for career development

◯ Related technology / course is not provided by TTTC / elsewhere

◯ No need of such type of educational qualification

(D) Expectation related to professional development

14. What is your expectation for professional development in your career pathway?

◯ Opportunity to achieve at least a professional teacher's education qualification after recruitment

◯ Opportunity of Continuous Professional Development (CPD) by pedagogy and subjective training facilities throughout the professional service

◯ Opportunity to achieve at least one professional teachers' education qualification and

Continuous Professional Development (CPD) through upskilling and reskilling training

15. Do you think that every TVET institute / providers should have a separate teachers education / training development unit / Quality Assurance Unit in it's own campus for continuous professional development of the teachers / educators?

◯ Yes ◯ No

16. if Yes What may be the functions and activities of the TE&TDU / QAU?

17. Please provide your overall insight regarding the quality improvement of those non-tech and tech teachers recruited but having no pedagogical (teaching) qualification in TVET sector?

Name of the respondent :

Department / Designation :

Email :

Mobile :

Signature of the respondent with date

providing insight which will be used for national policy decision as well as input of resource development activities.

Questionnaire-3 for alumni of TVE department of IUT

Signature of the data collector with

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
কারিগরি শিক্ষা অধিদপ্তর
আগারগাঁও, ঢাকা ১২০৭।

Survey Questionnaire for the Research Work
on
Effectiveness of the TVET Teachers Education Programs in Bangladesh

তথ্যদাতার সম্মতিপত্র

সম্মানিত তথ্যজ্ঞ,

*আন্তরিক শুভেচ্ছা ও সালাম। কারিগরি শিক্ষা অধিদপ্তর এর রিসার্চ এন্ড নলেজ ম্যানেজমেন্ট সেল কর্তৃক "***Effectiveness of the TVET Teachers Education Programs in Bangladesh***" শীর্ষক একটি গবেষণা কার্যক্রম পরিচালনা করা হচ্ছে। গবেষণাটির প্রধান উদ্দেশ্য হচ্ছে।*

10. To forecast the demand and the prospect of categorized TVET educators and training implementers in Bangladesh; (বাংলাদেশে বিভিন্ন শ্রেণীর টিভিইটি শিক্ষাবিদ এবং প্রশিক্ষণ বাস্তবায়নকারীগণের চাহিদা এবং সম্ভাবনার পূর্বাভাস দেয়া)
11. To determine the expected competency area of the 21st century qualified TVET educators and training Implementers; (একুশ শতকের যোগ্য টিভিইটি শিক্ষাবিদ ও প্রশিক্ষণ বাস্তবায়নকারীদের প্রত্যাশিত দক্ষতার ক্ষেত্র নির্ধারণ করা);
12. To unveil the capacity of public TVET teachers' education institute;
(টিভিইটি শিক্ষকগণের শিক্ষা কার্যক্রমের জন্য প্রতিষ্ঠিত সরকারি প্রতিষ্ঠানটির সক্ষমতা উন্মোচন করা);
13. To examine the overall effectiveness of the TVET teachers' education programs in Bangladesh (বাংলাদেশে টিভিইটি শিক্ষকগণের শিক্ষা কার্যক্রমের কার্যকারিতা পরীক্ষা করা)

গবেষণা সফলভাবে সম্পাদনের জন্য আপনাকে এই গবেষণার একজন বিজ্ঞ তথ্যজ্ঞ হিসেবে নির্বাচন করা হয়েছে এবং এজন্য আপনাকে অভিনন্দন জ্ঞাপন করছি। আমরা আপনার নিকট থেকে কারিগরি ও বৃত্তিমুলক শিক্ষা ও প্রশিক্ষণ(টিভিইটি) ক্ষেত্রসমুহের শিক্ষকদের শিক্ষা বিষয়ক ডিপ্লোমা। ডিগ্রি প্রদানকারী বিদ্যমান প্রতিষ্ঠানটির প্রশাসনিক কর্তৃত্ব, অবকাঠামোগত সুযোগ সুবিধা, বস্তুগত সম্পদ ও দ্রব্যাদির প্রাচুর্যতা, মানব সম্পদের সামর্থ, উক্ত প্রতিষ্ঠানসমুহে পরিচালিত শিক্ষা সংশ্লিষ্ট প্রোগ্রাম ও কোর্সসমুহের শিক্ষাক্রম ও পাঠ্যসূচি, পাঠদান পদ্ধতি, শিক্ষকদের পেশাগত মান উন্নয়নের সার্বিক কার্যকারিতা এবং শিক্ষার্থী ও অ্যালামনিগনের প্রত্যাশা ও সন্তোষ্টি সম্পর্কিত মূল্যবান মতামত সংগ্রহ করব। এ উদ্দেশ্যে আমরা তথ্য ছক, চেকলিস্ট, জরীপ প্রশ্নমালা, আলোচ্যসূচি ও সাক্ষাৎকার নির্দেশিকা তৈরি করেছি।

নির্ধারিত তথ্য ছক। চেকলিস্ট। জরীপ প্রশ্নমালা। আলোচ্যসূচি। সাক্ষাৎকার নির্দেশিকাটি এতদ্বসংগে যুক্ত করা হলো। আমরা আশা করি, আপনি তথ্য ছক। চেকলিস্ট। জরীপ প্রশ্নমালা। আলোচ্যসূচি। সাক্ষাৎকার নির্দেশিকাটি মনোযোগ সহকারে পড়ে আপনার মূল্যবান মতামত দেবেন। আপনার দেওয়া তথ্য শুধু গবেষণার কাজেই ব্যবহার করা হবে। গবেষণা প্রতিবেদনের কোথাও

আপনার নাম বা পরিচয় উল্লেখ করা হবে না। আমরা আপনাকে নিশ্চিত করছি যে, তথ্য প্রদানের কারণে আপনার কোনো ক্ষতি হবার সম্ভাবনা নেই, উপরন্তু এদেশের কারিগরি শিক্ষার গবেষণা এবং যোগ্য শিক্ষক তৈরির ক্ষেত্রে আপনার দেয়া তথ্য মূল্যবান অবদান রাখবে। আপনি যদি আমাদের প্রস্তাবে সাড়া দিয়ে প্রয়োজনীয় তথ্য প্রদান করতে সম্মত থাকেন, তবে নিচে আপনার সম্মতিসূচক স্বাক্ষর প্রদান করার অনুরোধ করছি।

নিবেদক

মো: শাহ আলম মজুমদার, বিশেষজ্ঞ(কোর্স এ্যাক্রিডিটেশন)
গবেষক দলের দলনেতা
বাংলাদেশ কারিগরি শিক্ষা বোর্ড, মোবাইল: ০১৮১৫৪২৪৮৫৫
ইমেইল : ehlam1999@gmail.com

আমি কারিগরি শিক্ষা অধিদপ্তর এর রিসার্চ এন্ড নলেজ ম্যানেজমেন্ট সেল কর্তৃক পরিচালিত "**Effectiveness of the TVET Teachers Education Programs in Bangladesh**" *শীর্ষক গবেষণায় প্রয়োজনীয় তথ্য দিয়ে সহায়তা করতে সম্মত আছি।*

স্বাক্ষর: .....

তারিখ: .....

মোবাইল নম্বর:.....

ইমেইল:.....

Research Instruments 02:

Survey Questionnaires-03
for
Alumni of TVE Teachers' Education Program of IUT

Background of the study:

The preliminary observations make a perception to the researchers that more than 98% existing TVET educators (Instructors, specialists, principals, directors and Policy Makers) and the training implementers (trainer, master trainer and head of the training institutes) are working in Polytechnic, TSC, TTC, MPO Vocational and private vocational and training institutes, directorates, Boards and ministries without any formal teachers' qualification in Bangladesh. The perception of TVET stakeholders is that the TVET teachers' education and training programs run in public institutions (TTTC and VTTI) could not met the requirements of qualified educators, through their education and training programs, both in consideration of quantity and quality. Consequently, way of teaching delivery and assessment, the design of TVET standards and the curricula as well as development and use of teaching learning resources, the quality of TVET planning, implementation monitoring and program evaluation are becoming substandard day by day and is disputed in Bangladesh. The issues need to be critically analyzed for mitigating based on research recommendation, which stimulated the researcher to choose the research title.

Objectives of the survey questionnaire-03

5. To assess the organizational capacity of the public teachers' education institute (TTTC) of Bangladesh
6. To know the sufficiency of the education programs and the relevancy of the curricula in the public TVET teachers' education institute.
7. To understand the graduate's satisfaction on teachers' education programs, curricula, quality of teaching learning activities and related issues.
8. To understand the expectation of the alumni of IUT-TVE department on teachers' education programs and from the recruiting authorities.

Confidentiality of personalized data and general Instruction:

This study information will be used for research purpose only. The personalized data will be kept as confidential. Please provide information and / or put tick marks (√) in appropriate places.

I. General information of the respondents

Please provide personal information or select / response to appropriate items / options putting tick marks (√) or writing information in appropriate places.

(You are an alumni of TVE department of IUT , not an alumni of TTTC but your view will be reflected here as a third eye educator based on your teachers' education qualification, long experience and on where you want to see TTTC as a public teachers education providers)

21. Name of the Organization/ Workplace you are working now : .....

22. Programs you attended in the ICTVTR/ IIT/ IUT under ITS/ TVET department :

- ◯ Diploma in Technical Education
- ◯ BSc. in Technical Education
- ◯ Post Graduate Diploma in Technical Education
- ◯ MSc in Technical Education

23. Your highest academic qualification :

◯ Diploma ◯ Degree ◯ PGD ◯ Masters ◯ PhD

I. Programs and course relevancy

24. Do you think that the existing two TVET teachers education programs (Diploma and degree) running in the Technical Teachers Training College (TTTC) are adequate for fulfilling the demand of present and upcoming TVET educators in Bangladesh ?

◯ Yes ◯ No

if No. please mentioned which other following programs need to be introduced in TTTC as teachers' education ?

PGD ☐ Masters ☐ PhD ☐ All three of them ☐

Others ☐ (Please mention the name of the program) .....

II. Alumni expectation

IV.1. Expectation on Techers Education Programs and courses

25. Do you think that the existing 03 technological / engineering departments (Civil, Mechanical, EEE) in TTTC are enough to cover the field level technology and trade courses running in different institutes like polytechnic, textile institute, IMT, TSC, TTC and other equivalent institutes)

Yes ◯ No ◯

if No. please mentioned which other one department may introduce in priority basis for you?

.....
.....

26. The researcher proposed following 12 technical and one related subject department need to be introduced as teachers' education program for ensuring the accessibility of all technology / trade teachers of polytechnics, TSCs and MPO vocational schools.

Sl. No	Proposed TVET Teachers' Education Department	Clustered Technologies in Diploma level
1.	Civil Engineering	Civil, Civil Wood, surveying, Construction and Environmental
2.	Mechanical Engineering	Mechanical, Mechatronics, Merin and Ship Building, Printing
3.	Architecture	Architecture, Architecture and Interior Design
4.	Computer Science and Engineering	Computer Science & Technology
5.	Electrical and Electronic Engineering	Electrical, Electronics, Electro-Medical, Telecommunication.
6.	Chemical Engineering	Chemical, Glass, Ceramic, Food
7.	Automobile Engineering	Automobile, RAC
8.	Agri-Engineering	Power, Agri Machineries
9.	Textile Engineering	Textile, Apparel Manufacturing, Wet Processing, Yarn manufacturing, Fashion Design, Merchandising and Marketing, Jute
10.	Agriculture	Agriculture, Forestry, Livestocks etc.
11	Fisheries	Fisheries
12	Non-Tech	Mathematic & statistics, Physics, Chemistry, language and literature, Accounting and Business

Do you think the proposed above departments and related clustered technologies shown in the table by the researchers is justified?

Yes ◯ No ◯

If No. Please proposed your suggestion / insights

.....
.....
.....

27. Do you think that Education / Technical Education should be a separate department in TTTC like the TVE department of IUT for teaching and research on pedagogy / andragogy subjects?

Yes ◯ No ◯

28. Do you think that the one year **duration** of the program "Diploma in Technical Education" under BTEB is justified?

Yes ◯ No ◯

if No please state the reason and mention what should be the duration of diploma in technical education program

.....
.....
.....

29. Do you think that the 02 years duration of the program "BSc in Technical Education" under Dhaka University for the graduates of Diploma in Technical education is justified?

Yes ◯ No ◯

if No Please state the reason and mention what should be the duration of BSc in technical education program

.....
.....

30. Do you think that the current academic calendar term-'Year System Education' for BSc in Technical Education program running under Dhaka University is justified?

Yes ◯ No ◯

if No Please mention the reason and put your suggestions

.....
.....
.....

31. Do you think that the Nomenclatures of the programme Diploma in Technical Education (DTE) and BSc in Technical Education (BScTE) should be renamed as Diploma in Technical and Vocational Education (DTVE) and BSc in Technical and Vocational Education (BScTVE) respectively ?

Yes ◯ No ◯

if No. Please mention the reason and put your suggestions

.....
.....
.....

32. Please rank the statement regarding the expectation from the TVET teachers education programs and the related curricula.
(STRONGLY AGREE-5, AGREE-4, MODARELY AGREE-3, NOT AGREE-2, STRONGLY DISAGREE -1)

Sl. No.	The expectation from the TVET teacher's education programs	5	4	3	2	1
1	BSc in Technical Education (BScTE) should be a 3 years degree program for diploma graduates with options to exit after completion of one-year Diploma in Technical Education where DTE will be the integrated part of BScTE.					
2	BSc in Technical Education (BScTE) should be a 4 years degree program for HSC(VOC) graduates with lateral entry of diploma graduates in second year and exit option after completion of Diploma in Technical Education (DTE) where DTE will be the part of BScTE					
3	The curricula of all teachers' education programs should be transformed to the semester system instead of current practice of year system in Bangladesh					
4	The curricula of teachers' education program should be redesigned and updated considering the need of 21st century teacher's qualification					
5	The teaching faculties of teacher's education program in TTTC should be academically qualified in his own subject / technology / discipline as well as must have the teacher's qualification like diploma in technical education / Degree in Technical education					
6	Others (if any,please specify)					

III. Alumni Expectation from recruitment authority:

33. Do you think that the recruitment rules need to be changed for harmonizing and justifying TVET teaching as a profession ?

Yes ◯ No ◯

if No. Please state the reason and mention what should be the other way of establishing it as a profession ?

.....
.....
....

34. Please rank the following alumni expectation regarding the teachers recruitment process and related qualifications.

(STRONGLY AGREE-5, AGREE-4, MODARATELY AGREE -3, NOT AGREE-2, STRONGLY DISAGREE -1)

Sl. No	TVET teachers' expectation from the teachers' education program	5	4	3	2	1
1	The TVET teachers' education qualifications (Certificate, diploma and degree in technical education) should have recognition to related recruiting authorities and be popular to the TVET educators					
2	The employment of the pre-service graduates in teachers' education qualification need to be encouraged, prevailed and ensured during teachers' recruitments by the government for attracting talents in teaching profession					
3	The in-service TVET teachers having education qualification should be incentivized by giving special increment / allowances and be prevailed during promotion					
4	Teachers education qualification (DTE / BScTE / MScTE / PhD in Technical Education) should be imposed in recruitment rules of public and private TVET providers and gradually it should be mandatory for different level of educators.					
5	Teachers salary should be at least one step higher grade for those having diploma / degree in teacher's education program.					
6	Others (if any,please specify)					

IV. Views of IUT -TVE Alumni on teachers' education program of TTTC

35. Please rate the degree of satisfaction in the following issues of teachers education at TTTC .(Highly Satisfied- 05 ----------01 - Highly dissatisfied)

Sl. No	Issues in teachers' education program, curricula and provides	5	4	3	2	1
1	Quantity of programs and departments *(Two program-diploma and bachelor degree and 3 departments-Civil, Mechanical and EEE)*					
2	Quality and relevancy of curricula					
3	Quality of teaching-learning delivery					
4	Quality of assessment and evaluation					
5	0. Duration of the programs (01 year for DTE and) 02 years for BScTE	1.	2.	3.	4.	5.
6. 6	107. Recognition of the certificate by recruiting authority	8.	9.	0.	1.	2.
8. 7	114. Employment opportunities	5.	6.	7.	8.	9.
0. 8	1. Quantity of qualified faculties / teachers in TTTC	2.	3.	4.	5.	6.

36. Please provide your overall insight regarding the quality improvement and enhancing proficiency of the TVET educators and training implementers in the context of Bangladesh

Name of the respondent :

Department / Designation :

Email :

Mobile :

Signature of the Respondent with Date

Thank you so much for your valuable time and providing insight which will be used for national policy decision as well as input of resource development activities.

TOOL B: Focus Group Interview / Discussion (FGI/D) guide for the faculties (Teachers) of TTTC

Signature of the Data Collector with Date

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
কারিগরি শিক্ষা অধিদপ্তর,
আগারগাঁও, ঢাকা ১২০৭।

Focus Group Interview / Discussion Guideline for the Research
on
Effectiveness of the TVET Teachers Education Programs in Bangladesh

তথ্যদাতার সম্মতিপত্র

সম্মানিত তথ্যজ্ঞ,
*আন্তরিক শুভেচ্ছা ও সালাম। কারিগরি শিক্ষা অধিদপ্তর এর রিসার্চ এন্ড নলেজ ম্যানেজমেন্ট সেল কর্তৃক "***Effectiveness of the TVET Teachers Education Programs in Bangladesh***" শীর্ষক একটি গবেষণা কার্যক্রম পরিচালনা করা হচ্ছে। গবেষণাটির প্রধান উদ্দেশ্য হচ্ছে।*

14. To forecast the demand and the prospect of categorized TVET educators and training implementers in Bangladesh; (বাংলাদেশে বিভিন্ন শ্রেণীর টিভিইটি শিক্ষাবিদ এবং প্রশিক্ষণ বাস্তবায়নকারীগণের চাহিদা এবং সম্ভাবনার পূর্বাভাস দেয়া)
15. To determine the expected competency area of the 21st century qualified TVET educators and training Implementers; (একুশ শতকের যোগ্য টিভিইটি শিক্ষাবিদ ও প্রশিক্ষণ বাস্তবায়নকারীদের প্রত্যাশিত দক্ষতার ক্ষেত্র নির্ধারণ করা);
16. To unveil the capacity of public TVET teachers' education institute;
(টিভিইটি শিক্ষকগণের শিক্ষা কার্যক্রমের জন্য প্রতিষ্ঠিত সরকারি প্রতিষ্ঠানটির সক্ষমতা উন্মোচন করা);
17. To examine the overall effectiveness of the TVET teachers' education programs in Bangladesh (বাংলাদেশে টিভিইটি শিক্ষকগণের শিক্ষা কার্যক্রমের কার্যকারিতা পরীক্ষা করা)

গবেষণা সফলভাবে সম্পাদনের জন্য আপনাকে এই গবেষণার একজন বিজ্ঞ তথ্যজ্ঞ হিসেবে নির্বাচন করা হয়েছে এবং এজন্য আপনাকে অভিনন্দন জ্ঞাপন করছি। আমরা আপনার নিকট থেকে কারিগরি ও বৃত্তিমুলক শিক্ষা ও প্রশিক্ষণ(টিভিইটি) ক্ষেত্রসমুহের শিক্ষকদের শিক্ষা বিষয়ক ডিপ্লোমা। ডিগ্রি প্রদানকারী বিদ্যমান প্রতিষ্ঠানটির প্রশাসনিক কর্তৃত্ব, অবকাঠামোগত সুযোগ সুবিধা, বস্তুগত সম্পদ ও দ্রব্যাদির প্রাচুর্যতা, মানব সম্পদের সামর্থ, উক্ত প্রতিষ্ঠানসমুহে পরিচালিত শিক্ষা সংশ্লিষ্ট প্রোগ্রাম ও কোর্সসমুহের শিক্ষাক্রম ও পাঠ্যসূচি, পাঠদান পদ্ধতি, শিক্ষকদের পেশাগত মান উন্নয়নের সার্বিক কার্যকারিতা এবং শিক্ষার্থী ও অ্যালামনিগনের প্রত্যাশা ও সন্তোষ্টি সম্পর্কিত মূল্যবান মতামত সংগ্রহ করব। এ উদ্দেশ্যে আমরা তথ্য ছক, চেকলিস্ট, জরীপ প্রশ্নমালা, আলোচ্যসূচি ও সাক্ষাৎকার নির্দেশিকা তৈরি করেছি।

নির্ধারিত তথ্য ছক। চেকলিস্ট। জরীপ প্রশ্নমালা। আলোচ্যসূচি। সাক্ষাৎকার নির্দেশিকাটি এতদ্বসংগে যুক্ত করা হলো। আমরা আশা করি, আপনি তথ্য ছক। চেকলিস্ট। জরীপ প্রশ্নমালা। আলোচ্যসূচি। সাক্ষাৎকার নির্দেশিকাটি মনোযোগ সহকারে পড়ে আপনার

মূল্যবান মতামত দেবেন। আপনার দেওয়া তথ্য শুধু গবেষণার কাজেই ব্যবহার করা হবে। গবেষণা প্রতিবেদনের কোথাও আপনার নাম বা পরিচয় উল্লেখ করা হবে না। আমরা আপনাকে নিশ্চিত করছি যে, তথ্য প্রদানের কারণে আপনার কোনো ক্ষতি হবার সম্ভাবনা নেই, উপরন্তু এদেশের কারিগরি শিক্ষার গবেষণা এবং যোগ্য শিক্ষক তৈরির ক্ষেত্রে আপনার দেয়া তথ্য মূল্যবান অবদান রাখবে। আপনি যদি আমাদের প্রস্তাবে সাড়া দিয়ে প্রয়োজনীয় তথ্য প্রদান করতে সম্মত থাকেন, তবে নিচে আপনার সম্মতিসূচক স্বাক্ষর প্রদান করার অনুরোধ করছি।

নিবেদক

মো: শাহ আলম মজুমদার, বিশেষজ্ঞ(কোর্স এ্যাক্রিডিটেশন)
গবেষক দলের দলনেতা
বাংলাদেশ কারিগরি শিক্ষা বোর্ড, মোবাইল: ০১৮১৫৪২৪৮৫৫
ইমেইল : ehlam1999@gmail.com

আমি কারিগরি শিক্ষা অধিদপ্তর এর রিসার্চ এন্ড নলেজ ম্যানেজমেন্ট সেল কর্তৃক পরিচালিত "**Effectiveness of the TVET Teachers Education Programs in Bangladesh**" *শীর্ষক গবেষণায় প্রয়োজনীয় তথ্য দিয়ে সহায়তা করতে সম্মত আছি।*

স্বাক্ষর: .....

তারিখ: .....

মোবাইল নম্বর:.....

ইমেইল:.....

Instrument C: FGI and FGD

Focus Group Interview (FGI) and Focus Group Discussion (FGD) Guideline

Participants: Group of Teaching Faculties from Teachers Education Institutes (TTTC)

Facilitator : Md. Shah Alam Majumder,

Recorder / Note Taker : Md. Mofizul Islam / Md. Mahabub Alam

Background of the study:

The preliminary observations make a perception to the researchers that more than 98% existing TVET educators (Instructors, specialists, principals, directors and Policy Makers) and the training implementers (trainer, master trainer and head of the training institutes) are working in Polytechnic, TSC, TTC, MPO Vocational and private vocational and training institutes, directorates, Boards and ministries without any formal teachers' qualification in Bangladesh. The perception of TVET stakeholders is that the TVET teachers' education and training programs run in public institutions (TTTC and VTTI) could not met the requirements of qualified educators, through their education and training programs, both in consideration of quantity and quality. Consequently, way of teaching delivery and assessment, the design of TVET standards and the curricula as well as development and use of teaching learning resources, the quality of TVET planning, implementation monitoring and program evaluation are becoming substandard day by day and is disputed in Bangladesh. The issues need to be critically analyzed for mitigating based on research recommendation, which stimulated the researcher to choose the research title.

Objectives of the focus group Interview:

- To identify the faculty development aspects from the teaching faculty members of teachers education / training institutes through FGI

Objectives of the focus group Discussion:

- To understand the perspectives of teaching faculties about the TVET teachers' development aspects
- To identify the strengths and weaknesses of the TVET Teachers Education Program
- To address the view of faculties on the recruitment and employment of the graduates from TTTC
- To gather recommendations for improving the effectiveness of TVET teachers' education programs.

B. Focus Group Interview (FGI) Guideline

B.1 Faculty development aspects (facilities and issues) of the Teachers Education Institute (TTTC)

B.1.1 Are you satisfy with your current teaching profession?

B.1.2 Was teaching the first/ priority in your career choice?

B.1.3 How much institute culture, diversity of works and other working conditions are favorable for your professional development? What culture and working conditions you expect in your workplace?

B.1.4 Are you satisfy with the administrative support and available resources in favour of your professional development?

B.1.5 How far you satisfy with the available opportunities of higher studies and training facilities? What strategies could be taken for availing those opportunities?

B.1.6 What type of compensation you are getting and what are the compensation you expect for your continuous professional development?

C. Focus group Discussion (FGD) Guideline:

C.1 TVET teacher's education programs aspects:

C.1.1 Are the programs (Diploma and Bachelor degree only) running in your institute enough to cover the requirement of qualified teachers' in TVET sector of Bangladesh? If no, what should be the strategies to cover the whole sectoral area? What may be the others program need to be introduced?

C.1.2 Do you think that some new departments need to be introduced for covering the other sectoral area of technology and engineering? If so, what should be the new departments which may create opportunities for the existing and upcoming TVET teachers to study in other trade / technology / engineering area?

C.1.3 Do you think that one-year diploma and two years degree program in technical education are feasible in current context? if no, please justify your opinion by explaining the limitation of current program duration.

C.1.4 How you evaluate the year-based term system still running for bachelor degree program under DU? What benefits may come if semester system introduced instead of traditional year system in TVET teacher's education programs?

C.1.5 Do you satisfy with the number of student enrolling in the program / courses? if no, please clarify, the reason of lower number of student / trainee enrollment in TVET teacher's education programs?

C.2 Twenty first century competences including transversal skills aspects from TVET teachers education Curriculum

C.2.1 Is the TVET teacher's education curriculum of different programs able to meet the requirement of producing 21st century qualified TVET teachers?

C.2.2 Are the 21st century strategies, methods, approach and philosophy of education like Competency or Outcome based education, TPACK framework, STEAM approach, LMS and 4.0 / 5.0 IR reflected in the curriculum of present TVET Teachers education programs? if no, how those contents may incorporate in different level of TVET teacher's education program?

C.3 Graduates **efficiency of TVET teacher's education program and employment aspects**

C.3.1 What is your perception about the quantity and quality of the graduates you are producing as the future teachers / educators from your institutes

C.3.2 What are your thoughts on the overall effectiveness of TVET teacher's education programs, TVET teacher's education curricula and efficiency of the graduate from your institute?

C.3.3 How you recommend for the overall change / modification of the TVET teachers education and training programs and the corresponding curricula?

C.4 Recruitment and employment aspects of the graduates in TVET teachers' education programs

C.4.1 What strategies need to be taken by the government for intensifying honorarium and / increasing salary of TVET teachers and faculties ?

C.4.2 How the talents can be motivated / attracted to TVET teaching profession? Do you think that the recruitment and promotion rules need to be changed for attracting talents in Teaching profession?

C.4.3 How can government ensuring the employment of the graduates in TVET teachers' education program

Thanks, giving and concluding remarks from the Facilitators / Researchers:

TOOL C : KII guideline for principal of TTTC, Curriculum Director of BTEB and Director (Planning and development) of Directorate of Technical Education

Key Informant Interview (KII) Guideline-I of TTTC

I. Background of the study:

The preliminary observations make a perception to the researchers that more than 98% existing TVET educators (Instructors, specialists, principals, directors and Policy Makers) and the training implementers (Trainer, master trainer and head of the training institutes) are working in Polytechnic, TSC, TTC, MPO Vocational and private vocational and training institutes, directorates, Boards and ministries without any formal teachers' / Educators' qualification in Bangladesh. The perception of TVET stakeholders is that the TVET teachers' education and training programs run in public institutions (TTTC and VTTI) could not met the requirements of qualified educators, through their education and training programs, both in consideration of quantity and quality. Consequently, way of teaching delivery and assessment, the design of TVET standards and the curricula as well as development and use of teaching learning

resources, the quality of TVET planning, implementation monitoring and program evaluation are becoming substandard day by day and is disputed in Bangladesh. The issues need to be critically analyzed for mitigating based on research recommendation, which stimulated the researcher to choose the research title.

II. Objectives of the Interview:

i) To know the institutional / instrumental capacity of the teachers' education and training institute (TTTC)
ii) To understand the views of the principals / head of the organization about the education and training program, curriculum, qualification and employment of the graduates.
iii) To understand the views of the principals / head of the organization about the organizational strength of the teachers' education and training organization.

III. KII guideline:

The following guideline and steps are planned to follow for completing an effective interview with key informants.

Before Interview

1. Requesting for consent and schedule time
2. Set the venue, date and time for interview
3. Ensure a quite setup of interview
4. Make device and materials (paper, pencil, pen available for recording and notetaking

During the day of Interview

5. Greeting with KI and build rapport
6. Take the consent of note taking / audio recording

Key Informant-1 : Principal of TTTC

7. Facilitator / Interviewer : Md. Shah Alam Majumder
8. Recorder / Note Taker : Md. Mofizul Islam / Md. Mahabub Alam
9. Fill the following checklist by asking questions to the KI / by the assistance of his representative

Sl. No	KI- Key Issue	Questions	Yes	Partially Yes	No	Remarks / Evidence / Quantity
1		1.1 Have autonomy for strategic plan and making administrative decision promptly				

	Institutional / Instrumental capacity	1.2 Has freedom to introduce new educational program and change the curriculum				
2.	Organizational Capacity	2.1 Have organizational vision and mission				
		2.2 Have specific goal and objectives				
		2.3 Has any target and Action plan for achieving the target				
		2.4 Has any quality assurance system manual				
		2.5 Has any monitoring and evaluation mechanism / checklist				
		2.6 Have any report(s) on monitoring and evaluation				
		2.7 Has any research and development cell / department				
		2.8 Is there any budget allocation for R&D				
		2.9 Have digitized facilities in library				
		2.10 Have digital repository of learning materials like OER				
3	Capacity of networking & collaboration	3.1 Is there any seminar / conferences for creating and disseminating knowledge arrange by your organization?				
		3.2 How many agreement / recognition you have with other similar local / foreign organization and with industries ?				

10. Ask and clarify the following Key Questions for Interview / Interview Guideline

a. Do you think that the budget allocation from the authority is sufficient for yearly expenditure? Have you enough financial disbursement authority? Are you satisfy with the authority you availing in your organization? What percent of budget allocation you can able to outlaid in last financial year?

b. Have you set any goal, objectives or action plan for the development of TTTC / VTTI? If yes how far it works? Is it functional?

1. Are you satisfy with the infrastructure, available space, favorable location and learning atmosphere? If No, please mention the reasons
2. Do you have any quality assurance system? If yes how far it is functional?

c. What is the cause of inadequacy of existing faculties and management supporting staffs in TTTC? Please express your view on it.

d. How many research and development have been done by your organization (faculty / students / trainee since last 10 years? How many research publications have been published by your faculty?

e. Have you taken any initiatives for introducing new programs and updating the curriculum considering the need of the stakeholders? If yes, what are the potentiality and / constraints in favor / against the initiative?
f. How you considered the programs (diploma and degree) running at TTTC ? Are those education or training ?
g. What are your overall views and plan for developing the teacher's education programs / courses as well as the development of the institution / organizations

11. Clarify the related issues found through other instruments (survey questionnaires and data collection forms) provided by the respondents

After interview

12. Give thanks to the key informants for the valuable time and insights

13. Preserve the note taken and record for further use and analysis

Curriculum Director of BTEB

People's Republic of Bangladesh
Directorate of Technical Education
Agargaon, Dhaka

Research Study on

Effectiveness of the TVET Teachers Education Program in Bangladesh

Key Informant Interview (KII) Guideline-2

III. Background of the study:

The preliminary observations make a perception to the researchers that more than 98% existing TVET educators (Instructors, specialists, principals, directors and Policy Makers) and the training implementers

(Trainer, master trainer and head of the training institutes) are working in Polytechnic, TSC, TTC, MPO Vocational and private vocational and training institutes, directorates, Boards and ministries without any formal teachers' / Educators' qualification in Bangladesh. Some of the TVET teachers received some discrete pedagogy and subjective training and a few portion of them also have occupational certificate both in occupation and teaching methodology (CBT&A level 4). The perception of TVET stakeholders is that the TVET teachers' education and training programs run in public institutions (TTTC and VTTI) could not met the requirements of qualified educators, through their education and training programs, both in consideration of quantity and quality. Consequently, way of teaching delivery and assessment, the design of TVET standards and the curricula as well as development and use of teaching learning resources, the quality of TVET planning, implementation monitoring and program evaluation are becoming substandard day by day and is disputed in Bangladesh. The issues need to be critically analyzed for mitigating based on research recommendation, which stimulated the researcher to choose the research title.

Objectives of the Interview:

To know the future plan of BTEB on the teachers' education programs offering by TTTC (Diploma in Technical Education) and Diploma / Certificate in Vocational Education mandated to offer by VTTI

iv) To understand the views of the curriculum director of Bangladesh Technical Education Board about the education and training program, standard & curriculum and qualifications of the graduates of teachers' education.

III. KII guideline:

The following guideline and steps are planned to follow for completing an effective interview with key informants.

Before Interview

1. Requesting for consent and schedule time
2. Set the venue, date and time for interview
3. Ensure a quite setup of interview
4. Make device and materials (paper, pencil, pen available for recording and notetaking

During the day of Interview

5. Greeting with KI and build rapport
6. Take the consent of note taking / audio recording

7. **Key Informant- Engr. Md. Rakib Ullah, Director (Curriculum) , Bangladesh Technic Education Board (BTEB)**
8. Facilitator / Interviewer : Md. Shah Alam Majumder
9. Recorder / Note Taker : Md. Mofizul Islam / Md. Mahabub Alam

10. Asking and clarifying the following Key Questions for Interview

h. Have you any future plan for modernizing / changing the curriculum of TTTC and VTTI? If yes, how could we access those plan / initiatives?

i. How you interpret the prospect of TVET educators and the technoedupreneurs in local and global job markets?

j. 68% respondents(alumni) believe that one year duration diploma in technical education (Dip in Tech Edu) program need to be run and continued in TTTC as a professional teacher education program for TVET teachers specially for the junior instructors of polytechnic, TSC and TTC and the trade instructors of MPO vocational Schools under DTE ? *Please provide your insights regarding the feasibility of Dip in Tech Edu program.*

k. Diploma / certificate in vocational education program is not offering in VTTI, Bangura since last more than one decade? Is there any plan for reactivating the teacher's education program on the said program for developing the vocational teachers of TSC and other organization?

l. Please clarify the related issues found through primary survey instruments (survey questionnaires and data collection forms) provided from the alumni (respondents)

From the analysis of the survey questionnaire it is found that 62.5% the alumni of TTTC and TVE department of IUT either **highly dissatisfied** or **not satisfied** regarding the number of programs and departments exist in TTTC, only 9.4% respondents show their satisfaction on it.

On the other hand, the satisfaction on the quality and relevancy of the teachers' education curriculum, quality of teaching learning delivery, assessment and evaluation system and recognition of the certification are illustrated below.

Degree of Satisfaction of the alumni on the **quality and relevancy of the curricula** for TVET teachers Education program	Frequency	Valid Percent
Highly dissatisfied	4	6.3
Not Satisfied	22	34.4
Moderately Satisfied	29	45.3
Satisfied	9	14.1
Total	64	100.0

Degree of satisfaction of the alumni on the **quality of teaching learning delivery system**	Frequency	Valid Percent
Highly dissatisfied	2	3.1
Not Satisfied	25	39.1
Moderately Satisfied	29	45.3
Satisfied	8	12.5
Total	64	100.0

Degree of satisfaction of the alumni on **quality of assessment and evaluation** of the Teachers' education program and courses	Frequency	Valid Percent
Highly dissatisfied	1	1.6
Not Satisfied	12	18.8
Moderately Satisfied	37	57.8
Satisfied	12	18.8
Highly Satisfied	2	3.1
Total	64	100.0

2. How you interpret this degree of satisfaction / dissatisfaction on the quality of teachers' education curriculum, quality of teaching learning delivery, the assessment of the students and evaluation of the program outcome?

After interview

a. Give thanks to the key informants for the valuable time and insights
b. Preserve the note taken and record for further use and analysis

KII Guideline: Director (Planning of DTE

People's Republic of Bangladesh
Directorate of Technical Education
Agargaon, Dhaka

Research Study on

Effectiveness of the TVET Teachers Education Program in Bangladesh

Key Informant Interview (KII) Guideline-3

Key Informant : **Engr. Md. Aktaruzzaman,**
Director (Planning & Development)
Directorate of Technical Education (DTE) under TMED of MoE

Facilitator / Interviewer : Md. Shah Alam Majumder/Md. Mofizul Islam

Recorder / Note Taker :Md. Mahabub Alam

IV. Background of the study:

The preliminary observations make a perception to the researchers that more than 98% existing TVET educators (Instructors, specialists, principals, directors and Policy Makers) and the training implementers (Trainer, master trainer and head of the training institutes) are working in Polytechnic, TSC, TTC, MPO Vocational and private vocational and training institutes, directorates, Boards and ministries without any formal teachers' / Educators' qualification in Bangladesh. Some of the TVET teachers received some discrete pedagogy and subjective training and a few portion of them also have occupational certificate both in occupation and teaching methodology (CBT&A level 4). The perception of TVET stakeholders is that the TVET teachers' education and training programs run in public institutions (TTTC and VTTI) could not met the requirements of qualified educators, through their education and training programs, both in consideration of quantity and quality. Consequently, way of teaching delivery and assessment, the design of TVET standards and the curricula as well as development and use of teaching learning resources, the quality of TVET planning, implementation monitoring and program evaluation are becoming substandard day by day and is disputed in Bangladesh. The issues need to be critically analyzed for mitigating based on research recommendation, which stimulated the researcher to choose the research title.

V. Objectives of the Interview:

v) To know the future plan of DTE on the teachers' education programs offering by TTTC and VTTI as well as other initiatives of TVET teachers education / development program / project like TTF

vi) To understand the views of the director (planning) of the DTE about the relevancy of education and training program, institutional and organizational capacity of the TVET teachers' education institutes and the quantity and quality of faculties as well as the capacity of the graduates of teachers' education program.

III. KII guide:

The following guiding steps are planned to follow for completing an effective interview with key informants.

Before Interview

1. Requesting for consent and schedule time
2. Set the venue, date and time for interview
3. Ensure a quite setup of interview
4. Make device and materials (paper, pencil, pen available for recording and notetaking

During the day of Interview

5. Greeting with Key Informant and build rapport
6. Take the consent of note taking / audio recording

7. Asking and clarifying the following Key Questions for Interview

m. Have you any future plan for the capacity building of the TTTC and VTTI? Is there any CPD initiatives from DTE? if yes please mention the number of yearly CPD programs has been initiated through TTTC/ VTTI ? How can we access the activity lists / plan initiated by government for TVET development?

n. Do you think that the TVET teacher's education institutes capable to meet the demand and or requirements of TVET teachers in Bangladesh?

95.3% alumni believe that only two teachers education program (DTE and BScTE) is not sufficient and 96.9 % alumni's view is that only 3 departments (Mechanical, Civil and EEE) under the two programs are too low to cover the number of technologies, trades and occupations in the whole TVET sector (29 type of programs and courses, 39+ type of technology and 29+14 type of trades courses) offered by BTEB

What are your insights regarding the issues mentioned in b?

o. The skills (occupational) certification as well as short term pedagogical training (CBT&A methodology level 4) is becoming popular in Bangladesh. Do you think that this very short-term training and certification is enough for producing qualified educators (professional teachers and assessors, learning resource developers, curriculum specialists, TVET experts, TVET researchers / evaluators and TVET managers)?

p. How you value the requirements of producing dedicated and specialized TVET educators through long run teachers' education programs (like Degree, Masters and PhD in Technical Education)?

q. Diploma / certificate in vocational education program is not offering in VTTI, Bogura since last more than one decade? Why this potential education / training program was stopped? Is there any plan for reactivating the teacher's education program (Diploma / Certificate in technical education) in VTTI for the occupational and professional development of the vocational teachers of TSC and other training organization?

r. How you interpret the prospect of TVET educators and the technoedupreneurs in local and global job markets?

s. *From the analysis of the survey questionnaire it is found that 62.5% of the alumni of TTTC and the alumni of TVE department of IUT are either **highly dissatisfied** or **not satisfied** regarding the number of programs and departments exist in TTTC. Only 9.4% respondents show their satisfaction on it. Again, the preliminary survey of the study shows that 40.7% alumni are not happy with the quality & relevancy of curricula of teachers' education program, only 57.8% alumni shows their satisfaction on the quality of teaching learning delivery system where most them are moderately satisfied (45.3%) and only 12.5% shows interest in satisfaction level. None of them were highly satisfied in the quality of teaching learning delivery system. On the other hand, lowest 20.4% alumni show their dissatisfaction on students' assessment and program evaluation system of TTTC.*

On the other hand, according to the respondents' opinion on an average, the adequacy of infrastructure and other physical resources in lab and workshops are 69% whereas availability of offline and online learning resources are 50.3% .

1. How you interpret this degree of satisfaction on the quality of teachers' education curriculum, quality of teaching learning delivery and the assessment of the students, the evaluation of the programs implementation as well as the availability of the infrastructure and resources?

2. What type of measures may you initiate for mitigating the above issues? Which organization will lead the initiatives (TMED / DTE / BTEB / TTTC / VTTI) ?

After interview

a. Give thanks to the key informants for the valuable time and insights
b. Preserve the note taken and record for further use and analysis

RESEARCH MATRIX

Research Matrix
(Research Questions-Key Issues -Key Performance Indicator – Method-Data source and Data collection Instruments / Data analysis process)

Research Questions (RQ)	Key Issues (KI)	KPI / Questions	Method	Data Source	Data Collection /Analysis Instruments
RQ1: What is the present status and future demand of categorical TVET educators by 2030 and 2041 in Bangladesh?	KI-1: National TVET enrolment Target	Q-1: TVE Student and Trainee enrolment national target	Quantitative	Literature review	Data Collection forms
	KI-2: Demand and Supply status of categorized TVET Educators	Q-2 : Category of TVET educators and training implementers	Quantitative	Literature review	Data Collection forms
		Q-3 : Existing categorized TVET educators	Quantitative	Literature review	Data Collection forms
		Q-4: Demand of categorized TVET educators by 2030 and 2041	Quantitative	Literature review	Data analysis using software
	KI-3: Potentiality and career prospect as TVET professionals	Q-78 Job creation trends	Quantitative	RQ1:KI-2: Q3, Q4	-Data analysis software
		Q-79 Employment opportunities	Qualitative	Primary	-FGD questions
		Q-80 Prospect in the area of TVET start-up and edu-preneurship	Qualitative	Primary	-KII guideline -KII guideline (with KI of DTE, BMET and BTEB
		Q-81 Prospect as TVET Educator	Qualitative	Primary	-KII guideline (with KI of DTE, BMET and BTEB
		Q-82 Prospect in global job markets	Qualitative	Primary	-KII guideline (with KI of DTE, BMET and BTEB
RQ2: Are the TVET teacher education program	KI-1: Programmes and course relevancy	Q-5: Adequacy of programmes	Qualitative	Primary data	Survey Questionnaires 1
		Q-6: Representation of field level implementing course (trade & technology) in teachers	Qualitative	Primary data	Survey Questionnaires 1

Research Questions (RQ)	Key Issues (KI)	KPI / Questions	Method	Data Source	Data Collection /Analysis Instruments
s and respective curricula relevant and fit for producing twenty first century qualified TVET educators?		education engineering departments.			
	KI-2 Integration of modern methodology and approach in curriculum	Q-7 : OBE / CBE in curriculum	qualitative	Primary data	FGD Checklist
		Q-8 STEAM approach in delivery system	qualitative	Primary data	FGD Checklist
		Q-9 Ensuring validity and accuracy of assessment	qualitative	Primary data	FGD Checklist
		Q-10 Regular update and practice of program evaluations	qualitative	Primary data	FGD Checklist
		Q-11 Having graduate tracking system	qualitative	Primary data	FGD Checklist
	KI-3 Content relevancy in program and courses	Q-12: Integration of generic competencies (soft skills / employability skills)	qualitative	Primary data	FGD Checklist
		Q-13: Inclusion of subject didactic pedagogy in courses (TPACK)	qualitative	Primary data	FGD Checklist
		Q-14 : Integration of 21st century skills (including digital literacy and related 4.0IR technological contents)	qualitative	Primary data	FGD Checklist
	KI-4 : Proportion of STEA/PM contents in syllabus	Q-15: Percentage of related science contents	qualitative	Syllabus of (TEP)	Literature Review and Content analysis
		Q-16: Percentage of related technology contents	qualitative	Syllabus of TEP	Literature Review and Content analysis
		Q-17: Percentage of core engineering contents	qualitative	Syllabus of TEP	Literature Review and Content analysis
		Q-18: Percentage of pedagogy and arts contents	qualitative	Syllabus of TEP	Literature Review and Content analysis

Research Questions (RQ)	Key Issues (KI)	KPI / Questions	Method	Data Source	Data Collection /Analysis Instruments
		Q-19: Percentage of mathematic contents	qualitative	Syllabus of TEP	Literature Review and Content analysis
		Q-20: Justification of the proportion of STEA/PM contents	qualitative	KI-2: Q15 to Q19	Cognitive analysis on the % of content
	KI-5: Flexibility and adaptability options in curricula	Q-21: Ease entry and exit with partial (micro credential) achievement	qualitative	Primary	FGD Checklist
		Q-22: Online education and certification provision	qualitative	Primary	FGD Checklist
		Q-23: Work-based learning (Practice teaching) provision	qualitative	Primary	FGD Checklist
	KI-6: Students and alumni expectation from program, and courses	Q-24: Candidate's preferred program /course	qualitative	Primary	Survey Questionnaires 1
		Q-25: Duration of the programs	qualitative	Primary	Survey Questionnaires 1 / KII
		Q-26: Year of Schooling of the programs	qualitative	Primary	Survey Questionnaires 1 and KII
		Q-27: Preferred academic calendar term (Year / Semester system)	qualitative	Primary	Survey Questionnaires 1/ KII
		Q-28: Nomenclature of the program	qualitative	Primary	Survey Questionnaires 1 / KII
	KI-7 : Students and alumni expectation on qualification and the	Q-29: Ensuring the popularization and employability of the qualification	qualitative	primary	Survey Questionnaires 1
		Q-30 : Change in recruitment rules	qualitative	Primary	Survey Questionnaires 1
		Q-31: Preference for teachers' education	qualitative	primary	Survey Questionnaires 1

Research Questions (RQ)	Key Issues (KI)	KPI / Questions	Method	Data Source	Data Collection /Analysis Instruments
	recruitment process	qualification during recruitment			
		Q-32: Separate salary scale for those, having teachers' education qualification or Special increments (incentivize) provision for attracting talents in TVET	qualitative	primary	Survey Questionnaires 1
		Q-33 : Mandatory teachers education qualification	qualitative	primary	Survey Questionnaires 1
	KI-8: Graduate / alumni satisfaction on teachers education program and their curricula	Q-34: Degree of satisfaction with programs	qualitative	primary	Survey Questionnaires 1
		Q-35: Degree of satisfaction with curricula and course contents	qualitative	primary	Survey Questionnaires 1
		Q-36: Degree of satisfaction with T/L delivery process, assessment and evaluation	qualitative	primary	Survey Questionnaires 1
		Q-37: Degree of satisfaction with duration of the programs	qualitative	primary	Survey Questionnaires 1
		Q-38 Recognition of the certificates / awards and employment opportunities	qualitative	primary	Survey Questionnaires 1
		Q-39 Quantity of qualified Faculties	qualitative	primary	Survey Questionnaires 1
	KI-9: Viewpoint of teaching faculties on TVET	Q-40 Education programs aspects	qualitative	primary	FGD questions
		Q-41 Curriculum aspects	qualitative	primary	FGD questions

Research Questions (RQ)	Key Issues (KI)	KPI / Questions	Method	Data Source	Data Collection /Analysis Instruments
	teachers education and training	Q-42 Efficiency of graduates	qualitative	primary	FGD questions
		Q-43 Deployment of Graduates	qualitative	primary	FGD questions
RQ3: Is the existing TVET Teachers Education Institute (TTTC) in Bangladesh have the capacity to meet the demand of qualified TVET educators?	Institutional Capacity (Policies, Acts, rules, mandate, authority and autonomy)				
	KI-1: Policies , Acts, rules, mandate	Q-44: Existence of Acts, rules, mandate	Qualitative	Primary	KII checklist
		Q-45: Advantage and limitation of absence of such rules	Qualitative	Primary	KII
	KI-2 : Authority and autonomy	Q-46: Degree of authority in management and decision making	Qualitative	Primary	KII
		Q-47: Autonomy to change / update in TVET Teachers education programs / courses when required	Qualitative	Primary	KII
		Q-48. Existence of Quality Assurance Manual / Guide	Qualitative	Primary	KII checklist
		Q-49 Autonomy to change the Quality Assurance System Manual	Qualitative	Primary	KII
	Organizational Capacity: (Enrolment, Human Resource, Infrastructure & physical resources, Students and alumni expectation, graduate satisfaction, Views and Expectation of tech. and non-tech. TVET teachers having no facilities to enrol in teachers' education program,				
	KI-3: Students and Trainee Enrollment	Q-50: Department wise seat capacity per programs	Quantitative	BTEB / TTTC	Literature review using data collection form
		Q-51: Department wise students' enrollment per programs	Quantitative	BTEB / TTTC	Direct field investigation using data collection form
		Q-52: Students enrollment trends	Quantitative	Process data of RQ3:KI-3: Q-43, Q-44	Data analysis using software

Research Questions (RQ)	Key Issues (KI)	KPI / Questions	Method	Data Source	Data Collection /Analysis Instruments
	KI-4 : Capacity of networking & collaboration	Q-53 : Number of seminar / conference arranged	Quantitative	TTTC	KII checklist
		Q-54 : Number of Agreement / recognition with other similar local / foreign organization and with industries	Quantitative	TTTC	KII checklist
	KI-4: Capacity of the teaching faculties of teachers education & training institutes (TTTC)	Q-55: Adequacy of existing faculty and management supporting staffs in TTTC	Quantitative	TTTC	KII
		Q-56: Academic qualification of the existing TTTC faculties	qualitative	TTTC	Data collection form using KII
		Q-57: Pedagogy Qualification of the existing TTTC faculties	Quantitative	TTTC	Data collection form using KII
		Q-58: Foreign qualification in education / Technical-vocational Education / education	Quantitative	TTTC	Data collection form using KII
		Q-59 : Experiences of existing TTTC faculties in teaching profession	Quantitative	Primary	Data collection form using KII
		Q-60: Industry Experiences of existing TTTC faculties	Quantitative	Primary	Data collection form using KII
		Q-61 : Field Experiences of existing TTTC faculties (in TVET institutes)	Quantitative	Primary	Data collection form using KII
		Q-62: Have Research & Publications	Quantitative	Primary	FGD Checklist
		Q-63: Have innovative project and new creation (of product / services)	Quantitative	Primary	FGD Checklist

Research Questions (RQ)	Key Issues (KI)	KPI / Questions	Method	Data Source	Data Collection /Analysis Instruments
		Q-64 Teacher Student Ratio (actual setting and real time ratio)	Quantitative	Primary	Cognitive analysis
	KI-5: CPD Opportunities for the faculties of TTTC	Q-65: Plan and program of CPD	Qualitative	Primary	KII
		Q-66: Number of yearly CPD programs	Quantitative	Primary	KII checklist
		Q-67: Number of faculty members having professional affiliation with related professional organization	Quantitative	Primary	FGD checklist
		Q-68 Perspectives on faculty development aspects	Quantitative	Primary	FGI (with faculties) questions
	KI-4: Infra-structure and physical resources	Q-69: Infrastructure and education friendly environment	qualitative	Primary	Survey Questionnaire1
		Q-70 Adequacy of lab, workshop resources	qualitative	Primary	Survey Questionnaire1
		Q-71 : Availability of teaching aids	qualitative	Primary	Survey Questionnaire1
		Q-72: Adequacy of learning materials	qualitative	Primary	Survey Questionnaire1
		Q-73: Adequate Classroom facilities and e-learning platform	qualitative	Primary	Survey Questionnaire1
	KI-7: Professional development opportunities and views of tech. and non-tech. TVET teachers	Q-74: Training Status and CPD Opportunities for the tech and non-tech. teachers recruited with engineering / Non-tech degree qualifications in TTTC	qualitative	Primary	Survey Questionnaire2
		Q-75: Views of tech. and non-tech. TVET teachers on teachers' education qualification	qualitative	Primary	Survey Questionnaire2

Research Questions (RQ)	Key Issues (KI)	KPI / Questions	Method	Data Source	Data Collection /Analysis Instruments
	KI-8 : Expectation of tech. and non-tech. TVET teachers from Teachers education program	Q-76: Reason of not enrolling in TVET teachers Education Program	qualitative	Primary	Survey Questionnaire2
		Q-77: Expectation of tech. and non-tech teachers having no opportunities to enrol in Teachers education program	Qualitative	Primary	Survey Questionnaire2
RQ5: What are the gaps in TVET teachers' education programs, lacks in teachers' education institutes, consequents of the gaps & lacks (effectiveness) in TVET sector	KI-1: Present status and future demand of TVET educators				
	KI-2: Gaps and Lacks between demand and Supply of TVET educators:				
	KI-3: Relevancy of TVET Teachers' Education Programs and Respective Curricula				
	KI-4: Gap in Teachers' Education Course and Contents				
	KI-5: Lacks in Institutional and Organizational Capacity of TTTC				
	KI-6 Gaps Between Expectation and Satisfactions of TVET teachers :				
	KI-7: Consequents of gaps and lacks				
	KI-8: Career Prospect OF TVET Educators in Bangladesh				
	KI-9 : (Discussion, recommendations and conclusion) Way out of mitigating the gaps & lacks and producing adequate qualified TVET educators and training implementers in Bangladesh				