

Assessing the Implementation of Dual Certification Initiatives under NTVQF in Polytechnics

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Declaration

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

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Acceptance

We state that this report titled *Status of the Practical Activity in Diploma in Computer Technology*, prepared by **Md. Shah Alam Majumder** and **Md. Mahabub Alam**, fulfil the standard requirements of research in the field of technical education. We recommend and accept this for the publication.

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Date:

Dedication

First of all, we dedicate this study to our almighty Allah, who gave us strength and knowledge for our everyday life.

Dedicate to parents for their understanding and for their overwhelming, support, morally.

Dedicate to wife and children who inspired to us of this work. Without their love and support this research would not have been made possible.

Dedicate to our brothers and sisters for their eternal love.

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Acronyms and Abbreviation

BTEB	Bangladesh Technical Education Board
CS	Competency Standards
CBC	Competency Based Curriculum
CAD	Course Accreditation Documents
CAM	Quality Assurance Manual
CBLM	Competency Based Learning Materials
DTE	Directorate of Technical Education
ISC	Industry Skills Council
NSDP	National Skills Development Policy
NTVQF	National Technical and Vocational Qualification Framework
TMED	Technical and Madrasha Education Division
TVET	Technical and Vocational Education and Training
SDG	Sustainable Development Goals
SCDC	Standard and Curriculum Development Committee
MDG	Millennium Development Goals

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Executive Summery

This study is the attempt to find the present status of diploma engineering education in terms of quality, issues and challenges exist in conventional implementation and practices, lesson learn from piloting NTVQF tuned course in selected polytechnic and perceiving the barrier of implementing NTVQF tuned courses under dual certification, addressing the challenges and resolving the way out of producing quality diploma graduates.

The Diploma in engineering education in Bangladesh is a four years course implementing by the polytechnic institutes under the academic direction, management and control of Bangladesh Technical Education Board provided the diploma graduation within 11th to 14th graders. At present this course is running in 617 polytechnics including some other organization like TSC in conventional mode of education and teaching learning system without any alignment with NTVQF-a nationally agreed 6th level qualification framework whereas the qualification framework implementation started in 2012. According to BSCO, the graduates of this engineering education fall into 3rd major group namely para professional but this very important professional education is crossing a fragile condition due to absent of number of quality aspects.

The NTVQF tuned dual certification program was such an initiative for ensuring the quality of technical education, preliminary piloted in 15 polytechnics where a total 1703 students of computer technology were attended and assessed through summative assessment where the target was 2350 students up to level 6 for each student. A total 904 of them became competent and achieved NSC level 1 in two occupations namely Computer Operation and IT support. Infra polytechnic, Barishal, Dhaka polytechnic and NIT, Chattrgram are the top ranked 3 polytechnics where number of candidates for assessment were 434, 337 and 306 respectively whereas the successful competent number of graduates were 202 in Dhaka polytechnic, 182 in NIT and 160 in Infra polytechnic.

After analyzing the case study of a polytechnic, it was found that placement rate of dual certified graduates was much higher than the unemployment rate and tendency of immediate enrollment in higher education reduced inversely with increasing the rate of employment. The employment rate of dual certified graduate increased to 79% from 49% of single certified graduates within the 6th month of their diploma graduation. The employment rate of occupational certified graduates (during or after the industrial attachment but before publishing the final result of diploma), increased to 26% whereas that was 11% only in previous year for the case of non-certified students. Again, immediate enrollment rate in higher study, decreases exponentially when the graduates achieved dual certificate and due to that getting jobs immediately after completing the course.

Regarding the query on occupational / skills qualification of teachers only 18.2% teachers were certified in NTVQF level -1 in either IT support or Computer Operation but only 12.12% have the full teacher's qualification i.e. both occupational as well as Teaching Methodology (CBT&A level 4) certificate. Most of the certified teachers were from private institutes, trained and assessed and came under certification in self financial supports without any initiatives from the authority.

Regarding the query on the limitation of the conventional course curriculum as well as the implementation issues exist in diploma in engineering program, according to the respondents views the worst issue is that the teachers are not properly trained either in subject domain nor in pedagogical aspect(65%) followed by there are sufficient numbers of discrete practical jobs/experiments in syllebus but not outcome based (63.4%, assessment is mostly theory based and usually don't cover the practical skills as well as attitudinal aspects (63%), No evaluation and impact analysis after the implementation of the course(60%), Shortage of resources (Insufficient Machines, Tools, Equipment, Ferniture, Teaching aids, learning materials and other technical and utilities support) (58%) , curriculum contents are not directly market responsive(54.6%) and Monitotoring of teaching learning progress is very weak (53%) respectively. From the analysis it is clear that the mentioned issues are exist in the system and most of the respondents were agreed or strongly agreed with the raised issues. Beside these a significant number of issues and limitations of conventional program are mentioned as

In most case both type of respondents (Head of Institute and The Teachers) rated the issues more or less in similar weights but concerning some of these issues, the views of head of institute and the teachers differ significantly. For example, regarding the issue on “no evaluation and impact analysis after the implementation of the course”, the percentage of the average degree of agreement for head of the institute was 73.4% but for the teachers it was only 54%. Similarly, the issue on “teachers are not properly trained either in subject domain nor in pedagogical aspect”, teachers' degree of agreement was 61.2% whereas it was 73.4% for the head of the institute.

One of the most significant queries in the research question was to know the satisfactory level of the implementation of the piloting program so far, the institute achieved the target, in response, 94% respondents said that they are not satisfied with this achievement and in favor of these dissatisfaction they raised number of valid reasons.

In the case of the inquiries on issues and challenges to implement the NTVQF pilot program the degree of agreement is rated in weighted average as below. According to the opinion of the respondents the most rated issues and challenges, those are strongly or outstandly agreed are lack of budget for implementation as well as assessment(4.27) followed by teachers are overloaded and have no time to implement such type(CBT) of program(3.81), lack of a clearly determined plan and policy to implement the program(3.46), teachers do not get any sort of training on the subject / related occupation(s) (3.33). Other agreed issue and challenges are teachers' lack of knowledge and skills in related occupational standard(2.83), lack of tools, equipment, machines, ferniture, teaching aids, learning materials and other technical and utilities support(2.77), teachers are not able to conduct such type of practical approach(CBT&A) (2.25) and teachers' are not motivated to work hard and have fear of change(2.08) respectively. In average no resondents disagree with any issues raised in the questionnaires. The other important and notable issue and challenges raised by the individual respondents are-

The respondents and key informant experts provide their opinion on the piloting program and recommended a way out for resolving the issue and challenges through the following consolidated suggestion-

- Though most of the respondents were not satisfied with the implementation of the piloting program but their opinion is that dual certification initiative under NTVQF system for diploma in computer technology was a good and timely initiative and its potentiality is proved statistically by the trend of the rate of immediate employment of the dual certified graduates in the job market
- If the identified limitations of conventional courses implementation might be overcome and the issues as well as challenges detected in research finding during the piloting of NTVQF tuned course could be mitigated and resolved, the dual certification program can be introduced in all polytechnics.
- For resolving the limitation of the implementation of conventional course and mitigating the issues and challenges of piloting program a number of change, modification and development steps need to be brought together in diploma engineering curriculum as well as in implementation process as mentioned in following recommendation.
 1. The diploma in Engineering curriculum need to be competency / outcome based and curriculum development procedure must be methodological (DACUM/ Functional Analysis), based on forecasting the number of required graduates in a particular technology and need analysis of the that courses in home and abroad.
 2. Transformation and alignment decision for all conventional courses to NTVQF/ BNQF need to be included in BTEB regulation and should be mandatory for TVET as suggested in the NSDP
 3. The teachers qualification, students teachers ratio, quality assurance system, inspection, monitoring and evaluation of course implementation including teaching delivery and assessment guideline need to be included in curriculum documents of BTEB.
 4. A teachers qualification framework including teachers recruitment rules need to be framed and established for the TVET teachers.
 5. Teachers apprenticeship need to be introduced immediately within a legal framework, so that every teachers can be attached with industry, use latest machine, tools and equipment and achieve real life experience by hand on practice.
 6. Beside the minimum academic qualification, teachers need to be certified in teachers training program like skills certification in occupation(s) including

teaching methodology level 4, 5, and 6, diploma in technical education, Bachelor of Technical Education , Masters / PhD in technical education as the regulation is followed in NTVQF system.

7. Teachers training and certification (licensing) need to be mandatory for being a professional teacher, given advantages in recruitment, for promotion in higher position or for providing incentives in service.
8. Students teachers ratio(STR) should be 12:1 for TVET teachers as per the recommendation of national education policy-2010.
9. Institute as well as course accreditation for both public and private polytechnics need to be based on coursewise accreditation requirements like minimum infrastructure, number of certified/ qualified teachers, number of lab / workshop , availability and installment of machines, tools, equipment & furniture, assurance of teaching aids, consumable material and learning materials(book, teachers guide like syllabus, course plan, semester plan, lesson plan etc. Learners guide like information sheet, job sheet, operation sheet and other manuals) as followed in NTVQF system.
10. Monitoring of the quality practice of the institutes and assurance of teaching delivery using appropriate progress /achievement chart must be strengthen locally as well as from central authorities like DTE and BTEB by frequent physical visit as well as using smart camera and surveillance system.
11. Extensive and rigorous changes are the immediate requirement of the examination system. Assessment should be performance/ outcome based assessment. Practical assessment need to be emphasized instead of dependency on theory examination for awarding diploma / certificate as it is followed in NTVQF implementation system.
12. Final practical assessment need to be conducted by the mandatory involvement of external certified assessor. A certified assessor pool need to be established from the potential industry experts as well as the academician.

Chapter One: Introduction of the Study

1.1 Statement of the problem

Currently diploma in engineering education in Bangladesh is crossing a fragile condition where the quality of the graduates from polytechnic disappointed the employers, related professionals, guardians and other stakeholders whereas this is the high time for preparing and utilizing such level of youth through technical education for achieving SDG by 2030 as well as becoming developed nation within 2041. It seems that the way of implementation of the existing curriculum unable to produce globally competitive competent graduates effectively for achieving the target and its need to be alleviated and changed. On the other hand, article 20.17 of the NSDP- 2011 and table 3 has given responsibility to BTEB for implementing NTVQF in support of the NSDA, ISCs and TVET providers. According to the 20th EC-NSDCs meeting minutes, dated 30-05-2016 the BTEB was advised to translate and tuned the existing diploma in computer technology courses to NTVQF up to level-6 in polytechnic institutes. In this circumstances BTEB translated and tuned the conventional diploma in computer technology syllabus to NTVQF form and started piloting in selected institutes for introducing dual certification. After the first round incomplete implementation of the programme, a number of issues and challenges are raised by the implementers, need to be addressed and overcome for successful implementation as well as producing quality diploma graduates.

1.2 Importance and Rationale of the Study

The Diploma in Engineering programme in Bangladesh yet mostly being implementing in conventional system instead to follow the direction of NSDP-2011. BTEB still uses behavioral objectives type syllabus, teachers practicing old method of teaching delivery and assesses students in an ineffective and defective way. The syllabus for diploma in engineering usually modified and revised after every five years within a 4 years cycle but no major visible changes have been found in course curriculum since last two and half decade after 1995. Even the revision of the syllabus or introducing of new courses usually done without any need analysis or tracer study. No research has been observed on impact analysis after implementation of the courses. Employers are not equipped for contributing in curriculum development activities. As a whole courses curriculum is not market responsive. Again both the materials as well as human resources for implementing curriculum are not aligned and synchronized with the courses. Two related acts for BTEB and NSDA were passed recently in 2018 but could not be fully operationalized due to number of constraints exist in the system. Even the qualification and capacity of the persons responsible for curriculum development are big questions due to the placement of non-relevant and non-competent persons as curriculum specialist. The implementation process, availability of resources including trained and quality teachers, teacher student ratio and assessment system are very delicate.

On the other hand the NTVQF certification system is implementing since 2012 as per the direction of NSDP-2011 with a separate setup in BTEB where Competency Standards (CS), Competency Based Curriculum (CBC), Course Accreditation Documents (CAD),

Quality Assurance Manual(CAM), Competency Based Learning Materials (CBLM), Assessment tools etc. are developed and prepared by the direct involvement of industry representatives through industry Skills Council (ISCs) by the active engagement of Technical Sub Committee (TSC) members, Standard and Curriculum Development Committee (SCDC). Certified trainers and assessors are mandatory for teaching and training delivery. Third party certified industry assessors are utilized for assessing the students / trainee. Assurance of the competencies through the measurement and evaluation of the learning outcome by assessing the knowledge, skills and attitude using separate method of assessment are the strategies in NTVQF system where quality assurance is the prime point for certification.

Since 2012 the progress of NTVQF training course implementation is quite satisfactory up to level 4 where the 7th FYP has strongly recommended to accelerate implementation of the on-going standard classification of the workforce following NTVQF up to level 6 which addresses the technical education level specially the diploma courses. Again the honorable prime minister of Bangladesh declared to formulate the BQF for bring the all upcoming and existing workforce under standard classification of occupation by transforming the Low-skill- low productivity of Bangladesh workforce to high-skill-high productivity through facilitate pathways to formal qualifications. However NSDP section 5.7 given the provision of dual certificate for the TVET students. Through this provision a student can be awarded both skill (National Skills Certificate-NSC level 1 to Level 6) and academic qualification (Diploma in Engineering).

On the other hand article 20.17 of the NSDP- 2011 and table 3 has given responsibility to BTEB for implementing NTVQF in support of the NSDA, ISCs and TVET providers. According to the 20th EC-NSDCs meeting minutes, dated 30-05-2016 the BTEB was advised to translate and tuned the existing diploma in computer technology courses to NTVQF up to level-6 and start piloting in polytechnic institutes. In this circumstances BTEB translated and tuned the conventional diploma in computer technology syllabus to NTVQF form and started piloting in selected institutes for introducing dual certification. After the first round incomplete implementation of the programme, a number of issue and challenges are raised by the implementers which need to be addressed and overcome for successful implementation as well as producing quality diploma graduates. Now it is the obligation to initiate actions for assuring the quality of TVET through a systematic and innovative approach under the policy framework. In this circumstances BTEB tuned and matched the existing traditional behavioral type syllabus with competency standard of NTVQF- the alternative pathway for ensuring the quality of diploma in engineering graduates and getting productive sustainable work ready flexible workforce from polytechnics. The new alternative strategies and innovative approach of dual certification were implemented as a pilot programme in 15 private and public institutes. The aim of this new strategy for quality assurance in diploma Engineering education provided opportunity for the graduates to achieve both academic diploma and skills certificate simultaneously. The matching and tuning of the course was a prototype for the other courses of the programme. But during the implementation of this new approach of quality assurance system faces number of challenges and visualizes some potential which need to be addressed for mitigation. To overcome the limitation and utilizing the potentials,

this action research will be an important tool for producing sustainable work ready flexible workforce in TVET.

1.3 Purpose of the Study

The main purpose of the study is to find the implementation challenges of dual certification under NTVQF in polytechnics

The specific objectives of the research include

1. To find the implementing variances between conventional diploma in Engineering and NTVQF tuned occupational courses.
2. To unveil the satisfactory level of implementation of the Dual certification program.
3. To extract the challenges in implementing NTVQF tuned occupational Course.
4. To recommend a way out for resolving the issue and challenges.

1.4 Scope and Limitation of the Study

Diploma in engineering program in Bangladesh consists of 34 different courses. Among those huge courses only the computer technology was translated and tuned to NTVQF and first round piloting in 15 polytechnics have been completed. All these 15 piloting institutes are taken under the study. The head of the implementing institutes, heads of computer technology and related teachers are included in the population size. The policy makers, related professionals and the competent experts from respective industry skills council (ISC) were included in the study for key informant interview (KII). Slovin's Formula with 10% margin of error(e) are used for determining the sample size. The competent graduates are now engaged in industrial attachment program. Due to the time and cost constraints those NTVQF graduates are not accessible and could not include in the study.

1.5 Research Questions

The research questions of the study are formulated as

1. What are the implementing variances between conventional diploma in Engineering and NTVQF tuned occupational courses?
2. To what extent the Dual certification program implementation are satisfactory?
3. What are challenges in implementing the tuned NTVQF occupational Course?
4. How can the challenges be resolved?

Chapter Two: Literature Review

2.1 Introduction

The goal of SDG4 (Quality Education) is to maintain the progress of quantitative achievement as well as ensuring quality at all level of education and training. For maintaining, accelerating and sustaining the economic growth, TVET and skill assurance are the prime agenda not only in Bangladesh but in all over the world. The Bonn declaration 2004 clearly 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”. For achieving SDG4 the quality and relevance of TVET need to be upgraded to match with contemporary market demand.

Government has strong resolve to foster quality education and skills for the youth of Bangladesh. The country seems firmly poised to achieve the education related sustainable development Goals by 2030. But for achieving this target, yet no holistic approach and readiness are structured as per the theory of strategic workforce plan. National Education policy(NEP) and National Skills Development Policy (NSDP) approved in 2010 and 2011 respectively but yet nation do not get any education act which is the fundamental and most important tool for reaching the target by 2030. Whereas this is the high time for preparing and utilizing the surplus youth by producing better productive and globally competitive workforce through quality Education as indicated in SDG4 by 2030. It seems that existing structure and strategies used for educating the learners could not able to contribute effectively for achieving the target and that’s need to be alleviated and changed.

Again, only the academic qualification in Bangladesh could not supply enough number of work ready workforce and good practitioner for the industry or business. The chapter 5.7. of NSDP stated “In general education, a new system of dual certification will be introduced so that students who satisfactorily achieve the skills component of vocational education programs such as the SSC (Voc), HSC (Voc) and HSC (BM), will receive a NTVQF qualification in addition to, and separate from, the school qualification.

“To match TVET supply and economic demand, TVET should be linked to economic development strategies by analyzing the skill implications of economic investments. One of the most effective strategies to raise the relevance of training is to involve employers closely in directing and evaluating the training system. Salient examples are noted in Bangladesh and Sri Lanka” - Asian Development Bank (2014), innovative strategies in Technical and Vocational Education and Training for Accelerated Human Resource Development in South Asia. The report also stated “Low performance of candidates on terminal examinations is symptomatic of low quality. The performance of many private institutions has been lower than that of public institutions in Bangladesh”

2.2 Conventional Diploma in engineering course, curriculum and its implementation practices in Bangladesh

The diploma in engineering program is a 4-year course consists of 8 semesters covered over a period of four calendar years. Academic activities are held during the first seventh semesters and in eighth semester students are required complete a 12 weeks full-time industrial placement and 4 week institutional attachment for completing a graduation project. The duration of a semester is 16 week with 7 mandatory subject in each semester. The whole diploma in computer technology course has 45 fixed and 8 optional subject where from 2 subject need to be taken to complete 7 consecutive semester. For awarding a diploma a student need complete and present this graduating project to a graduation evaluation committee at the end of last semester. The entry requirement in the course is general SSC from science/arts/commerce, dakhil (madrasha) or SSC(vocational) or SSC from open university or it's equivalent qualifications. The minimum Grade Point Average (GPA) requirements for admission in public polytechnic institute is GPA 3 and GPA 2.5 for private polytechnic institutes Plus Grade Point 3.5 in General /Elective Mathematics. Candidates are selected through the order of merit in their SSC or its equivalent examination without any admission or aptitude test. Since 1990 the practice was to taken the admission test incorporating the component of aptitude / IQ for the eligibility for being a diploma engineering student. Diploma in computer technology is one of the most demanded and important emerging courses among 39 different diploma engineering courses in Bangladesh

2.2.1 View of stakeholders, professional and experts on curriculum and its implementation practices in Bangladesh TVET system

Soon Tats Fah, (2020), director of Nanyang Polytechnic of Singapore mentioned that the real-life industry/business experience and effective curriculum, inspiring learning environment and experiences through actual/simulation of real life solutions, strong and effective sustainable staff capacity development initiative, teaching factory concept, engage students in full-time project works, continuous review and refine of curriculum and introducing design thinking approach in project or problem solving are the most important initiatives should be emphasized for quality assurance in polytechnics.

Curriculum implementation strategies, monitoring and evaluation system and assessment procedure of BTEB should be modified (Majumder S A, 2020).

Abu Raihan (2020) Professor of TVE department of IUT uttered in a focus group discussion that factors need to consider for developing curriculum, for instance, feasibility study, significance, relevancy, industry linkage/ partnership, and accurate representation of competent members from stakeholders according to the standard rules of curriculum development committee. He also expressed that most of the polytechnic teachers are not trained and now a day, the TVET teachers do not feel the requirements for training in professional life which is risky for the future TVET system in Bangladesh.

Kabir Mia (2020) a DACUM expert articulated that standard procedures are not maintained for developing traditional TVET curriculum in Bangladesh.

Technical teachers must recruit with relevant industry experience. Continuous skills as well as pedagogy training should be taken place for the quality TVET and TVET curriculum should be in line with the demand of the industry (Amin R,2020).

Masudur Rahman (2020), Associate Professor, University of Nordland, Norway suggested to take the experience of European curriculum and their implementation and assessment procedure. He has given emphasis to reduce gap between institutes and industry. He also stated that TVET curriculum should be developed based on TNA, through the proper professional qualified curriculum developer, maintaining the methodological procedure. M. Shahadat Hossain (2020) revealed that standard teacher student's ratio should be addressed and maintained for ensuring the quality of technical education.

2.3 National Technical and Vocational Qualifications Framework (NTVQF)

NTVQF is a set of principles and guidelines by which records of learners' achievement are registered to enable national recognition of acquired skills and knowledge. NTVQF also describes the competencies required to do a job at various levels according to industry need. NTVQF shows clear learning pathways of the vertical mobility and progression within training and career paths which helps the learners to compare the levels of different qualification and identify different ways to progress. Learners are often more encouraged to improve their knowledge and skills to increase their employment opportunities so, NTVQF helps learners make decision about the qualification they need to pursue.

The National Technical and Vocational Qualification Framework has levels from 1 to 6, as well as two pre-vocational levels to allow easier access to formal TVET for poor or under privileged groups who might not have sufficient formal schooling and lack of literacy and numeracy but having skills either working in different economic sector or have no works at all. Bangladesh NTVQF system

Table 1: National Technical and Vocational Qualification Framework

NTVQF LEVELS	EDUCATION SECTORS			Job Classification
	Pre-Vocation Education	Vocational Education	Technical Education	
NTVQF 6			Diploma in engineering or equivalent	Middle Level Manager /Sub Assistant Engr. etc.
NTVQF 5		National Skill Certificate 5 (NSC 5)		Highly Skilled Worker / Supervisor

NTVQF 4		National Skill Certificate 4 (NSC 4)		Skilled Worker
NTVQF 3		National Skill Certificate 3 (NSC 3)		Semi-Skilled Worker
NTVQF 2		National Skill Certificate 2 (NSC 2)		Basic Skilled Worker
NTVQF 1		National Skill Certificate 1 (NSC 1)		Basic Worker
Pre-Voc 2	National Pre-Vocation Certificate 2 (NPVC 2)			Pre-Vocation Trainee
Pre-Voc 1	National Pre-Vocation Certificate 1 (NPVC 1)			Pre-Vocation Trainee

Table 2: Level descriptor of NTVQF system

NTVQF Level	Knowledge	Skill	Responsibility	Job Class.
6	<ul style="list-style-type: none"> Comprehensive actual and theoretical knowledge within a specific study area with an awareness of the limits of that knowledge 	<ul style="list-style-type: none"> Specialised and restricted range of cognitive and practical skills required to provide leadership in the development of creative solutions to defined problems 	<ul style="list-style-type: none"> Mange a team or teams in workplace activities where there is unpredictable change Identify and design learning programs to develop performance of team members 	Supervisor / Middle Level Manager /Sub Assistant Engr. etc.
5	<ul style="list-style-type: none"> Very broad knowledge of the underlying, concepts, principles, and processes in a specific study area 	<ul style="list-style-type: none"> Very broad range of cognitive and practical skills required to generate solutions to specific problems in one or more study areas. 	<ul style="list-style-type: none"> Take overall responsibility for completion of tasks in work or study Apply past experiences in solving similar problems 	Highly Skilled Worker / Supervisor
4	<ul style="list-style-type: none"> Broad knowledge of the underlying, concepts, principles, and processes in a specific study area 	<ul style="list-style-type: none"> Range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying the full range of methods, tools, materials and information 	<ul style="list-style-type: none"> Take responsibility, within reason, for completion of tasks in work or study Apply past experiences in solving similar problems 	Skilled Worker

NTVQF Level	Knowledge	Skill	Responsibility	Job Class.
3	<ul style="list-style-type: none"> Moderately broad knowledge in a specific study area. 	<ul style="list-style-type: none"> Basic cognitive and practical skills required to use relevant information in order to carry out tasks and to solve routine problems using simple rules and tools 	<ul style="list-style-type: none"> Work or study under supervision with some autonomy 	Semi-Skilled Worker
2	<ul style="list-style-type: none"> Basic underpinning knowledge in a specific study area. 	<ul style="list-style-type: none"> Basic skills required to carry out simple tasks 	<ul style="list-style-type: none"> Work or study under indirect supervision in a structured context 	Basic Skilled Worker
1	<ul style="list-style-type: none"> Elementary understanding of the underpinning knowledge in a specific study area. 	<ul style="list-style-type: none"> Limited range of skills required to carry out simple tasks 	<ul style="list-style-type: none"> Work or study under direct supervision in a structured context 	Basic Worker
Pre-Voc 2	<ul style="list-style-type: none"> Limited general knowledge 	<ul style="list-style-type: none"> Very limited range of skills and use of tools required to carry out simple tasks 	<ul style="list-style-type: none"> Work or study under direct supervision in a well-defined, structured context. 	Pre-Vocation Trainee
Pre-Voc 1	<ul style="list-style-type: none"> Extremely limited general knowledge 	<ul style="list-style-type: none"> Minimal range of skills required to carry out simple tasks 	<ul style="list-style-type: none"> Simple work or study exercises, under direct supervision in a clear, well defined structured context 	Pre-Vocation Trainee

2.4 Alignment of the Computer Technology Course with NTVQF occupational standard and the aligned Course Structure

The Diploma in Engineering course in computer technology under Bangladesh Technical Education Board was developed and commenced in the year 1995 with the objective of producing the middle level IT professional required for the new millennium.

According to the existing curriculum documentation, the aims and objectives of the course are stated as follows.

- Provide Diploma Engineer in Computer Technology to cater to the demands in the next millennium industry requirements
- Provide a conceptual basis for more advanced studies/further education in engineering.

At the end of this diploma programme on computer technology the expectations from the graduates are that they able to

- Work as an IT supporter in the field of Hardware maintenance and Networking
- Function as a software developer.
- Train personals in IT skills.
- Use IT skills in the area of microcontroller-based system and automation.

- Make use of IT skills in decision making in an organization and
- Work as a mid-level professional in IT sector.

The curriculum and initial designed syllabus were revised three times, first in year 2000 followed by the second in year 2005, third in 2010 and then in the year 2016. However, first three versions of the revisions were of minor nature and did not affect the status of the core of the course.

Translating and tuning of the conventional diploma in computer technology course to NTVQF has been worked out during the revision of the course curriculum in 2016, where a significant change and innovative strategies are introduced for the first time.

The units of competency, elements of competency and the performance criteria of the occupational standards of different IT occupations are inserted as the contents of traditional subjects. A number of new emerging subjects are also introduced complying the contents with occupational standard. Only practical subjects are taken and considered for the alignment without troubling the traditional course structure and format. All subject contents are organized, sequenced and re-written as general objective and specific objectives in line with the unit of competency and element of the competency of NTVQF occupational standard. The element of the competency were further breakdown into smallest sequential steps which cannot be logically subdivided were written in 3rd layer of each individual practical jobs. In an occupational standard this 3rd layer of task elements are called performance criteria, those were not in conventional syllabus.

An outline of the NTVQF tuned course structure for diploma in computer technology is illustrated below where the technical subjects and practical contents of the subjects, aligned with the relevant occupations of NTVQF are illustrated in different semesters with bold and underline fonts.

1st Semester

Sl. No.	Name of the Subject	Credibility of learning domain		
		Theory	Practical	Credit
1	Bangla	3	3	4
2	English	2	0	2
3	Physical Education & Life Skill Development	0	3	1
4	Mathematics-I	3	3	4
5	Physics-I	3	3	4
6	<u>Computer Application</u>	0	6	2
7	Electrical Engineering Fundamentals	3	3	4
Total		14	21	21

2nd Semester

Sl. No.	Name of the Subject	Credibility of learning domain		
		Theory	Practical	Credit
1	<u>Database Application</u>	0	6	2

2	<u>IT support-I</u>	0	6	2
3	<u>Graphics Design-I</u>	0	6	2
4	Analog Electronics	3	3	4
5	Mathematics-2	3	3	4
6	Physics-2	3	3	4
7	Communicative English	1	3	2
Total		10	30	20

3rd Semester

Sl. No.	Name of the Subject	Credibility of learning domain		
		Theory	Practical	Credit
1	<u>Programming Essentials</u>	2	3	3
2	<u>Web Design</u>	0	6	2
3	<u>Graphics design-II</u>	0	6	2
4	<u>IT support-II</u>	0	6	2
5	Mathematics-3	3	3	4
6	Chemistry	3	3	4
7	Social Science	3	0	3
Total		11	27	20

4th Semester

Sl. No.	Name of the Subject	Credibility of learning domain		
		Theory	Practical	Credit
1	Object Oriented Programming	2	3	3
2	Data Structure & Algorithm	2	3	3
3	Web Development	0	6	2
4	Data Communication System	2	6	4
5	Computer Peripherals	1	6	3
6	Principle of Digital Electronics	3	3	4
7	Business Organization & Communication	2	0	2
Total		12	27	21

5th Semester

Sl. No.	Name of the Subject	Credibility of learning domain		
		Theory	Practical	Credit
1	Programming in Java	2	3	3
2	Surveillance Security System	1	6	3
3	Sequential Logic System	3	3	4
4	Web Development Project	0	6	2
5	PCB Design & Circuit Making	0	6	2

6	Operating System Application	2	3	3
7	Accounting Theory & Practice	2	3	3
Total		10	30	20

6th Semester

Sl. No.	Name of the Subject	Creditability of learning domain		
		Theory	Practical	Credit
1	Principals of Software Engineering	2	6	4
2	Microprocessor & Interfacing	2	3	3
3	Microcontroller Application	0	6	2
4	Database Management System	2	3	3
5	PLC Automation System /Web Mastering/ Network & Data Center Operation/ Multimedia & Animation	2	3	3
6	Environmental Studies	2	0	2
7	Industrial Management	2	0	2
Total		12	21	19

7th Semester

Sl. No.	Name of the Subject	Creditability of learning domain		
		Theory	Practical	Credit
1	System Analysis & Design	2	3	3
2	Network Administration & Services	2	6	4
3	Apps Development Project	0	6	2
4	E-Commerce & CMS	2	6	4
5	Cyber Security & Ethics	1	3	2
6	Embedded System Design/ Game Development/ Network Security System/ Advanced Database Management System	2	3	3
7	Innovation & Entrepreneurship	2	0	2
Total		11	27	20

2.5 NTVQF tuned Occupational Map of Computer Technology course

Existing conventional diploma in engineering (computer technology) course are translated & tuned as occupational standard under NTVQF. General Objectives (GO) and Specific Objectives (SO) of existing course of the technical subjects (practical part) are aligned and translated to unit of competency, competency elements and performance criteria as per competency standard followed in NTVQF system. Considering the gaps of the previous course structure (probidhan 2010), the syllabus is restructured and matched with NTVQF occupational standard by minimizing gaps of industry demand and

synchronized the course through developing a level and semester wise competency map. The developed competency map is shared with policy level industry representatives and TVET providers for validating the developed course structure. This new approach given the opportunity to introduce competency-based delivery of session and performance-based assessment at the end of the semester.

2.5.1 NTVQF level wise Occupation Map

The translated occupational standards are mapped in the following figure where NTVQF level wise occupations and competency standards are illustrated

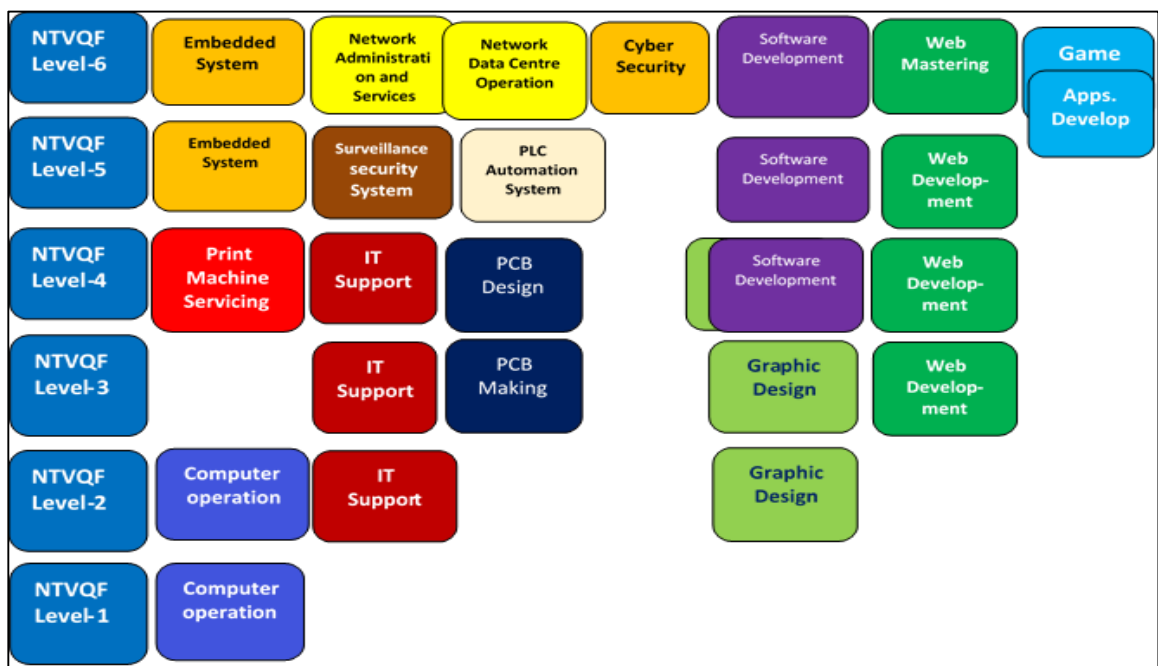


Figure-1: NTVQF Level wise Occupation standard mapping for Computer technology

After analysis of the whole diploma in computer engineering course, from the map it was found that at least 15 occupations exist in this particular technology where the number of standards became 27.

2.5.2 Semester wise Occupation Map and the Certification Pathway:

Again, the following figure demonstrated the semester wise occupations and pathway for achieving higher order specialized occupational competency through proper learning & training delivery, assessment and certification. After extensive analysis the occupations including the levels of standards are re-arranged and distributed in different certification pathway are demonstrated in different NTVQF levels within 8 different semesters.

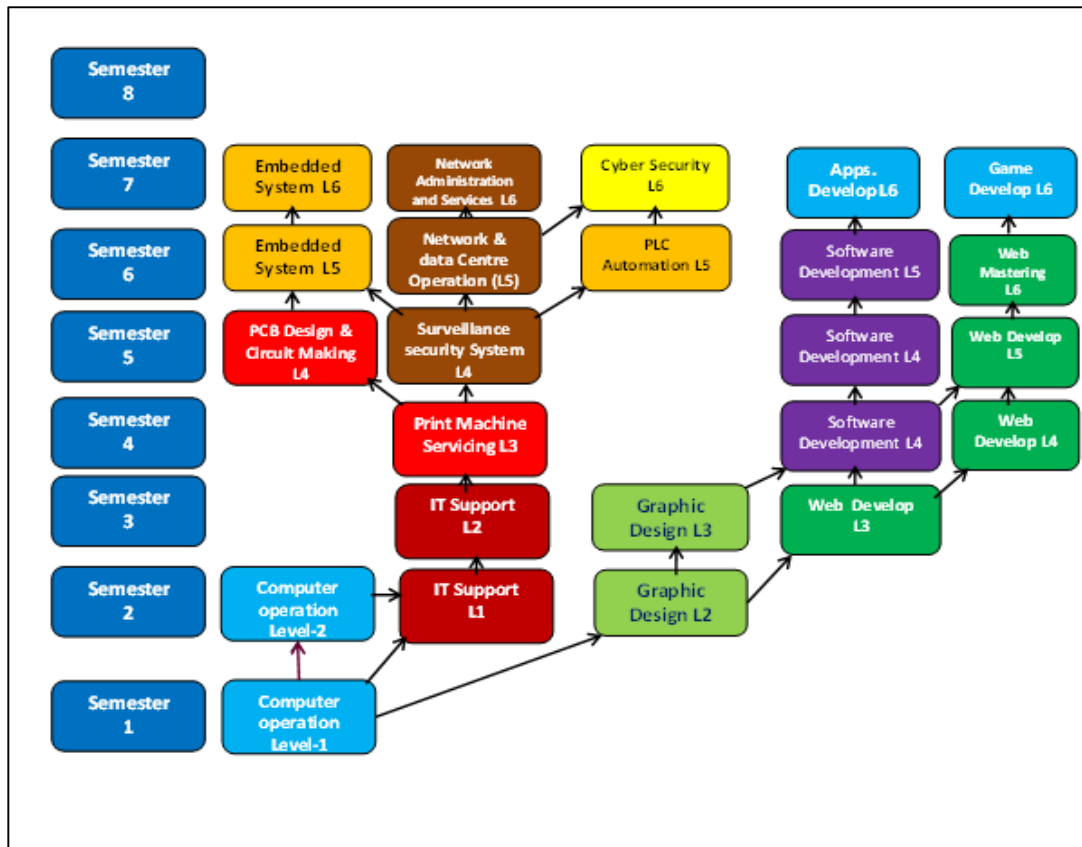


Figure-2: Semester wise Occupation standard mapping and certification pathway for Diploma in Computer Technology

2.5.3 Map of Competency Units for Sample Occupations

The following two figures are the illustration of the Map of Unit of Competency against each semester with NTVQF levels for the respective occupations. Each and every Occupations are mapped with their respective competency for the whole course but the below figures demonstrated the competency map for only 03 sample occupation.

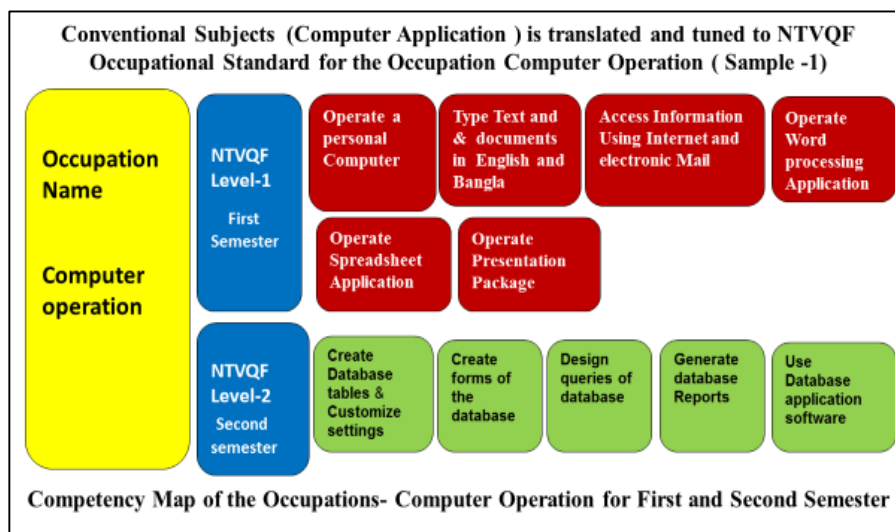


Figure-3: Sample competency map of the occupation- Computer operation

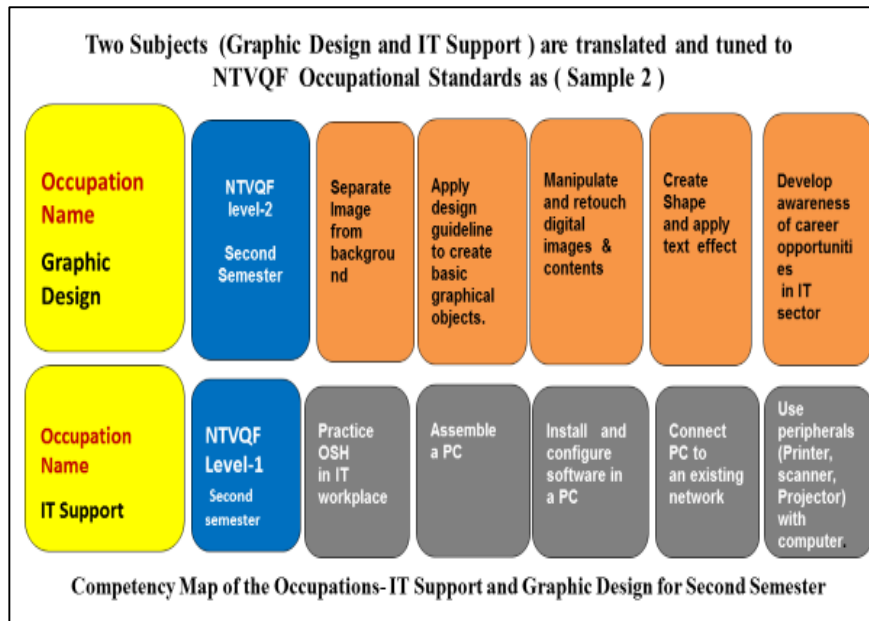


Figure-4: Sample competency map of the occupations- IT support and GD (Graphic Design)

Chapter - Three: Methodology

3. Methodology of the Study

This is a current, real time **action research** for impact analysis of a newly approach implementation of diploma engineering course under BTEB. Both quantitative and qualitative (**mixed**) **method** of study are used in the research. The preliminary study has been conducted based on secondary documents. Curriculum, syllabus, regulation (probidhan) of conventional course and competency standard, Quality Assurance Manual, Course Accreditation Documents of NTVQ system for competency-based education and training system are accessed and analyzed through desk review.

Two semi structured questionnaire are used to find out the strategies, issues and gap as well as remedial measures requirement after the first phase implementation of the piloting programme. Data has been collected through a semi structured questionnaire from the implementers like the principal and directors of 15 piloting institutes. Data collection from other respondents is in progress. The respondents for **Key Informant Interview** are planned and the checklist of the key questions will be finalized after getting the draft findings from the study.

3.1 Sampling

Stratified random sampling method are used for data collection from the respondents. All the 15 piloting institutes are taken under the study. The population size is 66 stratified in 3 different categories-The principals / Implementers, the Head of the department including trainers/ teachers and the policy makers, Industry Skills Council member and NTVQF professionals are taken as Key Informant for Interview. Slovin's Formula with 10% margin of error(e) are used for determining the sample size.

Slovin's Formula

$$\text{Sample size (n)} = \frac{N}{1 + Ne^2}$$

Where N=Population size

e= margin of error

The detail of the sampling is illustrated in following matrix.

Research Question	Type of data/ Instrument and Analysis Technique	Strategies for collecting and analyzing secondary data and information	Outcome
1.What are the implementing variances between conventional diploma in Engineering and NTVQF tuned occupational courses?	Secondary documents	Literature review and desktop analysis of conventional curriculum and its implementation strategies for diploma in Computer engineering course and the documents used in NTVQF system like Competency Standard and Curriculum, Quality Assurance Manual (QAM), Course Accreditation documents (CAD), CBT&A implementation guideline and assessment criteria. Comparative analysis of Conventional and NTVQF system	Variance of Course Implementation between conventional course and NTVQF tuned occupational courses?

Research Questions	Research Design	Type of Respondents	Population Size	Sample Size	Instruments / Tools and Type of Data	Technique of Analysis	Outcome
2.To what extent the Dual certification program implementation are satisfactory? 3.What are challenges in implementing the tuned NTVQF occupational Course? 4.How can the challenges be resolved?	Sequential mix method Design	Head of the Implementing Institute	(07 public and 08 private Institute 01+08=15	13	Questionnaire (Mixed Question)	Quantitative and qualitative analysis using SPSS and Spread sheet software	2.Program Implementation status and satisfactory level
	Action research	Teachers (Head of the Department and 02 related teachers assigned for the piloting program	(HoD and 02 related teachers from each institute 15+30=45	31	Questionnaire (Mixed Question)	Quantitative and qualitative analysis using SPSS and Spread sheet software	3. Issues and Challenges to Implement NTVQF tuned occupational courses
		Officials related to piloting program, assessor, Board representative and related TVET Experts	05	05	KII (Key Informant Interview)	qualitative analysis	4.Way our for resolving the challenges

3.2 Source of Data and Method of Data collection:

The source of secondary data was the existing curriculum documents of computer technology available in BTEB and BTEB website. Different related study paper also accessed for collecting secondary data. Selected relevant curriculum was collected from different TVET providers. Again, the existing list of occupations and competency standard of IT sector under NTVQF are collected from NTVQF division and MIS system of BTEB (cibtbeb.gov.bd). Other secondary document and data for IT sector was collected from IT-ISC and BTEB corresponding officers.

The source of primary data is the head of the institute / principals, the Head of computer department and the trainers / teachers of 15 piloting institutes. Two separate questionnaire were used for collecting primary data. One is for head of the institute and another is for the teachers including head of the department (HoD).

BTEB officials related to NTVQF piloting activities, the assessors of respective occupations and board representative involved in assessments and academician related to piloting as well as involved in diploma engineering course implementation have been taken as Key Informant for Interview.

3.3 Tools of Data Collection:

Secondary data is collected from BTEB and other website documents through both offline and online desk review. Primary data has been collected using semi structured questionnaires by direct field investigation and mail correspondence. Questionnaire1 (Mixed Question) is used to collect data from HoI / Principal and Questionnaire2 is used to collect data from head of the departments and other respective teachers/ trainers. Key Informant Interview were conducted for expert opinion and further clarification on collected primary and secondary data and information by engaging the TVET professionals related to diploma in engineering and NTVQF piloting program in the mode of one to one meeting using online media tools (Zoom Meeting)

3.4 Method of Data Analysis and presentation:

SPSS software is used for data entry. The preliminary analysis of raw data like data organization, scrutinizing, validating and integrating were accomplished by SPSS.

Preliminary analyzed data is transferred and/or used in spreadsheet analysis software is used for calculating the integrated data and further analysis, creating chart and graph. The word processing software is used to sharpen the graph/ chart and writing the report.

3.5 Conceptual Frame-work of the research

The major steps will be followed throughout this study work are shown in the following Diagram:

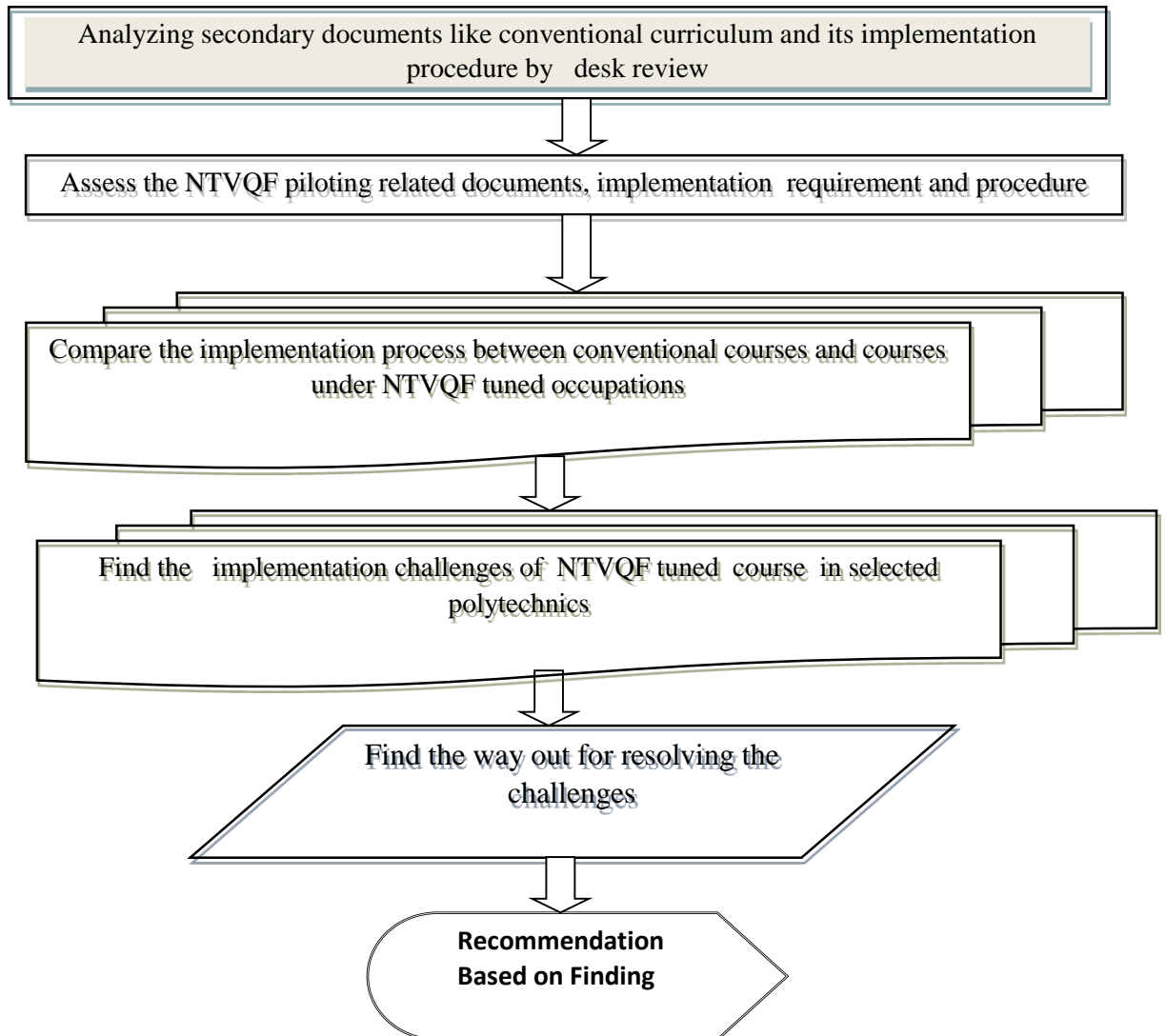


Figure-5: Conceptual Framework of the research activities

Chapter Four: Data Analysis

4.1 Section A: Analyzing secondary data and documents during desk review

4.1.1 Analyzing secondary data and documents related to conventional courses

The curriculum documents for diploma engineering like regulation (Providian), Course structure, syllabus, institute affiliation and accreditation procedure, institute management, inspection/ monitoring system of the institute by BTEB and DTE, teacher's recruitment rules for public polytechnics under DTE as well as private institute of BTEB are accessed and analyzed for understanding the scenario and present status of the implementation. After systematic analysis of the documents a number of potentials, limitations and challenges are observed in administrative and management level in the related organization from curriculum development to certification. The identified potentiality, limitation and challenges are mentioned below-

Sl. No	Potentiality, limitation and challenges of conventional diploma engineering courses
	Potentiality
1	Diploma in Engineering is a very popular and potential course in Bangladesh and its demand is increasing in local as well as foreign job market
2	A separate division under the ministry of education was established by the government and government always ready to provide necessary support for improving the quality of diploma in Engineering education
2	BTEB using semester system education since the independent of Bangladesh
3	The curriculum structure of BTEB is behavioural objective types since 1985 whereas still some institutes used traditional topic based curriculum in the field of engineering
4	Curriculum specially the probidhan and syllebi are updated atleast in 5 years interval by BTEB
5	A number of new important subjects were introduced in the syllebus like subject related to ICT skills, environmental studies and entrepreneurship in 1995 and it was updated as Innovartion and entrepreneurship in 2016 probidhan.
6	A moderate administrative and management infrastructure exist in related organizations like DTE, BTEB and public instututes
	Limitations and challenges
1	Curriculum is not market responsive mostly develop by academician in absence of need analysis and without following any standard procedure or methodology
2	Though there is a non standard regulation (Probithan) exist for implementing diploma engineering courses but no standard quality assurance manual / system exist in this traditional system
3	Syllebus / Course contents do not cover all the 3 aspect of learning domain(KSA)

4	Course contents are subject based, outline oriented, must be finished within a fixed period of time (06 months)
5	Learning continuum is mostly theory oriented and based on discrete practical class.
6	No standard course accreditation document (CAD) exists in traditional system
7	Institute affiliation / accreditation system is defective and non-functioning. No standard assessment tools are used for checking the availability of resource requirement during institution affiliation.
8	No Teachers Qualification Framework exist for teaching. Only a minimum academic qualification is the requirement for being a teacher. Qualification for teaching methodology as well as industry experience are not the requirement to be a teacher/ trainer in traditional system
9	Curriculum are designed for a group and considering group needs
10	Student Teacher ratio is not addressed in probhidan. Practically the STR is very high. Minimum 50:1, Maximum 160:1
11	Teacher centric teaching is used in traditional course delivery system
12	Final result of the student's achievement is declared usually within 2 to 3 months after summative assessment
13	No certified assessors are required /involve in final assessment of the students. Involvement of external examiner is not mandatory during practical final examination
14	Certification is based on obtaining 40% marks mostly assessing the knowledge with inattention of skills and attitude which could not assure that the examinee is competent in a particular job as per workplace standard
15	No strong monitoring system exist either from Board nor from the institute authority due to number of constraints exist the system

4.1.2 Analyzing secondary data and documents related to NTVQF tuned piloting courses

NTVQF tuned piloting for diploma in Computer Engineering course started in 5 February 2017 in 7 public and 8 private polytechnics in the session of 2016 -2017 first ever in Bangladesh by the direction of the Chairman of BTEB, referring the 20th EC-NSDCs meeting minutes, dated 30-05-2016. The program was scheduled for the students of first semester of that particular session only. The teaching delivery and formative as well as the summative assessment system remained same for all students of computer technology as they bound to followed the curriculum of traditional system. The teachers conducted the class of that particular NTVQF tuned occupational subjects as they usually taken in traditional system but they followed the new approach of the arrangement of curriculum

contents in syllabus like unit of competency, elements of competency and performance criteria in the newly introduced occupational (practical) subjects. To attend to the final assessment of the occupational subjects were made optional. Only the motivated students willingly involved and seated for final assessment of the predetermined occupational subjects after their regular semester final exam. At the end of first semester the motivated and registered students for piloting program were given special coaching and they are assessed for the first level of two occupations (Computer Operation and IT support) by the external certified assessors following the NTVQF assessment guideline and procedure. To encourage the students the assessment fee of assessors portion was given exemption and it was included in regulation that if any student become competent in any particular occupational subjects, their score/ grade achieved in traditional semester final exam would be replaced by the grade A+. This piloting program was continue up to 2019 but could not cross the level one and limited within only two occupations. The two occupations in which the assesses are seated for assessment are Computer Operation, level-1 and IT support level-1 whereas in full program there are 15 different occupations up to level 6. However the overall implementation status in 15 different polytechnics are shown in following chart.

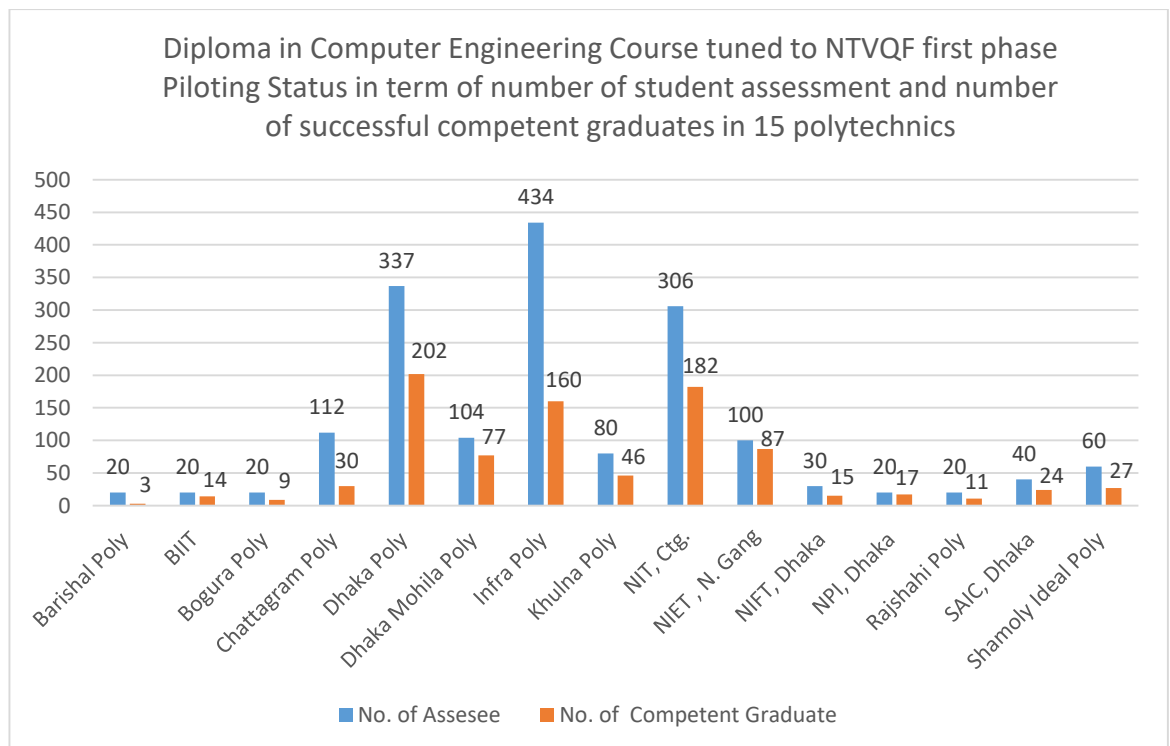


Figure-6: NTVQF tuned Diploma in computer engineering course piloting status in 15 different polytechnics

A total 1703 students were participated in summative assessment and among them 904 students became competent under the piloting program in 15 different polytechnics. The chart illustrated institute wise total number of students participated in final assessment as well as number of students became competent in the summative assessment. At the end of traditional semester final exam a maximum of 20 candidate were eligible to attend in assessment in a batch. For each batch of 20 students 02 certified industry assessors and a BTEB representative were directly responsible for conducting the assessment i.e the assessee versus assessor ratio was 10 : 1. From the chart it is visible that Infra polytechnic, Barishal, Dhaka polytechnic and NIT, Chattrgram are the top ranked 3 polytechnic where number of candidates for assessment were 434, 337 and 306 respectively whereas the successful competent number of graduates were 202 in Dhaka polytechnic, 182 in NIT, Chattrgram and 160 in Infra polytechnic, Barishal. On the other hand lowest number of students with only one batch in 20 were attended in final assessment in 5 polytechnics namely Barishal polytechnic, Bogura polytechnic, Rajshahi Polytechnic, BIIT, Bogura and NPI, Dhaka whereas the successful competent NTVQF graduates in those institutes were 03, 09, 11, 14 and 17 respectively.

The piloting stopped in 2019 due to number of constraints and challenges . For Finding those constraints, BTEB arranged a workshop meeting with the head of piloting institute and determined a list of issues and challenges. According to the BTEB regulation (2020) the identified constraints and limitation are -

- Most of the teacher's / trainers were neither certified nor trained in skills qualification (National Skills Certificate) for the higher level assigned occupations. So, they(teachers) themselves were unable to perform the assigned jobs as well as to teach the occupational subject practically in the assigned occupational levels.
- The teachers were also not trained or certified on teaching methodology (CBT&A level-4). So, they were unable to practice the teaching methodology used in NTVQF system and have lost their interest / motivation to continue the piloting program
- The occupational map, pathway of certification in different occupational level were not clear to the implementers/ teachers and time bound Schedule of piloting

could not be maintained due unexpected interval in teaching learning throughout the semester and during the final examination.

- It was not possible to limit this piloting program within the students of scheduled session, students from other session also allowed to attend the assessment program under this piloting
- There was a provision of incentives for the certified students to update their GPA to A+ in occupations related subjects if they become competent in that particular occupational level by replacing the previous traditional lower grade result if they achieved in usual final exam but that could not be materialized due to number of constraints like proper direction and follow up from BTEB and lack of awareness of both teachers and students of implementing institute
- Assessment billing and payment system for the assessors were very complex and time consuming which demotivated the pilot program implementers
- Lack of coordination and mutual understanding among piloting institute and certification authority in financial management during assessment.
- Teaching methodology and Dual certification system were not well aware to the teachers as well as students
- Registering the institute, supply of CS as well as CBLM in piloting institute were not well organized
- Lack of motivation, counselling for the piloting students as well as financial incentives for the teachers and staff were not adequate
- Financial support for supply of consumable materials were not adequate
- No incentive or honorarium provision for the teachers were involved for the extra coaching / effort during the piloting program

4.1.3 Impact analysis of Dual certification in piloting Institute:

After the end of the piloting program, the head of computer department of the Dhaka polytechnic institute conducted a study for finding the impact of certification on non-certified graduates' of 2017 batch and NTVQF certified graduates in 2018 batch by comparing the graduate's status using two parameter - job placement and enrollment in higher education which is illustrated in the following table. The table shows that total diploma graduated students in 2017 and 2018 batch were 116 and 106 respectively. Total NTVQF graduates in 2017 were 03 whereas in 2018 it was 92. In 2017 11% graduate got

job before passing diploma in computer engineering where as 34% got job within 6 months of their graduation. Rest of the graduates (46%) took admission for higher study. But in the following year 2018, total diploma graduated students were 106 and among those graduates 92 were also graduated in NTVQF system under dual certification piloting program. Now the scenario has been changed and it is shown that 26% dual certified graduate got job before they have completed their course. 53% dual certified graduates got job within 06 month of their graduation. Only 14% graduate went to higher study in different universities. From the study it is clear that placement rate of dual certified graduates is much higher than the tendency of higher education, inversely immediate enrollment rate in higher study, decreases exponentially when the graduates have dual certificate. A short statistical analysis of the impact of dual certification are illustrated in the following table

Table-3 : Impact of dual certification in Job placement and enrollment in Higher education

No. of Diploma graduates	Certified in NTVQF Level-1 IT support/ Computer Operation	Job Before publishing Final diploma Result	Job within 6 months of final diploma Result	Higher Education within 6 months of final diploma Result	Untraced/ Unemployed within 6 months of final diploma Result
(2017) 116	3	13 (11%)	39 (34%)	53 (46%)	11 (09%)
(2018) 106	92	28 (26%)	56 (53%)	15 (14%)	07 (6.6%)

4.2 Section B: Analysis of primary data collected through Questionnaires for Head of Institutions (HoI), Head of the Departments and related Teachers

This chapter illustrated the results of primary data analysis based on questionnaires prepared for gathering data from respondents. There were two set of questionnaires -one was for head of the institute (HoI)- the principals / director and another one was for the teachers -head of the department (HoD) and teachers involved in conducting the teaching, training and/or coaching under NTVQF piloting programme.

Regarding the query on educational as well as NTVQF related qualification of the head of the institute it was found that all the head of the institute were at least bachelor degree holder, most of them have engineering degree including MSc & PhD in field of

engineering or technical education whereas 13.3% are graduated in general education but unfortunately, no one have any NTVQF related qualification, neither in any level of National Skills Certificate (NSC) nor in Teaching Methodology (CBT&A level 4/5/6). On the other hand among the teachers and Head of the Department (HoD) 78.7% were at least bachelor degree holder and rest of the teachers highest educational qualification were either Diploma in Technical education or fresh diploma in Engineering. Regarding the query on occupational / skills qualification of teachers only 18.2% teachers were certified in NTVQF level 1 in either IT support or Computer Operation but only 12.12% have the full teacher's qualification i.e. both occupational as well as Teaching Methodology (CBT&A level 4) certificate.

In response of the questions “Have you ever seen the occupational map and read the BTEB regulation related to TNVQF tuned diploma (computer technology) course?” In both case, 81% respondents said that they have seen the occupational map and read the regulation related to NTVQF tuned diploma courses, unfortunately rest of the respondents (19%) never seen or aware about neither the occupational map nor read the related BTEB regulation.

4.2.1 Limitation of Conventional Course and its implementation Process

Regarding the query on the limitation of the conventional course curriculum as well as the implementation issues exist in diploma in engineering program (computer technology course), 07 limitation/issues were placed in the questionnaire, were analyzed by calculating the weighted mean of each statements provided in the form of rating scale (1 to 5). The formula for calculating the weighted average is

$$\text{Weighted Mean WM} = \sum(x_n * p_n)$$

$$p_n = (\sum R_n / N) * 100$$

$$\text{Where } x=1,2,3,4,5$$

$$N = \text{Total number of respondents}$$

$$R_n = \text{Weighted value of the rating scale}$$

After analysis the weighted average responses against each statement is illustrated in the following Table

Table- 4: Views of the respondents on limitation of Conventional curriculum and its implementation in Weighted Mean value

Sl. No	Statement	$\Sigma R1$	p1%	$\Sigma R2$	p2%	$\Sigma R3$	p3%	$\Sigma R4$	p4%	$\Sigma R5$	p5%	N	WM $\Sigma(x_n * p_n)$
Q6.1	Curriculum contents are not market responsive	6	0.13	13	0.27	18	0.38	10	0.21	1	0.02	48	2.73
Q6.2	Practical jobs/ experiments in syllabus are not outcome based	2	0.04	10	0.21	18	0.38	14	0.29	4	0.08	48	3.17
Q6.3	Teachers are not properly trained	1	0.02	8	0.17	23	0.48	10	0.21	6	0.13	48	3.25
Q6.4	Shortage of resources	7	0.15	14	0.29	11	0.23	9	0.19	7	0.15	48	2.90
Q6.5	Monitoring system is very weak	8	0.17	17	0.35	10	0.21	10	0.21	3	0.06	48	2.65
Q6.6	Assessment is mostly theory based	2	0.04	14	0.29	15	0.31	9	0.19	8	0.17	48	3.15
Q6.7	No evaluation and impact analysis	10	0.21	6	0.13	15	0.31	8	0.17	9	0.19	48	3.00

Regarding the query on the limitation of the conventional course curriculum as well as the implementation issues exist in diploma in engineering program, according to the respondents views the worst issue is that the teachers are not properly trained either in subject domain nor in pedagogical aspect(65%) followed by there are sufficient numbers of discrete practical jobs/experiments in syllebus but not outcome based (63.4%, assessment is mostly theory based and usually don't cover the practical skills as well as attitudinal aspects (63%), No evaluation and impact analysis after the implementation of the course(60%), Shortage of resources (Insufficient Machines, Tools, Equipment, Ferniture, Teaching aids, learning materials and other technical and utilities support) (58%) , curriculum contents are not directly market responsive(54.6%) and Monitotoring of teaching learning progress is very weak (53%) respectively. From the analysis it is clear that the mentioned issues are exist in the system and most of the respondents were agreed or strongly agreed with the raised issues. Beside these a significant number of issues and limitations of conventional program are mentioned as

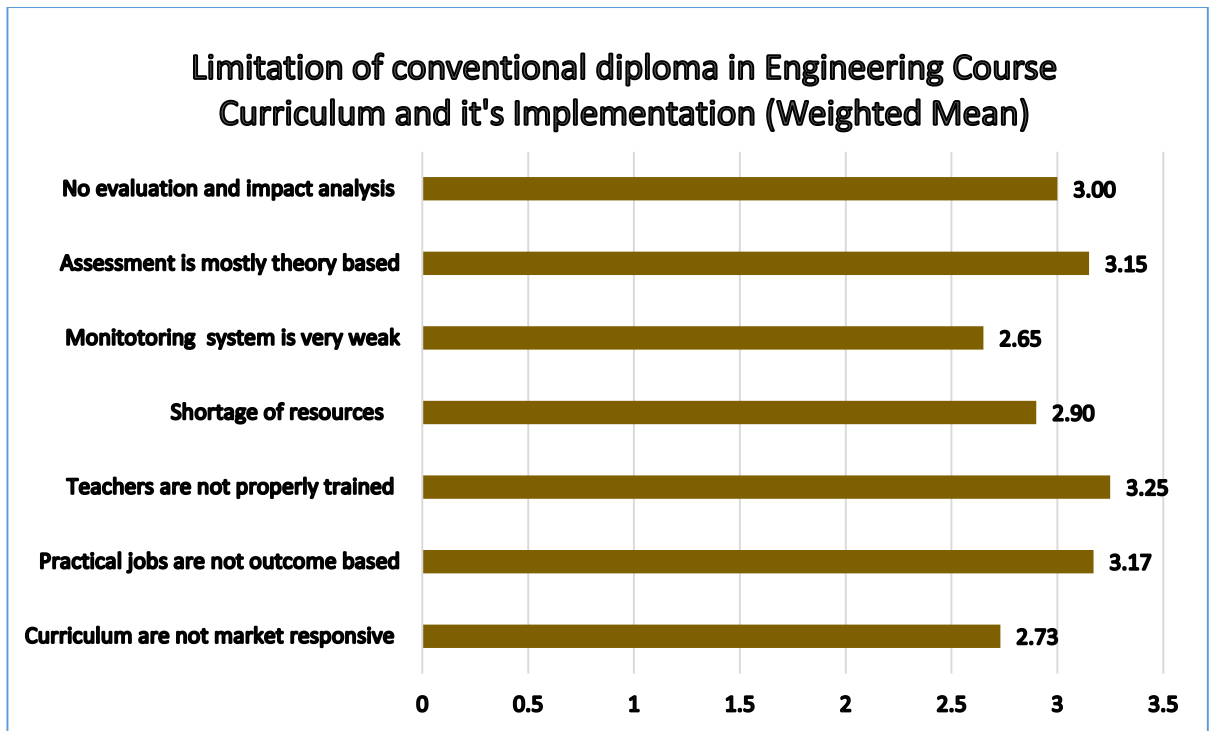


Figure-7: Combined Views of all respondents (Head of the Institute, Head of the Department and Teachers)

But when the views are analyzed separately it was found that in most cases both type of respondents (Head of Institute and The Teachers) rated the issues more or less in similar weights but concerning some of these issues, the views of head of institute and the teachers differ significantly. For example, regarding the issue on “no evaluation and impact analysis after the implementation of the course”, the percentage of the average degree of agreement for head of the institute was 73.4% but for the teachers it was only 54%. Similarly, the issue on “teachers are not properly trained either in subject domain nor in pedagogical aspect”, teachers’ degree of agreement was 61.2% whereas it was 73.4% for the head of the institute.

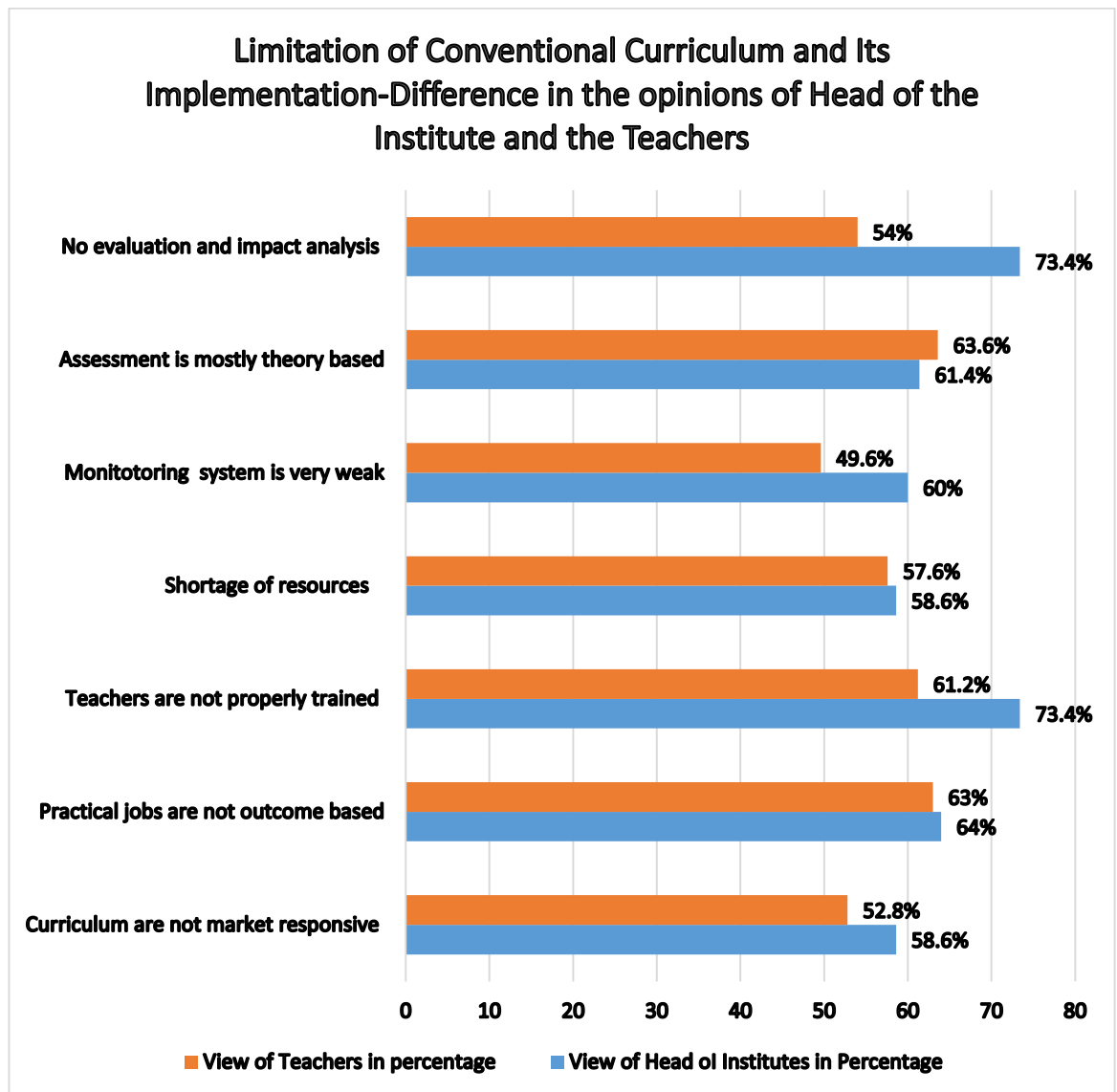


Figure-8: Deviation of the views of head of the institute and the views of teachers in weighted average mean converted to percentages

Two questions were raised to the respondents -one was ever they seen the occupational map of the competencies and another was have they seen read the BTEB regulation on the piloting program. In both case it was found that 81% respondents were seen the occupational map and read the regulation and rest of the 19% respondents never seen nor read the map and the regulation respectively

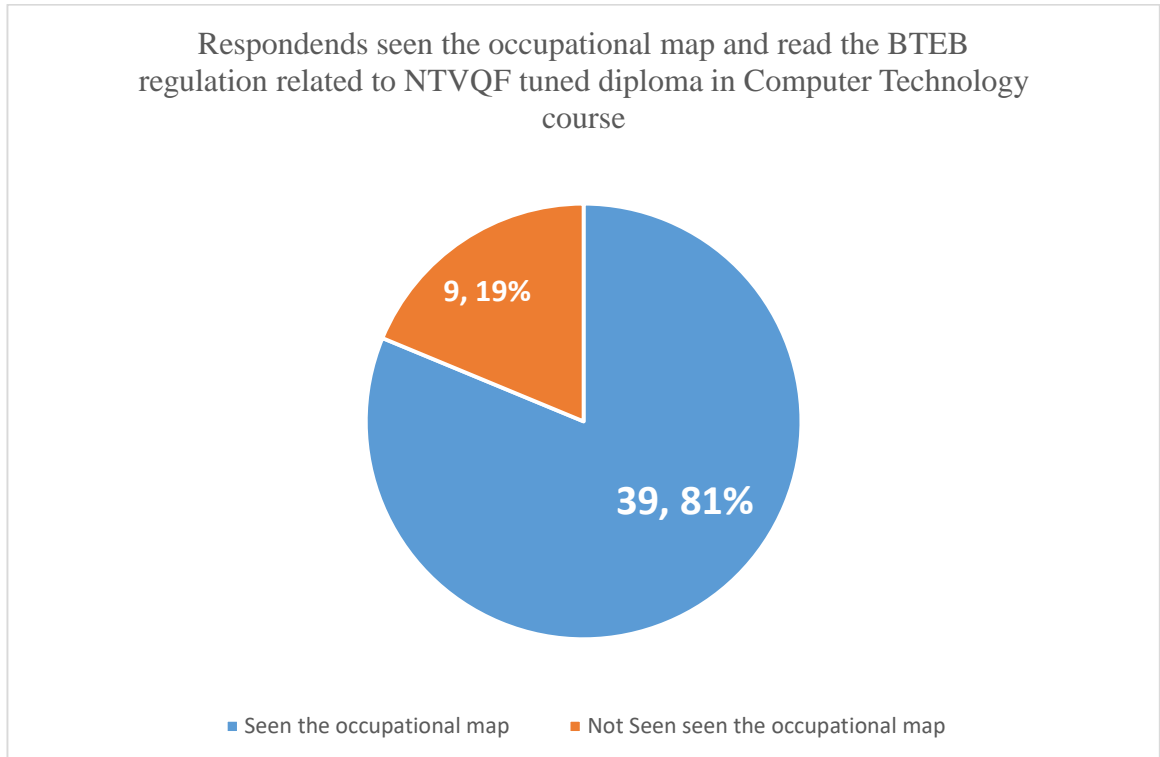


Figure-9: Respondents in-depth involvement in the piloting program

One of the most important queries was to know the satisfactory level of the implementation of the piloting program so far, the institute achieved the target, 94% respondents said that they were not satisfied with this achievement.

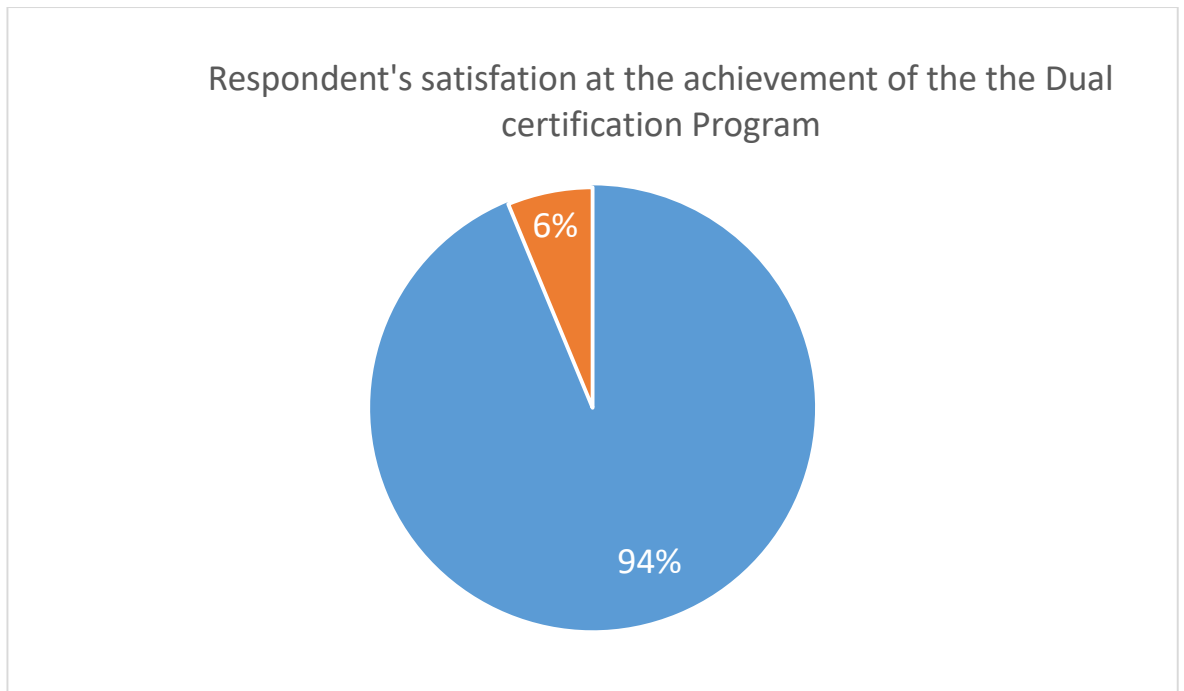


Figure-10: Level of satisfaction of the implementation of the piloting program (94% - not satisfactory, 6%- Satisfactory)

In the case of the inquiries on issues and challenges to implement the NTVQF pilot program the degree of agreement is rated in weighted average as below. According to the opinion of the respondents the most rated issues and challenges, those are strongly or outstandly agreed are lack of budget for implementation as well as assessing the students (4.27) followed by teachers are overloaded and have no time to implement such type(CBT) of program(3.81), lack of a clearly determined plan and policy to implement the program(3.46), teachers do not get any sort of training on the subject / related occupation(s) (3.33). Other agreed issue and challenges are teachers' lack of knowledge and skills in related occupational standard(2.83), lack of tools, equipment, machines, ferniture, teaching aids, learning materials and other technical and utilities support(2.77), teachers are not able to conduct such type of practical approach(CBT&A) (2.25) and teachers' are not motivated to work hard and have fear of change(2.08) respectively. In average no resondents disagree with any issues raised in the questionnaires.

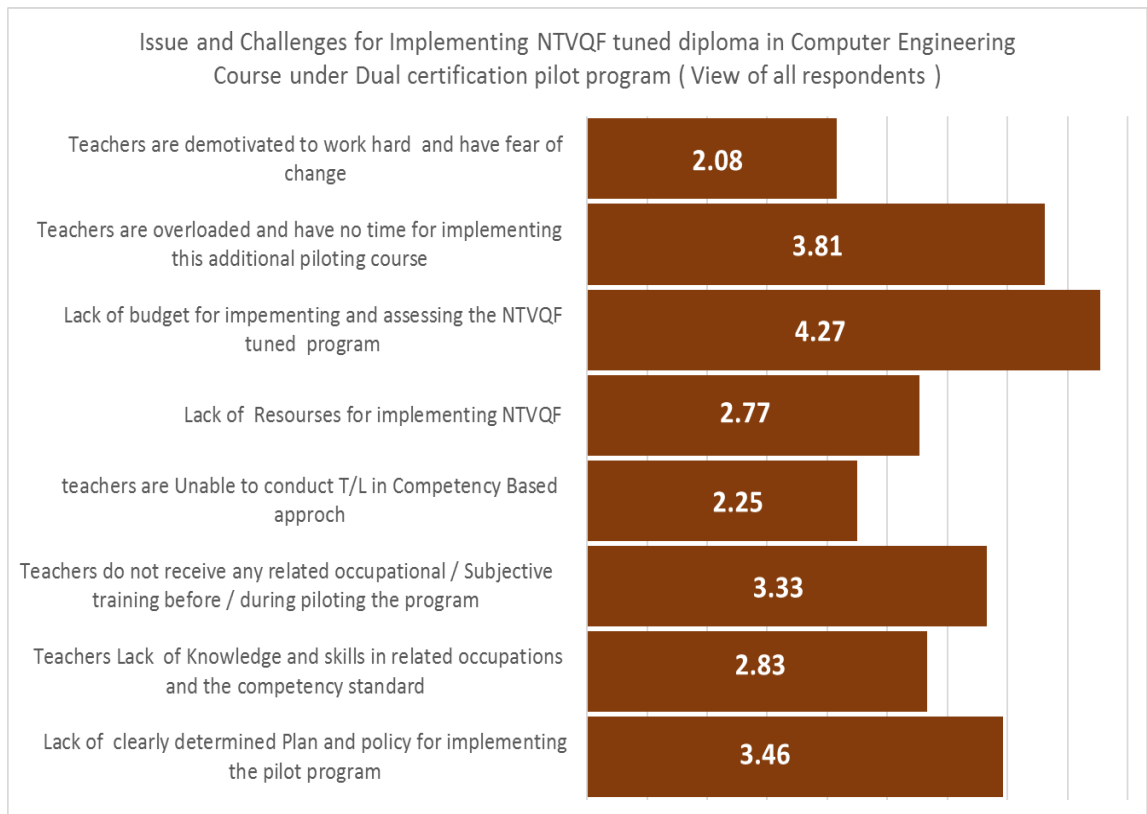


Figure-11: Respondents views on Issue and Challenges for Implementing NTVQF tuned Program

Following figure is a comparative views of Head of the Institute and the views of the general teachers of the department under computer technology. Though in most of the cases the views of both type of respondents are more or less similar but they differ significantly in two opinions. One is on teachers are not motivated to work hard and have fear of change and other one is teachers are not able to conduct such type of practical approach. In the first case from the bar chart it is clear that teachers are moderately agree with the statement on “teachers are not motivated to work hard and have fear of change” but head of the institute or principals are strongly agreed with this opinion. Similarly in the case the statement on “teachers are not able to conduct such type of practical approach” same type of views are reflected from two different type of respondents. In both case a moderate biasness and self-defending tendency were found from the teachers which is a limitation of this research and this may happen due to misinterpretation of the statements.

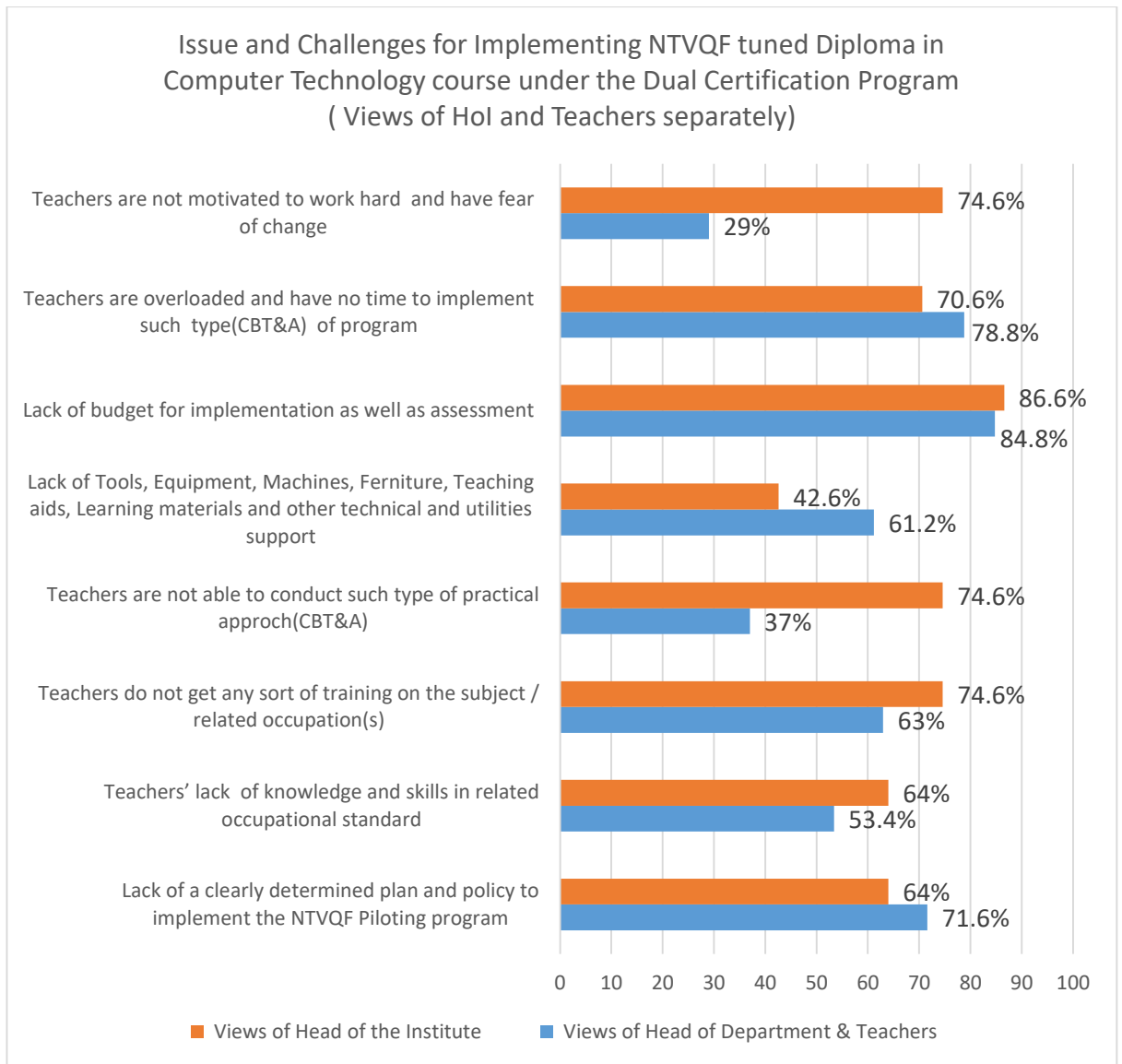


Figure-12: A comparative views of Head of the Institute and Teachers

Chapter Five: Findings of the Study

This chapter presents findings based on research questions from data analysis result extract from desk review of secondary documents and collection of primary data using semi structured questionnaires as well as incorporating the expert opinion and recommendation of key informant professionals.

RQ1 What are the variances between conventional diploma in Engineering and TVQF tuned occupational courses?

The variance between Conventional diploma in engineering educational courses and NTVQF tuned Occupational Course are illustrated as

Sl. No	Conventional Diploma Engineering Course	NTVQF Tuned Occupational Course
1	Curriculum is not market responsive mostly develop by academician in absence of need analysis and without following any standard procedure or methodology	Curriculum is market responsive and industry relevant, because the occupational subjects were included in diploma in computer engineering course from the CS of related occupations of NTVQF division which were selected base on Need Analysis and developed through the involvement of related industry representative following standard methodology(DACUM).
2	Though there is a non standard regulation (Probithan) exist for implementing diploma engineering courses but no standard quality assurance manual / system exist in this traditional system	Standard Quality Assurance Manual, Course Accreditation Documents, Institute Accrediation System and standard teaching learning modality Teachers guide, Learners guide , teaching delivery approach, monitoing & evaluation tools for quality checking and separate assessment guideline are developed and using in different implementing stage for assuring the quality of training/ education.
3	Syllebus / Course contents do not cover all the 3 aspect of learning domain(KSA)	Syllebus / Course contents are Competency Based, so all the 03 aspect of learning domain(KSA) are covered in this system
4	Course contents are subject based, outline oriented, must be finished within a fixed period of time (06 months)	Course contents are modular formed. Provision of complete in flexible modality within the ability of the learner
5	Learning continuum is mostly theory oriented and based on discrete practical class.	Learning continuum is mostly practical oriented and based on performance criteria
6	No standard course accreditation document (CAD) exists in traditional system	Standard Course Accreditation Document (CAD) are exist for every individual occupational standard in NTVQF system

7	Institute affiliation / accreditation system is defective and non-functioning. No standard assessment tools are used for checking the availability of resource requirement during institution affiliation.	Institute accreditation system is very structured, systematic and functioning. Standard assessment tools are used for checking the resource /requirements during institution accreditation. Only the competent institute those comply the requirements are accredited
8	No Teachers Qualification Framework exist for teaching. Only a minimum academic qualification is the requirement for being a teacher. Qualification for teaching methodology as well as industry experience are not the requirement to be a teacher/ trainer in traditional system	There is a Teachers Qualification Framework in NTVQF system. Minimum Academic Qualification, Mandatory certification Teaching Methodology and Industry experience are the minimum qualification for being a teacher / trainer in NTVQF system
9	Curriculum are designed for a group and considering group needs	Curriculum are designed considering the individual need of the student / trainee
10	Student Teacher ratio is not addressed in probhidan. Practically the STR is very high. Minimum 50:1, Maximum 160:1	Student Teacher ratio fixed and must be 10:1
11	Teacher centric teaching and delivery system in traditional course	Student/ Trainee centric teaching and learning is self paced
12	Final result of the student's achievement is declared usually within 2 to 3 months after summative assessment	Final Result of the student's/ Trainee's achievement is declared immediately just after completion of summative assessment in the day with necessary feedback and suggestion by the certified assessor
13	No certified assessors are required /involve in final assessment of the students. Involvement of external examiner is not mandatory during practical final examination	There is a pool of occupation wise certified industry assessors. Use of occupation wise certified industry assessors in final assessment of the students / trainee is mandatory in the presence of trained board representatives.
14	Certification is based on obtaining 40% marks mostly assessing the knowledge with inattention of skills and attitude which could not assure that the examinee is competent in a particular job as per workplace standard	Certification is based on 100% fulfillment of performing the Jobs/ Works including required bench mark achievement of knowledge and attitude which assured that the examinee is competent in a particular job as per workplace standard

15	No strong monitoring system exist either from Board nor from the institute authority due to number of constraints exist the system	Standard monitoring system and tools are designed and apply from the certification authority(NTVQF division of BTEB)
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RQ2 To what extent the implementation of dual certification program are satisfactory?

NTVQF tuned diploma in Computer Engineering course piloting started in 5 February 2017 in 7 public and 8 private polytechnics from the session of 2016 -2017 first ever in Bangladesh but the implementation of this dual certification program satisfactory level was not up to the mark. The program was designed for the students of first semester of the session 2016-2017 and that was scheduled for level 1 to level 6 certification under NTVQF within semester eighth but it was not possible to keep this program within those particular students. The institute included the students of other sessions to fill up their target. Unfortunately this was also stopped in 2019 and could not cross the level one of two particular occupations. A total 1703 students were participated in summative assessment and among them 904 students became competent under the piloting program in 15 different polytechnics.

Infra polytechnic, Barishal, Dhaka polytechnic and NIT, Chattrgram are the top ranked 3 polytechnics where number of candidates for assessment were 434, 337 and 306 respectively whereas the successful competent number of graduates were 202 in Dhaka polytechnic, 182 in NIT, Chattrgram and 160 in Infra polytechnic, Barishal. On the other hand 5 polytechnics namely Barishal polytechnic, Bogura polytechnic, Rajshahi Polytechnic, BIIT, Bogura and NPI, Dhaka arranged final assessment for only one batch of 20 candidates where the successful competent NTVQF graduates from those institutes were 03, 09, 11, 14 and 17 respectively which was the worst case of dual certification piloting program.

The piloting stopped in 2019 due to number of constraints and challenges which was disappointing and unexpected. This dissatisfaction also reflected in the views of respondents. Regarding the queries on the satisfactory level of the implementation of the piloting program so far, the institute achieved the target, 94% respondents said that they are not satisfied with this achievement.

QR 03: What are challenges in implementing the tuned NTVQF occupational Course?

There are two type of challenges exist in implementing the tuned NTVQF occupational Course. One is the constraints exist in conventional curriculum, infrastructure, resources, learning environment, financial supports and overall the implementation strategies. The other type of challenge is to fit and adopt a systematic and very structured NTVQF system in a very weak, non-standard and non-compliance conventional environment.

According to the respondents judgement the worst issue and challenge of conventional system is that teachers are not properly trained either in subject domain nor in pedagogical aspect where the percentage of weighed value of this constraints was rated as 65%, followed by there are sufficient numbers of discrete practical jobs/experiments in syllebus but not outcome based (63.4%), assessment is mostly theory based and usually don't cover the practical skills as well as attitudinal aspects (63%), No evaluation and impact analysis after the implementation of the course (60%), Shortage of resources (Insufficient Machines, Tools, Equipment, Furniture, Teaching aids, learning materials and other technical and utilities support) (58%) , curriculum contents are not directly market responsive(54.6%) and Monitoring of teaching learning progress is very weak (53%) respectively. From the analysis it is clear that the mentioned issues are exist in the system and most of the respondents were agreed or strongly agreed with the raised issues.

On the other hand, the inquiries on issues and challenges to implement the NTVQF pilot program, the degree of agreement is rated in weighted average as below –

According to the opinion of the respondents the most rated issues and challenges, those strongly or outstandly agreed are lack of budget for implementation as well as assessment (4.27) followed by teachers are overloaded and have no time to implement such type(CBT) of program(3.81), lack of a clearly determined plan and policy to implement the program(3.46), teachers do not get any sort of training on the subject / related occupation(s) (3.33). Other agreed issue and challenges are teachers' lack of knowledge and skills in related occupational standard(2.83), lack of tools, equipment, machines, ferniture, teaching aids, learning materials and other technical and utilities support(2.77), teachers are not able to conduct such type of practical approach(CBT&A) (2.25) and teachers' are not motivated to work hard and have fear of change(2.08) respectively. In average no resondents disagree with any issues raised in the questionnaires. The other important and notable issue and challenges raised by the individual respondents are-

Not a single teacher were neither trained nor certified in occupational qualification (National Skills Certificate) tuned to level 2 to 6 before or during the piloting program. So, teachers themselves were unable to perform the assigned jobs as well as to teach the occupational subject practically in the assigned occupational levels (Zahed, 2021)

QR 04 How can the challenges be resolved?

A way out to resolve the challengea are plotted in as recommendation in chapter 6. Please see the recommendation stated below

Chapter Six: Recommendation and Conclusion

6.1 Recommendation

The respondents and key informant experts provide their opinion on the piloting program and recommended a way out for resolving the issue and challenges through the following consolidated suggestion-

- Though most of the respondents were not satisfied with the implementation of the piloting program but their opinion is that dual certification initiative under NTVQF system for diploma in computer technology was a good and timely initiative and its potentiality is proved statistically by the trend of the rate of immediate employment of the dual certified graduates in job market
- If the identified limitations of conventional courses implementation might be overcome and the issues as well as challenges detected in research finding during the piloting of NTVQF tuned course could be mitigated and resolved, the dual certification program can be introduced in all polytechnics.
- For resolving the limitation of the implementation of conventional course and mitigating the issues and challenges of piloting program a number of change, modification and development steps need to be brought together in diploma engineering curriculum as well as in implementation process as mentioned in following recommendation.
 1. The diploma in Engineering curriculum need to be competency / outcome based and curriculum development procedure must be methodological (DACUM/ Functional Analysis), based on forecasting the number of required graduates in a particular technology and need analysis of the that courses in home and abroad.
 2. Transformation and alignment decision for all conventional courses to NTVQF/ BNQF need to be included in BTEB regulation and should be mandatory for TVET as suggested in the NSDP
 3. The teachers qualification, students teachers ratio, quality assurance system, inspection, monitoring and evaluation of course implementation including teaching delivery and assessment guideline need to be included in curriculum documents of BTEB.

4. A teachers qualification framework including teachers recruitment rules need to be frame and established for the TVET teachers.
5. Teachers apprenciceship need to be introduce immidiately within a legal framework, so that every teachers can be attached with industry , use latest machine,tools and equipment and achieve real life experience by hand on practice.
6. Beside the minimum academic qualification, teachers need to be certified in teachers training program like skills certification in occupation(s) including teaching methodology level 4, 5, and 6, diploma in technical education, Bachelor of Technical Education , Masters / PhD in technical education as the regulation is followed in NTVQF system.
7. Teachers training and certification (licensing) need to be mandatory for being a professional teacher, given advantages in recruitment, for promotion in higher position or for providing incentives in service.
8. Students teachers ratio(STR) should be 12:1 for TVET teachers as per the recommendation of national education policy-2010.
9. Institute as well as course acceditation for both public and private polytechnics need to be based on coursewise accediation requirements like minimum infrastructure, number of certified/ qualified teachers, number of lab / workshop , availability and installment of machines, tools, equipment & furniture, assurance of teaching aids, consumable material and learning materials(book, teachers guide like syllebus, course plan, semester plan, lesson plan etc. Learners guide like information sheet, job sheet, operation sheet and other manuals) as followed in NTVQF system.
10. Monitoring of the quality practice of the institutes and assurance of teaching delivery using appropriate progress /achivement chart must be strenghen locally as well as from central authorities like DTE and BTEB by frequent physical visit as well as using smart camera and surveillance system.
11. Extensive and rigorous changes are the immediate requirement of the examination system. Assessment should be performance/ outcome based assessment. Practical assessment need to be emphasized instead of dependency on theory examination for awarding diploma / certificate as it is followed in NTVQF implementation system.

12. Final practical assessment need to be conducted by the mandatory involvement of external certified assessor. A certified assessor pool need to be established from the potential industry experts as well as the academician.

6.2: Conclusion:

The syllabus of computer technology was partially aligned and tuned with NTVQF system not the curriculum. Beside the core practical subjects of computer technology, all other related and common subjects of other technology remain untouched during the alignment of the piloting course. The institutes were accredited only for two occupations whereas total aligned occupations were 15 in the course under the program.

The piloting program was not fully well planned and it was started without any prior preparation and modification of requirements in the institute level. No need analysis or survey were conducted on the availability of laboratory or workshop, the machines, tools, equipment, furniture, teaching aids, consumable materials, learning materials and other technical and utility support. 18.2% teachers were trained and certified only in one skills level of one occupation under NTVQF, most of them were from private polytechnics and among them 12.12% teachers were full certified, having both qualifications -NTVQF (National Skills Certificate (NSC) as well as the teaching methodology on CBT&A level 4. On the other hand not a single teacher were neither trained nor certified (National Skills Certificate) in any of the 15 aligned occupations of the piloting course before start or during the piloting program by the related authorities. So teachers themselves were unable to perform the assigned jobs as well as to teach the occupational subjects practically in the assigned occupational levels. No financial supports were provided or allocated from the authority of the public institutions except the exemption of the assessors honorarium from BTEB.

Though most of the respondents were not satisfied with the implementation of the piloting program but their opinion is that dual certification initiative under NTVQF system for diploma in computer technology was a good and timely initiative and its potentiality is proved statistically by the trend of the rate of immediate employment of the dual certified graduates in the job market

If the identified limitations of conventional courses implementation might be overcome and the issues as well as challenges detected in research finding during the piloting of NTVQF tuned course could be mitigated and resolved, the dual certification program can be introduced in all polytechnics.

For resolving the limitation of the implementation of conventional course and mitigating the issues and challenges of piloting program a number of change, modification and development steps need to be brought together in diploma engineering curriculum as well as in implementation process as mentioned in the recommendation of the report.

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Appendix

Appendix – A

Questionnaire for HoD and Teachers

Questionnaire for

Assessing the Implementation of Dual Certification Initiatives under NTVQF in Polytechnics

\\(This study will be used for research purpose only. The personalized data will be kept as confidential.)

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

Respondents- Head of Department and Teachers

1. Name of the respondent :
2. Designation with department/occupation :
3. Name of the Institution / Organization :
4. Please provide your education, training related information using tick mark (✓) in appropriate data

Education level	Engineering Education	Technical Education (Teacher Education)	General Education (Please write the Subject Name)
Doctoral	PhD in Engineering	PhD in Technical Education	
Masters	Masters in Engineering	Masters in Technical Education	
Bachelor	Bachelor In Engineering	Bachelor in Technical Education	
Diploma	Diploma in Engineering	Diploma in Technical Education	
Others			

5. Please provide your NTVQ related Qualification related information:

NTVQF Skill Certificate (if any)		CBT&A methodology level-4 certificate (if any)	
Occupations	Levels	Trained	Certified

6. Please rank appropriate statement using tick marks (√) regarding the **limitation to implement the conventional diploma course**

(Not Agree-1, Moderately Agree-2, Agree-3, Strongly agree-4, Outstandingly Agree-5)

<i>Limitation of existing course and its implement system</i>	1	2	3	4	5
1. Curriculum contents are not directly market responsive					
2. There are sufficient numbers of discrete practical jobs/experiments in syllebus but not outcome based					
3. Teachers are not properly trained either in subject domain nor in pedagogical aspect					
4. Shortage of resources (Insufficient Machines, Tools, Equipment, Ferniture, Teaching aids, learning materials and other technical and utilities support)					
5. Monitotoring of teaching learning progress is very weak					
6. Assessment is mostly theory based and usually don't cover the practical skills as well as attitudinal aspects.					
7. No evaluation and impact analysis after the implementation of the course					
Others (if any,please specify)					

7. Have you ever seen the occupational map of TNVQF tuned diploma (computer technology) course?

Yes No

8. Have you read the BTEB resolution related to pilot the TNVQF tuned course?

Yes No

9. Are you satisfy with the current implementation status of the piloting program so far you achieve the target?

Yes No

10. Please rank the appropriate statement using tick marks (√) regarding the issue and challenges to Implement the NTVQF tuned diploma in Computer technology course under the pilot program

(Not Agree-1, Moderately Agree-2, Agree-3, Strongly agree-4, Outstandingly Agree-5)

<i>Issue and challenges to Implement the pilot program in your institute</i>	1	2	3	4	5
1. Lack of a clearly determined plan and policy to implement the program					
2. Teachers' lack of knowledge and skills in related occupational standard					
3. Teachers do not get any sort of training on the subject / related occupation(s)					
4. Teachers are not able to conduct such type of practical approach(CBT)					
5. Lack of Tools, Equipment, Machines, Furniture, Teaching aids, Learning materials and other technical and utilities support					
6. Lack of budget for implementation as well as assessment					
7. Teachers are overloaded and have no time to implement such type(CBT) of program					
8. Teachers' are not motivated to work hard and have fear of change					
9. Others (if any, please specify)					

11. Do you think that this dual certification approach is implementable?

(i) if Yes Please mention what the other measures need to be taken to make it success?

(ii) if No, please mention what are the constraints?

12 Please provide your valuable suggestions related to implement this new approach effectively in your institute

Signature of the Respondent
with Date

Signature of the Data Collector/Researcher
with Date

Appendix – B

Questionnaire for Implementers / Principal

Questionnaire for

Assessing the Implementation of Dual Certification Initiatives under NTVQF in Polytechnics

\(*This study will be used for research purpose only. The personalized data will be kept as confidential.*\)

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

Respondents- Implementers / Principals

1. Name of the respondent :
2. Designation/ Occupation :
3. Name of the Institution / Organization :
4. Highest Educational Qualification :
5. NSC with level under NTVQF (if any) :
6. Please rank appropriate statement using tick marks (√) regarding the **limitation to implement the conventional diploma course**
(*Not Agree-1, Moderately Agree-2, Agree-3, Strongly agree-4, Outstandingly Agree-5*)

<i>Limitation of existing course and its implement system</i>	1	2	3	4	5
1. Curriculum contents are not directly market responsive					
2. There are sufficient numbers of discrete practical jobs/experiments in syllebus but not outcome based					
3. Teachers are not properly trained in specific subject domain					
4. Teachers are not trained / certified in pedagogical aspect					
5. Shortage of resources (Insufficient Machines, Tools, Equipment, Ferniture, Teaching aids, learning materials and other technical and utilities support)					
6. Monitotoring of teaching learning progress is very weak					
7. Assessment is mostly theory based and usually don't cover the practical skills as well as attitudinal aspects.					
8. No evaluation and impact analysis after the implementation of the course					
Others (if any,please specify)					

7. Have you ever seen the occupational map of TNVQF tuned diploma (computer technology) course?

Yes No

8. Have you read the BTEB resolution related to pilot the TNVQF tuned course?

Yes No

9. Are you satisfy with the current implementation status of the piloting program so far you achieved the target?

Yes No

10. Please rank the appropriate statement using tick marks (✓) regarding **the issue and challenges to Implement the NTVQF tuned diploma in Computer technology course under the pilot program**

(Not Agree-1, Moderately Agree-2, Agree-3, Strongly agree-4, Outstandingly Agree-5)

<i>Issue and challenges to Implement the pilot program in your institute</i>	1	2	3	4	5
1. Lack of a clearly determined plan and policy to implement the program					
2. Teachers' lack of knowledge and skills in related occupational standard					
3. Teachers do not get any sort of training on the subject / related occupation(s)					
4. Teachers are not able to conduct such type of practical approach(CBT)					
5. Lack of Tools, Equipment, Machines, Furniture, Teaching aids, Learning materials and other technical and utilities support					
6. Lack of budget for implementation as well as assessment					
7. Teachers are overloaded and have no time to implement such type(CBT) of program					
8. Teachers' are not motivated to work hard and have fear of change					
9. Others (if any,please specify)					

11. Do you think that this dual certification approach is implementable?

(i) if Yes Please mention what the other measures need to be taken to make it success?

(ii) if No, please mention what are the constraints?

12 Please provide your valuable suggestions related to implement this new approach effectively in your institute

Signature of the Respondent
with Date

Signature of the Data Collector/Researcher
with Date