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A Model of Technical and Vocational Teacher Education at Bachelor's Degree Level and its Relevance to the Occupational Tasks of TVET Teachers in the OIC Member States

Abstract

This study evaluates a TVET teacher education model of Islamic University of Technology (IUT) at the Bachelor Degree level in terms of its relevance to the occupational tasks of a TVET teacher and identifies the strengths and limitations of the programme. In this descriptive type of study the relevance of the curriculum was determined through a self-designed questionnaire in which the opinions of the teachers who are currently teaching at TVET institutions were gathered on a Likert-type scale. A sample of 50 TVET teachers was considered. The data was further analysed and estimated based on the Weighted Average (WA) of the respondents' opinions. The study results show that the curriculum of the B.Sc.TE degree programme of IUT is highly relevant to the occupational tasks of TVET teachers and trainers required in the OIC countries, but there is still potential to update the curriculum content. However, the study reveals that the programme has some limitations, particularly in terms of duration and lack of internship training, among others. Finally, the paper ends with some recommendations.

Keywords: *TVET teacher education model, Bachelor Degree, relevance of curriculum, questionnaire, OIC*

1 Introduction

Quality technical and vocational teacher education and training, along with other influential factors such as curricula, learning-teaching materials and environmental context, can significantly improve the quality of technical and vocational education and training (TVET). This has been clearly endorsed in an employment working paper of the ILO as, "the capacity of TVET systems to provide high quality and relevant training depends largely on the quality of its teachers and trainers, and, by extension, on the quality of their teacher training systems" (Axmann et al. 2015). Several phenomena such as rapid technological changes, regionalization and globalization of economic activities, and international acceptance of qualifications, among others, require new approaches and initiatives to foster TVET including the review of TVET curricula and hence the curricula of teacher education and training.

1.1 Distinctive features of TVET curriculum

The priority task of all Technical and Vocational Education and Training (TVET) policies and systems, distinctively and in contrast to general education, is to prepare individuals for

specific occupations and for the world of work. TVET is associated with a broader scope, including personal, general, and entrepreneurial skills, which can help individuals in their lifelong learning, improve their employability, and facilitate overall involvement in society. At its core, however, TVET remains concerned with those aspects of the educational process, in addition to general education, that involve the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding, and knowledge relating to occupations in various sectors of the economy (UNESCO 2001).

Another distinctive feature compared to general education is that TVET, by definition, has a practice-oriented component or work-based learning aspect. It can even be reasoned that ultimately any occupation must be learned on the job, regardless of whether it is an academic profession or a non-academic occupation (Schmidt 2010). Modern vocational education and training has shifted from preparing students for narrowly defined jobs to broader preparation for life in an ever-changing labour market (Nickolaus 2008). TVET curricula include subject contents where graduates acquire various dimensions of competences required for an occupation. These may include domain specific knowledge, sector specific knowledge, and general knowledge, as well as correlative thinking, assumption of process responsibility, autonomy in doing the work, willingness to work flexibly in groups, innovation and problem-solving strategies, abstract reasoning, and analytical skills, along with other key competencies and willingness to undergo continuing professional development (CPD) through higher education and training (Lipsmeier 2013; Hensge et al. 2008; KMK 2007; Bader 2004; Bader & Müller 2002, Dilger & Sloane 2005, Winther & Achtenhagen 2009).

1.2 TVET teacher training standards/curricula

Since each teacher's role is crucial in TVET, huge efforts have been made to develop training models and frameworks for teacher training in TVET. For example, the 'Core-Shell Model of TVET Teachers' Competences' developed by TT-TVET Consortium (2005) describes teachers' competences at three levels. At the *core level* the required competences are planning, conducting and evaluating teaching lessons and instruction, providing occupation-related learning environments, materials and media, guidance and placement of students, and assessment of student's performance. At the *shell level* the required competences are demand-driven school-programme planning and organization, capacity building, curriculum development and evaluation, and school and facility management. At the *framework level* the required competences are providing demand-driven training offers, giving training-inputs for creating self-employment, and developing communication and cooperation networks (Dittrich 2009). Spöttl (2007) in his working paper 'Standards for TVET Teacher Training' and the TT-TVET Consortium (2005) present general standards for TVET teacher education covering six areas of development: (1) Standards for lecturers'/teacher trainers' activities (in TVET teacher education) as support for teachers' practice in TVET, (2) Standards for supporting students (trainee teachers) and their learning processes within TVET teacher education, (3) Standards for evaluation (of curricula) and assessment (of students' achievements), (4) Standards for developing curricula and learning contents, (5) Standards for developing methods for

instruction and training, and (6) Standards for developing the organizational frameworks for learning environments. Jailani et al. (2007) and Spöttl (2007) underline the following four dimensions of an occupational profile of a TVET teacher: (A) Competency in teaching and learning. The core tasks of a teacher are the target oriented and scientifically sound planning, organization and reflection of teaching and learning processes as well as teachers' individual assessment and systemic evaluation. (B) Competency in assessment and counselling tasks. Advanced pedagogical, psychological and diagnostic competencies of teachers are crucial for these tasks. (C) Self-development of teachers. Make use of further and continuous training offers in order to consider the new developments and scientific findings of their profession. In addition, teachers should establish and maintain contacts to external institutions and industries. (D) Awareness that the educational tasks at school are closely linked to instruction and school life. Teachers participate in school development, in shaping a school culture suitable to enhance learning, and to create a motivating school climate. Soysouvanh et al. (2013) identified five competency areas of standards for vocational teachers at the Bachelor level:

- Competency Area of Acting in an exemplary manner;
- Competency Area of Educating;
- Competency Area of Teaching;
- Competency Area of Assessment;
- Competency Area of Self-Development and Innovation.

Each of these competency areas is subdivided into 16 specific competencies, which is illustrated by 80 indicators (ibid.). Bangladesh has developed National Competency Standards for Bangladesh TVET teachers and trainers through the EU-ILO funded TVET Reform Projects (2011). Here four aspects of work performance were considered: task skills: ability to perform individual tasks; task management skills: ability to manage a number of different tasks within the job; contingency management skills: ability to respond to irregularities and breakdowns in routine; and environment skills: ability to deal with the responsibilities and expectations of the work environment. For a TVET teacher qualification at Certificate V Level, fourteen units of competencies (UoCs) are to be completed which cover nine fields of the occupation as a TVET teacher/trainer, namely:

- Learning environment (ENV): work effectively within Bangladesh's TVET sector (policy and operating environment, etc.) and assess learner needs;
- Learning design (DES): design, develop, and evaluate competency based learning programmes and learning resources;
- Delivery and facilitation (DEL): plan, organize, and deliver training;
- Assessment of learning (ASL): develop assessment processes and instruments;
- Coordination, management and quality of training and/or assessment services (CMQ);
- Training advisory services (TAS): undertake organizational training needs analysis;
- Technical skills (TEC): demonstrate domain specific/technical competencies;
- Information Technology (ITSS): operate a PC and use office application software.

Furthermore, a compulsory unit of competencies from the Generic Area (GA) –which applies occupational safety and health practice in the workplace–is recommended for TVET teachers. The above mentioned training standards cover the 'vocational pedagogy' component of the Lipsmeier's (2013) 'consecutive model' of teacher training. The first level of teacher training may not necessarily be a Bachelor degree. Instead the teacher may acquire a certified trade or technical qualification that is at one level above which training will be delivered and/or assessed by the teacher/trainer.

Very recently a working paper of the ILO (Axmann et al. 2015) proposed an analytical tool for assessing TVET teacher training systems. This tool includes four essential dimensions (also called pillars) that comprise a successful teacher training system which include structure and relevance; responsiveness and inclusion; innovation and progress; and representation and communication. These pillars consist of 12 key elements of teacher training (Figure 1), "which, if appropriately addressed, would supply teachers and trainers with the skills necessary to be classroom leaders, innovative pedagogues, partners in policy reform, and adaptive curricula designers and implementers" (ibid).

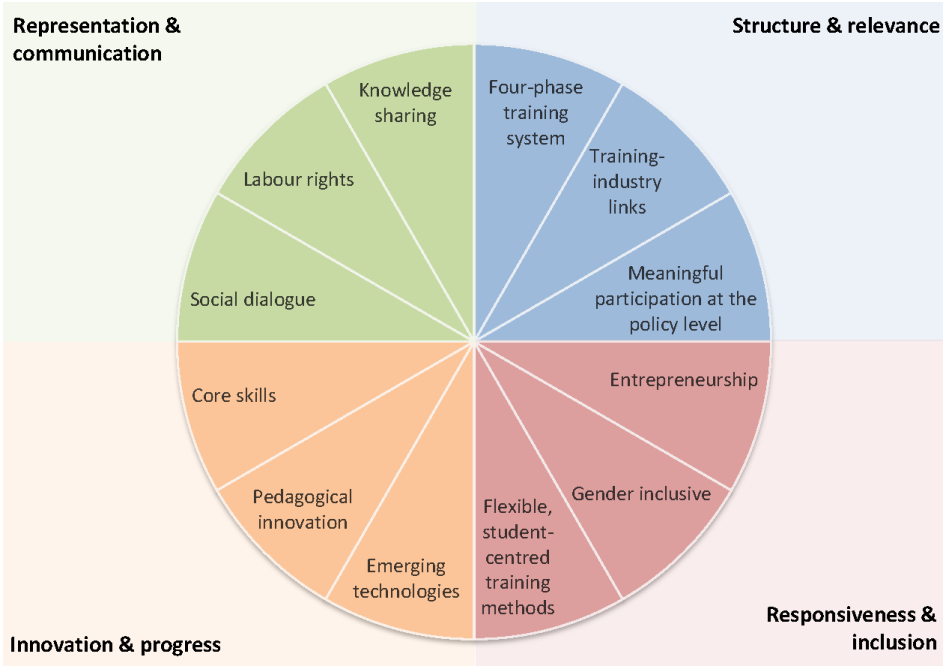


Figure 1: Four pillars and twelve key elements of teacher training systems (Axmann et al. 2015)

In our study we focus on *the structure and relevance* (the first essential pillar for a successful teacher training system, as discussed above) of the B.Sc.TE curriculum. This delimitation is only due to limitation of time and resources, not due to priority over any other pillars/ elements proposed by Axmann et al. (2015) in the framework for TVET teacher training systems.

1.3 Objectives of the study

This study focuses on TVET teacher education and training, in particular, the Bachelor of Science in Technical Education (B.Sc.TE) degree programme which is offered through the Department of Technical and Vocational Education (TVE) at the Islamic University of Technology (IUT). Considering the changing needs of the stakeholders, the curriculum of the B.Sc.TE programme has been recently reviewed. Therefore, the objectives of this study are to evaluate the curriculum – particularly the relevance of curriculum content with respect to the occupational tasks of TVET teachers – and to identify the strengths and limitations, if any, of the programme.

In other words, this study aims to provide answers to the following questions: (1) can the course contents of B.Sc.TE curriculum adequately equip the students (trainee-teachers) of the programme with the required competences? (2) what are the strengths and weaknesses, if any, of this programme?

The findings of this study are expected to be useful to relevant policymakers and stakeholders in the OIC member states.

2 OIC and IUT

The Organization of Islamic Cooperation (OIC) is the second largest inter-governmental organization with 57 member states. It is composed of three main bodies: the Islamic Summit, the Council of Foreign Ministers, and the General Secretariat. These main bodies are primarily subsidiary structures and specialized or affiliated institutions who work toward the achievement of the OIC objectives (OIC 2016).

Islamic University of Technology (IUT), a subsidiary structure of the OIC, is an educational and research institution located in Bangladesh. The main objective of the university is to help generally in human resources development in the member states through education and training in the fields of engineering and technology as well as technical and vocational education. IUT receives direct funding from OIC member countries and offers scholarships to its students from OIC member states in the form of free tuition, boarding, lodging and medical insurance (IUT 2016). The Department of Technical and Vocational Education (TVE), among IUT's five academic departments, has the mandate to educate and train human resources who will work as TVET professionals such as teachers, trainers, educators, managers, and researchers in the OIC member states. In particular, the department offers undergraduate and post-graduate level study programmes in technical education; conducts research in TVET and organizes short-term continuing professional developmental (CPD) training, workshops, seminars, etcetera, for TVET professionals; cooperates and collaborates with other educational and research institutions, industries, and development organizations.

3 B.Sc.TE programme of IUT-OIC

As mentioned earlier, the B.Sc.TE programme is offered through the TVE Department of IUT which is solely concerned with the education and training of TVET teachers and trainers for strengthening their capacities and competencies according to the needs and priorities of labour markets in the OIC member states. This would improve the quality of TVET and thus contribute to the development and competitiveness of the economies of concerned countries. The programme also facilitates the sharing of knowledge and skills between OIC member states.

The main objective of the B.Sc.TE programme of IUT is to cater to the needs of professionally trained teachers, trainers, and other educational personnel in the field of technical and vocational education in the OIC member states. The aim is to develop graduates who will not only be the classroom leaders, curriculum designers, and implementers, but also active partners in policy reform concerning TVET in their own countries.

3.1 The model and structure of the programme

According to the TVET teacher education models described by Lipsmeier (2013), the B.Sc.TE programme of IUT-OIC has a compound model which consists of two to three stages. The first stage is a technical-vocational qualification at upper secondary non-tertiary level (ISCED Level 3 to 4). For example, in the diagram below a 2 to 3-year diploma in engineering technology after Grade XII or a 3 to 4-year diploma in engineering technology after Grade X. The second stage is a 1-Year Diploma in Technical Education (DTE), and the third stage is a 2-Year B.Sc.TE (see Figure 2). Enrollees who have completed a 3-Year Higher Diploma in engineering technology can join a one-year B.sc.TE programme, skipping Stage 2. In IUT one academic year is composed of two semesters, each 16 to 19 weeks of course work, plus one to two months remedial internship training.

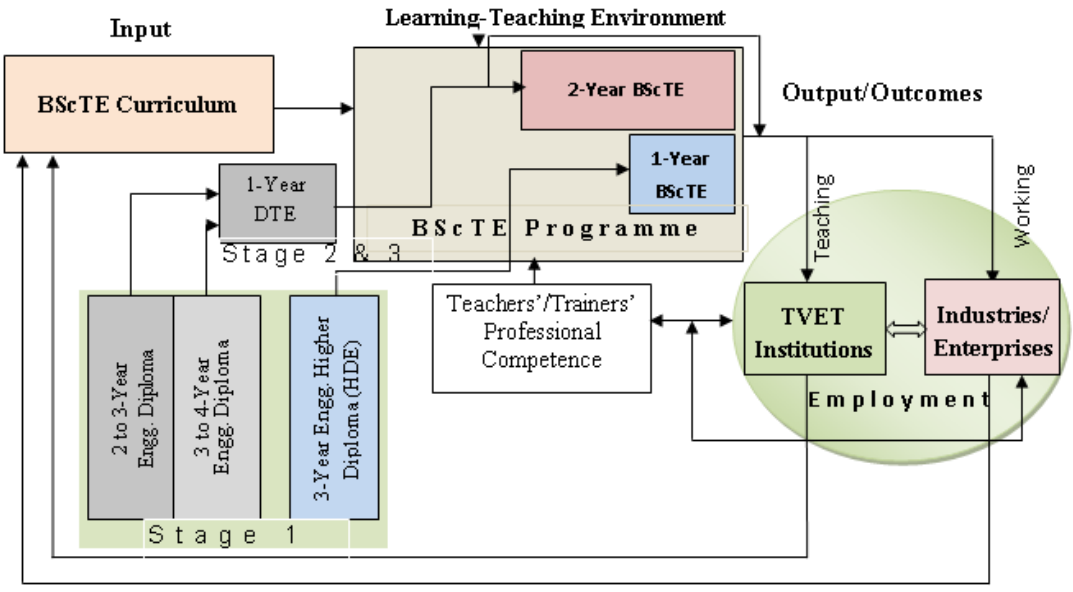


Figure 2: Model and structure of the B.Sc.TE programme of IUT

As shown in Figure 2, students with a two to four year diploma certificate in relevant fields that are offered by individual member states of the OIC, after grade 10 or above, are allowed to join the B.Sc.TE programme for a period of one or two years depending on their diploma certificate duration. Those who complete a 3-Year Higher Diploma (HD) or Higher National Diploma (HND) in engineering technology after Grade-XII or A-level with good grades can join at the (specially designed) final year of this programme and earn a one-year B.Sc.TE degree qualification. It is considered appropriate that effective professional preparation for teaching in technical institutions should involve pedagogical training, humanities, and the enrichment and upgrading of specialized technical subject areas to a level higher than one's basic preparation (TVET Reform Project 2011). Therefore, at the second (1-Yr DTE) and third (2-Yr B.Sc.TE) stages, a series of pedagogical and technical subjects, math and natural science subjects, and a final year project are taught. They are typically offered at the same time. Through these subjects, teachers-in-training develop a set of multi-dimensional competencies which enable them to teach effectively in the classroom through the application of appropriate methods and techniques along with the use of innovative teaching aids and materials. They also acquire administrative and supervisory competencies for running technical institutions; understand and apply the principles and techniques of educational measurement and evaluation; and gather competencies for curriculum development, abilities for proper planning and management, skill in evaluating the outcomes of technical education and, to some extent, designing and conducting educational research.

In addition to the professional courses, this curriculum includes humanities subjects such as languages (English, Arabic or French), Islamic history, science & culture, and professional ethics (IUT Calendar 2010-2011) which allow trainee teachers to enrich human and social competences.

3.2 The structure of the curriculum

The B.Sc.TE curriculum is subject-based. It includes content that should equip a graduate with the competences required to practice as a teacher in a TVET institution. The subjects taught can be categorized into vocational pedagogical subjects, technical subjects (within the area of specialization), maths and natural science subjects, humanities and other related subjects, and technical projects and reports. In IUT the B.Sc.TE programme has three major specializations: computer science and engineering, electrical and electronic engineering and mechanical engineering. The following paragraphs describe each category of the B.Sc.TE curriculum within the electrical and electronic engineering specialization.

There are 13 **vocational pedagogical classes**. They are Educational Psychology, Methods & Techniques of Teaching (both theory and lab), Educational Measurement and Evaluation, Principles of Vocational & Technical Education, Observation & Practice Teaching, Computer Aided Instruction (both theory and lab), Occupational Analysis & Course Construction, Curriculum Development in TVET, History of Technical & Vocational Education, Comparative Education, Instructional Technology and Commutation Skills (theory and lab), Sociology of Education, and Educational Measurement and Statistics.

There are **14 technical classes**. Each of these is complemented by a practical lab subject. They are Digital Techniques I & II and Labs, Electrical Measurement & Instrumentation I & II and Labs, Industrial Electronics I & II and Labs, Instrumentation Engineering I & II and Labs, Introduction to Micro-Processors & Computer Programming and Lab, Control System Engineering and Lab, Advanced Electronics I & II and Labs, Medical Electronics and Lab, Fundamentals of Computers and Lab.

There are 2 **math classes** which are Engineering Mathematics III, and Engineering Mathematics IV.

Humanities and other related classes include Islamic History, Science & Culture, Technology Environment and Society, Social Studies & Accounting, Engineering Management, Professional Ethics and Society and any two of the following three language courses: Spoken Arabic I & II (lab), Spoken English I & II (lab), Spoken French I & II (lab).

At the end of the course, students have to complete a technical project and submit a report. The **s**ubjects in the technical/vocational disciplines and vocational pedagogy are taught concurrently along with math, science, humanities, and other related subjects over the duration of the programme.

The distribution of credits and contact hours of all the subjects pertaining to the 1-Year Diploma in Technical Education (DTE) and the 2-Year B.Sc.TE degree is shown in Table 1 and in Figures 3 and 4.

Note: (1) Theory and practical contact hours were calculated based on the number of lectures and practical periods per week and accumulated over six semesters combining the 1-year diploma in technical education (DTE) courses at Stage 2 and the 2-Year B.Sc.TE at Stage 3. In this calculation, we combine the 1-Yr DTE and 2-Yr B.Sc.TE, which enabled us to make a comparative judgment with other similar TVET teacher training models in the OIC countries or in other regions.

(2) In this calculation, the subjects taught in Stage 1 (the entry qualification shown in Figure 2, i.e. the subjects which are taught during the two to four year diploma) were not included.

During the three-year period (six semesters) a trainee teacher takes 36 to 38 courses. For example, in the case of the B.Sc.TE degree with specialization in electrical and electronics engineering, altogether there are 122 credit hours and 148 contact hours (see Table 1, Figures 3 and 4).

Table 1: **Subjects category-wise distribution of credits and contact hours**

Subject category (no. of subjects)	Credit Hours	Contact Hours		
		Theory	Practical	Total
Vocational Pedagogy (13)	39	31	15	46
Technical Subjects (14) (Electrical & electronics)	52	41	22	63
Math & Natural Science (2)	6	6	0	6
Humanities/ related subjects (6)	19	17	4	21
Project & Report (1)	6	0	12	12
Total	122	95	53	148

Thus, the teacher education programme of IUT focuses on all the aspects a TVET teacher should have, and therefore, by the end of the programme a graduate should be able to teach, both theory and practical courses, at an institute which offers an upper-secondary non-tertiary vocational qualification. A graduate of this programme may also work at industries in their respective domain of specialization or pursue higher education.

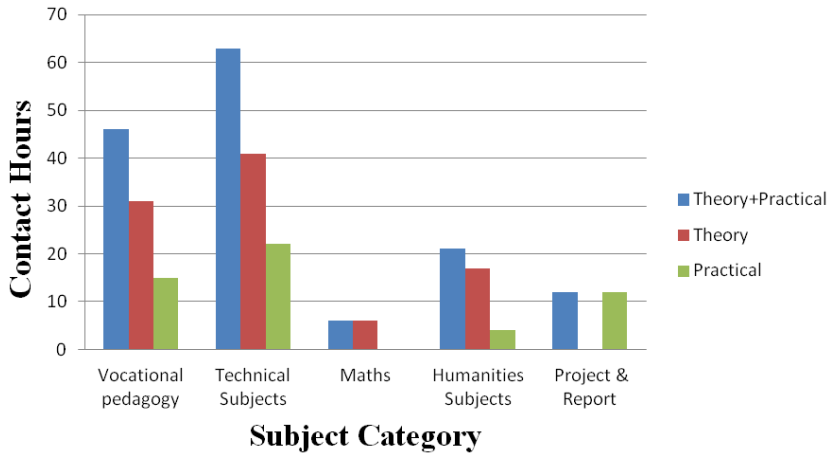


Figure 3: Subjects category-wise distribution of contact hours

Figure 4 shows the percentage of credit hours distributed among various categories of subjects in B.Sc.TE curriculum. The percentage of vocational pedagogical subjects is 32 %, technical subjects is 43 %, math and natural science is 5 %, humanities and related subjects is 15 %, and project and report is 5 %.

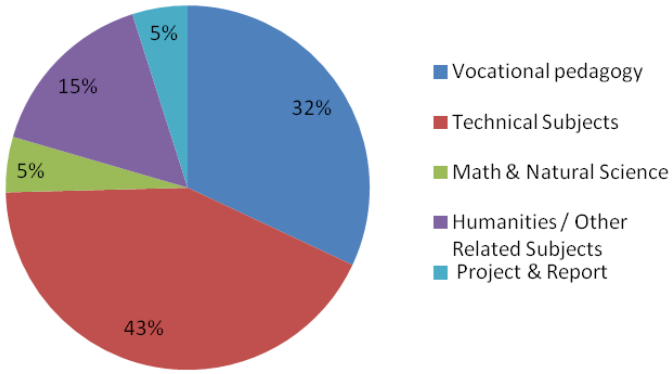
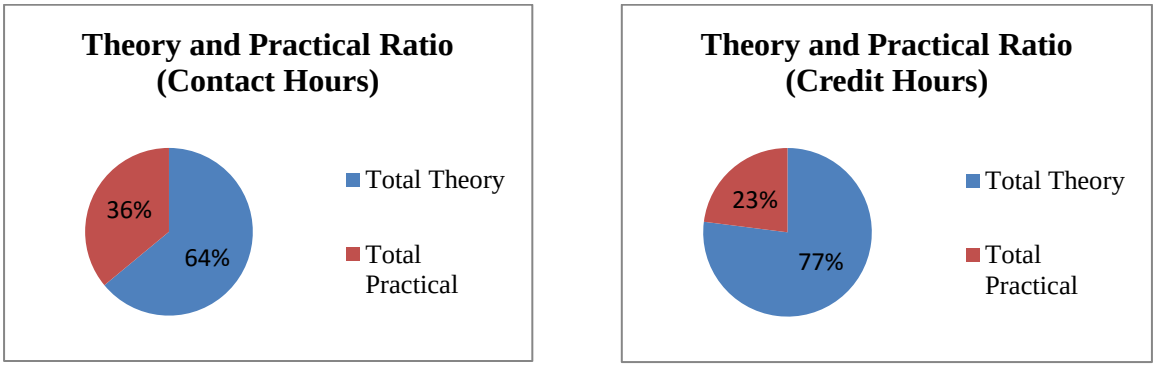


Figure 4: Subject category-wise distributions of credits

The theory and practical contact hour ratio of the curriculum is 64 % and 36 % respectively and the ratio of credit hours is 77 % and 23 % as shown in Figures 5a and 5b respectively.



a. Contact hours b. Credit hours

Figure 5: Ratio of theory and practical component of B.Sc.TE curriculum

These features of IUT's B.Sc.TE curriculum are comparable to the technical/vocational teacher education programmes at Bachelor level at other regional and international higher educational institutions. For example, Faculty of Technology and Vocational Education/ Indonesia University of Education (FPTK/ UPI) and Institute of Vocational Teacher Education (IBB)/Tongji University in China have recently developed core curricula for Vocational Teacher Education (VTE) in electrical engineering at bachelor's degree level. The total number of credits including general subjects, pedagogical, technical/vocational subjects and graduating paper (excluding internship) ranges from 146 to 178 over the four year duration of their programmes (Hung et al. 2013).

4 Methodology

4.1 Design and sample of the research

Descriptive research using the survey method was employed in this study. The sample consisted of TVET teachers working at TVET institutions including polytechnics, technical

schools and colleges in Bangladesh, and in some selected OIC countries. These teachers were from departments of electrical & electronic technology, electro-medical technology, instrumentation and control technology. As seen in Section 1.3 "Objectives of the Study", this study mainly evaluates the content of the TVET teacher education curriculum of IUT in terms of its relevance with teachers' occupational tasks; it does not focus on how the curriculum is really implemented and how the graduates perform at their workplace.

4.2 Sampling and data collection tool

The purposive sampling technique was used to pick 50 participants from the above population, and thus a sample of 50 respondents was considered. Among these respondents, 40 were teachers at selected polytechnic institutes in Bangladesh, and the remaining 10 were TVET teachers from other OIC countries including Afghanistan, Cameroon, Comoros, Pakistan, Turkey, Uganda, and Yemen, who were pursuing a master degree (M.Sc.T.E) with three or more years of teaching experience in their home countries. A questionnaire consisting of a five-point Likert-type scale was used to gather data from the respondents. This sample size made the data collection economically and timely feasible. The Likert-type five-point scale was described as follows: 1 = not relevant, 2 = undecided, 3 = moderately relevant, 4 = relevant, and 5 = highly relevant. The above scale was chosen because it helps the participants indicate the extent to which the given subject is relevant or not relevant to the tasks of a TVET teacher.

4.3 Data collection procedure

The questionnaires were distributed to individuals with the help of assigned research assistants in the selected polytechnic institutes and directly to M.Sc.TE students undergoing in-service teacher training at IUT. This opinion survey for assessing the relevance of the curriculum content was complemented by conducting a related literature (scientific reports, journal/conference papers, etc.) study and interviews with some selected participants and experts in the TVET field, which particularly helped to identify the limitations of the curriculum.

4.4 Data analysis technique

The relevance of the subjects was estimated based on the Weighted Average (WA) of the respondents' opinions. The calculations of the weighted average were done on the following interpretative scale and are shown in Table 2 below:

Table 2: **Interpretation of the Weighted Average**

Weighted Average (WA)	**Weighted Average Interpretation**
WA ≥ 4.5	Highly Relevant
$3.5 \leq$ WA <4.5	Relevant
$2.5 \leq$ WA < 3.5	Moderately Relevant
$1.5 \leq$ WA < 2.5	Undecided
WA < 1.5	Not relevant

5 Results

This section presents the data analysis and interpretation of TVET teachers' opinion regarding the relevance of the B.Sc.TE curriculum content (technical and pedagogical subjects only). It also presents the findings regarding the strengths and weaknesses of the programme.

First, in order to find out whether the course contents of B.Sc.TE programme are relevant to the occupational tasks of TVET teachers, the data from the questionnaire were tabulated and weighted averages of the raw data were calculated.

The respondents' responses and weighted average for each of the two subject categories mentioned above are given in Table 3 and Table 4.

Table 3: **Respondents' assessment on the relevance of technical subjects with respect to their professional tasks**

Technical Subjects	Degree of relevance of responses with respect to occupational tasks					
	Highly Relevant	**Relevant**	**Moderately Relevant**	**Undecided**	**Not Relevant**	**Weighted Average**
Digital Techniques I &II	35 (70 %)	11 (22 %)	4 (8 %)	0 (0 %)	0 (0 %)	4.62
Electrical Measurement & Instrument-ation I &II	28 (56 %)	15 (30 %)	7 (14 %)	0 (0 %)	0 (0 %)	4.42
Industrial Electronics I & II	37 (74 %)	7 (14 %)	6 (12 %)	0 (0 %)	0 (0 %)	4.62
Instrumentation Engineering I & II	31 (62 %)	11 (22 %)	8 (16 %)	0 (0 %)	0 (0 %)	4.46
Introduction to Microprocessor s & Computer Programming	24 (48 %)	20 (40 %)	6 (12 %)	0 (0 %)	0 (0 %)	4.36
Control System Engineering	26 (52 %)	17 (34 %)	7 (14 %)	0 (0 %)	0 (0 %)	4.38
Advanced Electronics I & II	30 (60 %)	11 (22 %)	9 (18 %)	0 (0 %)	0 (0 %)	4.42
Medical Electronics	27 (54 %)	19 (38 %)	4 (8 %)	0 (0 %)	0 (0 %)	4.46
Fundamentals of Computer	29 (58 %)	17 (34 %)	4 (8 %)	0 (0 %)	0 (0 %)	4.5

From the above table, it is seen that all the technical subjects were found to be relevant or highly relevant with the weighted average ranging from 4.36 to 4.62.

Table 4: **Respondents' assessment on the relevance of pedagogical subjects with respect to their professional tasks**

Pedagogical subjects	Degree of relevance of responses with respect to occupational tasks					
	Highly Relevant 5	Relevant 4	Moderately Relevant 3	Undecided 2	Not Relevant 1	Weighted Average
Educational Psychology	34 (68 %)	11 (22 %)	5 (10 %)	0 (0 %)	0 (0 %)	4.58
Methods & Techniques of Teaching	39 (78 %)	8 (16 %)	3 (6 %)	0 (0 %)	0 (0 %)	4.72
Educational Measurement and Evaluation	27 (54 %)	23 (46 %)	0 (0 %)	0 (0 %)	0 (0 %)	4.54
Principles of Vocational & Technical Education	30 (60 %)	14 (28 %)	6 (12 %)	0 (0 %)	0 (0 %)	4.48
Computer Aided Instruction	23 (46 %)	20 (40 %)	7 (14 %)	0 (0 %)	0 (0 %)	4.32
Occupational Analysis & Course Construction	38 (76 %)	10 (20 %)	2 (4 %)	0 (0 %)	0 (0 %)	4.72
Curriculum Development, Administration and Supervision of TVE	33 (66 %)	12 (24 %)	5 (10 %)	0 (0 %)	0 (0 %)	4.56
History of Technical & Vocational Education	28 (56 %)	12 (24 %)	10 (20 %)	0 (0 %)	0 (0 %)	4.36
Comparative Education	32 (64 %)	13 (26 %)	5 (10 %)	0 (0.0 %)	0 (0.0 %)	4.54
Sociology of Education	21 (42 %)	20 (40 %)	9 (18 %)	0 (0 %)	0 (0 %)	4.24
Observation & Practice Teaching	35 (70 %)	11 (22 %)	4 (8 %)	0 (0 %)	0 (0 %)	4.62

From Table 4, it is seen that all the pedagogical subjects were found to be relevant or highly relevant with the weighted average ranging from 4.24 to 4.72.

In summary, the majority of the TVET teachers opined that the technical and vocational pedagogical course contents of B.Sc.TE programme of IUT were relevant to the occupational tasks of TVET teachers.

Secondly, in regard to the strengths and limitations of this programme, observations, interviews with stakeholders, and relevant literature study revealed that the curriculum content of the teacher training programme of IUT was found to be relevant to the occupational tasks of the teachers as opined by the TVET teachers who participated in the study survey. Additionally, the length of this input based qualification(s) under this bachelor's degree programme seems at a glance somewhat short or broken, as opined by the interviewees and found through literature study as well as authors' own opinion, compared to other first university degrees at tertiary level internationally. For example, the enrollees who come through 1st and 2nd streams of input receive two separate qualifications after completing the second and third stages of this programme: a 1-year diploma and a 2-year bachelor's degree, respectively. Enrollees who come through 3rd stream of input, i.e. HDE, receive a 1-year bachelor's degree. Students, particularly those who come through 1st and 2nd streams of input having a two to four year national level diploma in engineering technology, have been complaining that their 2-year bachelor's degree is often not recognized or validated as a 'good' first university degree because the 'two-year' duration is rather short compared to other national and international university degrees. Usually, the duration of a first university degree worldwide varies from three to five years depending on national contexts and vocational specialization. For example, the Technical Trainers College in Riyadh (TTC) offers a three-year bachelor's degree in various technical disciplines (TTC 2016). The Federal University of Technology in Minna has a five-year bachelor's degree in education which includes a one year internship at TVET schools and industries. Under this five-year long programme, enrollees with pre-technical qualification can enter directly at Level 2, exempting their first year (Level 1), and in some cases they can enter at Level 3, exempting their first and second year (Level 1 and 2) through the school's recognition of prior learning (RPL) (FUTMINNA 2016).

Furthermore, the provision for institutional and/or industrial internship training within the duration of this bachelor's degree programme is almost nil, only one week (calculated based on 2 contact-hours a week and 16 weeks a semester (IUT Calendar 2015-2016), which is extremely insufficient for acquiring practical experience and training in applied vocational pedagogy. Also, technical subjects in each area of specialization are taught by the teachers of relevant engineering departments who usually have not undergone formal pedagogical training. Whereas, the pedagogical subjects are taught by the teachers of TVE Department. This isolated way of delivering pedagogical and technical knowledge and skills may not be the optimal way of TVET teacher training since pedagogical skills cannot be separated from technical skills.

Currently, only 2 credits of English are in the programme. Since English is the main language of instruction during the whole bachelor programme, students from non-English speaking countries are not receiving enough instruction in English to complement their education.

6 Conclusions and Recommendations

In this empirical study, a model of a bachelor's degree programme for TVET teachers' education was presented. The relevance of curriculum content (only vocational pedagogy and technical subjects) of this programme to the occupational tasks of a teacher was evaluated. The survey results show that the curriculum content is relevant, except in some cases where the content needs to be updated and fine-tuned to increase the responsiveness of the programme. Other strengths of this programme are well-equipped labs and classrooms, as well as other influencing factors which are seen as favourable for learning/teaching in IUT. However, in-depth studies on how the curriculum is being implemented (the teaching-learning process) and the outcomes of this teacher training system are yet to be done.

Based on the findings, authors make the following recommendations.

- Regarding the length of the study period, the present B.Sc.TE programme should be reformed, extending its current two-year duration to a four-year bachelor's degree programme (Level 1 to 4) with multiple entry and exit points that depend on recognition of prospective students' prior learning (pre-qualification). This could be achieved by combining the existing one-year diploma and two-year bachelor in technical education. In this case, for example, enrollees having a 2 to 4 year diploma/certificate may be exempted the first year (Level 1) and can start at the beginning of Level 2 with the options to either exit at the end of Level 2, having acquired a diploma in technical/vocational education, or to enter into the following stage(s) in order to acquire a four-year bachelor's degree, which may have a wider acceptance internationally.
- Considering the benefit of the 'dual approach' style of TVET teacher education (Soysouvanh et al. 2013), the B.Sc.TE curriculum should emphasize internships at TVET institutions as well as in companies in order to allow trainee teachers access to more practical training. This will obviously demand significant extension of the duration of the present B.Sc.TE programme ranging from three and a half to four years. Or alternatively, a student must have at least one year working experience after completing his/her diploma in a purely vocational discipline.
- Since English is the main language of instruction, an intensive English language learning pre-course should be introduced before commencing the programme, particularly for students from non-English speaking countries.

Acknowledgement

The authors would like to express their gratitude towards the editors of TVET@Asia for their valuable suggestions and input to this paper. Authors' special gratitude and thanks should go to Professor Thomas Werner Schröder for his kind cooperation and encouragement which helped in completion of this paper. The authors are also very much grateful to Mr. M. Golam Salek and Mr. Rezaul Karim for their kind support by providing valuable suggestions and input.

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CITATION:

Haolader, F. A., Cicioglu, D., & Kassim, K. (2017). A Model of Technical and Vocational Teacher Education at Bachelor's Degree Level and its Relevance to the Occupational Tasks of TVET Teachers in the OIC Member States. In: TVET@Asia, issue 8, 1-19. Online: http://www.tvet-online.asia/issue8/haolader_etal_tvet8.pdf (retrieved 28.01.2017).

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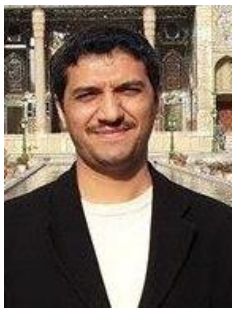

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