

Study on Development of ICT-Enabled Vocational Education at the Bangladesh Open University

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Abstract:

Around the globe, ICT is making major differences in the teaching-learning approaches and assessment. In line with this, Bangladesh implements ICT in education through its Access to Information (a2i) Programme, and puts emphasis on skilling people by using ICT for supporting SDGs by its ministries and associated agencies. In response to this, Bangladesh Open University in association with the Commonwealth Educational Media Centre for Asia (CEMCA/ COL) implements the project entitled 'Impacting Education and Open Schooling through OER- Making a Difference among the Learners'. This research paper forms part of an action research under this project, and focuses on identifying the policy gaps and tutors' attitudes towards ICT-enabled vocational education and training (VET) for skilling the disadvantaged learners. Desktop approach on open source materials was deployed for identifying the policy gap, and survey approach was used to collect 180 tutors' attitude to ICT-enabled VET. Analysis of literature and reports indicate that Bangladesh possesses significant advantage due to the availability of ICT infrastructure for implementing ICT-enabled VET. The results also showed that tutors had a positive attitude towards the use of ICT in vocational education, and it's use to help tutors be more effective in VET tutorials and in improving student learning. The results have been further interpreted in relation to the existing national and institutional policies and practices.

1. Introduction

Generally, national education systems have provision for Vocational Education and Training (VET) for skilling youths for the industry. VET is always expensive due to its apprenticeship systems (Fluitman, 1989), and therefore, each country tries to find innovative and cost-effective ways of delivering VET. Information and Communication Technology (ICT) is making differences in VET pedagogy through bringing changes in the delivery of both theoretical contents and practicum (labs). Generally, a country adopts VET policy and designs pedagogy according to its growth sectors, and accordingly, uses the available resources. VET is different from general education because its standards and enrolment needs are set by the chambers of commerce (i.e. business community), not by the academic community. VET aims at employment, self-employment and further skilling. Therefore, VET policy is generally part of the economic policy, not the social policy. The economy of Bangladesh is growing fast, and the country adopted the National Skills Development Policy 2011. In order to design any model for imparting VET, it is necessary to analyse the national policy. This study aims to identify the policy gaps which will help the Open School of Bangladesh Open University (OS-BOU) to focus on implementation of ICT-enabled vocational and technical education.

2. Review of Literature

Education is, generally, considered as investment (outlay of money for long-term benefit), and most theoretical models of investments in education are abstracted through either economic or sociological framework and/or a combination of both, as discussed below:

i) Economic framework

'Human capital' theory emerged during 1960s after the World War II when economic recession created uncertainty and insisted people to invest in education for immediate benefits (Becker, 1962; Schultz, 1961). This theory was greatly based on 'opportunity cost', i.e. individuals (or households) invest in education considering both direct costs and foregone benefits resulting from education. When Becker theorized human capital, there was uncertainty in the world economy, and individuals preferred instant liquidity i.e., cash benefit, rather long-term value addition.

Monetary benefit was central to this theory, and it is a well-grounded economic theory which guides VET implementation.

ii) Social framework

Becker's (1962) initial model assumes that information on perceived wages is important. But, after almost three decades, Becker (1993) found that non-monetary factors are also important i.e., other things remaining equal, the demand for education becomes stronger when benefits are expected to accrue over a longer period. Borghans et al. (1996) and Sen (1999) suggest that 'theory fails to capture the direct contribution to well-being and freedom, and show indirect effects on social change. Subsequently, social frameworks for investment in education emerged. Deployment of social framework focuses on creating employability i.e. the impact of VET programmes rather outputs, and subsequently, apprenticeships incorporated in skilling people for enabling youths to acquire the relevant competences to facilitate their transition from the world of education to the world of work.

iii) Combined economic and social framework

In respect of sociological literature on VET, Lipsmeier et al. (2003) state that human resource development through VET is not a sufficient condition for economic and social development, through it makes a crucial contribution to it. Perna (2006) combines elements of the economic and sociological practices in her theoretical framework of educational access. This model assumes that economic utility maximization is influenced by four contextual layers; (1) habitus or internalized mores, (2) the school and community context, (3) the higher education context, and (4) the general social, economic and policy context. Thus, the variation in educational engagement decisions is examined as a function of the resources used or available to learners during the decision-making process. Descy and Tessaring (2005) suggest that implementers of VET are to create a basic model which is adaptable to local conditions. Min (1995) states that the economic competitiveness of a country is dependent on the skilled workforce, and thus, VET is perceived as one of the crucial elements in enhancing economic productivity. Based on the social efficiency theory, schools should prepare and supply future workers with appropriate knowledge and skills to enhance their productivity and, therefore, promote economic growth (Finch, 1993; Labaree, 1997). Both economic and social considerations suggest investment in VET especially in an ICT-enabled learning environment.

3. Research Objectives

This research focused on analyzing policy and designing a framework for ICT-integrated VET through open schooling for skilling the youth who are out of conventional schooling for various economic reasons. More specifically, this research had the following objectives:

- i) to analyse the VET policy of Bangladesh with particular emphasis on ICT-enabled VET for the Open School learners;
- ii) to identify policy gap which will help OS-BOU to prepare to upgrade its VET tutors, curriculum, and labs;
- iii) to ascertain the tutors' perceptions towards ICT-enabled VET at BOU Open School;
- iv) to recommend for policy-makers to devise technology-oriented skilled workforce development policies;
- v) to suggest a framework for implementation of VET through open schooling by leveraging ICT.

4. Methods

This research used multi-methods to achieve the objectives of the study: i) desktop research for policy analysis; and ii) survey method to collect opinions from the Open School tutors. 80 tutors working under Dhaka Regional Centre and Chottagram Regional Center were mailed the questionnaire and 53 questionnaires were received back and analyzed. This study used a 5-point Likert-scale structured questionnaire to obtain the tutors' views and perceptions on the VET opportunities of the BOU Open School. The scale had five options: Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2 and Strongly Disagree = 1. SPSS statistical package was used to analyze data and to draw conclusions. The questionnaire comprised of : a) 8 questions on perceptions of VET curriculum, b) 10 questions on perception on VET learners, c) 7 questions on perception on VET instructors, d) 6 questions on perception on VET centers, and e) 5 questions on technology-enabled VET. Mean and standard deviation (SD) were calculated for each item. In mean scores, higher scores implied higher effectiveness of VET courses and lower scores implied lower effectiveness. Subsequently, data were collated to draw conclusions.

5. Findings

5.1 Policy issues

The economic argument in favor of VET is linked to the perceived need to orient the formal educational system to the needs of the world of work (Middleton, et al. 1993; Neuman & Ziderman, 1989). In Bangladesh, it is not yet achieved because people are more interested in formal schooling rather than vocational schooling, and traditionally, VET is for men because of prevailing gender stereotypes. Sen (1999) argues that women are equal partners' in development, and enhancing their agency is just as critical. Over two million young people, in Bangladesh, are entering the workforce each year, and two-thirds of the workforce had either no education or less than five years of primary education. The government provides only half a million with VET each year, and another half a million is served by short, flexible duration courses with diverse contents, mostly by NGOs and private providers (Ahmed, 2016). The government VET provider, BTEB (Bangladesh Technical Education Board), is the key player in Bangladesh.

In Bangladesh, VET is regulated by a set of policies: Industrial Policy of 2009, Education Policy of 2010, Non-Formal Education Policy of 2006, Youth Policy of 2003, National Training Policy of 2008 and the NSDA (National Skills Development Authority) Action Plan of 2013. All VET-related policy documents put emphasis on skilling youth for livelihood (MoE, 2011). The policy initiatives are for addressing the VET-related problems, but there is a mismatch between skills and jobs (NORRAG-BIED 2015). To address employability and promote self-employment, a project titled 'TVET Reform Project' was implemented, partnering with the ILO and European Union (ILO, 2012). The project developed the National Training and Vocational Qualifications Framework (NTVQF) which is part of National Skills Development Policy 2011, and the NTVQF (Figure 1) has been obligatory for VET providers.

Level	Description
Level 6	Middle Level Manager/Sub Assistant Engineer etc Manage a team or teams in a workplace where unpredictable change exists
Level 5	Highly Skilled Worker/Supervisor Take overall responsibility for completion of tasks in work or study
Level 4	Skilled Worker Take responsibility, within reason, for completion of tasks in work or study
Level 3	Semi-Skilled Worker Work under supervision with some autonomy
Level 2	Basic Skilled Worker Work under indirect supervision in a structured context
Level 1	Basic Worker Work under direct supervision in a structured context
Pre-Voc Level 2	Pre-Vocation Trainee Work under direct supervision in a well-defined, structured context
Pre-Voc Level 1	Pre-Vocation Trainee Simple work under direct supervision in a well-defined, structured context

Figure 1: NTVQF of Bangladesh

Use of ICT is the central notion of the policy. NGO-VET is now recognized through Pre-Voc Level 1 & 2 (CAMPE, 2013). NSDA has been the apex authority for skilling people, but their work has been limited to coordinate the VET providers. VET certificate awarding organization is the BTEB which runs programmes at par with conventional schooling. Thus, the VET policy does not include the diversified delivery mode for catering the mass. The major findings from the policy analysis are: resource constraints; less participation by women; a set of policy papers; people are mostly motivated in conventional schooling; and there is a huge scope for using ICT-enabled VET

through open schooling. Based on this result, CEMCA and BOU Open School developed VET textbooks in 2021 for creating a vocational stream in the higher secondary curriculum by using the OER Repository.

5.2 Tutors' perceptions

i) Perceptions on VET curriculum

VET curriculum is very crucial as the students become the agents of the chamber of commerce, and accordingly, teachers are conscious about updating the curriculum. Muhammad (2017) found positive responses of teachers' perception regarding the improvement of TVET curriculum practice after the TVET reform. Table 1 illustrates the responses of the sample.

Table 1: Perceptions on VET curriculum

Items	Mean	SD	Decision
Open School's planned VET program should consider income generating courses of studies	4.72	0.57	Agree
VET program also should have good academic base for pursuing higher programs	4.56	0.62	Agree
VET program should be accredited to allow students to meet admission requirements for the country's university system.	4.22	0.88	Agree
The main purpose of VET program should be to prepare students for a job	4.72	0.46	Agree
VET curriculum should focus on individual courses and not on two-year certification program	4.39	0.7	Agree
VET curriculum should be integrated to general school curriculum i.e., general curriculum should have a group named 'VET Group' like ' Science Group' 'Humanities Group' and 'Business Group'	4.17	1.1	Agree
Hand-on training should be the primary focus of Open School's VET Program	4.89	0.47	Agree
Internships training for VET students should be increased in the Open School	4.61	0.7	Agree

There was positive agreement in general curriculum coupled with vocational emphasis (Mean 4.17 and SD 1.1) putting emphasis on hand-on training (Mean 4.89 and SD 0.47), and with appropriate internship (Mean 4.61 and SD 0.7). They also had strong agreement in designing curriculum, keeping the competency for pursuing higher studies (mean 4.22 and SD 0.88). TVET includes formal and informal learning that prepares young people with the knowledge and skills required in the working world. The participants had positive perception on most statements.

ii) Perception on VET learners

Tutors were asked to report on prospective VET learners for open schooling (Table 2). VET enables students to gain qualifications for future employment.

Table 2: Perception on VET learners

Items	Mean	SD	Decision
Only students who want to pursue a job immediately after graduation from high school should enroll in VET courses.	4.39	0.85	Agree
The Open School should track students who want to pursue studies with VET group only	3.5	1.15	Agree
VET program should ensure students graduate with specific skills needed to get a job	4.67	0.59	Agree
NGO/Community School learners can enroll directly to the 'VET Group' for achieving the certificate in the specific skills	3.78	1.4	Agree
VET Program is not for smarter students	3	1.66	Neutral
VET Program is not for students desiring a higher degree.	2.33	1.28	Disagree
VET program is for students from poor families.	3.94	1.6	Agree
Vocational education is for any student desiring good job skills.	4.56	0.51	Agree
All students should be required to complete at least one vocational course in order to meet graduation requirements.	4.44	0.86	Agree
VET program should provide for the needs of all students.	4.56	0.62	Agree

Tutors were found to have positive agreement in most statements, with a mean value 4+ except disagreement in the statement of 'VET program is not for students desiring a higher degree' (Mean 2.33 and high SD 1.28). The score was low in the statement of 'VET program is not for smarter students' (Mean 3 and SD 1.66) and shows a neutrality position.

iii) Perception on VET instructors

NCES (n.d) found that vocational teachers had more 'real-life' experience in their field of teaching than academic teachers, and they are expected to have good practice (Table 3).

Table 3: Perception on VET instructors

Items	Mean	SD	Decision
Only certified VET instructors should teach vocational education courses	4.19	1.38	Agree
Instructors need special care for the VET students under open schooling	4.69	0.48	Agree
VET teachers should focus on hands-on learning.	4.01	0.89	Agree
VET teachers need to perform non-teaching duties (such as networking with business, industries, and local community).	4.19	0.66	Agree
VET teachers should talk to employers and keeping students informed on what is happening in the workforce.	4.25	0.93	Agree
VET teachers should provide students with helpful advice.	4.25	0.45	Agree
VET teachers should present their instructional materials.	3.31	1.01	Agree

The tutors had 'positive' or 'highly positive' perception on all the statements. But the statement on "VET teachers should present their instructional materials" scored slightly low (Mean 3.31 and SD 1.01). Statements belonging to 'VET should be certified', 'special care needed for VET through open schooling', 'counseling supports to students', and 'VET teachers should have network with the business and local community' had higher score (Mean value is 4+).

iv) Perception on VET Center

VET centre is very important for the students as it concentrates on hand-on training. There are two types of vocational courses in Bangladesh: formal and non-formal. Formal courses are operated by the BTEB in their designated VET center, and non-formal courses are run by the NGOs in the community schools.

Table 4: Perception on VET Center

Items	Mean	SD	Decision
VET courses should be taught only in community schools designated as VET Center	4.19	1.38	Agree
VET courses should be taught in both community schools and vocational schools	4.38	0.89	Agree
VET centers need community supports and coordinate with its stakeholders	4.31	0.7	Agree
General schools can be VET Center	3.06	1.48	Neutral
Community can regard VET as an important part of general schooling	4.44	0.63	Agree
Social status with peers (that are not enrolled in vocational education) will go down in the community if students enroll in VET course.	2.56	1.59	Disagree

Participants were asked questions on both the settings. The tutors, on an average, scored 4.19 in the perception score on VET only in the community schools (Table 4). They scored 4.38 in the perception on VET in the community and recognized VET centres, and the SD was 0.9 which indicate strong agreement. But there must have strong community support for success of the VET centres. Neutrality was shown in the statement on VET Centre in the conventional schools (Mean 3.04 and SD 1.48). They have shown strong disagreement in the statement on 'attachment with the VET centres degrades the status in the peer groups and in the community' (Mean 2.56 and SD 1.59).

v) *Perception on Technology-enabled VET*

There is a paradigm shift because of increased use of ICTs in TVET and in distance education (Wonacott, 2001). Therefore, our survey suggests positive results in integrating the ICT in VET for dropouts.

Table 5: Perception on Technology-enabled VET

Items	Mean	SD	Decision
VET courses have kept pace with changes in technology.	4.75	0.45	Agree
Efforts should be made to expand and upgrade the technology content of VET courses.	4.63	0.5	Agree
VET program should focus on contests and activities in new categories of technologies.	4.56	0.63	Agree
Technology sensitive courses should be prioritized	4.75	0.45	Agree
Bangladesh has sufficient ICT infrastructure to provide Technology-enabled VET	3.06	0.93	Neutral

Table 5 illustrates that there is an agreement for inclusion of technology contents in the VET courses (Mean = 4.63 & SD 0.5), and also agreement on priority of technology sensitive courses (Mean 4.75 and SD 0.45). This result matches with Martin (2020) who found that peer support and adequate technical support impacted the pre-service TVET teachers' mastery of integration of ICT in the curriculum. The crucial part of this section is that the participants were either neutral or just crossed the positive line (Mean 3.06 and SD 0.93) on the statement of 'Bangladesh has sufficient ICT infrastructure to provide Technology-enabled VET'. Pavlova (2020) found that in the Asia and Pacific region, there has been positive but uneven progress in terms of integrating ICT in TVET. Although many countries in the region have shown promise in integrating ICT in their TVET systems, there are still numerous countries in the region that continue to encounter problems in terms of limited financing, lack of trained staff with relevant knowledge and expertise, and inadequate IT infrastructure. Raihan and Shamim (2013) found that open courseware and repository of learning objects are possible to implement the TVET in Bangladesh.

6. Suggested Framework

The following Framework (Figure 3), which emerged from the current research work was developed to address the desired use of ICT-enabled VET at the BOU Open School and its practice at other open schools in the developing countries. The research studies reviewed earlier provided guidelines for designing model in combination of economic and social framework with effective use of ICT for VET development in open schooling. In addition, the

policy review revealed that effective use of ICT actually starts from policy consideration, i. e. a top-down approach rather than self-adopted technologies at the user level, say, particularly in the case of mobile technology.

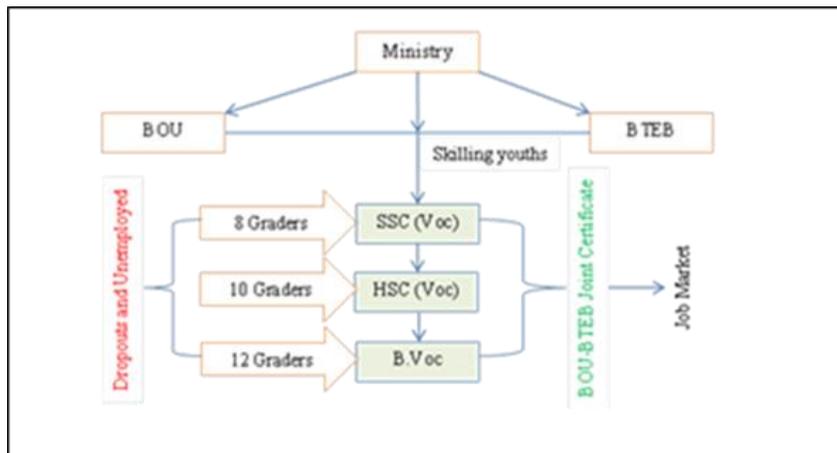


Fig 2: VET Framework for BOU Open School

It was also found that broadcast, OER, and Youtube are the mainstreamed technologies at BOU, and other technologies are being used as supplementary. It may be discontinued in future due to policy reconsideration. BOU, therefore, needs self-dependent, cost-effective, user-friendly, and sustainable TEL. At the same time, it is necessary to consider strategies for learners' attainment of learning outcomes through integrating TEL. Connell et al. (2015) noted that technology connects existing knowledge, and OER could come up as a significant curriculum and learning innovation within a blended learning framework to maintain continuity as also ensure innovation. It was found that the Open School had a clear-cut policy of paperless open schooling, and the University also attempts to be paperless, as was evident in the newspaper article written by the BOU former Vice Chancellor (Mannan, 2018). Online programmes are termed as paperless; however, the large number of enrolments may pose constraint to going exclusively online. A blended learning environment combining OERs, broadcast and mobile technologies, and physical learner centre interaction and practicum could emerge as the most appropriate and effective TEDL strategy for BOU-OS.

7. Conclusion

Policy analysis and exploration of tutor perception on VET were the core tasks of this study, and the results were collated. Tutors are also connected to dropouts who are the target audience of VET, and they are friendly to distance education. It was understood that participants had broad understanding regarding VET or skill training. Therefore, they dominantly perceived this as a tool for livelihood, and there are challenges of implementing VET through open schooling by leveraging ICT. Youths are using social media i.e. Facebook though which learning objects are easily sharable. Therefore, policy analysis has shown that VET was not popular among the youths as well as to the community like the other stream of school education. Tutors were in strong agreement for designing VET curriculum and upbringing it as per global standard, and this was felt by the respondents to meet the employers' demand. Students should be prepared in such way that they would get a job without hassle. The overall perception of the tutors on VET was highly positive. In only a few statements, there were neutral perceptions, most importantly in the statement of ICT infrastructure for implementing the ICT-enabled VET. BOU Open School has already incorporated to Voc Group in the Higher Secondary Certificate Programme.

8. References

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