FACTORS INFLUENCING USE OF ICT IN TEACHING-LEARNING PROCESS TO MAKE TEACHING-LEARNING MORE EFFECTIVE AND EFFICIENT: CASE OF POLYTECHNIC INSTITUTIONS IN BANGLADESH

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ABSTRACT

The purpose of the study was to determine factors that influence use of information and communication technology (ICT) in teaching-learning to enhance education more effectively. Nine polytechnic institutes were considered as sample for this study. Comprehensive questionnaires were sent to these institutions and in some institutions the researcher himself collected data. It was found that the overall ICT service received up to now is not satisfactory and there are many factors which are resisting the ICT progress in polytechnic institutes. Factors like lack of knowledge, lack of skill, lack of training, lack of availability of ICT tools, lack of awareness, lack of skilled Manpower, lack of available internet facilities, accessible computers and motivation are significantly opposing the use of ICTs in polytechnic institutions of Bangladesh. The study also revealed that the contribution of other factors like administrative support, unavailability of modern teaching aids, room capacities, insecurity for ICT equipments

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& maintenance etc are also the remarkable issues that has to be considered to understand the present status of the ICT in the polytechnic levels of Bangladesh. This study shows that the teachers of the polytechnic institutions are very much in favour of ICT. Because of, if it is used in teaching-learning process in technical and vocational education, the quality of education will be improved. The factors that stimulating teachers of polytechnic institutions to use of ICT in teaching-learning are: economical, time saving, easy to prepare, attractive, easy to motivate the students and easy to administer. Training on ICT & available ICT tools are influenced them for using in T-L process. ICT is a modern technology throughout the world. In Bangladesh, ICT as an enabling technology is creating and sustaining new opportunities for economic development both in public and private sectors.

Keywords—ICT (Information & Communication Technology), Teaching – Learning (T-L), Technical and vocational education & training (TVET) and Information Technology (IT).

Introduction

The world is perpetually changing and moving forward for better technology, better products, and better services. Technical education components are also continually generating a number of innovation and reforms in various aspects of technical education providing at diploma and a degree levels. Teacher trainers and curriculum developers in Bangladesh, Bhutan, Cambodia, Lao, Myanmar, Nepal and Viet Nam need to improve management and delivery of Technical and Vocational Education (TVE) through the use of Information and Communication Technology (ICT).

Khan (2010), mentions that the government of Bangladesh is committed to implementing ICT in education, the process is hindered by a number of barriers. The barriers are categorized as external (first-order) or internal (second order) (Keengwe, Onchwari et al. 2008). According to Snoeyink and Ertmer (2001), first order barriers include lack of equipments, unreliability of equipment, lack of technical support and other resource-related issues. Second-order barriers include both school level factors, such as organizational culture and teacher level factors, such as beliefs about teaching and technology and openness to change. Bangladesh is one of the developing countries that lack of the resources and appropriate infrastructure for implementing

ICT in education. The effective use of ICT would require the availability of equipment, supplies of computers and their proper maintenance including other accessories. Most of the rural areas in Bangladesh do not have electricity and therefore one cannot even run a computer in the first place. On the other hand most of the cities of Bangladesh don't get electricity more than eight hours in a day due to lack of electric supply. The development of the ICT infrastructure in a country is dependent on the availability of a reliable electricity supply. Implementing ICT demands other resources, such as computers, printers, multimedia projectors, scanners etc- which are not available in all the educational institutions. Besides, ICT requires up-to-date hardware and software. Using up-to-date hardware and software resources is a key feature in the diffusion of technology (G, Ibahar,2007): but a rare experience in educational institutions. High-speed internet connection is another prerequisite for integrating ICT into the teaching-learning situation. But unfortunately internet access is very poor.

Bangladesh is one of the developing countries in the world with a growth rate of GDP around 5.6% and having poor ICT infrastructure like the other less developed countries (Islam & Md. Selim 2006). Bhuiyan (2011) states that recently, Bangladesh has made considerable progress in introducing ICT in the public sector, although, in terms of e-readiness, the latest UN E-Government Readiness Survey 2008 identified Bangladesh as one of the poor performers in the Southern Asian region (See Table 1). This global survey report has ranked Bangladesh 142 among 189 countries with an index value of 0.2936, which, while perhaps low in comparison with some of the other countries studied, is nonetheless a clear improvement from its position in the 2005 survey (UN, 2008)

Table 1

e-Government readiness for Southern Asia

Source: Un (2008, p. 33)

Country	2008 Index	2005 Index	2008 Ranking	2005 Ranking
Maldives	0.4491	0.4321	95	77
Srilanka	0.4244	0.3950	101	94
Iran	0.4067	0.3813	108	98
India	0.3814	0.4001	113	87
Pakistan	0.3160	0.2836	131	136

Bhutan	0.3074	0.2941	134	130
Bangladesh	**0.2936**	**0.1762**	**142**	**162**
Nepal	0.2725	0.3021	150	126
Afganistan	0.2048	0.1490	167	168
Region	0.3395	0.3126		
World	0.4514	0.4267		

Also, Asian Development Bank (ADB) pressed a statement on 10 June, 2008 that the ADB is helping thousands of unemployed and underemployed Bangladesh adults attain better wage and employment prospects by improving the country's technical skills training system. ADB has approved a $ 50 million loan for the Ministry of Education of Bangladesh to organize technical and Vocational Education and Training (TVET) programmed market-oriented, short-term and relevant especially for the poor who were not able to finish the eighth grade. All things are now set to flourish the technical and vocational education (TVE) sector of Bangladesh with the blessing of ICT.

Asia-Pacific Development Information Programmed, (2007), research emphasize the use of ICT in promoting social and economic development and change within Asia. The research aims to reinstate human development at the core of ICT strategies and deployment. The central focus in this study is thus on human development, including the attainment of greater substantive freedoms in human life and society. At the same time UNESCO, UNDP, Asian south pacific Bureau of Adult Education and some other international organization has done very impressive work in the field of ICT to improve the overall life style of the people of South Asian Pacific region including Bangladesh.

Hoque (2007) mentions that government of Bangladesh has been striving to achieve higher living standard for the people of Bangladesh through planned development of ICT. After the introduction of ICT, the world is becoming smaller in the sense of communication and may now be called as a global village. As we are living in the global village our aim is to provide the maximum facilities to each employee, user and visitor through ICT. Hence the National ICT policy 2002 of Bangladesh states that "The Government of Bangladesh shall implement ICT

systems to provide nation-wide coverage and access by any citizen to government databases and administrative systems which can be used to extend public services to the remotest corner."

UNESCO (2006), reports that the use of ICT in education and training has been a priority in most European countries during the last decade, but progress has been uneven. Most schools in most countries, however, are in the early phase of ICT adoption, characterized by patchy uncoordinated provision and use, some enhancement of the learning process, some development of e-learning, but no profound improvement in learning and teaching.

EU commission, (2005) represents the current and possible use of information and communication Technology in initial Vocational Education and Training carried out by Ram boll Management for the European commission, DG Education and culture in 2004.

The application of ICT offers multiple learning pathways and widespread access to TVE, breaking down barriers for learning and teaching connected to distance and location, so vocational educators can easily have opportunities to update and upgrade their knowledge and skills". Over the last 10 years UNESCO has helped developing TVE in the Asia and Pacific Region, mainly through its International Centre for Technical and Vocational Education and Training (UNEVOC), encompassing system and policy development, research, information, communication and networking.

ICT is a modern technology throughout the world. In Bangladesh, ICT as an enabling technology is creating and sustaining new opportunities for economic development both in public and private sectors. New and sustainable ICT jobs have been created in both government and private sectors. The Government has set a plan to build "Digital Bangladesh" by the year 2021 as it has become a prime aspect for the development of a nation. A substantial investment has been made in equipping our young people with the skills and competence necessary for them to successfully meet the challenges of the 21st century.

In Bangladesh, in the ICT sector a large work force with different levels and various expertises' is growing. Computer literacy is imparted, computer applications are taught, training given,

diploma, bachelor's and master's degrees awarded. Training centers, colleges, computer institutes, private universities and public universities are all contributing in different ways. The related departments are IT, ICT, Computer Applications, Computer Science, Computer Engineering and Telecommunication Engineering. Steps for quality control of computer education of all kinds are already take place. To reap the benefits of ICT we have to take it to the doorsteps of general people throughout the country. It is possible to open a huge number of cyber centers in the small towns and villages in the country. The cyber centers can be a place where people will get opportunity to send and receive e-mail and can have telephonic talk over the internet. These are the places where people will have access to internet for information on agriculture and business, health service and can have education, entertainment and so on through internet. All post offices can work as cyber centers, in addition to their normal present duties. These cyber centers can be economically profitable for the entrepreneurs.

Bangladesh has an ICT policy formulated for human resource development (HRD) that states the country must prepare itself to compete effectively in the global ICT market. As the demand for skilled manpower in ICT is growing worldwide, the country needs to produce a large number of ICT professionals. Specifically, policy statements endorse the need for widespread introduction of ICT training in public and private educational institutions as a prerequisite for producing skilled ICT manpower. Facilities are to be built to promote ICT education and computer–aided education at all levels including primary schools. The policy also states Diploma and trade courses, both public and private institutes including polytechnics, while in–service training programmers will target the upgrading professionals now employed in the public and private sector.

ICT encompasses the broad fields of data/information processing, transmission and communications by means of computer and telecommunication techniques and these modern tools are being increasingly used for organizational/personal information processing in all sectors of economy and society. A dependable information system is essential for efficient management and operation. But there is a shortage of generated information needed for efficient performance of these sectors. In order to meet this objective, ICT use in every sector shall have to be accelerated in terms of information generation, utilization and applications. Considering the gravity and importance of ICT Prime Minister of Bangladesh has already declared ICT as the thrust sector. Bangladesh intends to use ICT as the key-driving element for socioeconomic

development. This Policy aims at building an ICT-driven nation comprising of knowledge based society by the year 2015. In view of this, a country-wide ICT infrastructure will be developed to ensure access to information by every citizen to facilitate empowerment of people and enhance democratic values and norms for sustainable economic development by using the infrastructure for human resources development, governance, e-commerce, banking, public utility services and all sorts of on-line ICT enabled service.

The Internet facilities are not widely available in most places of the Bangladesh. Internet is one of the main technologies which can help to use the ICT efficiently. To get benefit from ICT the educational policy must ensure the availability of internet in every institution both micro and macro level. Ministry of Science and Technology has been renamed on April 2002 as "Ministry of Science and Information and Communication Technology. http://www.sdnbd.org/sdi/issues/IT-computer/itpolicy-bd 2oo2.htm

Now a day's technology is changing that's why teachers are getting new and upgrading teaching aids, methodology, instruments, workshop equipments and also teachers are getting training from different institutions or abroad. For that reason students will be more benefited, Bangladesh as a developing country lags far behind from the other developed countries of the world in the context of Education, Economy and obviously in technology. Globalization and technological changes that have accelerated in tandem over the past fifteen years—have created a new global economy **"**powered by technology, fueled by information and driven by knowledge." The technology is now dominating in all sectors of human affairs. The emergence of this new global system has serious implications for the nature and purpose of educational institutions also. Here the term "ICT" comes ahead, which direct the education system to a new era.

ICT which includes electronic devices, as well as newer digital technology such as computers and the internet - have been touted as potentially powerful enabling tools for educational change and reform. When used appropriately, ICT is said to help expand access to education, strengthen the relevance of education to the workplace, and raise educational quality to make teaching and learning into an engaging, active process connected to real life. To compete with the new education system of the developed countries that is fueled by technology, we must introduce this gift of technology-ICT in the existing facilities of the educational system especially in TVE system of Bangladesh, as it is the main source of producing technically skilled manpower.

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This study is intended to find out the prospect of ICT in TVE system of Bangladesh. It will also help policymakers in the country to define a framework for the appropriate and effective use of ICT in the education system by providing a brief overview of the potential benefits of ICT use in education and the ways by which different ICT have been used in education. It addresses the four broad issues in the use of ICT in education—effectiveness, cost, equity, and sustainability.

The specific objectives of the study are to

- **Find out teachers' knowledge about ICT.**
- **Determine the different factors that stimulate the process of Teaching-Learning in TVE in terms of ICT.**
- **Identify the innovations of T-L process in TVE by using ICT.**
- **Find out the role of ICT in TVE.**

Methodology

This research was undertaken to find out the polytechnic teachers' knowledge about ICT, indicate different factors which stimulate the introduction of innovations of ICT in technical & vocational education to enhance teaching-learning process & also find out the role of ICT in TVE.

There are around 45 government polytechnic institutes in Bangladesh. In this research clustered sampling was used to select nine polytechnic institutes out of six administrative division of Bangladesh. Total number of teachers including part time teachers (1403+97) = 1500. Sample size: 8% of the population = 1500*.08 = 120.

A structured questionnaire was used for collecting data from the sample. The questionnaires were validated with the expert opinions. The questionnaire had mainly two parts, the first part contained direct questions with Yes/No answer and sometimes it requires their own views and ideas of the respondents for the qualitative analysis, and the second part contains the questions regarding the opinions of the respondents on different aspects of ICT used in their institution which were assessed on five point likert scale, ranging from 1 = "strongly disagree" to 5 = "strongly agree". Extra information is also collected which is helpful for making recommendations. Collected data was analyzed by using following statistical methods and

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techniques of analysis. The data were tabulated in the form of frequency distribution, percentage and chi-square ($\chi 2$) values have been calculated for each of the items.

Analysis and Interpretation of Data

Opinions of the teachers' regarding knowledge about Information & Communication Technology. Number of responses (N) =106

Sl. No.	Description	5	4	3	2	1	W.A.	χ_0^2
01	There is lack of understanding about knowledge of ICT among the TVE Teachers' in Bangladesh.	52 (49.1%)	45 (42.4%)	2 (1.8%)	5 (4.7%)	2 (1.8%)	4.3	118.6
02	TVE teachers don't have sufficient skills for using ICT.	25 (23.5%)	47 (44.3%)	9 (8.4%)	15 (14.1%)	10 (9.4%)	3.5	46.8
	At 0.05 Level of significance, $\chi_c^2 = 9.49$ (df = 4)							

The responses regarding "There is lack of understanding about knowledge of ICT among the TVE teachers' in Bangladesh" is **Agreed** (WA= 4.32). Whereas $\chi_o^2 > \chi_c^2$ (118.6>9.4) which indicates that the null hypothesis is rejected & the response is significant.

The responses regarding "TVE teachers don't have sufficient skills for using ICT" is **Agreed** (WA= 3.58). Whereas $\chi_o^2 > \chi_c^2$ (46.84>9.49) which indicates that the null hypothesis is rejected & the response is significant.

Sl. No.	Description	Yes	No	χ_0^2
01	Do you know what ICT is?	106	0	106

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		(100%)	(0.0%)	
02	Do you have any computer facility in your Institution?	105 (99.0%)	1 (0.9%)	102.03
03	Do you have any multi- media projector in your class?	46 (43.4%)	60 (56.6%)	1.85
04	Do you have any internet facility in your institution?	70 (66.0%)	36 (33.9%)	10.91

At 0.05 Level of significance, $\chi^2_c = 3.84$ (df = 1)

It reveals that 100% teachers know about ICT. 99% of the teachers have computer facilities and as well as 66% of the teachers gave their opinion that they have also internet facilities.

Opinions of teachers' to determine the factors that influencing the process of T-L in TVE

Number of responses (N) =106

Sl. No	Description	5	4	3	2	1	W.A.	χ_0^2
01	ICT is very much helpful for improving the techniques of T-L process in TVE	75 (70.8%)	27 (25.4%)	3 (2.8%)	1 (0.9%)	0 (0.0%)	4.66	194.2
02	Using ICTs Teaching-Learning will be easier, interesting & time saving.	48 (45.2%)	53 (50%)	4 (3.7%)	1 (0.9%)	0 (0.0%)	4.40	135.9
03	Students will be more motivated to learn if ICT tools are used in TVE.	60 (56.6%)	40 (37.7%)	6 (5.6%)	0 (0.0%)	0 (0.0%)	4.50	140.9
04	ICT tools are too complicated to use in T-L process.	10 (9.4%)	26 (24.5%)	12 (11.3%)	35 (33.1%)	23 (21.7%)	2.67	20.1

At 0.05 Level of significance, $\chi^2_c = 9.49$ (df = 4)

The responses regarding "ICT is very much helpful for improving the techniques of T-L process in TVE" is **Agreed** (WA= 4.66). Whereas $\chi^2_o > \chi^2_c$ (194.2>9.45) which indicates that the null hypothesis is rejected & the response is significant.

The responses regarding "Using ICTs Teaching - Learning will be easier, interesting & time saving" is **Agreed** (WA= 4.4). Whereas $\chi^2_o > \chi^2_c$ (135.97>9.49) which indicates that the null hypothesis is rejected & the response is significant.

The responses regarding "Students will be more motivated to learn if ICT tools are used in TVE" is **Strongly Agreed** (WA= 4.50). Whereas $\chi^2_o > \chi^2_c$ (140.98>9.49) which indicates that the null hypothesis is rejected & the response is significant.

The responses regarding "ICT tools are too complicated to use in T- L process" is **Undecided** (WA= 2.67). Whereas $\chi^2_o > \chi^2_c$ (20.13>9.49) which indicates that the null hypothesis is rejected & the response is significant.

Sl. No.	Description	Yes	No	χ^2_0
01	Do you think that ICT will inspire you to improve the T-L process	104 (98.1%)	2 (1.8%)	102.1
02	Do you think that your institution is rich enough for providing ICT tools?	40 (37.7%)	66 62.2%)	.4
3	Does factor create difficulties to use of ICT in your teaching process?	8 92.4%)	7.5%)	76.4
4	Do you use internet in your institution which will improve the quality of education?	2 58.5%)	4 41.5%)	.1

5	Do you feel interest by using computer, internet, & Multimedia that these will make the teaching learning effective & efficient?	103 (97.2%) 2.8%)	4.3
6	Do you encourage your students to use ICT for their learning?	97 (91.5%) 8.5%)	3.0
7 07	If you undergo a short training on ICT, will it improve your T-L skill?	98 (92.4%) 7.5%)	6.4

At 0.05 Level of significance, $\chi^2_c = 3.84$ (df = 1)

It reveals that 98.1% of the teachers agreed that ICT inspire them to improve teaching-learning process. 62.2% of the teachers, they have given their opinions that their institution is not enough rich to provide ICT tools. 92.4% of the teachers are agreed that short training is required to improve skill to use ICTs.

Opinions of the teachers to identify the innovations of T-L process in TEV by using ICT. (N=106)

Sl. No.	Description	5	4	3	2	1	W.A	χ^2_0
01	TVE should replace the traditional teaching aids by new ICT tools to improve the teaching-learning.	47 (44.3%)	48 (45.2%)	11 (10.3%)	0 (0.0%)	0 (0.0%)	4.34	112.59

Sl. No	Description	5	4	3	2	1	W.A.	χ_0^2
02	ICT is necessary in Teaching–Learning process in TVE.	68 (64.1%)	36 (33.9%)	2 (1.8%)	0 (0.0%)	0 (0.0%)	4.62	173.73
03	ICT tools can improve the efficiency of TVE teachers.	65 (61.3%)	37 (34.9%)	4 (3.7%)	0 (0.0%)	0 (0.0%)	4.58	158.62

At 0.05 Level of significance , χ_c^2 = 9.49 (df = 4)

The responses regarding "TVE should replace the traditional teaching aids by new ICT tools to improve the teaching-learning" is **Agreed** (WA= 4.34). Whereas $\chi_o^2 > \chi_c^2$ (112.59>9.49) which indicates that the null hypothesis is rejected & the response is significant.

The responses regarding "ICT is necessary in teaching–learning process in TVE" is **Strongly Agreed** (WA= 4.62). Whereas $\chi_o^2 > \chi_c^2$ (173.73>9.49) which indicates that the null hypothesis is rejected & the response is significant.

The responses regarding "ICT tools can improve the efficiency of TVE teachers" is **Strongly Agreed** (WA= 4.58). Whereas $\chi_o^2 > \chi_c^2$ (158.62>9.49) which indicates that the null hypothesis is rejected & the response is significant.

Opinions of the teachers' to find out the role of ICT in TVE. (N=106)

Sl. No	Description	5	4	3	2	1	W.A.	χ_0^2
01	ICT is very much needed for development of TVE.	62 (58.4%)	41 (38.6%)	3 (2.8%)	0 (0.0%)	0 (0.0%)	4.56	143.8
02	Government has enough policy to	18 (16.9%)	34 (32.0%)	41 (38.6%)	11 (10.3%)	2 (1.8%)	3.52	49

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improve the present condition of ICT in TVE.		

At 0.05 Level of significance, $\chi^2_c = 9.49$ (df = 4)

The responses regarding "ICT is very much needed for development of TVE" is **Strongly Agreed** (WA= 4.56). Whereas $\chi^2_o > \chi^2_c$ (143.88 > 9.49) which indicates that the null hypothesis is rejected & the response is significant.

The responses regarding "Government has enough policy to improve the present condition of ICT in TVE" is **Agreed** (WA= 3.52). Whereas $\chi^2_o > \chi^2_c$ (49>9.49) which indicates that the null hypothesis is rejected & the response is significant.

Responses use of ICT tools for preparing teaching-learning materials.

(Multiple answer were accepted)

ICT tools	Teachers' opinion	Percentage
OHP	40	37.74%
Computer	70	66.04%
Multimedia	25	23.58%
Internet	30	28.30%
	N = 106	

It reveals that most of the teachers (66.04%) used computer for preparing their teaching materials which is good whereas only 37.74% of the teachers take help from OHP for their teaching materials and only 23.58% of the teachers used multimedia for their teaching purpose. Internet, one of the important indicators is used by only 28.30% of the teachers. From the above figure it is seen that they are no getting more facilities to use modern ICT tools which will be more effective for teaching.

Opinion on training needs on ICT

Statement	Teachers opinion	Percentage
Need of ICT training	98	92.45%

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Most of the respondents 92.45% thought that training on ICT contributes to enhance their performance in teaching-learning and the quality of education will increase.

Factors stimulating to use of ICT.

(Multiple answer were accepted)

Factors	Teachers Opinion	Percentage
Economical	80	75.47%
Time saving	90	84.91%
Communication is easier	75	70.75%
Easy to prepare	76	71.70%
Easy to motivate students	82	77.34%
Attractive	75	70.75%
Easy to integrate	65	61.32%
Easy to administer	70	66.04%
	N = 106	

It reveals that every factor stimulates to use ICT for effective & efficient learning. That means all factors tabulated in the table have the greater role for influence to use of ICT in TVE sector of Bangladesh. However, most of the teachers said that time saving (84.91%), easy to motivate students (77.34%) & Economical (75.47%) have significant impact to use ICT in TVE in Bangladesh. Around 70% of the teachers said that Communication is easier (70.75%), Easy to prepare (71.70%), Attractive (70.75%) have a great impact that influences to use ICT in TVE. Around 60% of the teachers said that Easy to administer (66.04%) & Easy to integrate (61.32%) have a great impact to use ICT in TVE sector.

Opinion on the factors that limiting the use of ICT.

(Multiple answer were accepted)

Factors	Teachers Opinion	Percentage
Lack of Knowledge	50	47.17%
Lack of skill	45	42.45%
Lack of training	80	75.47%
Lack of available modern ICT tools	75	70.75%
Lack of awareness	50	47.1%
N = 106		

It reveals that no factor has the supreme majority for limiting the use of ICT in teaching-learning situation in polytechnic. That means all factors tabulated in the table have the greater role for limiting the use of ICT in TVE sector of Bangladesh. However most of the teachers said that lack of training (75.47%) and lack of availability of modern ICT tools (70.75%) have significant impact to limit the use of ICT tools in education. And a considerable portion of the teachers said that lack of knowledge (47.17%) about the use of ICT, lack of skill (42.45%) on ICT tools and lack of awareness (47.1%) have a great impact to limit the use of ICT tools in education

Findings

On the basis of the quantitative analyzed data concerning teachers' opinion the following are major findings.

Knowledge about Information and Communication Technology (ICT)

1. From the responses it is found that most of the teachers' know what is ICT?

2. For development of the teaching-learning process every institution should have enough facilities about teaching aids. Majority of the respondents are in favor that they have enough ICT tools.

3. Majority of the respondents are in favor that they have internet facility in their institutions.

4. Some of the respondents are in favor that there is lack of understanding about the knowledge of ICT among the TVE teachers' in Bangladesh.

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Factors influencing use of ICT in Teaching-Learning Process to enhance teaching- learning activities more effectively.

1. Majority of the respondents are in favor of that ICT is very much helpful for improving the techniques of T-L process in TVE. It is found that the class room situation is friendly in polytechnic institutions to use ICT for teaching-learning environment.

2. Most of the respondents are given their opinions that if ICT tools are used in TVE, students will be more motivated to learn. ICT which is using for teaching-learning process is very much helpful for time saving as well as easy to understand.

3. Most of the respondents agree that using ICT teaching-learning will be easier, interesting & time saving.

4. Most of the respondents are given their opinions that ICT will inspire to improve the quality of T-L process.

5. Majority of the respondents are given their opinion that they are feeling interest by using computer, internet, & Multimedia that these will make teaching-learning effective & efficient.

6. Majority of the respondents said that they are encouraging their students to use ICT tools for their learning.

7. Most of the respondents are interested to use internet in institution which will improve the quality of education.

Innovations of T-L process in TVE by using ICT.

1. Most of the respondents are Strongly Agree that ICT is necessary in teaching–learning process in TVE.

2. Most of the respondents said that ICT tools can improve the efficiency of TVE teachers.

3. Most of the respondents are in favor that TVE should replace the traditional teaching aids by

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new ICT tools to improve the quality of teaching- learning activities.

4. Most of the respondents think that internet is a new ICT tool in teaching-learning process.

5. Majority of the respondents are in favor of "No" because they do not develop any new technique for T-L by using ICT?

6. Majority of the respondents are in favor of "No" because they do not modify any existing technique of teaching to suit their classroom teaching-learning by using ICT tools.

Opinion of the teachers regarding the role of ICT in TVE.

1. Majority of the respondents said that ICT is very much needed for development of TVE.

2. Most of the respondents are in favor that Government has enough policy to improve the present condition of ICT in TVE.

ICT tools are used for preparing teaching-learning materials.

Most of the teachers use computer for preparing their teaching materials which is good whereas majority of the teachers take help from OHP for delivering their lecture. Few teachers are used multimedia for their teaching purpose. Internet, one of the important indicators is used by the teachers to prepare for their teaching materials but everybody is not getting enough facilities. From the above it is seen that they are not getting more facilities to use modern ICT tools which will be more effective for teaching.

Opinion on needs of training on ICT.

Most of the respondents thought that training on ICT contribute to enhance their performance in teaching-learning and the quality education as well. That's why most of the respondents thought that they are very much required training on ICT. Only few of the respondents said that they don't need ICT training as they are satisfied with their present condition or they are confident enough to handle the newest ICT tools for teaching-learning purpose with their present skills.

Factors stimulate the use of ICT in TVE.

Majority of the respondents are in favor that ICT tools stimulate for effective & efficient teaching-learning. ICT tools have the greater role for influencing in teaching-learning process in TVE sector of Bangladesh. However majority of teachers said that it is time saving, easy to motivate students, & Economical have significant impact to use ICT in TVE in Bangladesh.

Most of the teachers said that communication is easier, easy to prepare & attractive have a great impact that influences to use ICT in TVE.

Conclusion

The availability of technology is not necessarily a factor for the successful implementation of ICT, yet the absence of technology is a crucial hindrance. The provision of ICT infrastructure does not necessarily mean the use will be higher. If the maintenance is poorly handle than the overall systems are usually unreliable and likely to cause disruption to even the best planned lessons. From this study it has found that available of ICT tools will not improve the quality of education system. But mentality of the teachers should be in such that they can give their attention to properly use Information & Communication Technology in teaching-learning process.

The factors that stimulate to introduce ICT in teaching learning activities in the class room situation that are economical, time saving, easy to prepare, attractive, easy to motivate students, easy to administer, communication is easier & easy to integrate depending on the available of ICT tools. Institutions face problem of unsuccessful management implementation of ICT, because ICT is not seen as a part of the wide – ranging strategy at institutions level still now.

The proper policy development and its subsequent implementation for integration of ICT with economic and social activities can make a quantum shift in status of Bangladesh economy. Bangladeshi people cannot participate in the global ICT revolution, since they will not be connected, there is no point in discussing our ICT potential if we do not build the highway to connect it; Rural Bangladesh will suffer from the digital divide, being left further in terms of access to markets, education, social and health services.

The barrier of the teaching learning activities lack of ICT skills of instructional staffs (teachers), inappropriate instructional materials to meet the objectives of teaching and learning , inadequate motivational techniques to increase the interest to learn. Also lack of training of the teachers on ICT is a major barrier to improve the quality of the education. Updating of these skills may improve the quality of the present education. The education should be free from political factors. Even the family background, economic condition, psychological attitude, poor mentality and behavior of the teachers and students are the remarkable factors that limit the proper integration of ICT in the polytechnic level. Most of the teachers in each polytechnic institution are not getting proper facility to use computer, internet. Multimedia due to shortage of teaching aids. But

if they get proper facilities to use Information & communication technology in their teaching learning process than they will be able to develop the quality of education.

Recommendation

Depending on the research findings as outlined in this chapter and the discussion on emerging factors resulting from the evidence of gathered data, the researcher formulated recommendations for future actions to achieve greater impact in both areas of teaching and learning in the polytechnic institutions of Bangladesh.

- ICT tools should be provided to each polytechnic institution so that each of the teachers gets facility to use in classroom situation.
  - Teachers should give their attention to use information & communication technology in their teaching-learning process.
  - Teachers should stimulate the students to use internet for collecting necessary information for their education.
  - Government should provide enough budgets to ensure the requirement of ICT tools and machineries for each classroom. Every teacher should have at least one computer with internet connection.
  - Government should take proper policy to train the teachers for their respective field as well as in information & communication technology.
  - Education should be free from political factors.
  - In this study it was found that teachers' motivation is a critical factor in ICT adoption. Policies in this area should include measures raising the confidence levels of the teachers (by giving appropriate in-service and initial teachers' training in ICT) and also by rewarding them for the use of ICT.
  - The technology is ever changing. Depending on the future demand, government should take appropriate action to introduce ICT in school level. Research should be done for improving the present situation of education as well as technology of the country.

Effective implementation of ICT in educational institutions of Bangladesh largely depends on teachers and principals, teachers who require in-depth professional development due to lack of knowledge and skills, vigilant attention needs to be given to in-service teacher training for both

teachers and principals and pre-service training for newly appointed teachers before joining the regular classes to acquaint them with the important role of technology in schools settings and to train them on how to prepare and use ICT competently. Professional development is necessary for teachers to enable them to effectively use technology to improve students' learning. Staff development should be collaboratively created, based on faculty input and school needs. It must prepare teachers to use technology effectively in their teaching. But this training should not consist merely of short workshops or training, which is not enough to build proper knowledge and skills. In relation to this argument, Fullan (1992) suggested that training should not be one-shot workshops, but rather ongoing experiences so that learners/teachers can be kept up to date with ever-changing technologies. As ICT is relatively new field in Bangladesh education system, more in-depth research should be conducted related to integration of ICT into classroom situations, to show that ICT can make their lessons more interesting, easier and efficient.

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