Quality of ICT Service at Higher Educational Institutions in Bangladesh

H M Jahirul Haque and Manjurul Haque Khan

Abstract—A survey was conducted in order to scrutinize the users' evaluation of Information Technology Service in the higher education sector in Bangladesh in terms of quality. Ten universities (both public and private) of Bangladesh were selected in order to conduct the survey and the sample was taken on a random basis from the selected ten universities. The selected respondents were asked to evaluate the quality of IT service they get from their respective universities. A five point 'likert scale' has been used to quantify the variables used in the survey. The result of the survey shows that the variables—no. of computers, availability of necessary software, speed of internet, data sharing facilities—are statistically highly significant. That is, these variables are highly associated with quality IT service in the higher educational institutions of Bangladesh. Moreover, antivirus facilities, availability of supporting staff, quality of service are also significant.

Keywords—Quality, ICT, university, facility, software, Internet, data, variable.

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1 Introduction

THE advent of Information and Communication Technology has revolutionized the teaching, learning and research scenario at higher educational institutions all over the world. Information and Communication Technology has changed the teaching and learning environment of higher educational institutions by providing up to date information, informing the latest activities in a particular field and also in many other ways. Although Bangladesh is a small country with a large population and it has one of the least developed economies, higher educational institutions of Bangladesh are not out of the influential arena of ICT. In this study, the users' evaluation of ICT service in terms of quality has been explored.

During the last two decades, use of ICT at higher educational institutions of Bangladesh has developed rapidly, changing the traditional teaching and learning scenario and developing new skill as well. Both public and private universities have been developing IT infrastructure as a priority basis. Now Bangladesh has 31 public universities and 54 private universities. Most of them provide ICT service to students as well as faculty members. The rest few are considering seriously to introduce ICT service, as ICT has become inevitable part of higher education all over the world. So to say, introduction of ICT service in higher educational institution is seen as an important step for higher education in Bangladesh.

Although most of the higher educational institutions in Bangladesh provide ICT service, the quality of the service varies from institution to institution. Quality of ICT service depends on several factors, such as- no of computers, performance of equipments, data sharing facilities, speed of internet, availability of software so on and so forth. This study tries to analyze the users' evaluation of Information and Communication Technology Service in the higher education sector of Bangladesh in terms of quality.

2 What is Quality and Quality ICT Service?

The term 'quality' is a relative term and 'quality' is understood differently by different people. The term "quality" is derived from the Latin word "*qualitas*" that means the degree of excellence of a thing (Oxford Dictionary, 2003). According to ISO 9000, quality refers to— "Degree to which a set of inherent characteristics fulfills requirements." American Society for Quality defines 'quality' as—

a. The characteristics of a product or service that bear on its ability to satisfy stated or implied needs.
b. A product or service free of deficiencies.

According to Japanese philosophy, quality is "zero defects—doing it right the first time.

Quality ICT service has become more and more important in the organizations of the 21st century, no matter whether it is a business organization or a non-profit organization or an educational organization. Especially in higher educational institutions, it has significant value. In order to ensure right and desired information at the right time, ICT is playing an unprecedented role in modern information world. Moreover, in order to be informed the latest work in a particular field, there is no alternative of quality ICT service. ISO 20000 IT Service Management Standards emphasizes on Service Delivery Processes, Relationship Processes, Resolution Processes, Release Process, Control Processes in order to define standard ICT service.

As there is no universal definition of 'quality', it is im-

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portant to understand the users' perception of quality in a particular field.

3 Research Methodology

Several statistical analytical techniques such as Multiple Regression Analysis, ANOVA have been used to measure the level of quality Information and Communication Technology (ICT) provided by the higher educational institutes in Bangladesh.

Both primary and secondary type of information has been used in conducting the study. Secondary data have mainly been used in order to develop the conceptual framework of the study. Primary data, on the other hand, have been used to analyze the users' perception of quality Information and communication Service at higher educational institutions of Bangladesh.

Various statistical techniques have been used in order to quantify different parameters used in this research. A psychometric scale, namely 'Likert Scale', has been used in order to spacify the level of agreement of the respondents with 14 parameters. These 14 parameters have been used to evaluate the performance of the existing systems as well as facilities available at higher educational Institutions of BangladeshFor papers accepted for publication, it is essential that the electronic version of the manuscript and artwork match the hardcopy exactly! The quality and accuracy of the content of the electronic material submitted is crucial since the content is not recreated, but rather converted into the final published version.

3.1 Data Collection

Primary Sources:
Data from primary sources can be considered as the blood stream of a research project. In the study, Questionnaire Method has been used to collect primary data—

Questionnaire:

A carefully designed questionnaire was distributed among a sample group consisting of 281 persons. Among them 257 respondents were students and the rest ones were faculty members. The questionnaire was designed in such a way that perception about quality IT service in terms of users' point of view can specifically be measured. In order to assess the quality of service provided by IT dept, 14 variables are used. The items were applied to measure on a 5 point 'Likert type' scale (Likert, 1932). In the measurement, scale 1 indicates strongly disagree and scale 5 indicates strongly agree. The respondents select the appropriate point the best indicates how they would describe the attributes being rated.

The questionnaire was pre-tested and finally survey was conducted on 251 IT users from ten universities of Bangladesh.

Sampling:

As conducting the study with the entire population is nothing but impossible, a researcher needs to design the sample in such a way that the sample taken represents the entire population. In the study, 281 respondents were included from ten public and private universities.

10 private and public universitits were primarily selected in order to conduct the study. As the study is interested in assessing the perception of quality IT service provided by those institutions from users' perspective, only IT users of those universities were included in the study. The survey was conducted among 281 respondents--among them 77 are from public universiites and the rest are from private universities.

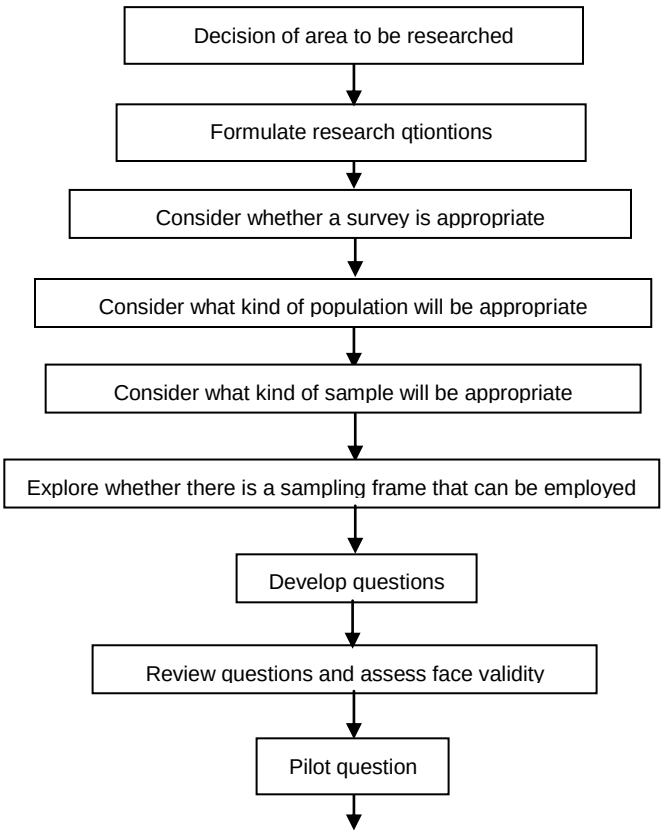
Here is a list of respondents among whom questionnaires were distributed—

TABLE 1
LIST OF RESPONDENTS IN THE STUDY

Type of Organization	*Type of Respondents*	*No. of Respondents*
Public University	Faculty	17
	Students	60
Private University	Faculty	7
	Students	197

3.2 Research Design

Multiple steps were followed in conducting the questionnaire survey. The basic steps which were followed in the survey have been shown in the following figures:



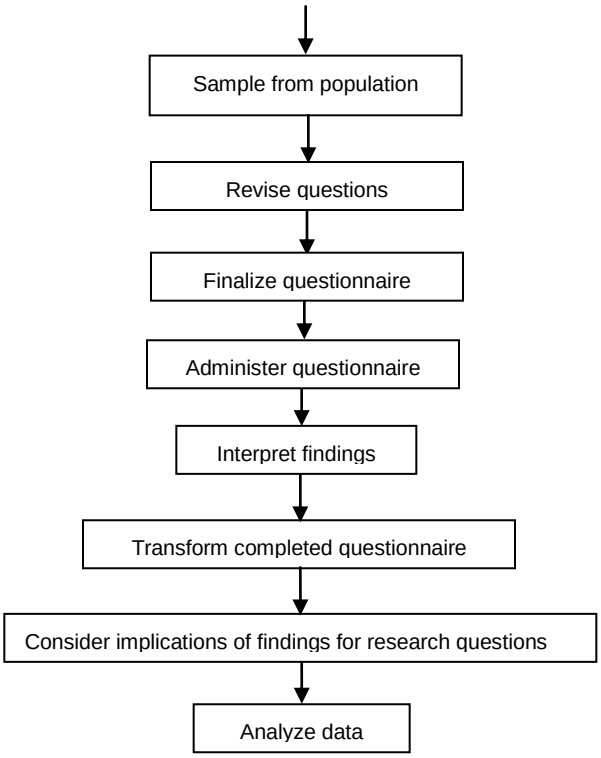


Figure 1: Steps followed in the survey.

3.3 Conceptual Framework

This study aims at identifying the factors that affect quality IT services at the higher educational institutions in Bangladesh. In order to conduct the study successfully, fourteen independent variables related to quality IT services have been selected. The independent factors used in the study are—

a. No of Computers
b. Printing facilities
c. Performance of equipment
d. UPS support
e. User friendliness of the software
f. Update version of software
g. Availability of software
h. Antivirus facility
i. Internet facility
j. Speed of internet
k. Data sharing facilities
l. Supporting staff
m. Quality of service
n. On time service

Number of computers and performance of equipment are one of the important factors in providing quality IT service. If numbers of computers are inadequate, no quality service is possible. On the other hand, quality service largely depends on the performance of equipment. Even if there are adequate numbers of computers, but performance of the computers are not satisfactory, no satisfactory ICT service can be made possible.

Printing facilities and UPS support are also expected. People may expect printing facilities in order to print their desired information. UPS support is necessary for uninterrupted work.

User friendliness of the software, update version of software and availability of software are also important factors to be considered. Software need to be user friendly so that users can operate it easily. Usually people do not want to deal with complex software. Rather they like software those are easy to operate. Many commercial software companies offer up date version of their existing software time to time. These up date versions sometimes carry new features and better approach of the existing features. So, in order to create satisfy users, attention needs to be concentrated on these factors too.

Everyday many computer programmers are creating computer VIRUS and these VIRUS are being spread out through internet. Sometimes they are fatal, sometimes they only make our computers slow. Whatever it is, computer VIRUS is a direct threat to ICT network and performance. Anti-VIRUS facilities provide security to our soft world.

Moreover, internet facility, speed of internet, and data sharing facilities also play a vital role in quality IT service. In providing quality service, it is to guarantee a certain level of data sharing facilities. If network capacity is insufficient, it will cast negative shadow over the entire performance.

Quality of supporting staff and willingness of proving service are also important. It is human who make things done.

4 Data Analysis

In order to measure quality of information technology service in higher educational institutions of Bangladesh, multiple regression technique has been applied. No of Computers are Sufficient (Q1), printing facilities provided by your Institutes are satisfactory(Q2), Performance of ICT equipments is satisfactory (Q3), UPS supports provided is satisfactory (Q4), Software provided by the Institutions is user-friendly (Q5), Update version of software are regularly provided by the Institution (Q6), Necessary software at your Institution are widely available(Q7), Antivirus facilities provided are satisfactory(Q8), Internet facilities provided by the Institutions are sufficient(Q9), Speed of Internet is satisfactory(Q10), Data sharing facilities within Local Area Network are satisfactory(Q11), Supporting staff are available whenever necessary(Q12), Service of the supporting staff is satisfactory(Q13), and Service is provided on time (Q14) are taken as independent variables, while Quality information technology service(X15) is taken as dependent variable. Regression results are shown in the following Tables. In the table, all the variables are shown with their respective regression coefficients (βs) and computed users' t statistics along with their respective significance levels have also been shown. Results of the regression analysis reveals that out of fourteen independent variables, four variables such as no. of computers, availability of necessary software, speed of internet, and data sharing facilities have statisti-

cally significant effects on the effective and efficient IT service of the concerned institutions in the study.

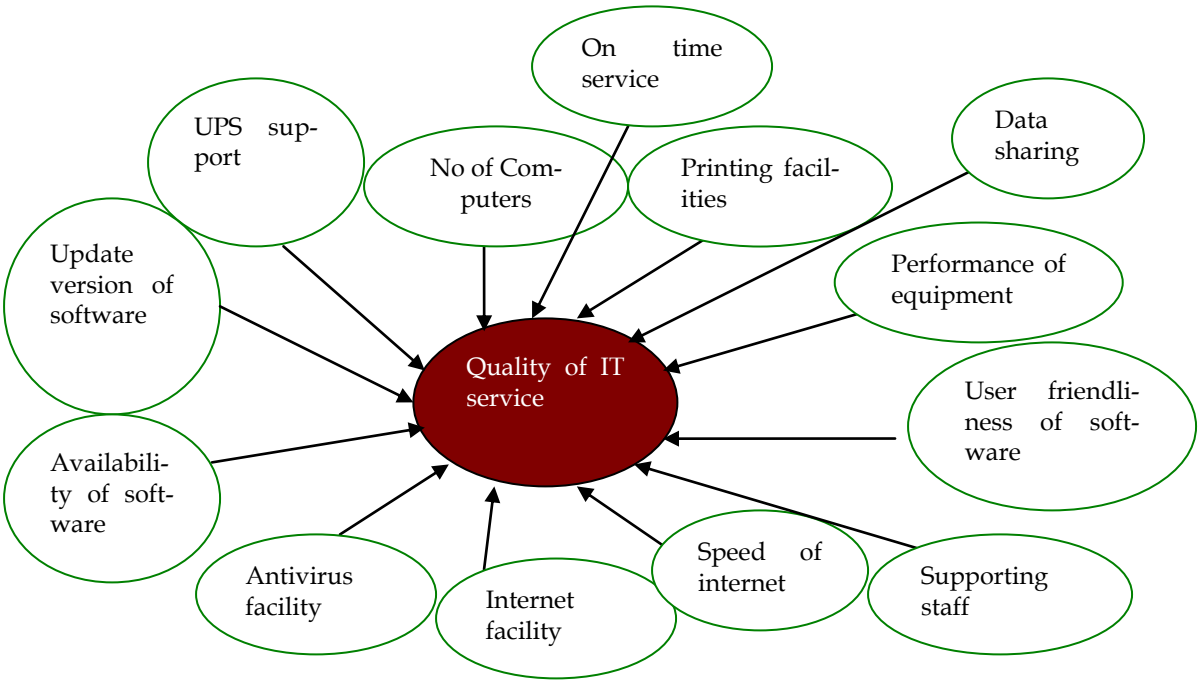


Figure 2: Conceptual Model for quality of IT service of higher educational institutions in Bangladesh.

X15 = Dependent variable
$R^2 = 0.831$
Adjusted $R^2 = 0.822$
F= 93.318 which is significant at .000 level
n= 281

TABLE 2
VARIABLES ENTERED/REMOVED

(b)

Model	Variables Entered	Variables Removed	Method
1	Q 14, Q 1, Q 7, Q 4, Q 10, Q 8, Q 2, Q 6, Q 12, Q 11, Q 3, Q 9, Q 5, Q 13(a)	.	Enter

a All requested variables entered.
b Dependent Variable: Q 15

TABLE 3
MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.912(a)	.831	.822	.52334

a Predictors: (Constant), Q 14, Q 1, Q 7, Q 4, Q 10, Q 8, Q 2, Q 6, Q 12, Q 11, Q 3, Q 9, Q 5, Q 13

TABLE 4
ANOVA

(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	357.817	14	25.558	93.318	.000 (a)
	Residual	72.579	265	.274		
	Total	430.396	279			

a Predictors: (Constant), Q 14, Q 1, Q 7, Q 4, Q 10, Q 8, Q 2, Q 6, Q 12, Q 11, Q 3, Q 9, Q 5, Q 13
b Dependent Variable: Q 15

TABLE 5
COEFFICIENTS
(a)

Model		Un-standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.278	.102		-2.729	.007
	Q 1	.199	.028	.233	7.123	.000
	Q 2	-.003	.031	-.004	-.099	.921
	Q 3	.030	.037	.031	.802	.423
	Q 4	.013	.031	.015	.414	.679
	Q 5	-.020	.039	-.022	-.528	.598
	Q 6	.002	.037	.003	.064	.949
	Q 7	.124	.034	.127	3.596	.000
	Q 8	.096	.032	.103	2.987	.003
	Q 9	.049	.035	.057	1.411	.159
	Q 10	.235	.032	.275	7.291	.000
	Q 11	.208	.036	.229	5.862	.000
	Q 12	.068	.039	.075	1.733	.084
	Q 13	.102	.044	.112	2.327	.021
	Q 14	-.015	.039	-.016	-.371	.711

a Dependent Variable: Q 15

The result shows that all four variables-- No of computers, availability of necessary software, speed of internet, and data sharing facilities -- are the most important components and these variables ensure Quality IT service in the higher educational institutions. Similarly, among other four variables, such as performance of ICT equipments, antivirus facilities, internet facilities and service of the supporting staff show significant result. That is, those variables are also important in ensuring Quality information technology service.

The result in ANOVA indicates that 83.1 per cent of the variation in the dependent variable can be explained by variations in the independent variables i.e. 16.9 per cent is due to 'something-else'. And those are not included in the model. The significance of F value indicates that there has been a zero per cent chance that the Adjusted R2 value is zero.

5 CONCLUSION

ICT has become an integral part of research and higher education. In this new millenium, one can hardly imagine any research or higher study without ICT service. So, quality of ICT service in higher educational institutions needs to be ensured. This study deals with the perception of quality ICT service from users' point of view. The findings of the study may be specific to higher educational institutions in Bangladesh, but their implications are significant to other sectors as well. The study suggests that no of computers, availability of necessary software, speed of internet, and data sharing facilities are the most important factors in ensuring quality ICT service. Other variables are also playing roles at different level.

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