

# Effectiveness of ISAS in PBM at Secondary Schools in Bangladesh: A Study on a Selected Upazilla

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## Abstract

*Institutional Self Assessment Summary (ISAS) is a tool to achieve the objectives of the Performance Based Management (PBM) in the secondary schools of Bangladesh. The objectives of the study are to check the validity of ISAS report and to apprehend the problems faced by the HTs and field level secondary education officers in fulfilling the ISAS questionnaire, as well as to grasp the solutions of those problems. The team has selected the 'C category' (moderate performing) schools that are middle ranked performing schools of Sylhet zone and from these category of schools again the team has selected nine schools of Sylhet Sadar Upazilla following purposive sampling process. The team has collected necessary information using structure questionnaire through interviewing method. Simultaneously some other techniques of data collection process like questionnaire, FGD, content analysis and cross-checking the ISAS questionnaire provided by the HTs were followed. The information has been processed manually. ISAS reports are being considered as a data bank of the schools. But unfortunately the ISAS questionnaire itself is erratic with problematic options; there are some erratic indicators and sub-indicators which create dilemma to choose the options. The ISAS data mismatch the real situation of the schools. The study team has apprehended that one of the major problems is lack of monitoring by the DEO and USEO regarding this process ISAS. Lack of suitable and adequate training for all field level officials is also a problem. Due to all of these reasons the ISAS report is yet to be accepted as a policy matter.*

## Chapter I: Introduction

### Prelude

In 2005 Government started implementing SPBMS in the secondary educational institutions of Bangladesh . At present all the secondary level schools of Bangladesh are implementing PBM.

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PBM requires assessing the actual state of the institutions for desired development. For this purpose an assessment tool based on a scientific scoring system was developed which was termed as Institutional Self Assessment Summary (ISAS). A unit namely Policy Support, Monitoring and Quality Assurance Unit (PMQAU) has been raised at Directorate of Secondary and Higher Education (DSHE) for supervising the implementation of PBM and preparing the ISAS report. Secondary Education Sector Investment Program (SESIP) also keeps the continuation of PBM and hence ISAS.

### **Statement of the Problem**

The ISAS reports announced so far by the Directorate of Secondary and Higher Education (DSHE) sparked multifarious debates. Firstly, some well functioning renowned schools have been categorized as lower grade schools. Secondly, some malfunctioning or known poor performing schools were categorized as better schools (Ahmed, 2014). Moreover, from the opinions of the Head Teachers in general, who have participated in different training programs at National Academy for Educational Management (NAEM), it was found that without a few exceptions they did not fill up the ISAS Questionnaire by themselves as it is supposed to be done. Rather they employed the Head Clerk or some other teacher(s) for this purpose. They also mentioned that, sometimes they face undue pressure to manipulate information.

### **Objectives**

The general objective of the study is to investigate into the effectiveness of ISAS in PBM at secondary level of education in a selected upazilla of Bangladesh.

### **Specific Objectives**

There are four specific objectives of the present study. The objectives are as follows:

- (1) To check the validity of ISAS report;
- (2) To identify the problems faced by the HTs in filling up the ISAS form;
- (3) To identify the problems regarding ISAS faced by the field level officers;
- (4) To grasp the solutions of the problems identified in the study.

### **Review of Literature**

Two studies have been done in PBM framework though not on ISAS at Directorate of Secondary and Higher Education (DSHE), Bangladesh. Those two works are reviewed here.

1) Hoque et al., (2013a) conducted a study titled Impact of Academic Supervision of Field Level Officers on Secondary School Teachers' Professionalism Development. Their study has identified lack of monitoring, one way implementation strategy and lack of co-ordination among the stakeholders as the main reasons of this failure.

2) Hoque et al., (2013a) conducted a study titled Role of HT in Implementing Performance Based Management (PBM). The study strongly recommended training and administrative support for the HTs on strategic planning and in different aspects of PBM to lead the schools into incremental improvement.

## **Importance and Rationale of the Study**

The importance and rationale of the study have been mentioned below:

- The review of literatures suggests that there exists some sort of knowledge-gap in the area of ISAS. Filling up this knowledge-gap is the main rationale of the study;
- To ensure quality education at secondary level the Government of Bangladesh placed much effort. ISAS holds an immensely vital position in the whole gamut of PBM. If ISAS is not done properly, the whole PBM is subject to be faulty and misleading. The overall quality of education largely depends on ISAS. So it is earnestly needed to evaluate the effectiveness of ISAS;
- The findings of the present study will be helpful to the policy makers and implementing agencies working in the arena of secondary education in Bangladesh.

## **Scope of the Study**

In the present study mainly four aspects of ISAS have been investigated. The validity of the ISAS report has been checked. It is apprehended that the HTs face some problems in filling up the ISAS questionnaire. These problems have been identified. The field level officers also face some problems regarding ISAS. These problems also have been identified. Lastly, probable solutions of the identified problems have been suggested. It is apprehended that as the upazilla has been selected purposively to represent the whole country, the findings of the study have been able to render a real picture of the whole country.

## **Chapter II: Methodology**

### **Selection of Method**

Survey method and Content Analysis method have been followed to accomplish the present study. Interviews are completed by the interviewer based on the respondent says. Both these categories have been conducted in the present study as the supporting techniques of the method. The study utilized both primary and secondary sources of data. The sources are explained below. Primary data have been collected from the following four groups of respondents: Head Teachers, Education Administrators, Planning & Development Wings of DSHE. Secondary Sources have been explored and utilized: National Institutional Self-Assessment Summary Reports prepared by DSHE, PBM materials and Educational Management Information System (EMIS).

### **Sampling**

#### **Selection of Upazilla (sub-district)**

In selecting the upazilla the following three step flow chart has been followed:

Firstly the zone has been selected based on the National Institutional Self-Assessment Summary (ISAS) Report 2014 prepared by DSHE. To make the zone a representative one, the Median ranked zone was selected. The Report shows that, Sylhet zone ranks 5th among the nine zones of Bangladesh. Accordingly Sylhet zone has been selected. From Sylhet zone Sylhet district has been chosen purposively. Again from the upazillas of Sylhet district, Sylhet Sadar has been chosen by purposive sampling process.

## **Selection of Respondents**

The total number of respondents is 29. The sampling of the respondents has been done following both simple random and purposive sampling. Some of the respondents have been selected based on their ex-officio status.

## **Method of Data Collection**

Different tools for different groups of respondents have been used to collect data according to the set objectives. The researchers have followed following five types of tools under the broad head of survey method to collect data from the primary sources:

- (a) Content Analysis
- (b) Cross Checking
- (c) Questionnaire
- (d) Interview
- (e) FGD

## **Chapter III: Analysis of Data**

Data collected through field survey, cross checking and content analysis are analyzed below:

### **ISAS Questionnaire**

Analysis of ISAS questionnaire reveals that there are ten types of problems in the options of the sub-indicators of ISAS questionnaire. The problems are: double barreled (5.78%), confusing (16.89%), inconsistent (7.56%), complicated (1.33%), improper sequence (0.89%), repetition (3.56%), irrelevant (0.89%), too narrow (1.78%), misleading (0.89%) and not universal (4.44%). Two major problems are found in the sub-indicators (SIs), which are mentioned below:

- The options are designed to facilitate the answers of questions representing each sub indicators. Out of 45 SIs there are problems in the options of 28 SIs that is 62.22% options are erratic.
- Another significant problem found in the SIs is that the SIs lack some important dimensions of modern teaching-learning activity like integration of ICT and inclusive education.

SIs were found to be modified by the Planning and Development wing of DSHE without any broad based workshop. The problem here is that, if SIs are modified, the whole Weighting Factors (WFs) associated to the SIs are subject to be changed. As the SIs have been changed without changing the WFs, these WFs don't represent the exact weights.

### **Response of HTs Through Questionnaire**

Data regarding representation of real situation of school the study have found that, only 44.44% HTs think that ISAS data fully represents the real situation of the schools. Among the remaining HTs, 44.44 % and 11.11 % think that ISAS data represents the real situation 'mostly' and 'moderately'. There is provision of correcting the data provided by HTs through ISAS by the FLOs. It is found that the HTs are not regularly informed of the correction. In 11.11% cases they

have been informed and in 88.88% cases they haven't been informed. The authority is supposed to inform the HTs the categories of the respective institutions. The study has found that about 88% HTs know the category of their respective schools. They have mentioned the way of knowing it.

### **Methods used in PBM/ISAS Training at NAEM**

The methods followed in training programs at NAEM are: lecture (88.88%), hands on practice/exercise (100.0%), discussion (33.33%), group work (66.66%), feedback (11.11%) and assignment (11.11%). The methods are not mutually exclusive. So the TSs mentioned more than one method in their response. 'Hands on practice/ exercise' is the mostly used method while 'Assignment' and 'feedback' are the least used methods as these have been found in the study.

### **Response of SESIP Officials**

Responses of the SESIP officials (Assistant Director and Joint Program Director) collected through interview have been compiled below:

- o The HTs do not fill up ISAS themselves. It is done by the Office Assistants.
- o All the data of ISAS are not valid. The causes are:
- o The FLOs do not check validity of ISAS data.
- o The HTs lack necessary knowledge about PBM and ISAS but they do not study the PBM manuals.
- o The HTs put higher score deliberately to get higher grade.

### **Response of Planning Wing, DSHE**

Opinions of the officials of Planning and Development wing of DSHE collected through FGD have been given below:

- o Software used by EMIS has some limitations.
- o The validity of ISAS data is very low.
- o No recognition certificate was awarded to the A, B, C category schools.
- o Data validation workshop was conducted in all of the nine zones.
- o Workshop on ISAS with the HTs was conducted in all the districts except Dhaka and Sylhet districts.
- o Effective coordination is needed among SESIP, Planning wing of DSHE and NAEM.

## **Chapter IV: Findings and Discussion**

### **The Data Generated by ISAS are Invalid**

It was found that the data generated by ISAS are mostly invalid. The findings and reasons are summed up as follows:

- o Problematic ISAS Questionnaire
- o Problematic Options
- o Problematic Sub-indicators
- o Unplanned Change in Sub-indicators
- o HTs do not fill up ISAS themselves

- o Mismatch with the real school situation
- o Inappropriateness of ISAS in extracting data of school
- o Problems faced by the HTs
- o Insufficient time to fill up ISAS
- o Lack of monitoring by FLOs
- o Capability of HTs in filling up ISAS
- o Feedback on ISAS report
- o Problems faced by the FLOs
- o Poor Implementation of PBM

## **Chapter V: Recommendations and Conclusion**

### **Recommendations**

The following measures are recommended to enhance effectiveness of ISAS in PBM:

- (01) ISAS questionnaire should be thoroughly revised.
- (02) The software used by EMIS is to be upgraded or changed if necessary for proper analysis of ISAS generated data.
- (03) Regular monitoring of the FLOs should be ensured.
- (04) Regular feedback from DSHE to the schools on ISAS data should be ensured.
- (05) More frequent and effective supervision of DSHE is needed.
- (06) The activities of the FLOs are to be monitored more intensely and they should be motivated anyway for the sake of positive change in their mindset in favor of ISAS and PBM.
- (07) The HTs should be trained properly and more often.
- (08) The time for sessions on ISAS can be extended and the training should be more activity based.
- (09) The capacity of the trainers, especially the concerned trainers of NAEM should be enhanced on priority basis. More domestic and overseas training should be arranged for them.
- (10) Effective coordination among NAEM, SESIP and P & D wing of DSHE should be ensured.
- (11) Due emphasis should be placed on proper implementation of PBM.
- (12) Data generated by ISAS should be used by appropriate authority as database for the school development plan.
- (13) Government should give due approval to PBM as policy matter.
- (14) Undue political influence in school development should be stopped.

### **Conclusion**

As we have learnt that ISAS is the important component of assessment of performance based secondary education management in Bangladesh, it is unfortunate that this component itself has been found faulty and difficult to conclude the decisions. The options regarding the questions are in dilemma in some cases. The HTs and FLOs are facing problems while they are to fill up the questionnaire accordingly. Simultaneously, the HTs and the FLOs are not capable enough to fill up the questionnaire and take decisions where it seems faulty. Some of the trainers of NAEM for PBM training are not up to the mark for providing appropriate training to the HTs. So ISAS, being a strong tool of assessment of PBM for secondary educational management, is not being used properly or

not being handled properly by the allied personnel. Sometimes the actual needy or vulnerable institutions are being deprived of favors from both the government or non-government sectors. It is worth mentioning that, only ISAS report or data can ensure equal opportunities for the institutions. The study attempts such an approach to solve all the problems regarding the highest achievement of ISAS report of PBM. The study has apprehended that some recommendations are needed for this purpose. It is being expected that the respective authority of DSHE and MoE can be enriched by these recommendations. It is to be mentioned here that the above mentioned recommendations have been prepared with field level responses and recommendations from NAEM trainers, DSHE personnel, participants of the seminars and the study team members as well.

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# ICT in Education: Exploring the Utilization of Wireless Local Area Networks (WLANs) for Educational Purpose at the University of Dhaka

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## Abstract

*Wireless Local Area Networks (WLANs) have become progressively popular, predominantly in education areas (Han, 2008). Hence, WLANs are being adopted in larger number by university authorities. A lot of planning and budgets are allocated for enhancing WLANs connections in the tertiary level of education for uplifting the digital knowledge and skills amongst the students. But it is yet unknown to the higher education authorities either WLANs' impact is good or bad on students, utilization of the WLANs for educational purpose. This study was conducted to reveal the real situation. This study mainly focused on exploring the educational purposes of using WLANs in Dhaka university campus. A mixed method design (Creswell, 2012) has been employed to conduct the study. To accomplish the study data have been collected from teachers, students and administrative personnel form University of Dhaka by using semi-structured interview schedule, semi-structured questionnaire and FGD. The data were analysed in mixed approaches using simple statistics and thematic analysis process and presented through tables and graphs. The result and detailed analysis of the study have brought out mainly four educational purposes lying behind the using of WLAN in Dhaka university campus those are completing classwork, self-development, research and using WLAN as a Tool in the Teaching-learning process. At last, some recommendations are given for deploying, managing and improving the wireless services in educational settings of the University of Dhaka.*

**Keyword:** WLANs; educational purpose; mixed method; University of Dhaka

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## **Background and Rationale of the study**

Today's students are digital natives. Today's student love digital devices: iPhone, iPod Touch, smart phone, laptop/netbook etc. With Wireless Local Area Networks (WLANs) service on university campus, students with WLANs enabled devices can enjoy surfing on internet and facilitate themselves by many ways. This will likely to extend their time of practicing technology skills as well as academic studying (Sharp, 2001). For that educational institutions can develop collaborative and interactive learning and enhance the digital studies curriculum by providing WLANs to students, staffs and faculties.

Wireless Local Area Networks (WLANs) are being adopted in larger number by university authorities. A lot of planning and budgets are allocated for enhancing WLANs connections in the tertiary level of education for uplifting the digital knowledge and skills amongst the students. But it is yet unknown to the higher education authorities either WLANs' impact is good or bad on students, utilization of the WLANs for educational purpose. So it is crying need and demand of the present time to know the real situation through research. Considering these, the researchers were interested to conduct this study.

Schwartz (2002) asserted that WLANs offer learners to access a wealth of learning resources, to communicate with others outside the classroom. To give new opportunities for collaborative learning, to work with individualized learning styles. Similarly many researchers supported this although some researchers are alarmed to utilize properly thinking it will harm the students' learning. To understand and measure the situation, the researchers were keenly interested in conducting such a research study.

## **Research Objectives**

The main aim of this study was to explore the actual use of on-campus WLANs by the students. In accordance with the research aim, the research specifically focused on the following specific objectives:

1. to figure out the proportion of using on campus WLANs by the students and teachers ,
2. to find out the used devices for connecting to the campus WLANs,
3. to identify the educational purposes of using WLANs in the campus

## **Research Methodology**

The study followed mixed methodology because, the research objectives of this study were aimed to obtain both quantitative and qualitative answers from students, teachers and administrators.

In this study, both quantitative and qualitative data were valued with equal importance. Both the kinds of data were collected concurrently and they were analysed and merged to yield similar or dissimilar data. In this research, how both the kinds of data were dealt with is shown in the following figure:

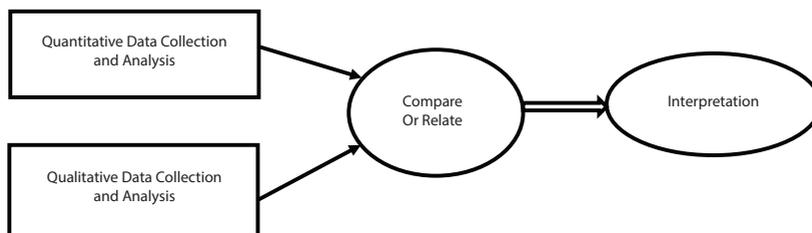


Fig-3.1: Convergent Parallel Mixed-method Design followed by the Study (Adapted from-Creswell, 2012)

For this study, the university was chosen conveniently. Among 13 faculties and 11 institutes, four faculties and one institute were selected through random sampling. Students were selected through random sampling process and teachers were selected by purposive sampling process. Area, faculties and institute were selected with considering the easy access of the researcher and to complete the research perfectly and minutely in imposed date.

The primary data source was the respondents and various related documents of university like budget book of university. Secondary data was collected from related articles, journals, books, documents etc. In the sample frame there were 370 samples in total. Among them 350 students, 15 teachers and 05 administrative personnel were in the sample frame. For the limitations of time and convenience of the researchers the sample size was confined to 370. The whole sample design is given below-

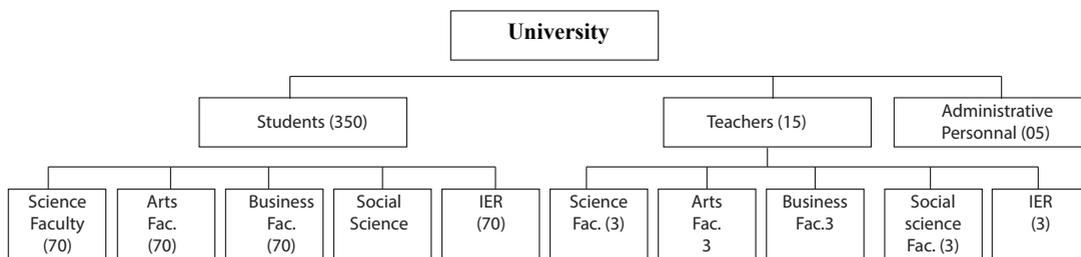


Fig.-3.2: Sample of the study

For this study, following data collection tools were used:

- Semi-structured Questionnaire for the students,
- Semi-structured Interviews Schedule for the teachers and administrative personnel,
- Focused Group Discussion for the students,

## Analysis of Data

This section is divided into several segments and presented the findings with analysis.

### Proportion of using WLANs in campus

In this portion, proportion of using WLANs is described from students' views and teacher's views.

Maximum Students (154 students out of 350, data collected from Semi-structured Questionnaire for Students) used WLANs in campus. The proportion of using WLANs by students is presented below with a graph:

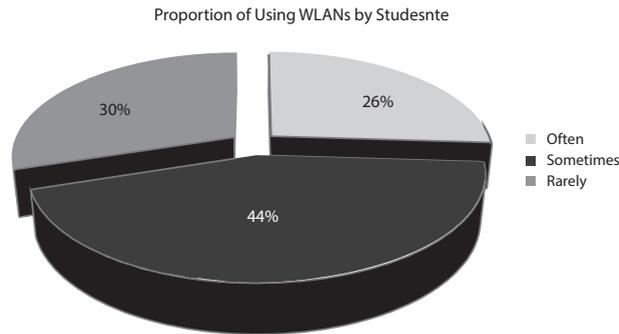


Fig.-4.1: Proportion of Using WLANs by Students

The figure indicates that 44% students sometimes used WLANs whereas 30% and 26% students respectively used often and rarely. When the researcher asks the students, “How often do you use the WLANs in campus?” they give prompt replies. Most of the students reply “We sometimes used WLANs in our free time and when we felt need.”(FGD2) Another group of students say, “We rarely used WLAN in campus because of tight schedule.”(FGD4).

On the other hand, some students often used WLAN in campus. They told that in this digital age we can’t go a moment without the help of WLAN and its connection. In the times of teachers’ interview, they expressed that most of them (8 out of 15) used WLAN often, some of them (4 out of 15) used sometimes and rest of them (3 out of 15) used rarely. Most remarkable quotation came from them that WLAN is like a daily usable tool which is used for various educational purposes. That means it can be generalized that most of the students (44%) sometimes used WLAN and maximum teachers (8 out of 15) often used WLAN in campus.

## Devices used for WLAN connection

The total responses of teachers & students are being combined here through a graph to generalize about the devices used for connecting to campus’ WLANs.

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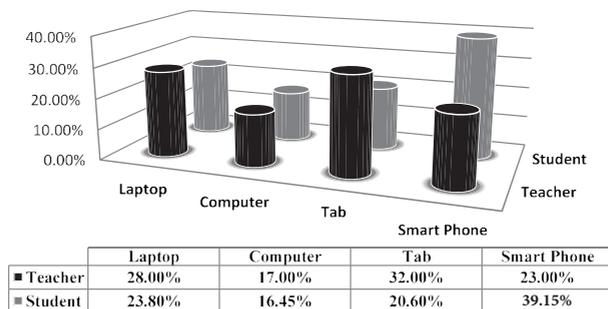


Fig-4.2: Combining picture of the Teacher’s & Students response about the devices used for connecting to campus’ WLANs

The above figure represents 28% Teachers' & 23.80% Students say that Laptop is used as a connecting device to the campus' WLAN. 17% of Teachers & 16.45% of Students say that they use Computer as a connecting device to the campus' WLAN. From this figure it is also shown that teachers and students used Tab as a connecting device to the campus' WLAN respectively 32% and 20.60% cases. Another noticeable thing is shown in the graph that 23% teachers and 39.15% students used Smart Phone as a connecting device to the campus' WLAN.

In the FGD session, students also said that they used sometimes laptop, sometimes smart phone but most of the time they used smart phone. One participant of the FGD said that-“I used Android phone to connect in our wifi-zones. Because it is easy to carry and always I carry this phone in the campus. (FGD<sub>1</sub>)”

Therefore, it can be generalized that most of the Teachers (32%) used Tab & most of the Students (39.15%) used Smart Phone as a connecting device to the campus' WLAN.

## Educational purposes of using WLAN

In this segment, this prominent research's objective is analysed under several sub-segments in turn by using thematic analysis process followed by **Creswell, J.W., 2012**.

Educational purposes of using WLAN in campus are documented here from what teachers and administrative personnel say during the semi-structured interview and what students say during the FGD and semi-structured Questionnaire in time of the data collection stage.

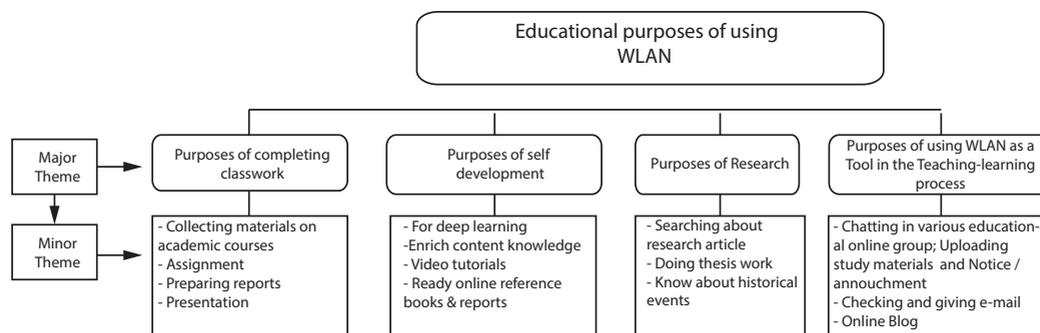


Fig.-4.3: Educational purposes of using WLAN

### Major theme-1: Purposes of completing classwork

This is one of the major purposes in using WLAN in campus. And under this purpose, there are also four other minor purposes which are analysed below :

#### i) Collecting materials on academic courses

In the semi-structured interview, teachers have been asked about the purposes of using WLAN in campus. Most of the teachers (87.5%) indicate it as one of the main educational purposes of

using WLAN in campus. One of the teachers says, “It is known to all that for conducting classes the usage of WLAN is needed. In the times of critical lesson topic we need the connection of WLAN for making students understand by showing various related article, images, videos etc. Besides, there are numerous items to display.” (*Teachers Interview/TI4*)

In this regard, other teachers speak out that- “The prerequisite of using digital system like digital content is the connection of WLAN. It helps to find the updated and latest material on academic courses.” (TI7)

This scenario is also found when the researcher has conducted FGD with students. Most of the students opined that they used WLAN for collecting relevant academic courses. The students also opined their opinion in this regard in the open ended section of the semi-structured questionnaire. One comment is presented here from the semi-structure questionnaire- “I use WLAN in campus for educational purpose specially to collect academic materials like reading online material, to make hand notes etc. (Ahona, Pseudonym) ”

One response from students FGD is quoted here to understand the existence of this purpose. Shoban (Pseudonym) has stated that- “WLAN is a medium of education which is mainly used by me for collecting educational materials such as documentary, online learning materials etc.” (FGD2)

## **ii) Assignment**

Analysing the evidence from teachers and students collected by different tools it is revealed that in using of WLAN in campus is another key educational purpose.

In line with the support of this one teacher expresses that- “Our students use WLAN for various purposes. But it is increasing in the time when we give them assignment or group work on the recent issues or something like that. Sometimes we also use it for our personal assignment.” (TI8) Comments from students FGD and Semi-structured questionnaire also point out it as one of the educational purposes. One comment from students FGD is presented here: “Sometimes when our teachers give us assignment we use WLAN for collecting materials regarding the assignment. We browse several sites for collecting understanding the topic, completing the assignment, adding variation and update information into it.” (FGD<sub>2</sub>). Zaynul (Pseudonym) says that he used WLAN in the purpose of collecting assignment resources.

## **iii) Preparing Reports**

During the semi-structured questionnaire students are asked about this. 75% students opine regarding this.

Rizvi (Pseudonym) from students FGD says that their department has no scope of submitting reports manually. All the students have to submit their reports through e-mail or educational group by using WLAN connection. WLAN is vastly used for preparing reports, he thinks. (FGD<sub>2</sub>)

In support of this statement, some teachers speak out that- “In this digital age we encourage our students to use WLAN for preparing their assigned reports and submitting them by using it. Besides various related information is gathered by the help of it. It helps our higher education with providing a new dimension. TI11)

In line with the statement, content specialists also identify this as a big challenge for some schools. Basically which are situated in the remote areas or which schools are non-government schools in a nature.

#### iv) Presentation

This is one of the educational purposes of using WLAN in campus. Most of the students (67.5%, evidence from semi-structured questionnaire) point toward this purposes. And also in the FGD, students raise their fingers to this purpose.

According to Yasmin(Pseudonym) -“I think, most of the students including me use WLAN for the purpose of completing presentation. By using WLAN we can relieve our extra tension.” (FGD<sub>12</sub> & FGD<sub>14</sub>).

In this regard, Jessica (Pseudonym) also comments , “I use WLAN in the preparing of my presentation. I make my presentation most appealing with different images, data and figure by searching in the internet after connecting in the WLANs.” (From Student’s Questionnaire)

### Major theme-2: Purposes of self-development

This is another major educational purpose of using WLAN in campus. Beneath this challenge, there are four minor purposes which are analysed below through gathered substantiation from teachers and students.

#### For deep learning

Assembled data from students’ semi-structured questionnaire reveal that maximum students (77.5%) have specified this as a big purpose of using WLAN in the campus. Students’ response from the FGD also proves this item to be a big purpose.

Table-4.1:Group responses about “For deep learning” from students FGD

FGD	Responses about “For deep learning”
FGD <sub>1</sub>	“It is not so easy to make clear concept on learning without the help of internet wherein WLAN works as a provider.” (Robin,<Pseudonym> “WLAN is very much important for all types of content like essay, recent issues, writing, paragraph writing, etc. for collecting all about these” (Jerin,<Pseudonym>)
FGD <sub>2</sub>	“We use it for our further learning and for making our concept clear by removing ambiguity.” (Kripa,<Pseudonym>)
FGD <sub>3</sub>	“I use it basically for making my learning deep and lucid.” (Shimul,<Pseudonym>)
FGD <sub>4</sub>	“For clearing and updating my knowledge I frequently use WLAN as a connector.” (Jacob,<Pseudonym>)

Apart from these, all of the teachers (100%) have also agreed about this. Among them, one teacher affirms that- “Students use WLAN for their further reading and deep learning. There work a lot of issues behind it like level of students’ grade, perception, acceptance, attitude, and some constrains of educational institutes.”(TI8)

### **Enrich content knowledge**

Collected data from teachers through semi-structured interview schedule disclose that all the teachers (100%) have opined that they use WLAN for enriching their content Knowledge. They also mark this item as a key purpose of using WLAN in the campus.

In line with the statement one teacher asserts that- “Using WLAN in the teaching-learning process is often attached students in the enrichment of content knowledge. For instance, when teachers show a video clip or audio for facilitating learning, students start to think about the video clip or audio to enrich their knowledge. Their brains focus on it, and they become able to enrich their content knowledge by further reading by using WLAN.”(TI<sub>1</sub>)

Students also focused that on it. They provide an example that when teachers use video, online or streaming audio-video, or search any important information by using WLAN they find the way to go through the site. As such they can enrich their content knowledge. They also enrich their content knowledge in their suitable time by self-study through using WLAN. (FGD2)

### **Video tutorials**

Most of the students (**almost 37%**) use WLAN in the campus for learning from video tutorials. In the time of data collection by using GD and questionnaire they gave their opinion on it.

One of the students in the questionnaire said that-“I usually visit various video tutorials sites like 10 minute school.com, YouTube site etc. for knowing about my unknown things or solving my problem by myself. Here WLAN helps me a lot. (FGD<sub>15</sub>)”

Teachers also underline that-“A video tutorial is one of the substitutions of a teacher. It is like a springboard. We use it for our better upgrading at a time our students also use it for their self-learning. In this regards, WLAN works as a free supplier of internet. (TI<sub>7</sub>) ”

### **Ready online reference books & reports**

This purpose is identified from the teachers’ and students’ responses collected via semi-structured interview schedule, semi-structured questionnaire and FGD. Half of the teachers (50%) have opined that using of WLAN helps to provide ready online materials like books, reports etc.

One remarkable comments from teachers interview is presented in this regards-“Now-a-days most of the faculty members of the university take class preparation from the ready online reference books and reports. These reports help them make an upgraded and standard class lecture within the short period of time span. Here, we only use the WLAN connection. (TI<sub>9</sub>)”

In a similar way, students also claim that WLAN helps them to find the readymade material like pdf books, readymade ppt files, reports on various issues by searching internet. About 52.5% of the students have marked this as one of the minor purposes of using WLAN in the campus.

Correspondingly, same comments are found from students' FGD. From their comments, significant one is presented here -“I collect ready online books like PDF book, download them to read in. I use WLAN for collecting book form various website with free of cost. (FGD<sub>4</sub>)”

### **Major theme-3: Purposes of Research**

This is another prominent major educational purpose of using WLAN in the campus. This major theme consists of three minor themes which are described below-

#### **a) Searching about research article**

Assembled data from students' semi-structured questionnaire reveal that most of the students (**40, 82.5%**) have strongly agreed on the point that they use WLAN in the purpose of Searching about research related articles.

In similar fashion, students FGD responses also identify this as a big educational purpose. The glimpse of students' responses regarding this is illustrated in the following: “In my thesis semester I fully use WLAN only for searching various research articles in the various sites like Research gate, JStore etc. (FGD<sub>9</sub>)”

In this regards teachers also opined that they use WLAN for collecting information to fulfil their research article, to complete their research work. One teacher comments that-“I use WLAN for goggling in the research sites for collecting research related data, to find the related literature, figures and to find an idea about overall background of the research. (TI<sub>4</sub>) ”

#### **b) Doing thesis work**

Maximum students (37%) have asserted that they use WLAN for doing their thesis work. This is found from the opinion in the time of data collection by semi-structured questionnaire.

The scenario is also found in the time of FGD session where students opined that-“Our thesis work cannot be thought without using WLAN's of the campus. Because only departmental WLAN connection allows us to browse in the specific research sites like JStore, Research gate, Global education journal etc. sites to download and read the necessary articles for our thesis work. (FGD<sub>5</sub>)”

In the interview session teachers also opined in favour of this. One of them pointed that-“Without the help of collecting information from internet by using campus WLAN, it is not possible for the students to collect data about their thesis work. Contract with the other university research work, contract with the various research sites allow anyone to browse those sites by using the WLAN connection of the university. Anyone cannot be able to browse those sites from the outside of the campus. (TI<sub>11</sub>)”

#### **c) Know about historical events**

This is another minor educational purpose. Most of the students (49%) use WLAN for

knowing the various historical events. In the FGD session one students remark that-  
 “I use WLAN in the campus to know about our different historical events like the declaration of independence, the memory of the 1971’s, the story of the 21st February. Because in the You Tube there are a lot of videos and documentary on it by seeing those I can able to know about the history of our liberation war and many other historical events. This also helps our education. (FGD<sub>4</sub>)”

In line with the students’ voice most of the teachers (**8 out of 15**) also agree on this matter. They told that-“In the historical research, it is important to know fully about the specific historical events. In this case using of WLAN helps to find the related information, videos, documentary etc. for completing the historical research. (TI3)”

**d) Major theme-4: Purposes of using WLAN as a Tool in the Teaching-learning process**

In this segment, one more major educational purpose of using WLAN is analysed classifying it into three minor educational purposes. All the challenges are analysed according to proof collected from teachers’ and students’ response.

**i) Chatting in various educational online group; Uploading study materials and Notice / announcement**

Teachers and students have identified that Chatting in various educational online group; Uploading study materials and Notice / announcement is one of the most significant educational purposes of using WLAN in the campus. They opine about this through semi-structured interview schedule, questionnaire and FGD.

Maximum students (55% <data collected from students’ semi-structured questionnaire>) have strongly agreed that they use WLAN in the campus for following their online study group. One of the students said in the open ended portion of questionnaire that- “I use WLAN in campus for educational purpose specially to chat in our speaking English group where we try to express ourselves.”

Harmoniously, they also give same opinions when the researcher has been conducting FGD with them. The pivotal opinions from Student FGD regarding this are presented in the following table:

Table-4.2: Group responses about “Chatting in various educational online group; Uploading study materials and Notice / announcement” from students FGD

FGD	Responses about “Chatting in various educational online group; Uploading study materials and Notice / announcement”
FGD <sub>1</sub>	“I always use WLAN in the campus for knowing upgrade about the class and exam from our educational Facebook group.” (Riya,<Pseudonym>)

FGD <sub>2</sub>	“If teaching and learning of English are possible by interacting in the online group , why we do not use WLAN in the campus.” <b>(Quoted by Arjun, &lt;Pseudonym&gt;)</b>
FGD <sub>3</sub>	“As I am the class representative I often use WLAN for uploading study materials provided by the teachers and posting any notice regarding the exam or classes.” <b>Nakib&lt;Pseudonym&gt;.)</b>
FGD <sub>4</sub>	“Getting update information about class and exam, downloading the uploaded study materials for the study group, I usually use WLAN in the campus.” <b>(Akbar,&lt;Pseudonym&gt;)</b>

In the same way, teachers have addressed this as educational purpose. The maximum number of teachers (**75%**) opine that WLAN is used as a teaching-learning tool for Chatting in various educational online groups; uploading study materials and notice / announcement.

Teacher<sub>12</sub> delineates that- “In my class I used Facebook educational group as an online platform where I update students about the class and exam schedule. Sometimes I upload some valuable study materials like PDF file, power point presentation file etc. to make students understand. Here the role of WLAN is very important.”(T11)

While the researcher was taking semi-structured interview with the teachers, he also found that one post in his Facebook group to make students know about the time of class when the class will be held.

After all, it can be undoubtedly assumed that chatting in various educational online groups; uploading study materials and Notice / announcement in the online groups is one of the educational purposes of using WLAN in the campus.

## ii) Checking and giving e-mail

Checking and giving e-mail are identified as educational purposes basically by teachers and students.

Maximum number of teachers (**62%; data collected from semi-structured interview schedule**) have identified Checking and giving e-mail as educational purposes of using WLAN in the campus.

One of the senior teachers’ opinion regarding this is revealing: “E-mail is an important part of today’s education system. We can use it for sending and receiving email, attaching education related various files and communicating with others. Here we use WLAN and our professional email id provided by the university.”(T16)

In this regard, administrative personnel remarks that- “Most of the students as well as teachers use WLAN for their daily educational medium to send and receive educational related files.(Administrative Personnel Interview/AI2, AI5 & AI3)”

Apart from that, students’ response also supports teachers’ above statements and they also opine similarly in the semi-structured questionnaire and FGD. Most students (70%, data collected from semi-structured questionnaire) say that they use WLAN in the campus for checking and

sending their mail. Their remarkable response about this is mentioned in the following which is mainly congregated from students FGD: "I use it usually for goggling about research article and to find out academic materials. I also use it for checking and giving mail. (FGD<sub>3</sub>)"

### iii) Online Blog

This is one of the educational purposes of using WLAN in the campus. Most of the students (67%, evidence from semi-structured questionnaire) point toward this. And also in the FGD, students raise their voice to this purpose.

According to Yasmin(Pseudonym) - "*I think, for online blogging the friend circle of mine use WLAN in the campus. Because by using WLAN in the campus we easily do blogging.*" (FGD<sub>4</sub>).

In this regard, Jessica (Pseudonym) also comments that they use WLAN as a tool where they do blogging in the online for expressing their own views and opinions. (FGD<sub>3</sub>)

Teachers also agree in this statement. Most of them (almost 42%) give their opinion that for online blogging many teachers and students use WLAN in the area of the campuses.

## Findings and Discussion

The major findings of the research comprise of the following:

- Most of the students (44%) sometimes used WLAN and maximum teachers (8 out of 15) often used WLAN in campus.
- Most of the teachers (32%) used 'Tab' whereas most of the Students (39.15%) used 'Smart Phone' as a connecting device to the campus' WLAN.
- The study results reveal that mainly four educational purposes are lying behind the using of WLAN in the Dhaka university campus those are-

### Purposes of completing classwork

- a) Collecting materials on academic courses
- b) Assignment
- c) Preparing reports
- d) Presentation

### Purposes of self-development

- a) Collecting materials on academic courses
- b) Assignment
- c) Preparing reports
- d) Presentation

## Purposes of Research

- a) Searching about research article
- b) Doing thesis work
- c) Knowing about historical events

## Purposes of using WLAN as a Tool in the Teaching-learning process

- a) Chatting in various educational online groups; Uploading study materials and Notice / announcements
- b) Checking and giving e-mail
- c) Online Blog

## Discussion

The following discussion proceeds considering the research objectives of the study based on the findings and their interpretations. The whole discussion has presented some segments. Major findings are described under these segments with the support of other literatures and research findings. The total framework of the discussion of this study is presented below with a figure:

## Research findings

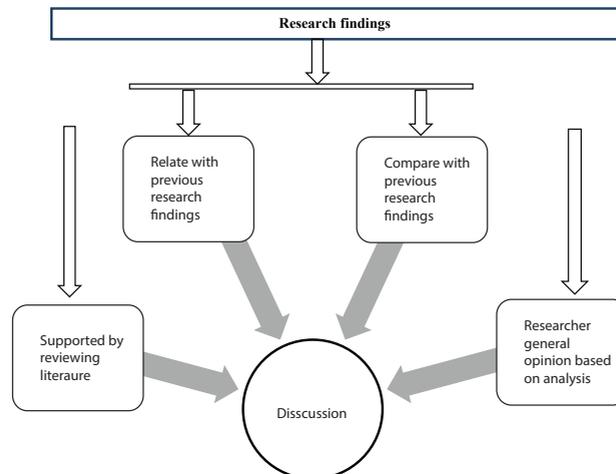


Fig.-5.1: Framework of Discussion process (adopted from: Shaha&Rahman, 2015)

The present study concludes that 44% students sometimes used campus WLAN. This finding is strongly supported by a study conducted by Kelly & Johnson (2006) who analysed statistical data on the growth of wireless services in Arizona and Arizona State University (ASU). Kelly & Johnson (2006) highlighted that “Student needing technology....Faculty embracing technology”. With the responses of 237 students and faculties who use WLAN, over half of the responses were “always” and “almost always” in using technology in the classroom.

Present study results also proved that most of the teachers (32%) used 'Tab' whereas most of the students (39.15%) used 'Smart Phone' as a connecting device to the campus' WLAN of Dhaka University.

This findings are also sustained by "Tech Check" (2007) which discussed some statistics of some popular electronic devices being used by students. According to "Tech Check" (2007): • 93% of college students own a Cell phone (up 15% since 2003) • 58% own an MP3 player vs. 17% in the pre-iPod days of 2003 • A little under one in three (28.9%) of college campuses offers wireless coverage, while four years ago, only 14% of campuses had this capacity. Additionally, today, two-thirds are planning a wireless strategy • 63% of college students own laptops today compared with less than half only two years ago (2005: 42%). This means the trend of owning and using mobile electronic devices among college students was increasing and seemed unlikely to stop in the next few years. The college campuses that provided wireless connection for students doubled in four years, and more campuses were planning on wireless solutions. It seemed the ever-increasing demand by students forced colleges to provide more flexible campuses with more features. The campus wide wireless network was one of those features to meet the needs of students.

Besides, Henderson, Kotz&Abyzov (2004) studied, over seventeen weeks, a trace from a mature wireless LAN which supported 7000 users connected over 550 access points. According to Henderson et al. (2004), the client devices varied from Windows, MacOS, Linux, PocketPC and Unidentified. There were 7134 devices in total seen on the wireless network and Windows was the most common among ten categories. Several measurement techniques were employed for tracing collection such as sys-logs and telephone records (Henderson et al. 2004).

Purposes of completing classwork, self-development, research and purposes of using WLAN as a tool in the teaching-learning process are the four major educational purposes of using WLAN in Dhaka University campus. This similar finding also found by a group of researcher is discussed in the following.

Rudsar, Joyce &Kolahi (2006) gathered and compared data from 19 institutes not only in Auckland but also in other cities. The paper discussed the status of wireless networks in seven educational institutes in Auckland. Compared to the institutes in other countries, Rudsar et al. (2006) found that "the Auckland institutes were a little ahead with their pilot projects and planning of their wireless networks." A table in the article stated the purpose of providing wireless. The purposes included: "Student access, Staff access, Increased access, Flexible access/mobility, Outside access, Areas without feasibility for wires, Giving students and staff 24/7 access, Testing, Demand, Promote use of laptops, More seats" (Rudsar et al. 2006).

Furthermore, According to "Government Solution Blueprint" (2003), more and more universities were adopting WLAN technology in order to enhance their value to attract and retain more students. Students and staff would get benefit from easier access and IT departments would be benefitted from the reduced requirements for physical cabling. Based on those benefits and demands, "the Portuguese Government is a leading example of this as they have created an initiative called the e-U project to drive the use of technology in education" ("Government Solution Blueprint", 2003). E-U stands for Electronic University. The e-U project allowed students to "have access to classes, R&D articles, students' papers, grades, bookshops and academic administrative services online, as well as access to the internet through a broadband wireless LAN" ("Government Solution Blueprint", 2003).

Moreover, “Wireless Networks in Education – A New Zealand Perspective” by Nisbet (2004) is an article that from a New Zealand perspective talked about wireless networks in education. The writer mentioned “four key questions that must be answered when planning a wireless network for a campus” (Nisbet, 2004). The four questions were “Who will use it? Where will they use it? What services will be delivered? How will they use it?” (Nisbet, 2004). The article discussed WLANs’ using these four questions as the framework. Nisbet (2004) research study indirectly related with the findings of this research study that emphasis on the purposes of using WLAN in the educational institutions.

## Recommendations and Conclusion

Based on the research findings and the discussion on emerging factors resulting from the evidence of gathered data, the researcher has formulated recommendations for future actions to achieve greater impact.

- Authority should increase the speed of network
- Establish more WLANs zones in the campus
- Provide More and powerful router
- Expand WLAN capability
- Everyone should be aware of the merits and demerits of using WLAN
- Aware the students about –learning sites and encourage them to visit those sites.
- Awareness based initiative e.g. campaign on WLAN etc. should be taken to change the attitude towards the WLAN.
- WLAN should be adapted to the particular needs of students and fitted to subjects and institutional related needs.
- Safety Code 6 includes a recommendation for prudent use of Wi-Fi.

## Concluding remarks

Utilization of Wireless Local Area Networks (WLANs) for Educational Purpose at the University of Dhaka is a very important research study in this digital age. It encompasses a great horizon of facilities with its various dimensions. Those are crucially necessary for the teachers and students in the teaching-learning process. In Bangladesh present scenarios are not up-to-the mark. This research is a small effort to bring it into focus.

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# Impact of Philosophical Assumptions on Research Strategies in Social Science: Research Philosophy Perspective

Md. Mamin Ullah<sup>1</sup>

## Abstract

*Understanding philosophy has become a critical aspect in social science research as it exerts significant influences on the choice of research strategies. A researcher's philosophical stance in a study is undoubtedly important to know in order to make sure that research outcomes are appropriately and meaningfully interpreted. This paper attempts to explore the impact of philosophical assumptions on the choice of research strategies in social science. Alternatively, how different philosophical assumptions of the researcher, such as ontology, epistemology, and axiology affect research strategies adopted in social science studies. At first, the fundamental philosophical principles are explored in the paper. Afterwards, the relationships between these philosophical principles and research strategies are critically discussed. The paper is supposed to contribute to the existing literature concerning philosophical perspectives in social science research. Academics, independent researchers, and doctoral students will largely be benefitted from this paper. Implications of different philosophical assumptions for social science researchers are outlined throughout the paper. Several recommendations are made along with a list of research agenda for future research.*

**Keywords:** Research philosophy, philosophical assumptions, research paradigms, research strategies, social science research

## Introduction

With an increased literature on research methodologies in social science research, researchers are exposed to different research approaches, strategies, and methods. In addition, different philosophical underpinnings concerning research methodologies have got momentum among contemporary academics and researchers. Although philosophy as a distinct field of study has been practiced and acclaimed by mankind over two thousand years (Kamber, 2011), its importance in interdisciplinary research came into light with the introduction of philosophy into the title of Doctor of Philosophy (PhD). Accordingly, all research is now based on some underlying philosophical assumptions that largely define about which research strategy is appropriate for a specific field of study. Thus, the choice of research methodologies is of secondary importance compared to

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the choice of research philosophies (Sobh & Perry, 2006; Brown & Sice, 2003). Philosophical assumptions adopted in conducting a study are of critical importance in order to justify the validity of the research (Myers & Avison, 1997).

In essence, 'all research projects have philosophical foundations' (Hunt & Hansen, 2011). Researchers are therefore required to develop a sound understanding of fundamental philosophical concepts before choosing research methodology (Jackman, 2005).

Given the importance of philosophical perspectives in social science studies, research philosophy has received limited attention in the literature (Crossan, 2003; Mills & Birks, 2014). In addition, most of the existing literatures concerning research philosophy and methodology are not easily understood by the novice researchers, such as postgraduate and doctoral students (Baldwin, 2014). Moreover, beginning researchers often face 'dilemma' in making the appropriate methodological decisions due to the increasing debates and discussions pertaining to research philosophies (Knox, 2004; Mkansi & Acheampong, 2012). This paper attempts to explore the fundamental philosophical assumptions that exert significant influence on the choice of research strategies in social science. The philosophical concepts and their relationships with research strategies are outlined in more succinct form in order to address the unfulfilled need of the novice researchers. Hence, the paper is supposed to fill in the research gap to a large extent.

The remainder paper is organized into five consecutive and related sections. The paper starts with providing a brief account of rationale of conducting this study. Then, the fundamental philosophical assumptions are outlined pertaining to social science research. In the fourth section, the modes of research strategies are briefly discussed. The relationship between philosophical assumptions and research strategies is explored in section five. Finally, we conclude the paper with providing several recommendations.

## **Objectives and Justification**

The main objective of this paper is to explore the impact of philosophical assumptions on research strategies in social science. More specifically, the objectives of this paper are: (1) to explore the relationships between philosophical assumptions and research strategies; (2) to identify and explain the underlying philosophical assumptions in social science; (3) to justify the importance of understanding philosophy in social science studies; and (4) to provide recommendations for social science researchers along with a set of research agenda for further studies.

There are several critical grounds that justify the rationale of conducting this study. Despite a significant part of rationale of conducting this study is presented in introduction section, there are at least six distinct issues that justify the worthwhile of this study. First and the foremost rationale is the lack of adequate literature addressing the relationship between philosophy and research strategies. There is a little discussion in the literature in this regard (Baldwin, 2014; Crossan, 2003). The relationships between philosophical assumptions and research strategies are succinctly discussed in this paper.

Second, researchers, mainly the novice researchers, are confronted with a dilemma in making appropriate philosophical stance in their studies. Understanding the intricate relationships between philosophical perspectives and research methodologies is a dilemma for many novice researchers (Mackenzie & Knipe, 2006). This dilemma becomes an impediment in using pertinent

philosophical concepts and principles (Laurence & Margolis, 2003). This paper attempts to clarify the fundamental concepts of research philosophy in order to remove a researcher’s dilemma, especially in making appropriate alignment between philosophical assumptions and research strategies.

Third, the worthwhile importance of crafting appropriate research philosophies in social science studies is addressed in this paper with adequate references. Thus, researchers, academics, and students are supposed to be convinced in the use of philosophical assumptions in research projects. Fourth, implications concerning the usage of philosophical principles in research strategies are provided throughout the paper. This will be immensely useful for the researchers in developing countries like Bangladesh where higher education is on the rise. Fifth, the paper is supposed to contribute to the existing literature of research philosophies and methodologies. Finally, the paper provides several recommendations that are deemed to be useful for social science researchers along with a list of agenda for further studies.

### Philosophical Assumptions

Philosophy is defined as ‘a view of the world encompassing the questions and mechanisms for finding answers that inform that view’ (Birks, 2014). Broadly speaking, philosophy is the study of general and fundamental problems concerning matters such as existence, knowledge, values, reason, mind, and language (Teichmann & Evans, 1999). In essence, the fundamental concern of philosophy is knowledge. Accordingly, research philosophy is related to ‘development of knowledge and the nature of that knowledge’ (Saunders et al., 2012). The philosophical stance of a researcher is a set of assumptions that largely define his or her view of the world. An understanding of research philosophy is critically important for a researcher as it helps to appropriately adopt research strategies. Moreover, philosophical statement in a study is quite useful to justify the validity of research findings. According to Wilson (2014), research philosophy consists of three fundamental assumptions i.e., a researcher’s view of the reality (ontology), knowledge (epistemology), and value (axiology).

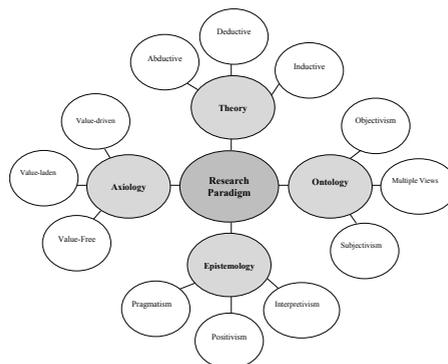


Figure 1: Research Paradigm and Its Different Elements  
 Source: Author’s Own Illustration. Partially developed from Bryman (2008)

In addition, theoretical framework and practical consideration also play a significant role

in developing a researcher’s stance in a study (Bryman, 2008). Accordingly, we focus on four important factors (i.e., ontology, epistemology, axiology, and theory) in the coming discussions along with their implications for research strategies. These four factors collectively define research paradigm in social science. Research paradigm is a set of beliefs and feelings of a researcher about the world and how it should be understood and studied (Guba, 1990). See figure 1.

### Ontological Perspective: Subjectivism versus Objectivism

Ontology is basically concerned with the nature of reality (Saunders et al., 2012). Thus, a social science researcher’s ontological position defines ‘how he or she perceives the social world’ (Wilson, 2014). Ontology is concerned with two broad dimensions: objectivism and subjectivism (Morgan & Smircich, 1980). Burrell and Morgan (1979) illustrated how this subjective and objective view of the world affects the philosophical stances and methodological choices. See figure 2.

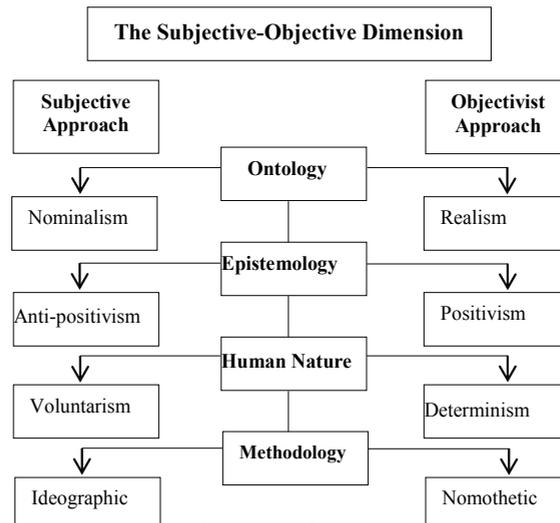


Figure 2: A Scheme for Analyzing Assumptions about the Nature of Social Science  
 Source: Author’s Own Illustration based on Burrell and Morgan (1979)

Objectivism views reality as a ‘concrete structure’ that exist external to social world and that the world predates individuals (Holden & Lynch, 2004). Thus, an objectivist believes in single reality (Ragab & Arisha, 2018). In objectivism, a researcher’s ontological position portrays that ‘social phenomena and their meanings have an existence that is independent of social actors’ (Bryman, 2012). Subjectivists, in contrast, believe in multiple realities i.e., the perceptions and actions of social actors create social phenomena (Smircich, 1983; Wilson, 2014). In addition to objectivism and subjectivism view, there are some researchers who hold multiple views i.e. they emphasize on both facts and perceptions of social actors. Whatever the case is, identification of ontological position at the beginning of the research process is critical as it significantly influences the choice of the research design (Dudovskiy, 2018; Oliver, 2010).

### 3.2 Epistemological Perspective: Positivism versus Interpretivism

Epistemology is a branch of philosophy that deals with knowledge and ‘the grounds upon which we believe something to be true’ (Oliver, 2010; ). Alternatively, epistemology is concerned with the answers of the questions ‘what is acceptable knowledge?’ (Wilson, 2014) and ‘how is it obtained?’ (Sharp, 2009). Thus, epistemological position of a researcher largely determines what does and does not constitute the knowledge (Hallebone & Priest, 2009). Epistemology is better understood in a two-fold dimension: positivism and interpretivism (Hussey & Hussey, 1997). Thompson (2015) highlighted the characteristics of these two epistemological philosophical assumptions through an excellent graphical illustration. See figure 3.

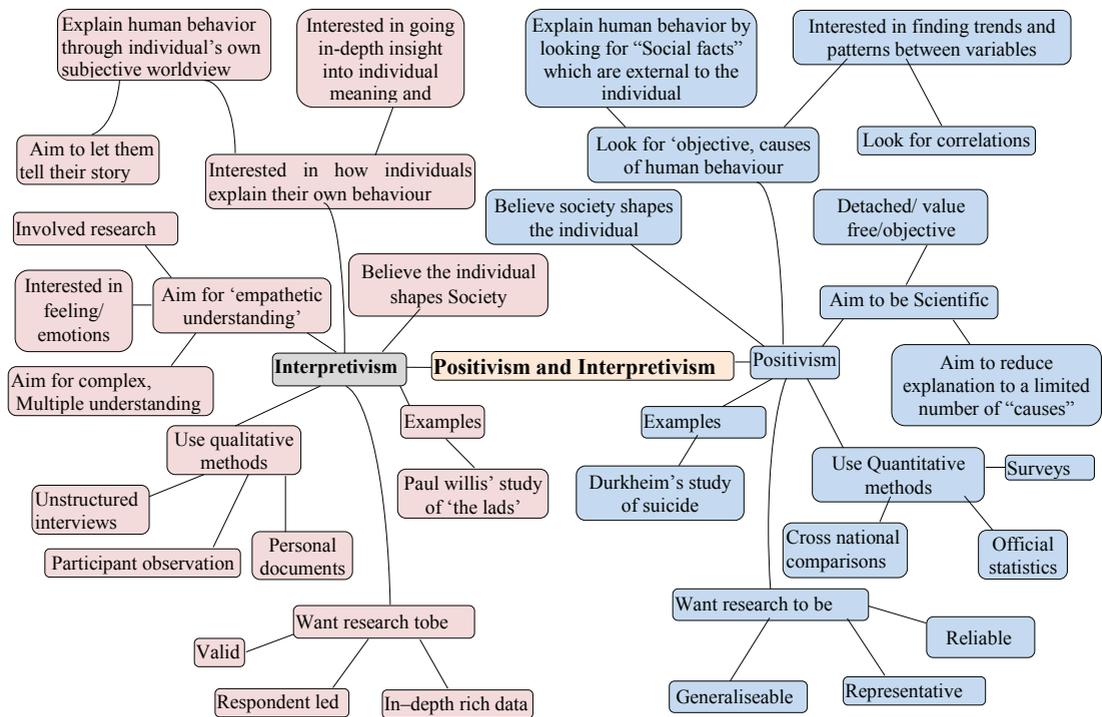


Figure 3: Positivism versus Interpretivism  
Source: Adopted from Thompson (2015)

In positivism, a researcher is independent of his or her research requiring minimum interactions with the research participants (Wilson, 2014). With an emphasize on “factual” knowledge (Dudovskiy, 2018), a positivist researcher believes in ‘discrete, observable elements and events that interact in a discrete, observable, determined and regular manner’ (Collins, H. (2010). In positivism, the researcher objectively obtains data while remaining external to the research process (Remenyi et al., 1998). Accordingly, the outcomes of positivist research are replicable factual generalisations about social phenomena (Hussey & Hussey, 1997; Ragab & Arisha, 2018).

Unlike positivism, interpretivism integrates human interest into a study. An interpretive researcher believes that subjectivity is inherent within all humans (Blumberg et al., 2011; Remenyi

et al., 1998). Thus, a researcher with interpretivism epistemological stance is interdependent of the research process resulting in in-depth interaction with research participants. In fact, the proponents of interpretivism emphasize that ‘social phenomena are unique and are too complex to be reduced to generalized rules and formulae’ (Crotty, 1998; Rowlands, 2005). Thus, it is immensely important to understand the world through directly experiencing the phenomena (Littlejohn & Foss, 2009).

Notably, positivism and interpretivism are the two mutually exclusive philosophical assumptions about the nature and sources of knowledge (Dudovskiy, 2018). Some research projects fall broadly within one of these two main paradigms. Nonetheless, sometimes researchers need to ‘modify their philosophical assumptions over time and move to a new position on the continuum’ (Collis & Hussey, 2014). This need has led to the development of pragmatism concept in research philosophy. With a view to interpreting the world using multiple lens, a pragmatist researcher believes that ‘no single point of view can ever give the entire picture and that there may be multiple realities’ (Saunders et al., 2012). In pragmatism, the ultimate concern is the research questions that determine a research philosophy and thus the ‘forced-selection’ between positivism and interpretivism research paradigms is rejected (Tashakkori & Teddlie, 1998). Morgan (2007) illustrated the concept of pragmatism along with its implication for social science research methodology. See figure 4.

**A Pragmatic Alternative to the Key Issues in  
Social Science Research Methodology**

	Qualitative Approach	Quantitative Approach	Pragmatic Approach
Connection of theory and data	Induction	Deduction	Abduction
Relationship to research process	Subjectivity	Objectivity	Intersubjectivity Transferability
Inference from data	Context	Generality	

Figure 4: Pragmatic Research Paradigm in Social Science  
Source: Adopted from Morgan (2007)

Whatever the epistemological stance of a researcher is, the implication is that ‘the researcher’s epistemological stance is central to the choice of methodology in terms of its purpose and goals’ (Snape & Spencer, 2003). Again, since epistemology reflects how a researcher’s worldview influences knowledge and how that knowledge is to be acquired (Burrell & Morgan 2000), epistemology is largely influenced by ontology. In fact, researchers’ view of ontology affects their epistemological underpinnings (Mc Manus et al., 2017). Consequently, the research approach, strategies and methods are largely dependent on both the ontological and epistemological stance of a researcher (Holden & Lynch, 2004).

**Axiological Perspective: Value-free versus value-bound**

Axiology is concerned with the nature of value (Wilson, 2014) or the judgments about the value (Saunders et al., 2012). In fact, axiology large defines in regard to ‘what a researcher considers

important or unimportant in a research project’. Positivists consider the research process as value free (Wilson, 2014). Positivism research paradigm is value-free as the researcher is independent of the research. In contrast, a researcher with interpretive epistemological stance works within a value bound framework. The researcher is a part of what is being researched and thus cannot be separated (Dudovskiy, 2018). The relationship between axiology, epistemology, and ontology is presented in table 1.

Table 1: Relationship between Ontology, Epistemology, and Axiology

<b>Ontology</b>	<b>Epistemological Stance</b>	<b>Axiological Dimension</b>
Objectivism	Positivism. The researcher is independent of the study.	Research is value-free
Subjectivism	Interpretivism. The researcher is part of what is being researched and thus cannot be separated.	Research is value bound
Multiple View	Pragmatism. The researcher holds both the positivism and interpretivism research philosophies.	Values play a large role in interpreting results

Source: Author’s Own Illustration

The axiological stance of a researcher exerts significant implications. First, a researcher’s own value influences all stages of the research process (Li, 2016). It is undoubtedly important to know what do a researcher values in his or her research. A critical implication of axiology in research philosophy is that understanding a researcher’s axiological stance plays a vital role in judging the validity of the research outcomes based on value-free or value-laden dimension. Accordingly, axiology influences the choice of research strategies, data collection methods and data analysis techniques.

### **Theoretical Perspective: Inductive versus Deductive**

One of the distinctive features of social science studies in an academic setting is the development of a new theory. There are two approaches that deal with the notion of ‘theory’ in social science: inductive and deductive. Inductive research approach is a theory-building process (Hyde, 2000). More specially, a researcher with inductive approach ‘starts with the observations and theories are proposed towards the end of the research process as a result of observations’ (Goddard & Melville, 2004). In an inductive research approach, a researcher strives to generate meanings from the collected data in order to identify patterns and relationships to build a theory. Inductive reasoning is often referred to as a “bottom-up” approach to knowing (Lodico et al., 2010).

Deductive approach, on the other hand, is concerned with ‘developing a hypothesis (or hypotheses) based on existing theory, and then designing a research strategy to test the hypothesis’ (Wilson, 2014). Thus, this approach is known as the ‘top-down approach’ (Trochim, 2006.). Researchers with deductive research approach follow a highly structured methodology (Ragab & Arisha, 2018). In essence, deductive approach is concerned with deducting conclusions from

premises or propositions. Dudovskiy (2018) demonstrated how inductive and deductive approach works in social science research. See figure 5.

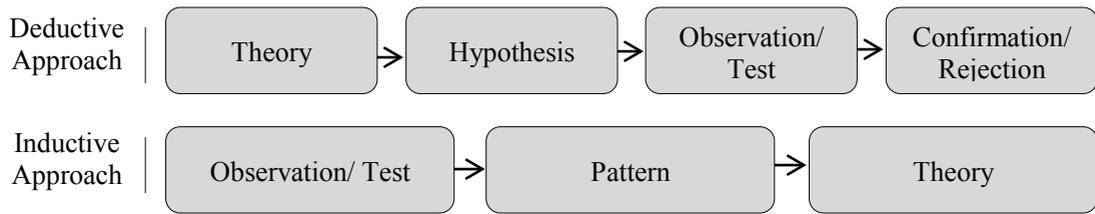


Figure 5: Inductive and Deductive Research Approach  
Source: Author's Illustration based on Dudovskiy (2018)

Both the induction and deduction research approaches are subject to criticisms. A deductive approach is criticized due to the lack of clarity in terms of selecting theory to be tested and then formulating hypotheses. Similarly, Inductive approach is criticized because ‘no amount of empirical data will necessarily enable theory-building’ (Saunders et al., 2012). Thus, abductive research approach emerged as an alternative to address weaknesses associated with deductive and inductive approaches. In abductive approach, the research process is generally started with ‘surprising facts’ or ‘puzzles’ (Bryman & Bell, 2015) and then the explanation is developed as the outcome of the research. However, the application of abductive reasoning is challenging in practice (Dudovskiy, 2018).

The research approach is directly related to the choice of research strategies and methods. For instance, deductive approach is more concerned with generalization. Contrarily, an inductive approach emphasizes a close understanding of the research phenomenon within its context (Easterby-Smith et al., 2002). Accordingly, it requires a more flexible structure to investigation (Douglas, 2003).

## Research Strategies: Qualitative versus Quantitative

Generally, a strategy is a general plan or set of plans intended to achieve something. Likewise, a research strategy is a step-by-step plan of action of conducting a research systematically resulting in quality results and detailed reporting. A research strategy is much more important than any other element of a research project because it ‘enables a researcher to stay focused, reduce frustration, enhance quality and most importantly, save time and resources’ (Dinnen, 2014). In social science studies, researchers are concerned with the choice between a quantitative and a qualitative research strategy (Sobh & Perry, 2006).

## Qualitative Research

Qualitative research deals with the aim of an understanding of underlying reasons, opinions, and motivations resulting in critical insights into the research problem. Thus, a qualitative research strategy involves an interpretive, naturalistic approach to its subject matter in order to make sense of, or interpret, phenomena in terms of the meanings people bring to them (Denzin &

Lincoln, 1994). Accordingly, the aim of qualitative research is to ‘understand the social reality of individuals, groups and cultures as nearly as possible as its participants feel it or live it’ (McLeod, 2017). Researchers using qualitative strategy seek to explain ‘how’ and ‘why’ a phenomenon behaves or operates in a particular context (Given, 2008). Thus, qualitative research is exploratory in nature. With a qualitative research strategy, social science researchers use a variety of methods in order to explore how the participants perceive their social realities including in-depth unstructured interview, focus group discussion, diary accounts, open-ended questionnaires, documents, and participants’ observation.

The most common data analysis techniques in qualitative research includes content analysis (Bray, 2006), grounded theory (Glaser & Strauss, 1967), thematic analysis (Braun & Clarke, 2006) or discourse analysis.

## 4.2 Quantitative Research

Quantitative research is the systematic examination of social phenomena by using statistical models and mathematical theories. Using a quantitative research strategy, a researcher seeks to quantify attitudes, opinions, behaviors, and other defined variables and then attempt to construct generalizations regarding the populations as a whole (Hyde, 2000). In quantitative research, the common data collection methods include questionnaires, surveys, and/or historical numerical data (Saunders et al. 2012). Descriptive and inferential statistics are largely used to analyze the data. The major drawback of quantitative research is that researchers in quantitative studies do not allow participants to explain their choices since the study does not take place in natural settings (McLeod, 2017). The basic differences between quantitative and qualitative research are illustrated in table 2.

Table 2: Fundamental Differences between Quantitative and Qualitative Research

<b>Points of Difference</b>	<b>Qualitative Research</b>	<b>Quantitative Research</b>
Nature of Research	Exploratory	Descriptive & Explanatory
Research Questions	How and Why	What and Who
Data Type	Narrative	Numerical
Objective	To understand the social reality of individuals, groups and cultures	To establish general laws of behavior and phenomenon across different settings contexts
Research Context	Participants are studied in their natural setting.	Quantitative experiments do not take place in natural settings
Theory	Theory is developed.	Theory is tested.
Research and Researcher	The researcher is an integral part of the data. Active participation is required.	The research aims for objectivity and is separated from the data.

Methods of Data Collection	Diary accounts, focus group discussion, open-ended questionnaires, observation documents	Questionnaires, surveys, and/or historical numerical data, structured interview
Data Analysis Techniques	Content analysis, grounded theory, thematic analysis and discourse analysis.	Descriptive and inferential statistics

Source: Author's Illustration

Despite several differences between quantitative and qualitative research strategies, both the research strives to attain one single objective in true sense i.e., knowledge creation. Thus, researchers should not become so caught up in the polarizing differences between these two research strategies. In essence, ‘all quantitative data are based upon qualitative judgments and all qualitative data can be described and manipulated numerically’ (Trochim, 2006).

### Mixed-Methods Research (Multi Strategy)

Due to the limitations associated with the choice of either quantitative or qualitative strategy for conducting a study, some researchers tend to focus on a mixture of both quantitative and qualitative research strategies within the same piece of research. This led to the development of mixed-methods research. Notably, some scholars refer the ‘mixed-methods research’ as the multi-strategy (e.g., Wilson, 2014; Bryman, 2011). Whatever the name is, mixed-methods research (multi strategy) is ‘the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative approaches for the purpose of breadth and depth of understanding and corroboration’ (Johnson et al., 2007). Using a multi strategy in a research project, a researcher utilizes the strengths of quantitative and qualitative methodologies and avoids the weaknesses of both (Venkatesh et al., 2013; Creswell & Clark, 2011). In mixed-methods research, researchers focus on both the facts and the understanding of social realities.

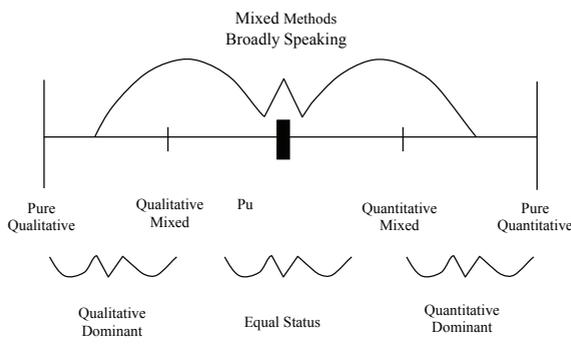


Figure 6: Mixed-methods in Social Science  
Source: Adopted from Mc Manus et al. (2017)

McManus et al. (2017) provided a better illustration showing how mixed-research strategies are practiced in social science studies. See figure 6. The qualitative and quantitative research lie at the opposite ends of the same spectrum. Different levels of mixed-methods lie between these two ends of the same spectrum. The choice of types of mixed-methods largely depends on the research questions (Onwuegbuzie & Combs, 2010).

## Connection between Philosophical Assumptions and Research Strategies

In this section of the paper, based on the discussions in sections 3 and 4, we intend to explain the relationships between philosophical assumptions and research strategies in a succinct manner. Undoubtedly, the philosophical stance of a researcher is likely to influence both choice of research approach and strategies (Wilson, 2014). Notably, a researcher’s perception of reality (ontology) affects how or she gains knowledge of the world (epistemology). In addition, what a researcher values in his or her research findings (axiology) is also a considerable factor. These three philosophical assumptions collectively determine how a researcher conducts his or her research (research strategy). Taylor and Edgar (1999) summarized the relationship between ontology, epistemology and research strategies in more constructive manner: ‘the belief about the nature of the world (ontology) adopted by an enquirer will affect his or her belief about the nature of knowledge in that world (epistemology) which in turn will influence the enquirer’s belief as to how that knowledge can be uncovered (methodology).’

In a qualitative research, the relationship between researcher and the research (knower and the known) are interdependent of each other. Researcher’s active participation is highly required in conducting the study. Since the ultimate objective of qualitative research is to understand the social realities of participants i.e., to understand differences between humans in our role as social actors, the epistemological stance of a researcher is interpretivism. In fact, a qualitative researcher is an interpretivist as he or she is required to gain an insider’s view of the field. Moreover, a researcher’s own value plays a vital role on all stages of the research process. Thus, he or she works within value-bound framework. For the qualitative researcher, there is no single reality, it is subjective and exists only in reference to the observer (McLeod, 2017).

Contrarily, a quantitative researcher takes an external view of the world (objectivism) i.e., social phenomena are based on external realities that are beyond a researcher’s control (Wilson, 2014). In quantitative research, researcher needs to concentrate on facts. Accordingly, only “factual” knowledge gained through observation (the senses) is valid and trustworthy (positivism). A qualitative researcher is independent on the study and there are no provisions for human interests within the study (Dudovskiy, 2014). Thus, he or she works in a value-free way

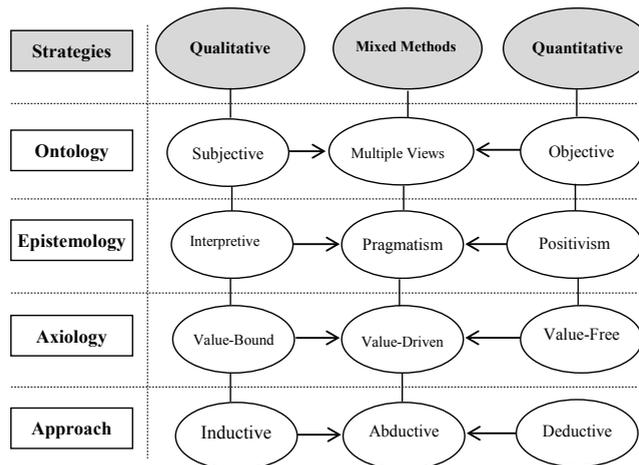


Figure 7: Relationship Philosophy, Theory and Research Strategies  
Source: Author’s Own Illustration

We illustrate how the choice of research strategies is influenced by philosophical assumptions in figure 4. The basic implications of research philosophies are that if a researcher holds subjective view of the world and believes that true knowledge can only be achieved through in-depth interactions with the research participants (interpretivism), he is supposed to adopt qualitative research strategy. In contrast, if a researcher holds the external view of the world (objectivism) and believes that facts are the only acceptable knowledge and the true way of acquiring knowledge is quantifiable observations generated from statistical analyses (positivism), he or she is supposed to adopt quantitative research strategy.

Interestingly, there are some researchers who take mid-position between positivism and interpretivism. This has led to the development of pragmatism research philosophy. In pragmatism, the importance of both positivism and interpretivism philosophies are recognized along with an emphasis on both facts and interpretations. However, research questions lie at the center of philosophical stance. Thus, if a researcher thinks that he or she holds multiple view of the world and believes that both factual knowledge and understanding of the social of the research participants are important, he or she is supposed to adopt mixed-method research strategy (multi strategy). For the ease of understanding, the relationships between philosophical assumptions and research strategies are presented in tabular form. See table 3.

Table 3: Relationship between Philosophical Assumptions and Research Strategies

<b>Research Strategy</b>	<b>Ontology</b>	<b>Epistemology</b>	<b>Axiology</b>	<b>Research Approach</b>
Qualitative	Subjectivism	Interpretivism	Value-bound	Inductive
Quantitative	Objectivism	Positivism	Value-free	Deductive
Mixed-Strategy	Multiple View	Pragmatism	Value-driven	Abductive

Source: Author's Own Illustration

Since a qualitative researcher seeks to make observations about his or her research, he or she reasonably adopts inductive research approach. Both the inductive logic and qualitative methods are generally employed in order to develop an understanding of a phenomenon within social and cultural setting (Rocco et al., 2003). In contrast, deductive approach is referred to as testing/verifying theory and is generally used in extensive (quantitative) research strategies (Bahari, 2010). Finally, in mixed-method research, a researcher adopts abductive research approach.

## Recommendations

Based on the discussions so far made in this paper, several recommendations can be put forward for the social science researchers. These recommendations are particularly important for novice researchers, graduate and post graduate students, doctoral researchers, and the interested readers. At first, the researchers should develop an in-depth understanding of research philosophies and their impact on research methodologies. Building a good command on both research philosophy and research methodologies is useful as it helps a researcher to choose the appropriate philosophical stance in a research project. Second, researchers should not be biased to any particular research philosophy. A caliber policy in this regard is to focus on research questions (Wilson, 2014). When considering research problem and research questions, a researcher is supposed to be able to identify his or her philosophical stance in terms of ontology, epistemology, and axiology.

The researcher then decides which research strategy is better suited to address the research questions. Third, although research philosophy is critically important in social science studies, literature addressing this significant element of research methodology is scarce. Even, many research books do not address this subject. Thus, researchers and academics are required to read research papers, e-materials and conference proceedings on research philosophy through constant searching.

Fourth, most of the researchers are confronted with a 'dilemma' in choosing the appropriate philosophical stance. This generally occurs due to the less informed understanding of the philosophical concepts underpinning research (Sefotho, 2015). One of the best techniques to avoid this problem is to think about philosophy first, then to decide about research methodologies. A researcher should consider his or her views of the reality and knowledge. In addition, it is also important to decide 'what a researcher values in the research. Once these philosophical assumptions are properly made, it will be easier to select the research approach and strategy in alignment with the philosophical stance. Fifth, introducing a basic course concerning philosophy and research at the undergraduate and graduate levels is supposed to build up the confidence among the potential researchers. Finally, research supervisors, at both graduate and doctoral level, should make it compulsory for the researchers to include a separate section concerning research philosophy in dissertations and theses.

## **Conclusion**

Philosophy has become an integral part of research methodology in social science studies. Containing important assumptions in regard to the view of the world, research philosophy largely underpins research strategy, approach and the methods. In addition, understanding a researcher's philosophical stance is critical in order to justify the validity of research findings. Despite research philosophy is of immense importance in social science studies, very little literature addresses this inevitable segment of research methodology. Moreover, the multiple propositions of different concepts pertaining to research philosophy and methodology have increased a researcher's dilemma in the use of philosophical assumptions. This paper succinctly discusses the fundamental philosophical assumptions addressing the unfulfilled need of novice researchers. The paper then illustrates in regard to how philosophical assumptions such as ontology, epistemology, and axiology affect the choice of research strategy. Implications of different philosophical assumptions are outlined throughout the paper.

## **Research Agenda**

There are several grounds for future research concerning research philosophy and methodology. First, the current scenario in regard to the practices of incorporating a researcher's philosophical stance in research projects is to be explored. Research can be conducted to evaluate the perceptions among the academics and novice researchers toward research philosophy. More research is required to examine the role of research philosophy in informing dissertations and theses. Developing a comprehensive model incorporating the fundamental philosophical and methodological concepts is immensely required. More conceptual papers are needed to explore the meanings of philosophical assumptions in in-depth manner and their underlying impacts on the

research process. In essence, research philosophy is a growing field of interest for academics and researchers. An interested researcher is therefore advised to conduct an extensive review of current literature concerning research philosophy. It will open the different doors for future research.

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# SDG & the Role of Media in Uplifting the Third Gender People by Ensuring Inclusion as the Prime Requirement for Inclusive Education

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## Abstracts

*SDGs- the ambitious 2030 agenda of UN, viewing the transformation of the world into a green future, but is challenged by numerous hurdles that are needed to be removed if the world needs to see that long cherished dream to be true. Creating a sustainable green future, a very high sounding expectation- no matter how lofty it seems but achieving it, demands mammoth task of ensuring the participation of all sectors of life, as negligence towards any faction, no matter how small that is cannot guarantee the actualization of that dream. Since Bangladesh has been on the same march with the rest of the world and pursuing the SDGs with strong conviction and enthusiasm, therefore for a successful achievement of the target, the Govt. should assure the participation of all, as no development can be materialized without wholesome effort. With that view this article will focus on the inclusion of the third gender people, a very minority group of Bangladeshi nationals in the sustainable development projects- where the emphasis will be on the role of media as the most powerful, revolutionary and mobilizing weapon of change in society to ensure their inclusion in the broader social spectrum and giving them the rightful exposure to have the due educational qualification which is mandatory to stand on their own and contribute in the development goal of the country. The research findings indicate that in the context of Bangladesh, the printed media time to time is publishing awareness raising reports but mostly the repetitive oratory and unfortunately the electronic media is playing an unhealthy role by fostering the ridiculous caricature and mocking representation of the third gender people-which is actually denouncing them and contributing to their social exclusion. Moreover, if these people are not becoming active participant but remaining passive stake holders in media coverage then complete recognition and acceptance cannot be achieved.*

**Key Words:** Media Representation, Mainstream Education, SDG, Third Gender

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## Introduction

Inclusion of all to achieve an overall transformation of life with the fulfillment of sustainable development goals are the focal targets of the 2030 Agenda of UN. Among the 17 global goals including 169 targets, Bangladesh has aimed at 47 targets in 9 sectors emphasizing the accomplishment of a hunger-poverty-illiteracy and exploitation free Bangladesh. The elementary groundwork for the achievement of this target is the daunting task of ensuring the participation of all from all strata of life, as only concerted and consolidated efforts can secure sustainability and reinforce the continual development in the long run. Negligence towards any group however minority that is, thwarts the whole initiatives of creating synergic development of economy and economic sustainability, as all the estates are intertwined and imperative blocks of the larger social scenario. Therefore, this paper solely focuses on the gravely abandoned minority group – the Third Gender community, their predicament and dehumanization, the necessity of their inclusion and participation to assure their dignified acceptance in the society, necessity of turning them into potent manpower through proper education and skillful training, to bolster the SDGs of the country and the obligation and intensely crucial role of media to ensure their acceptance and presence in the broader social platform.

The lives of the third gender people is the tale of an unending saga of annihilating derogatory discriminations, lined up with -exclusion, harassment, malicious rumors, prejudice, and exhaustive denial of all basic human rights. Disowned and banished by their own family at a very early stage and gradually getting excluded from all social bonding and recognition, they are devoured by all-consuming poverty i.e. not only financial poverty but poverty of empathy, all kinds of human rights, interaction, respect & so on. The necessity of their inclusion and participation to assure their dignified survival and turning them into potent manpower to strengthen the SDGs of the country is obligatory right now.

The society is comfortable with the binary definition of gender. But gender does not exist on a continuum. There are lots of in-between this binary conceptualization. Being a manifestation of diversity of nature they are at present disgraced to extreme dehumanized condition in our society with phony hopes of dignified recognition and being vilified for something, over which they have no control.

The constitution of the People’s Republic of Bangladesh declares “The State shall not discriminate against any citizen on the ground of religion, race, caste, sex or place of birth” (1972). Unfortunately, constitution itself gets exploited by social prejudices & indifferences. Their affliction deepens and brings forth the question of the validity of the successful achievement of SDGs (to ensure poverty free, equitable, equal society for all). As, if anyone is lagging behind then it would be a total defeat of all attempts. Therefore, it is imperative to improve their condition and in doing so we have to ensure their inclusion in the mainstream education as education alone can ensure the total uplift of any backward section of society. In her adopted targets of SDGs, Bangladesh has embraced SDG 4 with the following objectives-

- Achieving **100%** net enrollment rate for primary & secondary education
- Ensure quality education at primary, secondary & tertiary education
- Percentage of cohort reaching grade 5 to be increased to 100% from current 80%

Moreover, the Article 17(a) states, “ The State shall adopt effective measures for the purpose of establishing a uniform, mass oriented & universal system of education & extending free & compulsory education to all children.” (The Constitution of the People’s Republic of Bangladesh, 1972).

## **Research Methodology**

This study employs documentary research as well as qualitative approach. For documentary research data, national policy, laws, web sites of different ministries of the govt. newspaper reports, previous studies and case studies related to the issues of ‘Third Gender’ people were investigated. The programs (in electronic media) and movements of this community were watched and studied simultaneously. Primary data were collected from open ended interview of 15 members of this community and survey is conducted in primary (govt., private & English medium schools), secondary & tertiary levels of educational institutes to find out the provision they have to integrate these ostracized people in the mainstream education.

## **Limitations**

The number of interviewee was limited. Only 20 educational institutions were surveyed and 25 third gender persons were interviewed and comparative data were collected from the neighboring countries of Bangladesh only.

## **Initiatives Taken by Government to remove the Plights of The Third Gender Community**

On 11<sup>th</sup> November in the year 2013, the government of Bangladesh has taken the phenomenal decision of giving recognition to the Hijras as the ‘Third Gender’ which lets all to contemplate the hope of addressing the discrimination faced by this community & an overall improvement of their condition. Moreover, two years before that, they have got their voting rights on December 2009. In 2012-13 fiscal tenure the Department of Social Services has taken pilot welfare program for them in 7 districts. The fund is estimated 72 lakhs. With gradual increase in the funding, in the 2017-18 fiscal year the govt. has sanctioned 11 crore taka for the development of the lives of these people, this time extending it to 64 districts. Under this program govt. is providing financial help to the third gender students in 4 steps –

- in primary level 300 tk per month
- in secondary level 450 tk per month
- in higher secondary level 600 tk per month &
- in higher level 1000 tk per month.

Not only that the govt. is providing allowance for vocational career oriented training & giving 10,000 tk after successful completion of the training program to engage in self-employment.

During 2016-17 fiscal year the number of recipients receiving the educational grants are as follows – financial allowance 2,340, training allowance 1,650 & post training assistance 1,650 persons.

Besides, the ICT Ministry declares in early 2017 that they are planning to provide IT training to the members of the Hijra community to create new employment opportunities for them. This initiative has been supposed to be in full swing within April, 2017. Unfortunately there is no visible outcome of it.

Besides, many non-government organizations are trying to bring changes in their lives but those are very sporadic, inadequate and an absolute outcome is still far away to achieve. The major reason behind their backwardness detected by this community itself is that they are not accepted in the mainstream society. They are in the opinion that unless and until they are accepted in the society no matter what initiatives are taken that will fall behind.

Till today in most cases job application forms and admission forms in educational institutes there is no option of 'other' gender category except male & female. Birth registration forms, patient admission forms in govt. hospitals and even the forms of SSC & HSC examination forms don't have 'other' gender option. Only recently the Passport form, BCS form, Du admission form & very few other institutions have added the option. Remarkably, the primary, secondary level school admission forms lack this options which is a notable impediment for the inclusion of this group in mainstream education system. The most important thing that can assure their respectable living in the society, is almost denied to them. If the educational institutions do not even have the provision of recognizing these children in their admission procedure then it is not hard to comprehend that their possibility in getting jobs is extremely blocked as unskilled workers. They are not still accepted in mainstream job sector, people are abusive and no progress of sensitization of public outlook has taken place since their recognition of having a separate gender identity. People are gravely prejudiced and some of them (Hijras) pointed out in different interviews that some people even think that if they (Hijras) touch them then they will become 'Hijra' too. This shows the monumental level of ignorance of common people. The most important thing they are crying out to have is 'social acceptance'. According to Schech & Haggis (2000), it is communication that is central to sociality. The way we communicate has an immense impact on passing values and knowledge and creating interconnectedness. This interconnectedness creates the bridge among people and acknowledges and accelerates social acceptance. This is where contribution of media as a means of communication and interaction is very crucial if the country wants to ensure the successful achievement of all the SDGs, then it has to accommodate all-inclusive participation.

## **The Genre 'Media' and its Specification**

Media is a collective form of different communication outlets or tools which include television, radio, newspapers, internet, social media sites and various relevant sites and blogs. It can be both communication media, or the specialized mass media but the main purpose is to disseminate the information and knowledge. Whatever the definition is, media is an omnipresent and undoubtedly a very important agency to disseminate information and knowledge which influences and persuades people; shapes and promotes cultural diversity; plays the role of an important accountability mechanism and acts as a watchdog of society. The world of media has no limit. It is irrespective of age and outlook as well as regardless of nationality and creed. It is said that in the media industry, limitations are limited. The fundamental and dormant factor of media is that it has the ability to influence people, regulate their lives, underlying sentiment and opinion and that the intrinsic dominance of it, is unquestionable. It also plays commendable role in stimulating governments

to take action and propagate agenda on social policy. Media portrayals can sometimes serve to exacerbate certain issues but rational and planned issue of it can ensure extensive success and accomplishment as it can reach people irrespective of age, gender, culture, race and religion swiftly and with minimal effort. Moreover, the internet has radically changed the way in which people communicate and connect with each other. As a means of social interaction, the web brings people together instantaneously and fosters a sense of belongingness and identity.

The major types of media are- (i) The Print Media and (ii) The Electronic Media. 'Print media' is regarded as the traditional or "old-fashioned" print-based media. It is composed of newspapers, community newsletters, wire services, magazines, and other publications. Due to landslide spread of electronic media recently there is a decline in print media readership in the last few decades but still many people in Bangladesh every day read a newspaper or a newsmagazine on a regular basis. Electronic media uses electronics or electromechanical instrument to carry and publish the information, news and now a days it is the most dominant form of media worldwide. Most dominating electronic media sources familiar to the general public are Radio, Television etc. However, in today's world any new media is in the form of digital media. Besides, Social Media is another important platform of electronic media which has immense appeal to people, generally the youth of our country.

At present, media both electronic and printed, is emerging as a fascinating force of dominance, change, manipulation, direction, motivation and spreading ideological stand. It is also a collaborator with government, non-government or other social agencies in the frontier of social activities and change. Not only that, next to judiciary, legislature and executive pillars of the state, it is considered as the fourth pillar of a state. Therefore, the overwhelming importance of the influence of media is undeniable. The dynamism of media lies in the fact that no matter how trivial or insignificant an event may be, the media can represent it in gigantic proportion, attach substantial importance to any incident, transform a collective opinion into something totally different, is able to transport the audience into a total unexplored vista, introduce new concept and even can manipulate significantly. But leaving behind all these roles, the major role the media performs is gearing up the wheel of social change. Because of its involvement in changing people's perception and mobilizing their initiatives it holds a distinctive statement in the affairs of a nation and in the extended context i.e. in the world's affair. This particular role of media can be used in developing acceptance of the third gender people among general mass, ensuring their inclusion in mainstream education and contributing in the alleviation of the miserable condition of these people- which is the focus of this paper.

## **Role of Media and Previous Success Stories in Bangladesh**

The importance of media has been summed up quite aptly in Jim Morrison's words – "Whoever controls the media controls the mind".

Till date, media or specially mass media proved to be a very effective tool for spreading knowledge and changing attitude in different grounds of Bangladesh and helped to achieve several target focused development projects. Since, the inception of the 1990s, radio and television has become available in the majority of the households of Bangladesh. Albeit, the number of radio listener has decreased in the late 1990 and 2000, but the starting of FM radio stations, has ushered another new era in Bangladesh for radio listeners thus providing a great opportunity to stir the

public-media collaboration. Besides, the gradual inclusion of television as a common household item has made it a very effective mass media to influence and propel the public opinion as a massive source of opinion generator and motivator. Later, with the dawn of internet and social networking, Bangladesh has witnessed a torrent of information and knowledge that they have become tremendously influential components of social regulator and social change. Nonetheless, all these media have gradually got inseparable from public life and their attachment gave them the prioritized position to disseminate knowledge, forming and changing views and creating hypes or publicizing certain policies and sometimes circulating propagandas. Taking advantage of these mass media, the government of Bangladesh has been successfully implemented and carried out certain projects whose outcome garnered praise and contributed in the country's growth immensely.

One of the major outstanding successes of media is the radical change of education of girls in Bangladesh since 1992 when the Meena cartoon captured the imagination of the country and led to profound changes in attitudes and practices. The MCI (Meena Communication Initiative) is recognized to be one of the most effective strategies ever developed by UNICEF to raise social awareness (Chesterton, 2004). The series was jointly funded by Finland, Netherlands, Norway, United Kingdom and the United States and was first telecast on television in Bangladesh. It also launched a new way for the government to effectively communicate directly to the people through the media and to enact the Primary Education (Compulsory) Act, 1990 and the Female Stipend Program (1994). The program not only achieved its aim which was to address concerns about equal access to education and greater participation of girls in Bangladeshi society but also won the hearts of the people and brought tremendous change in age old social outlook and removed many of the previous prejudices. (Chesterton, 2004; Clark, 1997; Clark & McKee, 2015).

Another major issue and project has been the 'family planning' agenda. Several studies have confirmed that mass media campaigns have significant effects in changing behavior, proved to be influential in the diffusion of attitudes and knowledge about family planning, contraceptive etc. which indirectly has affected fertility. As cited in Rabbi (2012), the fertility rate declined in Bangladesh from 6.3 in the early 1970s to 3.3 in the mid 90s. According to BDHS 2007 the decline reached to 2.7 after 2000 and the success is achieved through proper utilization of mass media. Men and women who are regularly exposed to mass media, or who have a wider social network, have more knowledge about contraceptives than their counterparts through watching/listening of family planning program on television/radio albeit the impact was verified only for contraception.

Besides, family planning, raising awareness about drug addiction and its harmful effect, spreading knowledge about SM-Saline-N for preventing diarrhea, a very lethal disease in Bangladeshi context, preventing AIDS epidemic – in all these cases and in checking many more social crises government integrated media campaign along with other institutional efforts and achieved significant result through the employment of media. Several research conducted on this ground support this claim. According to the research findings of Tabassum, R., Froeschl, G., Cruz, P. J., Colet, C. P., Dey, S. & Islam, S. M.S. (2018), mass media campaigns can play a pivotal role in changing health behaviors of the population and prevent non-communicable diseases (NCDs). Moreover, media campaigns have been successful in delivering health messages with the intention of changing health behaviours amongst defined populations (Wakefield, M. A., Loken B, & Hornik, R.C. ,2010). According to, Naugle, D. A. & Hornik, R. C. (2014), Bangladeshi mass media campaigns have been successful in increasing childhood immunisation, and reducing tobacco use.

Not only that, their report also affirm that mass media campaigns for oral rehydration saline and breastfeeding resulted in reduced number of child mortality in Bangladesh. Furthermore, anti-tobacco campaign in Bangladesh and Tongo led to decrease in smoking prevalence (Sugden C, Filiati S, Phongsavan P, Gloede S, Tongamana VO, 2017). According to Rahman & Rahman (2007), the awareness about AIDS epidemic among men and women who regularly watch TV is 8.6 times more than those who never watches TV.

Thus media's immense role and contribution is undeniable. If utilized properly the media is capable of bringing surge of new ideas to work and breaking age old barriers. Its attachment with people in grass root level works wonder for generating public consensus and acceptance unanimously and unequivocally. To alleviate the plight of the third gender people therefore, needs more engagement from the domain of media.

### **Media representation of the Third Gender People in Bangladesh**

When media representation helped govt. to achieve focused targets in past, so at present when the govt. has taken a target of achieving sustainable development then the proper utilization of the media can help the policy makers to ensure inclusion of the third gender people in the mainstream society no matter how small a minority group they may be. Everyone deserves to be valued and has responsibility in the country's development. Otherwise, this community will keep relying heavily on begging, extorting money and prostitution. Thus, remaining as a liability of the country and reason of social disharmony.

In most cases the print media is publishing articles about their plights and printing news report of the programs organized by different organizations to address their issues (*Several well circulated daily newspapers have been scrutinized. The articles reviewed are mentioned in the appendix section*). Print media is mainly for educated class and at present time there is a fall of readership of newspapers. So, their investigative report though is helping people to give a second thought about these people but it can't attract the whole mass. Newspapers like The Daily Star, Dhaka Tribune, Daily Sun, New Age and a few other Dailies are publishing articles regarding third gender issues time to time whose frequency is also limited. But the vast majority of people of our society remains detached from newspaper. So, the major responsibility falls on the shoulder of the electronic media as people now a days are very closely attached with it.

In our electronic media like – TV, radio, internet, social media – the depiction of these people is by far a farce. In TV the role given to these people is used as burlesque or caricature to make people laugh. They are degraded as a laughing stock. Dramas like “ChaiyaChaiya”, funny videos on them which are flooding the internet - are full of utter dehumanization and degradation of these people and they are nothing but the use of the third gender people for pure entertainment. A very few commendable works such as telefilm “Samparko”, movies like - “ShikhondiKotha”, “Common Gender” are bringing out their pains and cry for empathy from the society. But the number of this types of endeavors are so few that change of attitudes and views of society is hard to achieve. In some programs like ‘Hizra community in Bangladesh’ in Jamuna TV, ‘The Third Gender of Bangladesh’ in Shomoy TV, ‘Talash Crime- Hijra episode’ in Independent channel, ‘Je golpoNishidho’ in News 24 and many more TV reporting and documentaries are conducted to focus on their hazards and traumas and raising awareness among mass people from time to time. BNNRC (Bangladesh NGOs Network or Radio and Communication) is using 16 Community

Radio Stations to create awareness on third gender issues towards establishing their rights and dignity. But these programs are again sporadic. Infrequent telecasts cannot bring overall change. There should be continuation of all these initiatives.

But all these programs and reporting have missed one very important major issue i.e. to create a harmonious accommodating environment for them, only showing their distress and plights will not complete the whole picture. Their stories of **achievement** should accompany their stories of plight, representation of their lives and pains should be accompanied by their visual participation, which needs to be as objective and as positive as possible in the media. Their skills, talents must be given an outlet to flourish which eventually will create appreciation side by side with empathy among people. They need to be shown as potential human beings, capable of being skilled manpower, not only helpless lot. Visual participation in positive form enhances the possibility to remove the stubborn resistance from the society and escalate acceptability enormously.

### **Positive outcome of the media representation of the Third gender people in some other countries**

In India many 'hijra' or third gender people are doing wonder. From being college principal, mayor, legislative members and so on. They have their voice in the policy making and their presence in media is very vibrant. However, the role of Laxmi Narayan Tripathi, the dynamic and courageous transgender rights activist, hindi movie actor, dancer is contributing a lot to pave the way for social acceptance for these people according to the view of this community (cited from the interview of Laxmi herself). She is lauded by both mainstream society and her community which shows that if instigated properly, empathy and acceptance in common people will definitely flare up and make these people live a respectable life. Her vibrant presence in the media is an example that if chances are given then these people can do wonder and will not be a liability for the state. Not only in India but also in Pakistan which is a very conservative country laudable improvement has occurred as they are empowering the third gender people in media. Jannat Ali's (a third gender dance artist) performances have been broadcasted in Pakistani TV networks attracting publicity and recognition as an artist. On March 24, 2018 the broadcast of the presentation of the first third gender TV newsreader Marvia Malik in Pakistani channel 'Kohinoor' was a triumphant victory for the third gender people of the country. With this the society took a great stride towards breaking barrier and acknowledging the outcast third gender people in their mainstream societal frame. Their participation was not meant to be shown them as vulnerable or deplorable rather their skills and qualifications are highlighted which made them more acceptable to general people and took them many steps ahead to pave the way to a bright future for their community. Media in these countries is the staunchest supporter of these people and very committed in its fundamental role.

It needs extreme courage, boldness, strength to fight against odds in life in a society where one is not even recognized as "human" and establish identity in that mainstream society where people are conformed to the binary definition of sex. If support and scopes are not given then that journey gets terminated. But if given proper exposure then anyone can be a hero that the society can be proud of. A sharp contrast to our neighbors, we don't have any active presence of third gender persons in our media except their passive participation in talk shows, dramas and movies. Like Mavia, Laxmi if we give chance to these people to remain present constantly in the media, in front of the gaze of people then it would boost their social acceptance many fold more which will make it easier for them to receive institutionalized education and training.

## **Findings from the Survey of the Educational Institutions**

The survey has been conducted in 20 Educational institutions covering primary (govt., private & English medium schools), secondary & tertiary levels. The findings of the survey are startling as the authorities of all these institutes have informed that –

- None of them at present has any Third Gender student.
- None has any existing policy & has no possibility in near future to have any policy regarding the admission of the third gender student in their institutions.
- They have mentioned of not receiving any instruction from the govt. to give admission to third gender students and they are not aware about the allocation of govt. stipend for these students.
- All of these spokespersons in those institutes have said that admitting third gender students will create uncomfortable situation for other students. But if any student of that category comes then they will take them but none has ever come.

## **Findings from the Interviews of the Third Gender Persons**

The researchers have conducted interview of the third gender people. The findings regarding their perception of receiving education and the role of media in improving their condition are –

- 1% of the total interviewees has received only primary education.
- 40% could not receive any education for social discrimination and institutional abuse.
- 60% has said they haven't been interested to go for education to avoid more psychological trauma.
- Unequivocally they have asked for social acceptance before entering into educational field and expressed that they are not asking for any special privileges, their demand is only their lawful equal rights and acceptance as humans.
- They are not clear about the role of media in alleviating their condition due to their lack of education and knowledge.
- They are confused about their presentation (i.e. whether it is good or bad for them) in the media as sometimes people taunt them in the way they are shown in the screen.
- Don't think that they get enough media attention in positive way.
- Believe that electronic media can play very influential role as people watch drama, movie, talk show, news more than reading articles or newspaper report.
- Expect media to broadcast not only their plights but also give them chance to be a part of it so that they themselves can try to change their situation with the help of others.

## **Recommendation**

- Both print and electronic media should give more media coverage to highlight the plights and rights of this socially marginalized people.
- Not only report, talk show, drama and movie about them but media should recruit them to show their acceptance of these people which will eventually transform the mass people.
- Sensitive, compassionate portrayal of these people are highly required to kindle the empathy and realization of people.
- Frequency of their participation not as passive participant but in active role should be prioritized.
- Their skills and talents need to be focused to inspire people not only to sympathize but also to

admire them.

- Government has to mobilize the infinite scope of media to remove social prejudice, ensure their social acceptance and assure their commendable development by instilling proper education and training.

Thus the research findings show that inclusion is the foremost requirement to empower these people. If proper contribution is made by the mass media which has enormous potential, then it is possible to ensure absolute integration of the third gender people in the mainstream society, incorporate them in the workforce and use this potent manpower to achieve the SDGs in all forms and perspectives. Further research on employing emerging digital technologies to uphold the cause of the third gender people needs to be conducted.

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# Teachers' Belief, Practice and Challenges in Implementing Inquiry-Based Teaching at Higher Secondary Biology Class

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## Abstract

*Biology is one of the core science subjects at higher secondary level in Bangladesh. Biology curriculum is intended to promote Inquiry-Based Teaching-learning. This study was conducted to analyze the current situation of implementation of Inquiry-Based Teaching (IBT) learning process in Biology classes at higher secondary level. To explore the teachers view about IBT in Biology at higher secondary level and the challenge affecting the implementation. Mixed method research design has been followed to conduct this study from teachers of high, medium and low Category. It was found from the classroom observation that most of the participant-teachers do not promote IBT in their Biology classes in all three categories where some of the high category college teachers promote IBT in their Biology classes. This study also finds that there is a gap between the view and their classroom practice in higher secondary Biology classes. It was also found that participant teachers who have professional training shown better performance promoting IBT in higher secondary Biology classes. This study found that most of the teachers' face challenges to implement IBT approach due to teachers' lacking of pedagogical knowledge, time constraint of the classes, pressure to complete syllabus, large class size, lacking of students' interest and active participation, shortage of required teaching aids, and students' limited learning capacity. This study can help for developing the current situation. Findings can be implicated for the betterment of teachers' knowledge and understanding of IBT, teachers' practice of IBT, Policy maker, College authority to support teachers and this study can also be helpful for further research ahead.*

## Introduction

Biology is a natural science concerned with the study of life and living organisms, including their structure, function, growth, evolution, distribution, and taxonomy (Aquarena Wetlands

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Project, 2004 in Aniaku, 2012). Inquiry helps students to learn and experience Biology first-hand, by taking on the role of scientist. The student use Inquiry process to develop explanations from their observations (evidence) by integrating what they already know with what they have learned (Opara, 2011). A central goal of education is teaching critical-thinking skills. Inquiry-based teaching is an excellent path to this goal (Kyle, 2016). “Inquiry-based teaching (IBT) is a pedagogical approach that invites students to explore academic content by posing, investigating, and answering questions (Goodrum, 2012).

In Bangladesh, new curriculum at the higher secondary level was introduced in 2012. After that the new Biology textbooks were developed and introduced in the classrooms in line with the new curriculum in 2013. One of the main focuses of this new Higher Secondary Biology Curriculum is to emphasize on the implementation of Inquiry-Based Teaching (IBT) and Learning in our classrooms (NCTB, 2012). To make IBT implementation successful, curriculum dissemination program as well as TQI Project also given training on IBT. However, according to my observation as a Biology teacher and college science coordinator, the scenario of Biology teaching at the higher secondary level remains the same where students are not active in learning Biology.

## **Research Questions**

The main purpose of this study is to identify the status of IBT in Biology classes at higher secondary level. This status mainly includes both the current situation and teachers' views. Challenges on the implementation of IBT in Biology classes at higher secondary level are also another focus of this study. Therefore, to address this issue, this study sets the following research questions.

1. What is the current situation of the Inquiry-Based Teaching activities at higher secondary Biology class?
2. How do teachers view on the Inquiry-Based Teaching practice?
3. What are the challenges in implementing Inquiry-Based Teaching at higher secondary Biology class?

## **Theoretical Framework**

### **Inquiry-Based Teaching (IBT)**

“Inquiry is the dynamic process of being open to wonder and puzzlements and coming to know and understanding the world” (Galileo Educational Network, 2015). A historical view of inquiry in science classrooms reveals three phases-learners doing inquiry, learners learn core science concepts through inquiry, and learners learning the nature of a scientist's inquiry (Saden & Zion, 2009). Inquiry exists within different contexts- scientific inquiry, inquiry-based learning, and inquiry-based teaching (Hasson & Yarden, 2012; Marshall & Smart, 2013). “IBT is a pedagogical approach that invites students to explore academic content by posing, investigating and answering questions (Goodrum, 2012). Inquiry-Based approaches to teaching science may have a significant influence on the ways in which inquiry is enacted in classrooms.

### **Indicators of Inquiry-Based Teaching**

Goodrum (2012) provided a framework that attempts to describe Inquiry-Based Teaching (IBT) mentioning twelve themes or indicators. These are: Science being interesting for all students.

Studying a few fundamental concepts. Content that is meaningful to the students' experiences and interests. Guiding students in active and extended student inquiry. Providing opportunities for scientific discussion among students. Groups working cooperatively to investigate problems or issues. Open-ended activities that investigate relevant science questions. Learning broader concepts that can be applied in new situations. Learning science actively by seeking understanding from multiple sources of information, including books, internet, media reports, discussion and hands-on investigations. Assessing learning outcomes that are most valued. Assessing understanding and its application to new situations, and skills of investigation, data analysis and communication. Ongoing assessment of work and the provision of feedback that assists learning.

### **Methodology**

This study is conducted based on explanatory sequential mixed method focusing on three research questions. RQ1 is focused on the current situation of IBT practice in higher secondary Biology classes which is the quantitative part of the study. RQ2 and RQ3 focuses on the teachers' views and challenges they face implementing IBT in higher secondary Biology classes. For finding the answer of RQ1 a lesson observation grid was used based on Goodrum (2012) framework. Interview of the participant teachers were conducted to find out the teachers views and challenges they faces promoting IBT in higher secondary Biology classes which was the focus of RQ2 and RQ3.

A total of 13 colleges and 21 teachers were selected from Dhaka city for the study. The colleges were categorized in three different categories (high, medium and low) based on Higher Secondary School Certificate Examination results of Biology in 2017. The colleges and the participant teachers were selected through purposive and convenience sampling. A total number of 28 classes of were observed from which 14 in high, 7 classes each in medium and low category colleges. The quantitative data was analyzed through descriptive analysis and the qualitative data was analyzed through thematic analysis.

### **Results and Discussion**

The gathered data from the study is presented and analyzed in this section, according to the three research question. First one is "current situation of the IBT", then "Teachers' view" and the last one is "Challenged face by the teachers". To attain the result of the research questions (RQ-1,2,3) both quantitative and qualitative data collected through lesson observation and interview. Teacher responses are analyzed under 12 major themes of the IBT followed by Goodrum's framework (Goodrum&Druham, 2012).

### **Science being interesting for all students**

Most of the participant-teachers of high and medium category colleges provided a lot of emphasis on making the Biology contents interesting for all the students where the participant-teacher of low category college provided some emphasis on making the Biology content interesting. The chart represents the situation of making Biology content interesting for all.

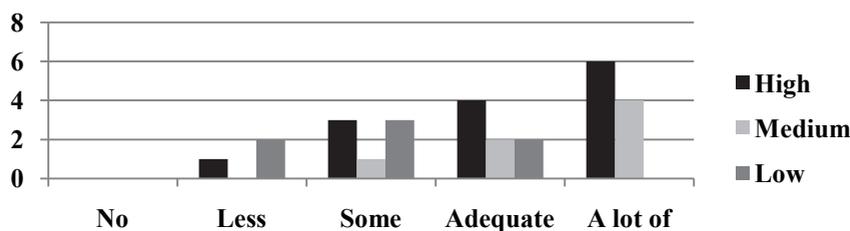


Fig-1: Emphasis level on “Science being interesting for all students” for different categories of colleges

Most of the participant-teacher have the acknowledged the importance of making the contents interesting for all the students but in practice the high and medium category college teachers provided a lot of emphasis on it. Their views reflect in their classroom practice where there is a gap between the views and practice in low category colleges. Lack of students’ interest, equipment shortage and lack of teachers’ pedagogical knowledge are the challenges for making the Biology contents interesting for all the students.

### Studying a few fundamental concepts

Teachers of high category colleges provide adequate emphasis on studying a few fundamental concepts of Biology contents where most of the participant-teachers in medium and low category college provided some emphasis on it. The chart represents the current situation of studying fundamental concepts of the Biology contents.

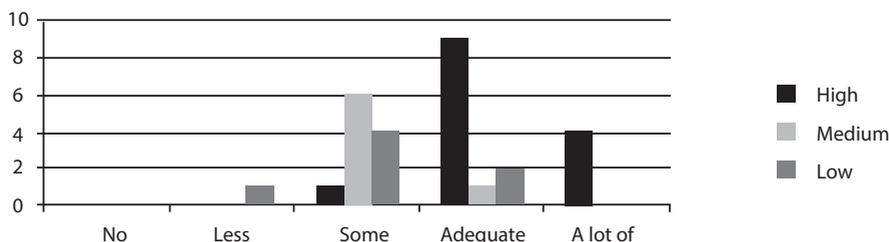


Fig-2: Emphasis level on “Studying a few fundamental concepts” for different categories of colleges

Most of the participant-teachers in medium and low category colleges provided some emphasis on studying fundamental concepts of Biology in their classes. But they have acknowledged the importance of studding the fundamental concepts in the interviews. Their views do not reflect in their classroom practice. Shortage of proper teaching and learning materials, time limitation and traditional assessment system are the challenges studying the fundamental concepts of higher secondary Biology classes.

### Content that is meaningful to the students’ experiences and interests

The participant-teachers in high category colleges provided adequate emphasis on relating the content to student’s real life experiences and interests where most of the participant- teachers

in medium category colleges provide some emphasis and the participant-teachers in low category colleges provided less emphasis on it. The chart represents the current situation of relating the content to students' real life experiences and interests.

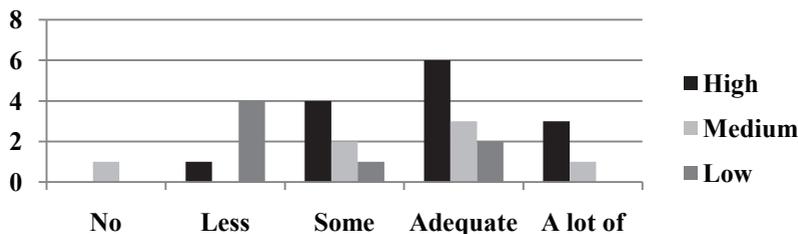


Fig-3: Emphasis level on "Content that is meaningful to the student's experiences and interests" for different categories of colleges

Most of the participant-teachers' view of the medium and low category colleges was not reflected through their classroom practices. Most of the participant-teachers acknowledged the importance of relating the contents to their real life experiences and interests to the students but only in the high category colleges the participant-teachers provided adequate emphasis on it. The students learning capacity, time limitation and lack of teachers' pedagogical knowledge are the challenges for making the Biology contents interesting for all the students.

### Guiding students in active and extended student inquiry

Most of the participant-teachers in high and medium category colleges provided some emphasis on guiding students in active and extended student inquiry where most of the participant-teachers in low category colleges provided no emphasis on guiding students in active and extended student inquiry.

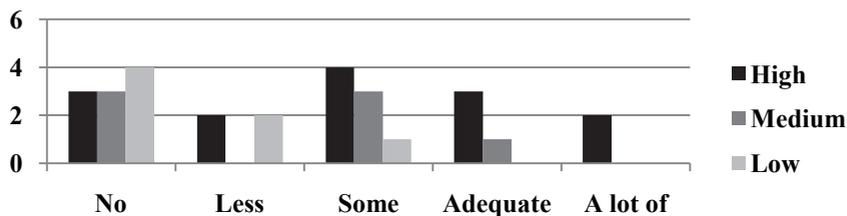


Fig-4: Emphases level on "Guiding students in active and extended student inquiry" for different categories of colleges

In medium and low category colleges the participant-teachers' view was not reflected through their classroom practices. Most of the participant-teachers acknowledged the importance of guiding the students to active and extended inquiry for better understanding the contents of Biology but only in the high category colleges, provided adequate emphasis on it. Students less attentive and time constraint are challenges for guiding in active and extended student inquiry.

## Providing opportunities for scientific discussion among students

Most of the participant-teachers in high category colleges provided some emphasis on providing scope for scientific discussion among the students where medium category colleges the participant-teachers provided adequate emphasis and the participant-teachers in low category college provided less emphasis.

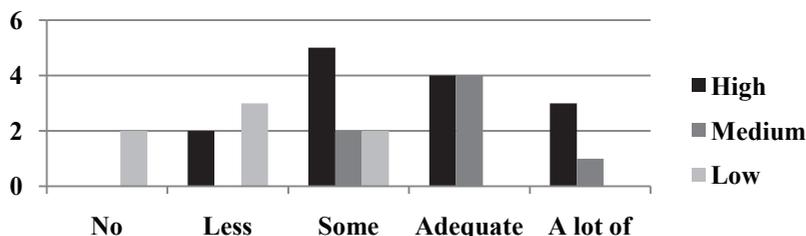


Fig-5: Emphases level on “Providing opportunities for scientific discussion among students” for different categories of colleges

Participant-teachers’ view of the medium and low category colleges was not reflected through their classroom practices. Most of the participant-teachers acknowledged the importance of scientific discussion among the students for better understanding the contents of Biology but in only in the high category colleges the participant-teachers provided adequate emphasis. Excessive content load, lack of students’ active participation and time management are issues on providing opportunities for scientific discussion among students.

## Groups working cooperatively to investigate problems or issues

All most all of the participation-teachers in all categories of colleges provided no emphasis on giving the students opportunity to work in a group cooperatively to investigate problems or issues.

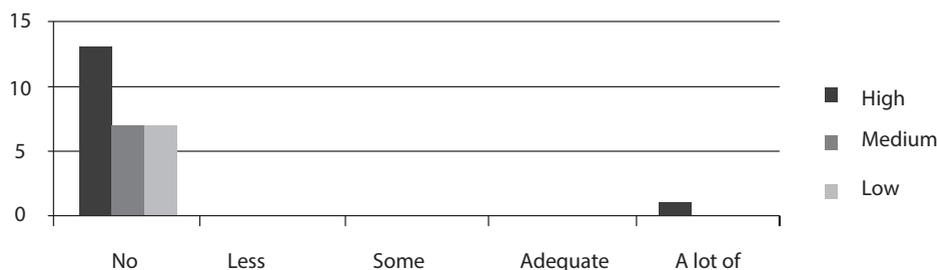


Fig-6: Emphases level on “Groups working cooperatively to investigate problems or issues” for different categories of colleges

All the participant-teachers have acknowledged the importance of group work but none of them provided any emphasis on it in their daily classroom activity. Lack of students’ interest, their active participation and time limitation causes problem for giving the students opportunity to work cooperatively in a group.

## Open-ended activities that investigate relevant science questions

Most of the participant-teachers in high and medium categories of colleges provided less emphasis on providing open-ended activities that investigate relevant science questions. On the other hand, the participant-teachers in low category colleges provided no emphasis in their daily classroom practices.

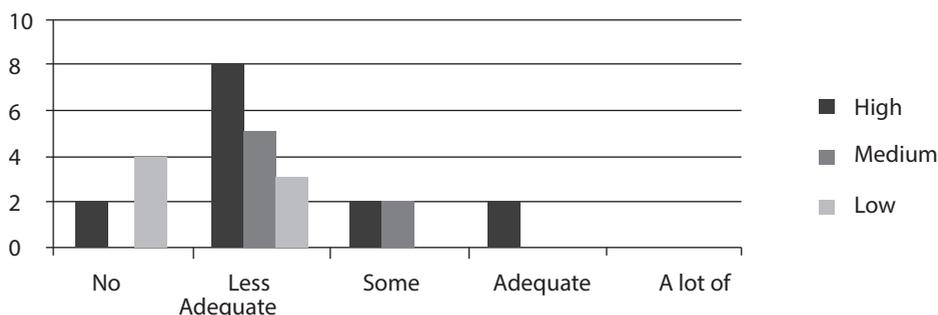


Fig-7: Emphases level on “Open-ended activities that investigate relevant science questions” for different categories of colleges

The participant-teachers view of the high, medium and low categories of colleges was not reflected through their classroom practices. Though they said that open-ended activity is important for students’ better learning most of them provided less emphasis on this theme. Lack of students’ active participation and time limitation are the challenges for giving the students opportunity for open-ended activities among the students.

## Learning broader concepts that can be applied in new situations

Most of the participant-teachers in high and medium category colleges provided some emphasis and the participant-teachers in low category college provided less emphasis on helping the students to learn broader concepts of the higher secondary Biology contents that can applied in a new situations.

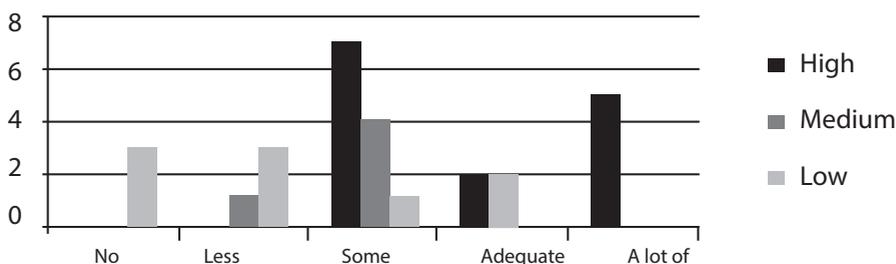


Fig-8: Emphases level on “Learning broader concepts that can be applied in new situations” for different categories of colleges

The participant-teachers believe that learning broader concepts of the Biology content can help the students have in-depth knowledge about the contents in their textbooks. It was found

that the high and medium category colleges the participant-teachers view were partially reflected in their daily classroom practice, but teachers' view of low category colleges was not reflected in their classroom practices. Large class size and time constraint are the main challenges for giving the students opportunity for learning broader concepts.

### Learning science actively by seeking understanding from multiple sources of information, including books, internet, media reports, discussion and hands-on investigations

Most of the participant-teachers in all three categories of colleges provided less emphasis and in high category colleges some practices were found providing adequately emphasis to allow the students to use multiple sources of information for learning Biology contents.

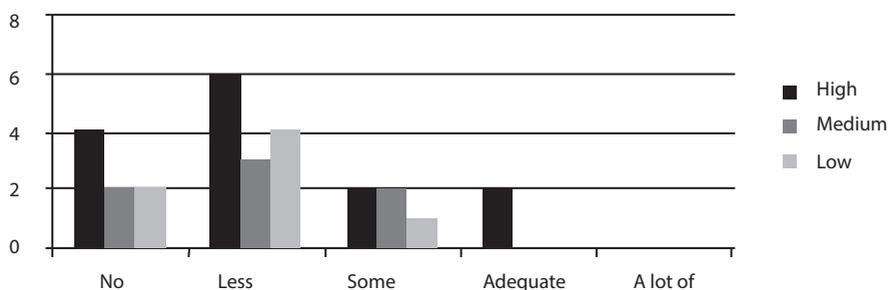


Fig-9: Emphases level on “Learning science actively by seeking understanding from multiple sources of information” for different categories of colleges

Participant-teacher views towards IBT does not reflect in their practice in all categories of colleges as most of them provided less emphasis on using multiple sources of information. Most of the participant-teachers acknowledged that using multiple sources can help the students to have new knowledge about new discoveries in the field of Biology. Students learning capacity, lack of students' active participation and pressure to complete syllabus in time causes problem for giving them the opportunity to use multiple sources of information.

### Assessing learning outcomes that are most valued

The participant-teachers of high category colleges provided adequate emphasis on assessing the, at medium category colleges provided some emphasis and participant-teachers in low category colleges provided less emphasis for assessing the learning outcome that is most valued.

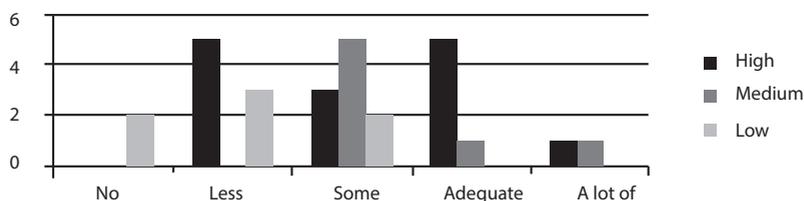


Fig-10: Emphases level on “Assessing learning outcomes that are valued” for different categories of colleges

It was found that the medium and low category colleges the participant-teachers view does not reflected through their classroom practices. Most of the participant-teachers acknowledged the importance of assessing the learning outcome that are most valued but in their classroom practices it is quite missing. Lack of students' active participation and time limitation are challenges for assessing the learning outcome of each and every student.

### Assessing understanding and its application to new situations, and skills of investigation, data analysis and communication

Most of the participant teachers in high and low category colleges provided no emphasis and in medium category college provide less emphasis on assessing the application of the students' knowledge in new situations.

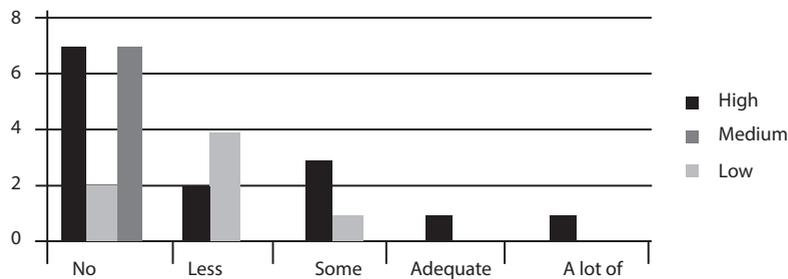


Fig-11: Emphases level on “Assessing understanding and its application to new situations, and skills of investigation, data analysis and communication” for different categories of colleges

Most of the participant-teachers acknowledged the importance of assessing the students understanding and its application in a new situation. But in their daily classroom practice the participant-teacher does not assess the students understanding and its application in a new situation. Lack of students' interest, very poor feedback from students, and time limitation of the class does not allow participant teachers to assess students understanding and its application in a new situation.

### Ongoing assessment of work and the provision of feedback that assists learning

Most of the participant-teachers in all three categories of colleges provided less emphasis on ongoing assessment of work and the provision of feedback that assists learning. For the assessment of the students the participant-teachers usually depends on summative assessment of the respective colleges.

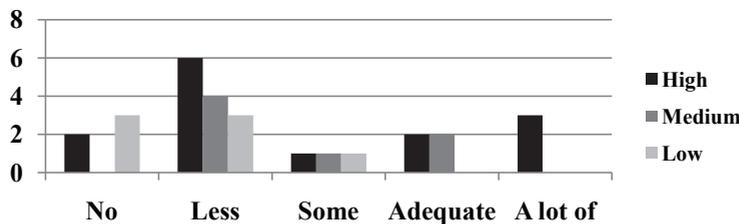


Fig-12: Emphases level on “Ongoing assessment of work and the provision of feedback that assists learning” for different categories of colleges

Most of the participant-teachers acknowledged the importance of assessing the students work in regular basis. It can be helpful for them as well as the students for ensuring proper understanding of the students of the higher secondary Biology contents. But most of the participant-teachers cannot provide proper emphasis on assessing each and every student’s work. Lack of students interest, class pressure, and time limitation are the challenges for conducting ongoing assessment of each and every student’s work

### Comparison between trained and no trained teachers to promote IBT

This study finds that there is a significant difference between the classroom practices of the teacher to promote IBT and their belief in Biology classes at higher secondary classes. The trained teachers have provided more emphasis to ensure inquiry based teaching than the untrained teachers. The following chart represents the classroom performance of the trained and non-trained teachers in the pre-selected indicators.

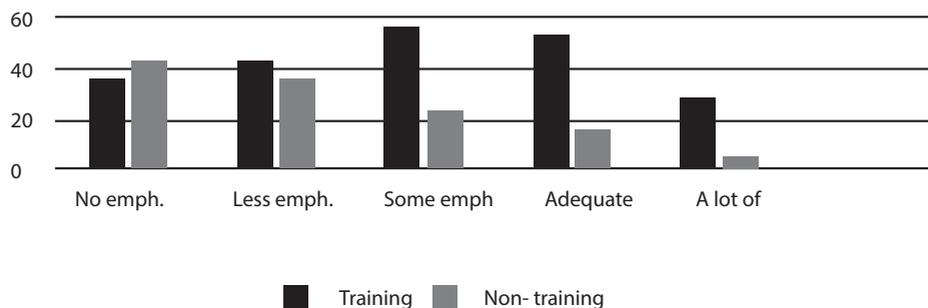


Fig-13: Comparison between trained and no trained teachers to promote IBT

It is, therefore, said that professional training can help the participant teacher to conduct better performance to promote IBT in Biology classes at higher secondary level.

### Discussion

It was found from the study that most of the participant-teachers of medium and low category colleges do not take class according to their views towards IBT at higher secondary Biology class. Most of the participant-teachers acknowledged the importance of IBT for making the Biology contents interesting, real life oriented and students center for ensuring better understanding of the Biology content at higher secondary level. A study (Linn, Songer, & Eylon, 1996) shows that “Inquiry-based learning is based on the recognition that science is essentially a question-driven, open-ended process and that students must have personal experience with scientific inquiry to understand this fundamental concept of science. Furthermore, inquiry activities provide a valuable context for students to acquire, clarify, and apply an understanding of science fundamental concepts and discuss many things everywhere. It was found that practice of IBT is not performing in low and medium category colleges properly. Therefore students of these colleges may not get the opportunity to conduct open-ended activities and apply their knowledge and understanding in a new situation. Moreover, several complicated and difficult Biology contents can be made easier and helps the students to understand the fundamental concepts in an easy and joyful way. So it may hamper the learning process of the students of these colleges.

This study finds that most of the participant-teacher does not provide emphasis on ensuring inquiry-based classroom activities. Even though the participant-teachers have good knowledge about IBT, they do not implement their knowledge in their daily classroom practice. Mostly the participant-teachers in medium and low category colleges have significant differences between their believed system and their everyday classroom practices. On the other hand, the participant teachers' view is reflected through their classroom activities in high category colleges.

Most of the participant-teachers have identified some issues that hamper the implementation of IBT in higher secondary Biology classes. The challenges identified by the teachers are large class size, lack of students' active participation, time limitation, students learning capacity, and teacher pedagogical knowledge about IBT. Several literatures show similar results in different context. According to Sultana (2017), most common challenges teacher face to implement inquiry based teaching learning approach are due to, large class size, students of different learning abilities, lack of students' interest and active participation in inquiry based activity. In another study, Kaya (2017) shows that, when teachers lack the necessary knowledge base about student-centeredness, time management, inquiry activities, they might have problems in implementing inquiry based science activities in their classroom. It is, therefore, might have affected the implementation of IBT at higher secondary Biology classes.

## **Implications**

### **Implication for Teachers Understanding and Knowledge of IBT**

This study finds that the teacher don't have proper understanding about IBT. In some cases there is lacking in teachers pedagogical knowledge towards implementing inquiry-based teaching-learning approach. This study can guide the teachers to have concrete understanding about inquiry-based teaching and learning approach and ensure proper implementation of inquiry based teaching in higher secondary Biology classes.

### **Implication for Teachers' Practice**

This study finds that, the achievement of the students in Biology is better in those colleges where the teachers implement IBT in their regular classroom practice. This finding indicate that ensuring proper practice of IBT in Biology classes students can be easily engaged and made interested towards the contents of Biology at higher secondary level. So, this study can guide the teachers to implement inquiry based teaching for making the contents of Biology easier and enjoyable for the students as well as for ensuring better achievement of the students.

### **Implication for Policy Maker and Future Research**

This study finds that most of the participant-teachers don't have proper understanding about the inquiry based teaching and learning approach. It also finds that some of the participant-teachers don't implement IBT approach. This study can help the policy maker to ensure proper training to the teachers and suggest them to conduct regular monitoring of the classroom practice to ensure proper implementation of IBT process. This study has been conducted in a small scale. Future research can be done in a large scale specially focusing on rural area.

## Conclusion

Through this study I have found that in the context of Bangladesh, high category college teachers are moderately practice IBT approaches in Biology classes at higher secondary level, where some practice in medium category college and very poor practice found in low category college. I have seen that teachers are not proper understanding IBT approaches, for this reason, they cannot proper practice of IBT in Biology classes at higher secondary level. According to me it can be an effective teaching strategy for making complicated Biology content easier and interesting to the students at higher secondary level.

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# Understanding Durable Gender Inequality and Identifying its Determinants in the Education Sector

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Anup Kumar Talukder <sup>2</sup>

## Abstract

*Durable inequality is the categorical long-persisting inequality found in every sphere of life. The categorical distinction, such as male/female or rich/poor among people is the fundamental thesis of this term. Exploitation and opportunity hoarding are the major structural causes of durable inequality whereas emulation and adaptation are the tools for establishing durable inequality. This paper addresses the social and economic dimensions of durable gender inequality in Bangladesh. It finds that the patriarchal social system is the major social cause for durable gender inequality which creates the ground for discrimination against women from their birth to death. It limits women's ability in the decision-making process, affects the health status of women's own and their families and creates the early marriage of women. Access to and control over productive resources is the main economic cause for durable gender inequality which affects overall growth and development of the country. This paper finds out the main determinants of durable gender inequality in the education system. Access to schooling, educational investment and learning outcomes are the three major reasons which can create durable gender inequality in the education sector.*

**Keywords:** Durable inequality, Poverty, SDGs, Access to Schooling, Educational Investment, Learning Outcome

## Introduction

Inequality has both ethical and economic attribution and it prevents flourishing the capabilities of the bottom-end or otherwise deprived population (Ray, 1998). The very first article of the Universal Declaration of Human Rights (UN, 2015) confirmed equal right for every human being, however, because of inequality every human being is not being treated in the same way in the world. From ethical consideration, this reality is hard to accept. Again, economic inequality affects

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not only the distribution of income but also the overall growth and development (World Bank, 2005).

The term 'durable inequality' denotes long-standing inequalities in social and economic domains. There are different schools of thought for understanding the social and economic reasons behind it. Tilly (1998) has defined and explained the term in a broader sociological context. The World Bank (2005), on the other hand, despite not using 'durable inequality' term, has used interrelation of different kinds of deprivation of endowment for explaining the multidimensional and group-based long persisting inequality. Tilly (1998) described durable inequality as 'distinctly bounded pairs' like a male/female, which could be addressed as durable gender inequality. Durable gender inequality is practised in many sectors and education sector is one of them.

Education has been considered as a long-term investment since the 1960s with the rise of Human Capital Theory. A growing number of literateurs advocate for gender equality in the education sector for a long period of time. For example, the World Bank economist George Psacharopoulos and Harry Anthony Patrinos (2002, p.15) have shown that girls receive higher returns to education compared to boys. Female education generates many additional socio-economic gains which eventually benefit the whole society. However, female education has been neglected until recently though there have numbers of arguments on investing in this sector (Hanushek, 2008, p.24).

This paper is an attempt to address durable gender inequality in Bangladesh with a special attention in the education sector. In recent times, this country has achieved substantial success in several areas of social and economic development. However, 'poverty is still persistent and inequality is rising and becoming more diversified in Bangladesh' (Afsar, 2010, p. 187). This contradicting nature is the main reason for studying about inequalities in Bangladesh.

The main body of this paper is divided into four parts. In the next section, the theoretical consideration of durable inequality is pointed out. The third section starts with a quick summary of the present state of 'vertical inequality' situation in Bangladesh. The main contribution of this section is to find out the social and economic causes and consequences of durable inequalities in gender in Bangladesh. The fourth section covered three major determinants of durable gender inequality in education. The final section concludes the paper.

## **Conceptual Framework of Durable Inequality**

In 1998, American sociologist Charles Tilly published a book called 'Durable Inequality' in which he has explained durable inequality as 'those that last from one social interaction to the next, with special attention to those that persist over whole careers, lifetimes, and organizational histories' (p.6). The categorical distinctions among people are the fundamental notion of his thesis, in which durable inequalities have always been built. He has sorted out these categories not by gradient attributes of individuals, but by 'distinctly bounded pairs' like a male/female or citizen/foreigner and 'more complex classifications based on religious affiliation, ethnic origin, or race' (p.6). However, he has considered bounded categories more prominent for offering more proof of durable inequality.

Tilly (1998) argued that 'exploitation' and 'opportunity hoarding' are the major structural causes of durable inequality. 'Emulation' and 'adaptation' are the other two devices for establishing the system of durable inequality (p.9). Here, 'exploitation' refers full control over resources and

gaining returns by using coordinated collective approach by one powerful group. Hence, the powerless group of the paired and unequal categories excluded from the process because of having limited or no access to resources. 'Opportunity hoarding' allows the members of a bounded network to access 'a resource that is valuable, renewable, subject to monopoly, supportive of network activities, and enhanced by network's modus operandi' (Tilly, 1998, p.10). Again, 'Emulation' involves duplicating recognized organizational models or transplanting active social relation to different setting and 'adaptation' means expansion of everyday practices relying on categorically unequal structures (Tilly, 1998, p.10). These two devices are used to reinforcing and maintaining the existing form of durable inequality.

Morris (2000) has criticized that Tilly failed to notice the role of inheritance in transmitting inequality across generations. He cited the example of American slavery and argued that this durable inequality stranded for centuries because of the role of inheritance. The dominant role of large formal organizations in Tilly's analysis has also been criticized by him.

Except for Tilly (1998), several other ideas have also occurred on durable inequality in a sense of long-lasting inequality in different attributes among the people across the border. For example, development economists have explained durable inequality in the production point of view. One model called 'history dependence' tells nothing about the history of the inequality but suggests that 'a history of the high inequality may persist into the indefinite future, carrying with it inefficiencies in production' (Ray, 1998, p.236).

The World Bank(2005), on the other hand, has tried to figure out the root causes of durable inequality by correlating the unequal distribution of assets, opportunities and political power among the people. The central line of argument in this correlation of unequal distribution of assets, opportunities and political power gives rise to a circular flow of mutually reinforcing pattern of inequality. Such a flow ... help inequalities persist over long periods' (World Bank, 2005, p. 21). It has been mentioned that the policy planners are not necessarily humanitarian persons working to maximize the social welfare of the people. They can make decisions and establish institutions according to their own group interest that might not narrow down the prevailing inequality. Again, institutions can prevent people's equal economic opportunities ('circumstances at birth should not matter for a person's chances in life') which result in unequal economic outcomes and unequal political powers- the latter then again shapes institutions in favour of unequal opportunities (World Bank, 2005, p. 19-20). The interactions among political, socio-cultural and economic inequalities, therefore, shape the institutions and rule the society.

There are two other dimensions of this explanation. First, the unequal societal structure starts reproducing itself, believing in itself and become a barrier for the further of the equal opportunity. Second, the majority of the population, because of the ethical question, may not be happy with the unequal society though they cannot reshape the system because of the unequal distribution of political power.

## **Durable Inequality in Bangladesh**

Bangladesh is a small South Asian country with approximately an area of 55,750 square miles. Its present population is, according to the survey estimates, 161.3 million, and of them, 81.0 million were male and 80.3 million were female. The literacy rate among the population is not

satisfactory with only an estimated 69.0 per cent of the population aged 15 or older was literate. A huge inequality is evident between the sexes, in terms of literacy where the male literacy rate is 72.7 per cent and the female literacy rate at 65.3 per cent (Bangladesh Bureau of Statistics, 2018).

There is an alarming situation prevailing in terms of income inequality in Bangladesh, despite its huge and constant success in poverty reduction lately. The latest preliminary report of the Household Income and Expenditure Survey (Bangladesh Bureau of Statistics, 2017) found that income share of the poorest five per cent was 0.23 per cent, which was 0.78 per cent in 2010. Conversely, the income share of the richest five per cent rose to 27.89 per cent from 24.61 per cent in 2010 (Bangladesh Bureau of Statistics, p.27-28). It means the income inequality was sharply raised throughout the second decade of this century in Bangladesh. Considering the Gini coefficient, another important tool for measuring inequality, it shot up to 0.32 in 2015, rising from 0.26 in 1985 (The World Bank, 2018). The widening gap in income between rich and poor certainly makes an impact in the overall development agenda of the government which is committed to fulfilling all related targets of the Sustainable Development Goals (SDGs).

Durable inequality exists in different bounded categories in Bangladesh. Gender, ethnicity, land ownership have made the major categories in which durable inequality has created and can be investigated for finding out the social and economic causes and consequences which are briefly discussed below. However, only durable gender inequality with a particular importance in education is discussed in this paper.

### **Causes and Consequences of Durable Gender Inequality in Bangladesh**

Gender equality is defined as ‘the desired result of gender equity and refers to equal opportunities and outcomes for men and women’ (ADB, 2010). The fifth goal of the Sustainable Development goals (Achieve gender equality and empower all women and girls) has devised to eliminate all forms of discriminations against all women and girls, eradicate child marriage, ensure universal access to sexual and reproductive health and reproductive rights, undertake reforms to give women equal rights to economic resources, adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels and other related issues (General Economics Division, 2016). However, in Bangladesh, so far some socioeconomic indicators show that Bangladesh suffers from persistent gender inequality. For example, despite all efforts from the government and the international community, the present situation tells that 62.8 percent of women marry before 18 years of age (Bangladesh Bureau of Statistics, 2015). Again, the labour force participation rate of the population aged 15 or older is 58.2 per cent, at 80.5 per cent male and only 36.3 per cent for females (Bangladesh Bureau of Statistics, 2018). Though women’s participation in the labour force has increased in the service and the industry sector, their participation at management levels continues to remain low. Women’s contribution in the political decision making is also limited (Khan, et al., 2004), and they face restriction on accessing assets (World Bank, 2005). Hence, the correlation of unequal gender distribution of opportunity, political power and assets creates the durable gender inequality. For more understanding, the social and economic causes and consequences of durable gender inequality are discussed below.

## **Social Causes and Consequences of Durable Gender Inequality in Bangladesh**

a) Causes: Like the other South Asian societies, Bangladesh strictly follows the patriarchal social system which reflects systematic subordination of woman's role and responsibility. The patriarchal society also prescribes lower social status for women than men (Grist, Seeley and Maddox, 2006) and this creates the ground for discrimination against women from their birth to death.

The unequal structure of the society also endorses male protection for females. This happens mainly because of the government's inability to protect women from various forms of violence (Grist, Seeley and Maddox, 2006; Khan et al., 2004). It shapes the women's world to be subordinate to male dominance. They start believing in their existing social norms and transmit those to their daughters and daughter-in-law, and indirectly assist to maintain the durable gender inequality (World Bank, 2005, p. 19-20).

b) Consequences: The social consequences of durable gender inequality can be perceived in their major channels. Firstly, it limits women's inability in the decision-making process. Bangladesh is densely populated and an effective family planning programme could only maintain the population in a proper shape. However, it is argued that women do not have the power to take decisions on taking babies; even they could not have the liberty to use the contraceptives (Khan, et al., 2004). The low contraceptive prevalence, which is only 54.1 percent (World Bank, 2018), supports the argument.

Secondly, it affects the health status of women's own and their families. Currently, around 32.6 percent of fewer than 5 years old children is suffering from malnutrition problem (World Bank, 2018). Poverty is the major cause of it, but women's lack of knowledge and awareness about child care, which comes out from the inability of access to school and modern education also plays a vital role here.

Finally, it affects the early marriage of women. Early marriage affects the reproductive health of women and prevents the educational prospect of them.

## **Economic Causes and Consequences of Durable Gender Inequality in Bangladesh**

a) Causes: The social causes affect the economic causes and eventually the economic consequences. Sen argues that existing gender systems are oppressive to women in two ways: 'i) unequal access to resources and divisions of labour within and outside the home; and ii) non-recognition of the work of household reproduction' (Sen 2000, cited in Grist, Seeley and Maddox 2006, p.21). The social system confined them in the houses and at the same time gives less status for doing household work. Male dominant society perceives earning money in the outside which is the only productive work and for that reason, they simply ignore the monetary value of women's work in the household.

Access to and control over productive resources is unequal between women and men (ADB, 2010). The law of Inheritance favours for men (Khan, et al., 2004) and women still now have a full restriction on access to opening a bank account, access to possess the land property and property

other than land (World Bank, 2005). This situation is somehow challenged by the long battle over establishing women's right in Bangladesh.

b) Consequences: The consequences of economic causes of durable gender inequality can be perceived mainly in two channels. Firstly, it affects women in getting a higher education. Data shows that Bangladesh has achieved gender parity in the primary and secondary education, mainly because of international commitments towards Millennium Development Goals (Goal 2 and 3) and positive discrimination by the government by introducing female stipend programme in secondary level (Schurmann, 2009). However, the ratio of a female in tertiary enrolment still now 41.53 with 0.71 Gender Parity Index (GPI)(BANBEIS, 2017) and the reason is the cost associated with it. Families do not consider women as possible workforce and therefore are not interested in investing in their education. Again, boys look after their parents in the old age and parents do their most to prepare their son for the future job market.

Secondly, durable gender inequality affects the overall growth and development of the country. In the labour market, women participate mostly in the agriculture sector (51.7 percent of female employment), craft and related trade sector (17.5 percent of female employment) and the elementary occupations (15.8 percent of female employment) (Bangladesh Bureau of Statistics, 2018). Their household work is not counted in the GDP. Hossain and Tisdell (2005) have found in their study that women are paid less than men though the wage gap is being reduced throughout the time. They have also shown that women earning in the formal sector got the entitlement of producing resources. However, the social and economic exclusion of women reduce the earning of the family and thus savings too. Then, in that case, the family could not invest in the productive sector. Thus, as a whole, the lower participation of women in the labour market affects the overall growth and development of the country adversely.

## **The Multiple Dimensions of Durable Gender Inequality in the Education Sector**

Apart from improving school agenda, gender equality in education is also considered for increasing economic growth. A number of studies have shown 'a negative link between gender inequality in education and economic growth' (Klasen and Lamanna, 2008). Several theorists such as Hanushek (2008, p.24) and Herz and Sperling (2004, cited in Subrahmanian, 2007, p.10) have listed a number of reasons for gender equality in education. They primarily argued for gender equality in the economic perspective as an investment in female education increases labour force participation and fosters economic growth. However, positive externalities such as small and healthier families with educated children and lower chances of HIV/AIDS prevalence are also listed for the argument of female education.

Some academics differentiated the meanings of 'Gender Parity' and 'Gender Equality' in education. Leach (2003, p.23) has described gender parity as a 'rather narrow aspiration', which only covers the equal presence of boys and girls in the school. On the other hand, gender equality covers the equal opportunity for both sexes taking away all 'deep-seated barriers', which come from durable gender inequality (Leach, 2003, p.23). Three major dimensions of durable gender inequality in education are being discussed below, and these are: a) gender difference in access of schooling; b) gender difference in educational investment; and c) gender difference in learning outcomes.

## **Gender Difference in Access of Schooling**

The access of schooling for all children in the primary and secondary level is vastly covered by the fourth goal of the Sustainable development goals (SDGs) (Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all). It has aimed to achieve gender disparity in primary and secondary education (General Economics Division, 2016). However, for the Millennium Development Goals (MDGs), in most of the cases, it only limited to gain admissions into any approaches of basic education (USAID, 2008).

The determinants of differential access to schooling have been discussed in a considerable amount of literature. The UN Task Force on Education and Gender Equality (2005, p.36) mentioned that poverty is the root cause of girl's absence in school. For example, they found a twenty-four percent difference in the enrolment of girls and boys from the poorest households in rural India. These people do not find any benefits from sending their girls to schools. This reality has been supported by Subrahmanian (2007) and Kabeer (2005), who argued that society's expectation of the girl in the reproductive role only is the main disadvantage to their access of schooling.

Kabeer (2005, p.17) has listed several other reasons which 'act as a barrier to girl's access to and completion of schooling'. These include teacher's bias behaviour (showing more attention towards boys and having a lower opinion of girl's abilities), absence or minority presence of female teachers and negative learning experience for girls. The UN Task Force on Education and Gender Equality (2005) has added early marriage, the huge opportunity cost for attending school (hidden domestic labourers), labour market inequalities as the other determinants of differential access to schooling between boys and girl. All the studies reviewed so far, however, suffer from the fact that gender bias infrastructure in the school (boys and girls using the same toilet) and long distance from home to school can also be considered as determinants of girl's inability to access or retain the school.

## **Gender Difference in Educational Investment**

From the macro point of view, the government's investment in education is not generally gender-bias. However, in the case of parental investment, it has some gender implications. Alderman (1994) has shown several reasons behind it. Their main point of argument based on the people's perception of women's wage, which is lower than men; makes a barrier to invest more in girl child. Kabeer (2005) explained this phenomenon that 'lack of financial gain to the family' reduces the parental investment in girls as education is a 'labour intensive business'. Tenikue (2010) has proved that girl child will receive less education if she has identical schooling history with her brother and she participates in household works.

## **Gender Difference in Learning Outcomes**

Gender difference in learning outcomes has been subject matter to educational research for so many decades. Now, it has found that from elementary level to higher education, girls get good grades in almost all subjects including Science and Mathematics (Perkins et al., 2004, cited in Buchmann, DiPrete and McDaniel, 2008, p. 322). Ma (2007) has also found the similar trend by studying some regional and international student assessments.

## Conclusion

Income or asset distribution among the individuals has often been used for the academic and practical purpose. Different methods are used in this process and the household becomes the centre of analysis. The data give the idea of 'vertical inequality' in the society (Kabeer, 2006, p. 65) and used in the poverty analysis and governance decisions. However, the 'durable inequality' analysis has the more sociological meaning which normally explains the interrelationship of paired and unequal categories in the society.

This paper has supported and analyzed categorical durable inequalities in Bangladesh. It has taken gender as the dominant categories which resulted in long-lasting and systematic inequalities in life. It has shown that unequal distribution of asset, opportunity and political power shaped categorical durable inequality for women. The social and economic consequence of gender inequality has a long-term effect on the country and it influences the overall development of the society.

Education is a human right and the most important instrument for human resource development. It has been found from a large number of studies that returns to education for women are frequently larger than that of men (Psacharopoulos, 2002 and Aslam and Kingdon, 2008). However, a gender inequality in education is present in all developing countries mostly with the poor people (Chaudhry and Rahman, 2009, p.175). This paper has shown that there are various determinants of differential access to schooling, educational investments and learning outcomes between boys and girls which create durable gender inequality in education.

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# Use of Behaviourism and Constructivism to Enhance English Speaking Skill of Undergraduate Students

Ranjit Podder<sup>1</sup>

## Abstract

*This reflective study aimed at exploring the effect of theoretical ideas such as behaviourism and constructivism in teaching English speaking skill to the undergraduate students of a government Teachers' Training College in Bangladesh. Some aspects of B. F Skinner's (1904-1990) behaviourism such as laws of exercise and effect or drilling and practices; and some ideas of Lev Vygotsky's (1896-1934) constructivism such as collaborative and cooperative learning in pairs and groups, and scaffolding were consciously used in the teaching of English speaking with 79 second semester undergraduate students. The execution of the three lesson plans in which the mentioned theoretical ideas were consciously incorporated and executed; formative assessment was performed during the lesson; summative assessment was conducted at the end of the three lessons; and the researcher's reflection on the implementation of the theoretical ideas revealed that the implementation of the theoretical ideas helped the researcher to engage the students in language practices; learners took responsibility of their own learning; the students seemed to become more tolerant and active helping each other in developing English speaking skill; and the students were observed to be more enthusiastic in learning. Engaging students in pairs and groups practices, the formative assessment and scaffolding where needed during teaching, and the summative assessment at the end of the three lessons revealed that, using those theoretical ideas helped the researcher to achieve the learning outcomes to a great extent. However, teachers willing to implement the learning theories need to train the students beforehand for better results and a teacher must think about an alternative way to use the theoretical ideas in a large class with fixed furniture.*

**Keywords:** Learning theory, Behaviourism, Constructivism, Learning outcomes, assessment, scaffolding, drilling

## Introduction

The undergraduate students in Bangladesh have to learn communicative English as a compulsory foreign language. In the first year, students have to practise the four language skills-

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listening, speaking, reading, and writing. Although English is taught as a compulsory subject all through primary and secondary education, and the first year of undergraduate level, the English oral-aural skills of students remain much lower than was set by the curriculum (Podder, 2014). Similar situation is reported in Malaysia by Fausi (2005, cited in Maesin, Mansor, Shafie, & Nayan, 2009) that many students were not found confident in public communication and they were found afraid of communication in English. However, after one year of practices, most students at government Teachers' Training College (TTC) in Bangladesh are found unable to communicate orally in English. It was reported by Podder (2012 & 2014) that the secondary teacher taught English using Bangla and they used the Grammar Translation Method. Similar situation regarding teaching English prevails at undergraduate level at the TTCs, too. In order to improve the English speaking skill situation, learning theories can be useful. The researcher learnt from literature and he had a belief that changing the way of teaching could be effective. He tried to exploit some aspects of B. F. Skinner's (1904-1990) behaviourism and Lev Vygotsky's (1896-1934) constructivism and observed their effect on students' learning of English speaking skill at a public TTC, Bangladesh. Here at this college too, although students study English as a compulsory subject, their performance in oral communication is not satisfactory which is evident during semester final viva voce test.

The teacher educators at the college teach English through Bangla although English teachers at all levels are expected to teach English through English language. In this reflective study, a feature of behaviourism such as laws of exercise and effect; and two features of constructivist learning theory such as collaborative or cooperative group and pair work; and scaffolding have been exploited in teaching and learning of English speaking skill in the classrooms. Three lesson plans were prepared where the mentioned theoretical ideas were incorporated and after the teaching-learning sessions were over, the researcher reflected on the teaching of the lessons with special focus on the effect of the theoretical ideas on students' learning. The report of the study has been developed under the following heads such as describing the theoretical ideas; reasons for choosing the theoretical ideas; effect of the lesson plans execution on the students; critical discussion regarding how the theoretical ideas had an effect on the teaching and learning; structure of the lesson plans; critical reflections on teaching of the lessons; and conclusion.

## **Theoretical ideas**

“Nothing is so practical as a good theory” (Merriam & Bierema, 2014, p.25). Therefore, learning theories should be used in order to achieve the better results in students' learning. It is evident from studies that using the established learning theories in teaching English oral skill to learners brought better results (Merriam & Bierema, 2014). The learning theories used by the researcher to develop the first year undergraduate students' English speaking skill were behaviourism and constructivism and the teaching sessions were reflected on to understand the effect of the theories on students' speaking skill achievement.

Behaviourists B. F. Skinner (1904 - 1990) and I. P. Pavlov (1849 - 1936) claim that, in learning a language skill or any other skills, a learner has to practise them again and again, that is, a learner has to form habits by doing something again and again. On the other hand, Russian educationist Lev Vygotsky (1896 -1934) claims that people learn when they share ideas with others. According to Carpendale and Lewis (2004), scaffolding is useful for students to learn easily and better. According to Vygotsky, human knowledge is constructed and reconstructed based on the social interactions (Carpendale & Lewis, 2004) in pairs and groups.

## **Theoretical idea 1: Laws of exercise and effect (Behaviourism)**

Thorndike's laws of exercise and effect claims that when responses are made to stimuli, their connections are strengthened if followed by satisfaction (reward); and when responses are not made to the stimuli, the learning is weakened (Schunk, 2012; Abidin, 2009). The behaviourists believe that human behaviour is the response to particular stimuli; and if and when this behaviour gets recognition, it is likely to continue; and if it is negatively rewarded, it is likely that it would disappear or weaken (Merriam & Bierema, 2014). Merriam and Bierema (2014) further has claimed that this behaviour of the animals is not an internal mental process, it is visible and measurable. According to Stout (2003), the behaviouristic learning theory talks about the relationship between the mind and the body where the expression of mind is visible through the body. Although Pavlov (1849 – 1936) discovered the theory in the 1890s, B. F. Skinner (1904 – 1990) felt in 1971 the necessity of behavioural approach to education.

Abidin (2009) states that the main principles of behaviourism include - learning is exhibited through observable and measurable changes in behaviours; and it is intensified when rewarded. Goh (2017) claims that in order to learn speaking, a learner has to repeat tasks immediately after the intervention or later; and this repetition may be based on the same tasks or same language practices with different contents. Abidin (2009) claims that, through continuous practices there is a change of behaviours; and according to the behaviouristic language learning theory, language learning is a matter of habit formation and habit is formed through imitation, practices, and reinforcement (Barua, Karim, Khaled, & Sultana, 2017; Adams, 1990; Abidin, 2009). Repeated practices make habit stronger and lack of experiences and practices would weaken the habit (Abidin, 2009).

### **Rationale for choosing laws of exercise and effect**

Language learning is a matter of habit formation and habit is formed through repeated practices or through responding to a stimulus repeatedly; if something is repeated, stronger habit is formed (Khataguri & Albay, 2016). According to Schunk (2012) and Adams (1990), responses producing satisfying effect in a particular situation are more likely to occur in similar situations. Bangladesh National Curriculum (NCTB, 1995 & 2012) for secondary education and National University (NU) of Bangladesh accepted communicative language teaching (CLT) as an approach to teaching English language. The CLT approach to teaching English is mostly based on the behaviouristic learning theories where learners are expected to learn the target language through the recurrent use of it with teachers, peers, and thus form the language speaking habits (Barua et al., 2017). The language practices must occur based on stimuli followed by proper responses based on Thorndike's laws of exercise and effect (Schunk, 2012; Adams, 1990). Therefore, it is reasonable to employ this learning theory in classroom teaching in order to develop students' oral-aural skills in English through repeated practices.

### **Critical discussion**

Khataguri and Albay (2016) and Adams (1990) claim that language learning is habit formation through repeated practices. Although this kind of habit formation started in 1995 theoretically in the name of CLT in Bangladesh, the major features of the approach were not being employed by the classroom teachers. However, the researcher's experiences as a teacher educator show that changing habits through recurrent practices does not happen very often in the classrooms. Teachers

were observed to teach English through Bangla and they were observed to dominate classroom activities marring the opportunities for students' language practices. Although that is not the fault with the theory, behaviouristic learning theory has proof of its positive impact in language learning (Jatmiko, 2017; Long & Porter, 1985; Podder, 2016). In Bangladeshi edu-culture, the researcher's 23 years of teaching experiences show that repeated practices followed by rewards in educational institutions is rare although punishment is rampant!

## **Theoretical idea 2: Scaffolding**

The main idea of constructivism is that knowledge is constructed and reconstructed through social interactions (Carpendale & Lewis, 2004). One of the major features of constructivism is scaffolding which was mentioned by Brunner in 1975 and supported by Vygotsky in 1978 (Aslam, Fatima, Akbar, & Muhammad, 2017). According to Aslam et al. (2017) scaffolding is an educational concept where someone more knowledgeable provides support to a beginning learner for better and easier understanding and learning. In other words, scaffolding is a temporary support in completing a task which students cannot accomplish themselves (Pol, Volman, & Beishuzen, 2010). The supports mentioned by Pol et al. (2010) can be in the form of modelling, posing questions, providing feedback, prompting, providing clues, and so on. This scaffolding or support is important in teaching and learning a language. According to Vygotskian perspective, learning happens in the presence of others who are more knowledgeable (Abtahi, Grave, & Lerman, 2017). And the presence of the more knowledgeable others creates Zone of Proximal Development (ZPD) because learning activates a variety of internal development processes which happens only in the presence of the knowledgeable others and ZPD is a means through which children grow intellectually (Abtahi et al., 2017). Learners need support in order to learn well and scaffolding provides that support through interactions with students improving their skills, level of understanding, and concepts (Carpendale & Lewis, 2004). However, scaffolding or temporary support is withdrawn when it is no more necessary. However, Melero, Hernandez-Leo, and Blat (2012) advise to use different combination of guidance together to scaffold the learning process of students because sometimes it is necessary to provide meta-scaffolding (overall support) and sometimes micro-scaffolding (supports to perform a specific action within the whole activities).

## **Rationale for choosing scaffolding**

A mixed-method two-group experimental study at the State Polytechnic of Bali with 50 randomly selected students of third semester reveals that scaffolding technique was effective in teaching-learning of English speaking skill (Westwood, 2001). Also Goh (2017) from his 20 years experiences as a teacher educator in Singapore and in China observed that scaffolding was effective for developing the learners' English speaking skill. Moreover, Abtahi et al. (2017) claimed that scaffolding helps students learn better. This is why the researcher has chosen the theoretical idea to implement in his class with 1<sup>st</sup> year students at the TTC where he teaches so that he can improve their oral English skill. Melero et al. (2012) reported that they found positive impact by using macro-and-micro-scaffolding in their computer classes. As there is ample proof of positive impact of scaffolding on students' learning, the researcher wanted to try scaffolding to develop English speaking skill of the first year undergraduate students at the TTC he works in.

## **Critical discussion**

Aslam et al. (2017) conducted a two-group experimental study at a university in Pakistan and reported that after 16 weeks of scaffold instruction with the experimental group, the increase in the post-test score was significantly positive which meant that scaffolding had a positive effect on learning speaking. When Aslam et al. (2017) supported the students in need, their students' language learning occurred well. Melero et al. (2012) also reported benefits of macro-and-micro-scaffolding in computer classes. The researcher also believed that if the first year undergraduate students were properly supported with macro-and-micro-scaffolding, their English speaking skill would improve. However, Montague and Meza-Zarangosa (2013) claimed that elicited answers, code-switching during teacher-scaffolding, and peer-scaffolding is not always good for the learners because elicited answers do not indicate the real ability of students; code-switching steals opportunity for students' speaking the target language; and supports by peers, in many cases, are not that much strong and effective as a teacher's supports.

## **Theoretical Idea 3: Collaborative learning in pairs and groups**

Collaborative or cooperative learning can be defined as a teaching strategy in which two or more learners are expected to depend on and be accountable for their own and one another's learning (Dillenbourg, 1999). Dillenbourg (1999) claims that this collaboration or cooperation usually happens between people of equal status. The advent of content-based language teaching and learning paradigm has opened up opportunities for using collaborative approaches to language teaching and learning (Kaufman, 2004). This collaborative approach is one of the features of constructivism which focuses more on social interactions in the form of pair work and group work for learning to happen. Furthermore, language learning is viewed from an interactionist perspective (Kaufman, 2004) which means that language is learnt through interactions. Maesin et al. (2009) claimed from a survey study with 162 undergraduate Malaysian students studying Science and Social Science at Universiti Teknologi MARA Perlis that all the students preferred to learn English language collaboratively in groups.

Maesin et al. (2009) referred to Harmer (1991) and claimed that collaborative learning approach provides language learners with maximum opportunities to interact and cooperate with one another towards achieving a common goal of four language skills practices regardless of their differences in language proficiency. When we interact with the members of the society, our knowledge is constructed and reconstructed and skills are developed (Carpendale & Lewis, 2004). In constructivism, learning is viewed as an active process where teachers and learners work together as co-constructors of meaning (Freire, 1970).

## **Rationale for choosing the collaborative learning theory**

When students take active part in the learning process, they learn better (Carpendale & Lewis, 2004). Jatmiko (2017) conducted an experimental research with students of second semester at the Pharmacist Program at the Kadir University, East Java and found that engaging the learners in pair work improved their fluency, vocabulary, pronunciation, grammar, and contents; and also found that pair work contributed to learners' improved interactions; and made students more active during speaking. Moreover, Long and Porter (1985) found in their research that group work created maximum opportunity for students to practise the four language skills improving the quality

of students' speaking; promoting affective environment; and motivating them to a great extent; and alongside language skills practices, students take decision in consultation with others. Ruys, Keer, and Aelterman (2011) conducted a study with 105 pre-service trainee teachers studying Bachelor of Education course at four university colleges in Flanders, Belgium and reported that the performances of the trainees improved positively because of implementing collaborative learning strategies during their course work. The researcher's situation is similar to that of Ruys et al. (2011) because his students are also studying four years Bachelor of Education under National University (NU), Bangladesh. Maesin et al. (2009) suggested the teacher educators to use the learner preferred collaborative learning theories for better outcomes in language learning.

## **Critical Discussion**

Working in collaboration is preferred nowadays because when students learn in pairs and groups, they have maximum language practice opportunities; they become independent through negotiating and making their own decisions; and students' speaking quality improves (Long & Porter, 1985; Jatmiko, 2017). Jatmiko (2017) further claims that students' fluency, pronunciation, vocabulary, and grammar skills improve if they are engaged in pair work. However, in the large classes of Bangladesh with 115 or more students, teachers need to train the students before starting to use the cooperative learning theory (TQI-SEP, 2009) and form groups beforehand for a month or two together in order to save time. They can make groups for a month or two and students can be asked to sit in the same group every day until the groups are re-formed. Although many researches show that collaborative or cooperative learning provides positive results in learning, Montague et al. (2013) claims that working in pairs and groups does not always provide proper learning as students themselves lack rich experiences and code-switching during scaffolding ruins the opportunity for students' using the target language.

## **Lesson Plans**

The formats of lesson plans differ from subject to subject but the major components of a lesson plan are similar. The major components of a good lesson plan include the objectives or learning outcomes; warmer or starter; teaching-learning activities through which the learning outcomes or the objectives would be realized; formative assessment for learning to happen; teaching aids and teaching-learning materials to be used to achieve a particular learning outcome; direction for the next session; summative assessment in case of some subjects; and home work that students are expected to accomplish at home and present in the next class (Fautley & Savage, 2013). The following three lessons were executed with the first year undergraduate students enrolled at a TTC under NU, Bangladesh. Every class is of 60 minutes and the lesson plans were executed as per the college routine. At the end of the three lessons, there was an arrangement of summative assessment in order to check the growth in students' learning and to test the effectiveness of the theoretical ideas in teaching English speaking skill. However, Westwood (2001) alleges that AfL is more important in language teaching as during-teaching assessment can uncover students'

motivational, pedagogical, and educational factors that need to be addressed for better learning to happen. The lesson plans were developed based on the plans in the Teacher’s Curriculum Guide (NCTB, 2016) for the secondary English teachers of Bangladesh.

First of all, the researcher informed the students that they needed to practise English speaking in pairs; work in groups; and to receive supports from the teacher or from the peers when and if necessary. The topics taught in the three sessions included Exchanging Greetings, Introducing Self Formally, and Introducing a Guest Formally. One lesson plan is given below to show the readers an example of the three lesson plans prepared and executed:

### Lesson Plan 1

Lesson Plan 1			
<b>Subject:</b> English	<b>Date of execution:</b> 02.04.2019 <b>Class Time:</b> 11:15 – 12:15	<b>Course / Class:</b> BA (Honours) 1 <sup>st</sup> year <b>Unit:</b> Three <b>Topic:</b> Exchanging Greetings <b>Time:</b> 60 minutes.	
<b>Learning Outcomes:</b> By the end of the lesson, the students will be able to - - a. make a list of English greeting words/terms - b. greet people in different times using different greeting words/terms			
Lesson Steps	Activities and Assessment	Theoretical ideas used	
<b>Warmer</b> Playing a speaking game (5 minutes)	<ol style="list-style-type: none"> <li>1. I'll draw a matchstick picture of a gentleman/lady in the board</li> <li>2. I'll give him/her a name of an important person of the country (Students must know that person whose name I am using but they do not know what name I have assigned to him/her).</li> <li>3. Students will ask me YES/NO-answer questions (Questions which can be answered with YES or NO). Students will try to find the person's field of work, then place of work, then physical appearance, etc. and when they are confirmed about the person's name, they will tell the name. If they can tell the name I assigned to the person, the students will be winners.</li> <li>4. I'll answer with YES or NO</li> <li>5. I'll declare them winners when they are able to find the name of the person drawn in the Black/White Board. Also, I'll congratulate them with claps!!!</li> </ol>	<b>Behaviourism</b> (Laws of exercise and effect has been used here)	
<b>Learning outcome (a)</b> Students will be able to make a list of English greeting words/ terms (20 minutes)	<ol style="list-style-type: none"> <li>6. I'll tell the students to make a list of English Greetings in pairs we use different times with different persons.</li> <li>7. Students will talk in pairs and make a list and I'll move to check what the students are doing.</li> <li>8. When the students finish, I will elicit the answers from all the pairs and write them on the board.</li> <li>9. After appreciating, I'll tell the students to tell me which ones are Meeting Greetings and which ones are Departure Greetings.</li> <li>10. I'll provide clarification and support, if necessary</li> </ol>	<b>Formative Assessment</b> <ul style="list-style-type: none"> <li>➤ I'll observe the students in activities</li> <li>➤ I'll elicit answers</li> </ul>	
		<b>Constructivism</b> (Collaborative or cooperative learning theory and scaffolding have been used)	

<p><b>Learning outcome (b)</b> Students will be able to greet people in different times using different greeting words/terms (30 minutes)</p>	<p>11. I'll give the following three situations and tell the students to practise Meeting Greetings and Departure Greetings in pairs. <b>Situations</b></p> <ul style="list-style-type: none"> <li>➤ You meet your English teacher in the morning</li> <li>➤ You meet your bosom friend in the afternoon</li> <li>➤ You meet your maternal uncle at his place at night</li> </ul> <p>12. I'll monitor during practices in pairs, note down the areas of feedback, and provide instant feedback if situations dictate.</p> <p>13. Invite some 3 / 4 pairs to come to the front and to demonstrate what they have practised in pairs.</p> <p>14. Ask students if they have any suggestions/comments on the demonstrations.</p> <p>15. I'll thank the pairs for their demonstrations and provide feedback to the whole class.</p>	<p><b>Formative Assessment</b></p> <ul style="list-style-type: none"> <li>➤ I'll observe the students in greetings practices</li> <li>➤ I'll invite some pairs to the front to demonstrate what they have practised</li> </ul>	<p><b>Behaviourism</b> (Laws of exercise and effect; scaffolding)</p>
<p><b>Ending</b> (5 minutes)</p>	<p>17. I'll tell the students to summarise what important language items/terms they have learnt today</p> <p>18. After summarisation by 2/3/4 students, I'll mention if something important was dropped out and mention greetings such as Good Day (spoken by Australians).</p> <p>19. I'll tell them to practise the greetings.</p> <p>20. I'll thank the students for their active participation and say goodbye to them.</p>	<p><b>Formative assessment (summarizing, )</b></p>	<p>Scaffolding</p>

There was formative assessment during the teaching and there was a summative assessment at the end of teaching of the three lessons. During the formative assessment, the students received necessary supports which helped them to practise and perform better in the later sessions. Kahoot was used for summative assessment of the students. There were 30 Multiple Choice Questions (MCQs) covering the contents of all the three lessons and the students had to answer those questions in 10 minutes. Only three MCQs are given below, for example:

1. What do you say to greet people when you meet them in the morning?
  - a. goodbye
  - b. good night
  - c. Good morning
  - d. Good evening
2. Which is not used in a formal introduction

- a. I am a Professor
- b. I studied in Oxford
- c. I have been teaching for long 20 years
- d. I have got three children

3. Which of the following do we say to introduce a high-profile guest formally?

- a. He/she is Mr/Ms Rahim/Rahima
- b. I am going to introduce MrAtanu to you
- c. Hello, I am going to introduce our Chief Guest
- d. I am very happy to have the opportunity to introduce our respected Chief Guest MrX to you all.

### **Critical reflection on teaching of the lessons**

Reflective teaching practice is a process through which a practising teacher looks back to their performed teaching and tries to identify the strengths and weaknesses and then tries to improve the weaker areas in future teaching (Barua et al., 2017). Reflective practice has become an international movement for teachers' professional development (Zeichner& Liston, 2011) and reflection helps deeper teaching and learning to happen (Brockbank& McGill, 2007). The reflections on all the three lessons were done during and after the teaching sessions. The sessions were on developing English speaking skill and they were totally interactive using laws of exercise and effect which belongs to behaviouristic learning theory (Jatmiko, 2017); and collaborative pair and group work; and scaffolding which belong to constructivism (Long & Porter, 1985; Jatmiko, 2017).

During the first lesson on Exchanging Greetings, the researcher started engaging students in speaking right from the warmer. The learners enjoyed the language game very much and that was evident in their facial expressions and in interest to play similar language games again. In order to achieve the first learning outcome, the researcher engaged the students in pairs to make a list of English greeting words and terms from recollection. There collaborative learning theory was employed because students discussed in pairs, argued among themselves and the researcher, as a facilitator, supported when they asked for. That support from the researcher was scaffolding. When they practised greetings in pairs based on the given situations, they were using the laws of exercise and effect of behaviouristic learning theory. And in the summarization, the students were using scaffolding as they were supporting the students in case someone dropped or missed something or provided some wrong information. The students were happy during and after the class because they could greet people in English in different situations. All the learning outcomes were satisfactorily achieved.

The second lesson was on Introducing Self Formally. During the warmer, they identified two positive and two negative aspects of their character and after sharing in pairs, they told the class the positive aspects and the negative aspects positively. Here at this stage, the teacher scaffolded the students in saying the negative aspects of one's character positively. During the activities for achieving learning outcome (a), the students wrote the pieces of information that are usually used in formal self-introduction. Students' talk during the pair work was collaborative learning and the teacher's support after eliciting the points from the pairs was scaffolding. In order to achieve the learning outcome (b), the students were asked to write the introduction in groups where the benefits of cooperative learning theory were exploited. The teacher provided a sentence such as "I feel honoured to have the opportunity to introduce myself to you all" to start with and told the

students to start and end the introduction with appropriate greetings. This support by the teacher was scaffolding. In order to achieve the learning outcome (c), the students were asked to practise the written introduction individually which is laws of exercise and effect (drilling and practices) mentioned by the behaviourists for learning a language. The learning outcomes of the second lesson plan were also achieved which was evident from the formative assessment.

The third lesson plan was on Introducing a Guest Formally. The warmer in this lesson was collecting information about the partners in pairs and then to use them in introducing their friends. Collecting information from one another was social interaction which, in other words, is constructivism. In order to achieve the learning outcome (a), the students made a list of words and terms individually usually used to introduce a guest. Then through talking in pairs and with support from the teacher, they made a concise list. The teacher provided common feedback to all the students of the class. Students' talking in pairs was social collaborative learning and the support the teacher provided was scaffolding. Then comes the learning outcome (b). The students wrote the introduction in groups through talking to their group members. That was clearly cooperative or collaborative learning and the teacher's support regarding how to introduce and providing with a special sentence such as "I am very happy to have the opportunity to introduce our new English teacher to you all" was scaffolding. The learning outcomes of the third lesson were also achieved to the full.

The use of behaviourism (laws of exercise and effect) and the constructivism (Cooperative or collaborative learning in pairs and groups; and scaffolding) had a great effect in learning to speak as almost all the students could greet, introduce self and others formally although they were not fluent enough.

### **Outcomes of the three lesson plans**

At the end of the three sessions, students looked enthusiastic and started to greet the English teachers in English whenever they met them. Moreover, the scores of the summative assessment organized at the end of the third lesson covering the contents from all the three lessons showed that the students' overall achievement of the learning outcomes were significant which can be quantified as 80%. Through the formative assessment, it was possible on the part of the researcher cum teacher to find the weaknesses of the learners and special steps to minimize the weaknesses could have been taken immediately and in the later teaching sessions. Although some of the students were stammering during formative assessment; they started to speak English and in course of time, they are expected to be fluent. If, this kind of teaching continues, in near future, students are expected to be able to communicate in English fluently.

### **A summary of the researcher's reflection**

The strength of teaching was, the teacher could easily engage the students in different activities as the students were trained beforehand as suggested by TQI (TQI, 2009). That was an advantage for the teacher to use the theoretical ideas in teaching. The formative assessment during the lessons execution revealed that all the learning outcomes were achieved. Of course, the students needed more practices in order to achieve fluency as well as accuracy in speaking. However, there was a good start of English speaking practices in the classroom and if they continue this, they are expected to achieve fluency and accuracy as added practices can help students acquire the English speaking skill (Abidin, 2009).

In order to implement the theoretical ideas in large classes, it would be better if the groups are formed beforehand for better management of students, and the teaching-learning. In that case, too, the learners need to be trained beforehand for achieving learning outcomes in the highest rate.

### **Lesson learnt from the execution of the new lesson plans**

As the classes were student-centred, students enjoyed more freedom to work in pairs and groups and that freedom helped them to practise in their own way. The researcher's learning is, if students are given responsibility, they learn better. The furniture used in the college was not suitable to easily put students into groups and the researcher has to find alternative ways in future to engage a large number of students in group activities. However, by working in pairs and in groups, the students are taking responsibility of their own learning.

### **Strengths and weaknesses of the theories**

The strengths of the theoretical ideas are; the students enjoyed the drilling and speaking practices in pairs; working in groups and supporting each other making them more tolerant. Moreover, after the first session on greetings, they started to greet each other and the teachers in English when they met them. Students looked enthusiastic in pairs and in groups which is a positive sign that the students learnt to work in a team in friendly environment.

Although, the theories have got some strengths, they have got some weaknesses as well. Collaborative learning best fits in teaching and learning content-based subjects, not skill-based subjects. However, the knowledge of English language and grammar alongside skills are practised in collaborative or cooperative learning strategy. Scaffolding worked well when the students needed teacher's support but the negative thing about the scaffolding was that the teacher had to speak Bangla to make the task clear to the students.

### **Conclusion**

In the three lessons, the researcher consciously employed behaviourism (laws of exercise and effect or drill and practices); collaborative or cooperative learning (pair and group work); and scaffolding strategies in order to teach English speaking to the students. During teaching and after teaching, the researcher reflected on the teaching and the reflection revealed that those theoretical ideas helped to achieve the learning outcomes of the three lesson plans. Students looked happy after each of the lessons and the formative assessment showed that the learning outcomes were achieved to a great extent. The teaching was effective as the researcher could engage all the students in the language practice activities although they needed to acquire fluency through practices over time. Abidin (2009) also claims that, these theories contribute to forming habits through continuous practices. The researcher wanted to engage students in language practices which he could successfully do.

However, collaborative learning in Bangladesh classrooms may be difficult in some cases where the number of students in each class is big, students are not previously trained, and the furniture is not flexible. On the other hand, scaffolding is the most used support strategy by the Bangladeshi teachers at all levels. What the researcher learnt through teaching the lessons where

he consciously exploited some aspects of the behaviouristic and constructivist learning theories, the students are absorbed in learning when the theoretical ideas are employed properly. Personally, the researcher has been benefitted from using the theories and decided to use them in future and explore other learning theories and use them in teaching English in future.

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# Achievement (Behavior-Effort) Theory: An attempt to quantify the achievement in secondary Mathematics-

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## Abstract

*Quality secondary education and its outcome depends on the quality of input and the processing factors guided by the administrators, the teachers, the students, the parents and the communities. Since teaching learning depends on created environment by the persons and persons' behavior influences the teaching learning on mathematics, researcher proposed that achievement of mathematics education is a function of behavior and effort of the persons involved in teaching learning, i.e.  $a=f(b,c)$ , where behavioral components are teacher's behavior, student's behavior, social behavior, administrative behavior and curriculum behavior, and effort components are teacher's effort, student's effort, social effort, administrative effort, and timing effort. Also, the consistent equation established by the researcher is  $a=r(b^s-c)$ ;  $0 < b \leq 2$ ,  $0 \leq s \leq 2$ ,  $b \neq c=1$ , where,  $a$ = achievement in mathematics education,  $b$ = behavioral strength of the persons involved,  $s$ = strength of the effort of the persons involved,  $r$ = the learning background constant, and  $c$ = the learning behavior constant; completely an inventory attempt.*

## Introduction

### Background of the Theory

From my observation, teaching experience, and research, it is confirmed that each and every learner has some concrete experience which is gathered by birth and accumulated by behavioral change. A new born infant cries, moves and calls for his/her patience treatment. Such kind of treatment solely depends on behavior of the parents, society and the communities. Parents are often referred to as the 'first teacher' of their children and in particular first timers often surprise what to suppose in terms of their child's development. It is always exciting to see children grow and learn new things, having an idea of usual patterns of development can help parents to provide their children with the right support at the right time. Secondary mathematics must need to take place on time, resources, energy, expertise, commitment, and creative mental efforts on the part of both the teaching and the learning. Well-thought-through pedagogical decisions and instructional strategies need to aim at constructing conceptual structures and facilitating the process of evolution

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of mathematical thinking by the persons involved in teaching and learning process.

An individual's attitude towards mathematics defines as a more complex way by the emotions that s/he associates with mathematics, his/her beliefs towards mathematics, which could be either positive or negative and how s/he behaves towards mathematics [8]. Research on attitude in mathematics education has been motivated by the belief that 'something' called "attitude" plays a crucial role in learning mathematics but the goal of highlighting a connection between positive attitude and mathematics achievement has not been reached conclusively [17]. Behavior is a function of the person and the environment supported [11], behavioral objectives clearly indicate to students what is required of them and as a result relevant learning is enhanced, behavioral objectives and inserted questions are very much similar in that both show students what they should be able to do as a result of learning process [13]. The attitude towards mathematics is just a positive or negative emotional disposition towards mathematics [17]. Behavior and effort towards mathematics are numerous as researchers and thinkers conceptions, thoughts and perspectives vary. In this connection, it is proposed that teaching learning technique should be applied with a combination of behavioral objectives and necessary efforts having zeroed constraints to harvest the expected achievement in secondary school mathematics.

### Conceptual Framework

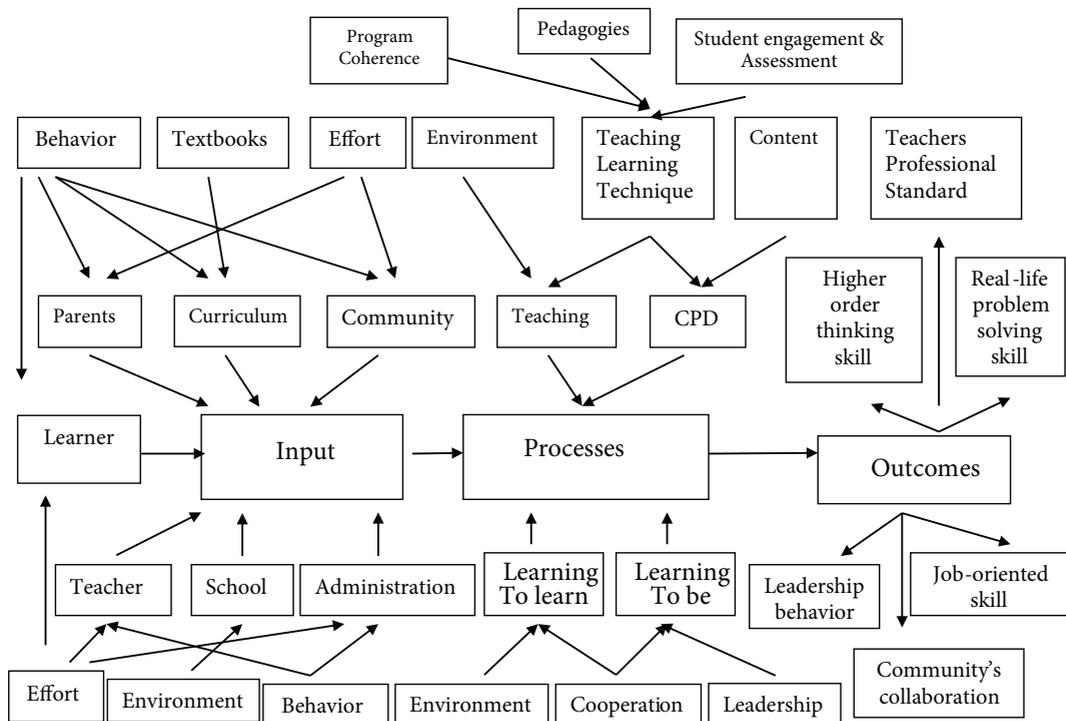


Figure: Conceptual Framework of the Study Theory

## Statement of the theory

Achievement in secondary mathematics education is a function of behavior and effort of the persons involved in teaching learning process. Mathematically, we can express as:  $a=f(b,e)$  ;  
Where

a = Achievement in secondary mathematics education,

b = Behavior of the persons involved, and

c = Effort of the persons involved.

Behavior and effort in mathematics teaching learning process includes:

### Behavior

1. Teacher's Behavior
2. Student's Behavior
3. Social Behavior
4. Administrative Behavior, and
5. Curriculum Behavior.

### Effort

1. Teacher's Effort
2. Student's Effort
3. Social Effort
4. Administrative Effort, and
5. Timing Effort.

## Analysis of the component

### Behavior Analysis

Behavior is the base of action of person/s for determining the position and achieving the expected result/s of the system and is influenced by knowledge, belief and attitude of the person/s. Achievement depends on activated effort/s on the base behavior applied for the target. Every single instance of the behavior involves four specific elements:

1. a specific action
2. performed with respect to a given target
3. in a given context, and
4. at a given point in time [2].

It is generally agreed that attitude forms only one determinant of behavior. An attitude should forecast one's behavior to some extent, even if this is extremely limited and specific, there may be exact situational factors influencing behavior.

Knowledge means understanding based on experience and knowing subject matter of the topic or issues of a field which can be communicated and shared to other/s. Depth of knowledge, disseminating of that knowledge and assimilating the distributed knowledge is the main role of acquired knowledge. Belief system consists of conceptions, values and ideology of a person about the system. Belief system forms the basis of philosophy of a work of the system or the whole. It develops the mental snapshot of the process and way out the connectivity of the deeds which have to be performing for the greater achievement of the system. Attitudes are psychological constructs theorized to be composed of emotional, cognitive, and behavioral components. Attitudes serve as functions including social expressions, value expressive, utilitarian, and defensive functions, for

the people who hold them [15]. Instructional design can create instructional environments to effect attitude change. Attitudes are typically classified with affective domain, and are part of the larger concept of motivation [7]. Attitudes are connected to Bandura's social cognitive learning theory as one of the personal factors [3] that affect learning [18]. It is important to note that all responses are technically behaviors [1].

### **Teacher's Behavior**

Teacher's behavior consists of teacher's knowledge, belief and attitude in such a way that pedagogy and content knowledge, teaching technique/strategies, strategies diversity, professional development, professional communities, technology uses and program coherence would be ensured. Teachers can use a wide variety of activities and techniques such as discussion, stories, songs, role play, visual illustrations, patterns seeking, using examples from real life, use of analogy and explanations, to help build prerequisite knowledge and strengthen connections between what students already know about a concept and what they need to know more about it [12]. Teachers need to pay attention to these vital steps by calling for students' attention, by reinforcing, by asking question, by challenging students, encouraging students to ask questions, by repeating instruction, and by using other strategies.

### **Student's Behavior**

Student's behavior consists of student's background of knowledge, belief and attitude. It is said that "the seeds of mathematical thinking" can be sown in early years (primary grades) in students minds. Mathematical concepts at secondary level are mainly rooted in the knowledge gap they bring with them. Insufficient knowledge of generic concepts seems to hinder students to make conceptual connections. Thus, due to huge gaps in students' understanding of fundamental concepts they are unable to engage. Teacher needs to try out their own unique remedial tactics and instructional strategies in order to engage students in meaningful learning.

In early years, when children begin to form concepts, teachers need to present mathematical concepts by making them as much practical as possible through the use of activities and concrete materials. Students can only master the process of learning mathematics through concrete experience which can ultimately lead to development of students' mental capacity to meaningfully engage in logical reasoning and thinking at the level of abstraction. Concrete experiences not only can help students relate mathematics to everyday life, but also can enhance their motivation and encourage them to actively participate in the lesson.

### **Social behavior**

Social behavior consists of societal knowledge, belief and attitude about mathematics learning in which parents and community cooperation and the resources are required for the system. Society can play a vital role to make communities of learners and professional communities of teachers, reinforces understanding of the concepts in mathematics, reinforces positive attitude to the subject of mathematics, autonomous in choosing the topic in mathematics, discover various sources of information in mathematics and value teaching learning atmosphere by which both the learners

and teachers would be insisted and inspired to mathematics education, seeking the better ways of mathematics teaching/learning, intensive experience and reflection on this experience. Society can also play a role insisting on special training for mathematics teachers, providing necessary resources and can tackle all kinds of hazards opponent to mathematics education. Society can ensure all kinds of parents and community cooperation and social interaction in terms of mathematics education. Assessment procedure, feedback procedure and evaluation procedure of the teacher will be properly scanned and confirmed by the society.

### **Administrative Behavior**

Administrative behavior comprises knowledge, belief and attitude of the administration in respect of mathematics education by which leadership for teaching learning process of mathematics education, policies on teachers' qualification, creating teaching learning environment, teachers' working condition and professional development would be ensured. Administration must monitor and supervise the activities in teaching learning process of all grades with all discipline and specially mathematics teaching learning procedure in respect of knowledge, skill and attitude as well as teaching strategies, technology uses, time management, assessment, feedback and evaluation procedure and interests and motivational activities. Administration is responsible for the appropriateness of the curriculum and textbooks, qualified teachers, social cooperation and resources.

### **Curriculum behavior**

Curriculum behavior means the instructional behavior of the curriculum and the consistencies of the textbooks prepared for the learners. School mathematics curriculum has not been thoroughly contextualized to reflect students' interest, aspiration and their real life experience [10]. Understandably, when students do not relate well to the curriculum they fall short of efforts to excel in the subject. Students bring with them a variety of conceptions, abilities, skills, knowledge, interest, attitudes, beliefs, perceptions, aspirations, expectations, habits, and preferences, which may not be in harmony with the demands of deep engagement with subject matter.

### **Effort Analysis**

Effort is the processing zone performing well within a system under some rules and regulations to score expected achievement and position. It is the well planned process based on and playing out one's behavior (i.e. the belief, attitude and knowledge). Standard-based mathematics teaching and learning is a cooperative effort by teachers and students to engage actively in purposeful learning experiences that stimulate curiosity, enjoyment, and deep understanding of the mathematical concepts outlined in the mathematics curriculum. Effort must be maintained in making students' prior knowledge of basic mathematical concepts in detail learning of new concepts which depends on synergy of efforts on the part of teacher, school, and other key stakeholders, and curriculum in creating and promoting an environment favorable to students. According to the National Council of Teachers of Mathematics [14], teachers should engage students in rich, meaningful tasks as part of a coherent curriculum, students' thinking, shared orally and in writing, is used by teachers to guide the classroom community's exploration of important mathematical ideas; and teachers gather

information from many sources as they assess their students' understanding of these ideas.

### **Teacher's Effort**

Teacher's effort means the effort needed for proper teaching learning environment and student's engagement and enjoyment, assessment, feedback and appreciation. Teacher is accountable for developing suitable instructional strategies to help students, achieve the curriculum prospect, and for developing suitable methods for assessing and evaluating student's learning. Teacher also supports students in developing the reading, writing, and oral communication skills needed for achievement in mathematics. Teachers bring interest and diverse teaching and assessment approaches to the classroom, addressing different student's requirements and ensuring sound learning opportunities for every student. Recognizing that students need a concrete conceptual foundation in mathematics in order to further develop and apply their knowledge efficiently, teachers effort to generate a classroom environment that engages students' interest and helps them enter at the understanding of mathematics. It is important for teachers to use a variety of instructional, assessment, and evaluation strategies, in order to provide several opportunities for students to develop their ability to solve problems, reason mathematically, and connect the mathematics they are learning to the real world around them. Opportunities to relate knowledge and skills to wider contexts will motivate students to learn and to become constant learners.

Teaching Learning environment means the necessary learning circumstances, atmosphere, utensils, learning equipments, creating attention to the lesson, making sitting arrangement, ensuring understanding of the learner, creating joys and cheer, exciting in learners learning, offering an ideal classroom teaching learning environment, maintaining proper usage of allocated time and resource with a proper discipline and cooperation and student's engagement means the work needed to perform by the learner like home work, assignment, class test, group learning, cooperative learning, creative thinking, questioning, making mental picture and decision making. Only knowledge that touches the emotions, along with a deep feeling of mathematics, can give vision to mathematics teachers. Active learning demands that they spend a great deal of physical, mental, and emotional effort. Teachers' teaching would be rich and improved promoting acquiring new skills through searching, choosing, classifying, and organizing knowledge, as well as developing new knowledge; gaining experience in teaching/learning and reflecting on this experience, assessing cooperation's contribution to better production of learning and of the products of learning, observing changes in attitude to Mathematics as a discipline, and to mathematics as a teaching profession and integrating humanist values into the educational process.

### **Student's Effort**

Student's effort comprises with the facts, regularities of the learner and ensuring all the scopes and jobs provided by the teacher, parents and communities in favor of his/her better learning and achievement. Students have many firm duties with regard to their learning. Students who are eager to make the effort required and who are competent to apply themselves will soon find out that there is a direct relationship between this effort and their achievement in Mathematics. For these students, the attention, patience, and encouragement of teachers and family can be extremely important factors for success.

## **Social Effort**

Mathematics education as a human effort needs a strengthened effort of the community/society. Both the teachers and students are human being and have social identities. Acknowledgement of mathematics as “a human effort,” understanding mathematics as a humanist-social activity [9], seeking mathematics as humanist [4], and learning/teaching mathematics humanistically [16] provide a humanist foundation in mathematics education. Social efforts confirm the social interaction and value expression. Studies showed that students perform better in school if their parents or guardians are involved in their education. By becoming known with the curriculum, parents locate what is being taught and what their child is estimated to learn. This consciousness will improve parents’ ability to talk about school work with their child, to talk with teachers, and to inquire pertinent questions about their child’s development. Knowledge of the prospect in the various grades also helps parents interpret their child’s progressive board and effort with teachers to get better their child’s learning. Attending parent-teacher interview, participating in parent workshops and school committee activities and encourage students to complete their homework/assignment at home can make sure by which parents can support students learning.

Society will deal in such a way that learners, teachers and administration must play their satisfactory role for expected achievement in mathematics education. Such a situation makes the ideal learning circumstances for liberating education, in which “teacher and pupils form a community of learners, and where both sides are essential factors in the process of obtaining knowledge” [6]. Society cooperates through reciprocity, values people with understanding and experience in mathematics, shows team spirit, learns together with others in a group, learns through teaching, is a wise consumer of knowledge, solves problems together, and creates knowledge from experience.

## **Administrative Effort**

Administrative effort means the effort which confirms the teacher with teaching and learners with learning and society with cooperative mode. The administration works in partnership with teachers and parents to ensure that each student has access to the best potential educational experience. To support student learning, administration ensures that the curriculum is being appropriately implemented in all classrooms through the use of a diversity of instructional approaches, and that appropriate resources are made available for teachers and students. Administration must ensure the appropriate and sophisticated instructional behavior of curriculum and the consistencies of the textbooks prepared for the learners within the appropriate time with appropriate manner. Administration will share and supervise all the activities done by the teacher, learner and the communities, suggest the best teaching learning technique, provide professional development scope and encourage to establish professional communities of teachers and make proper correction, criticism/punishment and appraisals for the part done by the teachers, learners and communities as well as curriculum.

## **Timing Effort**

Timing effort is the effort that makes sufficient allocation of time to mathematical task. In a mathematical task, it needs initial experience, thoughts, ways of calculation, justification and

evaluation, building clear conception and understanding, mental images, sharing and cooperation, and ways of expression. These huge numbers of complements demand appropriate timing effort from the persons involved in mathematics education especially from teachers and students. When a person is not able to make sure his timing effort in mathematics education, achievement must not gain at expected rate. According to Carroll, “The degree of learning or achievement (L) is a function of the ratio of the time actually spent on learning (Tsl) to the time needed to learn (Tnl), or  $L = f(Tsl/Tnl)$ ” [5].

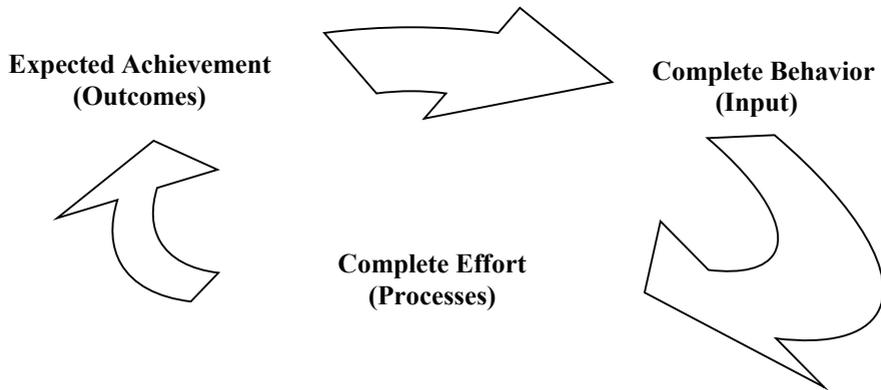


Figure: The cycle of achievement (Behavior-Effort) theory

### Mathematical Model of the theory

Teaching learning must take place interactively. Where there is a teaching there is learning and in the reverse way where there is learning there is a teaching. Suppose, total strength of behavior is the sum of unit strength total of teaching behavior and the unit strength total of learning behavior. Assuming that the unit strength total of the teaching behavior is 1(one) and the unit strength total of learning behavior is 1(one), then the total behavioral strength is  $(1+1) = 2$ , which is applicable. In the same manner, total strength of effort is the sum of unit strength total of the teaching effort and the unit strength total of the learning effort. Assuming as earlier, the unit strength total of the teaching effort is 1(one) and the unit strength total of learning effort is 1(one), then the total strength of actively effort is  $(1+1) = 2$ . Activating each and every effort, there must raise some constraints, which have effects on activating effort. So, it needs considering the total strength of effort as resultant of total activated effort and the raised constraints.

**Proposition:** For,  $0 < b \leq 2, 0 \leq s \leq 2, b \neq c = 1$

$$a = r(b^s - c); \dots \dots \dots (1)$$

Where,  $a$  = Achievement in secondary mathematics education,  $b$  = Behavioral strength of the persons involved,  $s$  = Strength of the effort of the persons involved,  $r$  = the learning background constant, and  $c$  = the learning behavior constant.

**Proof (Direct Search Method):** For different values of  $b$  and  $s$  within their own interval, the different values found for  $a$ , i.e. the achievements are shown in the following:

<b>b</b>	<b>s</b>	<b>b<sup>s</sup></b>	<b>a = r(b<sup>s</sup> - 1)</b>
0.00001	0.0001	0.998849	-0.00115 r
0.1	0	1	0
0.2	0.1	0.85134	-0.14866 r
0.3	0.2	0.786003	-0.214 r
0.4	0.3	0.759658	-0.24034 r
0.5	0.4	0.757858	-0.24 214 r
0.6	0.5	0.774597	-0.2254 r
0.7	0.6	0.807344	-0.19266 r
0.8	0.7	0.855388	-0.14461 r
0.9	0.8	0.919166	-0.08083 r
0.95	0.9	0.954885	-0.04511 r
0.99	0.99	0.9901	-0.0099 r
1.1	1.1	1.110534	0.110534 r
1.2	1.2	1.244565	0.244565 r
1.3	1.3	1.406457	0.406457 r
1.4	1.4	1.601693	0.601693 r
1.5	1.5	1.837117	0.837117 r
1.6	1.6	2.121251	1.121251 r
1.7	1.7	2.464695	1.464695 r
1.8	1.8	2.88065	1.88065 r
1.9	1.9	3.38557	2.38557 r
1.99	1.99	3.932943	2.932943 r
2	2	4	3 r
0.1	2	0.01	-0.99 r
0.2	1.99	0.040649	-0.95935 r
0.3	1.9	0.101515	-0.89848 r
0.4	1.8	0.19218	-0.80782 r
0.5	1.7	0.307786	-0.69221 r
0.6	1.6	0.441613	-0.55839 r
0.7	1.5	0.585662	-0.41434 r
0.8	1.4	0.731688	-0.26831 r
0.9	1.3	0.871998	-0.128 r
0.95	1.2	0.940304	-0.0597 r
0.99	1.1	0.989006	-0.01099 r
1.1	0.99	1.098952	0.098952 r
1.2	0.8	1.157031	0.157031 r
1.3	0.7	1.201601	0.201601 r
1.4	0.6	1.223705	0.223705 r
1.5	0.5	1.224745	0.224745 r
1.6	0.4	1.206835	0.206835 r
1.7	0.3	1.172559	0.172559 r
1.8	0.2	1.124746	0.124746 r
1.9	0.1	1.06629	0.06629 r
1.99	0.01	1.006905	0.006905 r
2	0.001	1.000693	0.000693 r

Table: List of corresponding values of a with the given values of b and s

Table shows that within the discussed values of  $b$  and  $s$ ; the values of  $a$ , i.e. the achievement in secondary Mathematics education forms a real number ranged from  $0$  to  $100$ . For,  $a$ , the achievement comes either  $0$ (zero) or negative values, and the positive achievement comes for each values of  $a$ . It can be stated that when a teaching learning process in secondary mathematics can activate the highest behavioral strength and highest strength of the effort on a student, the achievement of that student within the teaching learning process of mathematics would be cent percent, i.e. 100%.

### 3.3 Validity of the Proposition:

We see from the valuating that the function

$$a=r(b^s-c); 0<b\leq 2, 0\leq s\leq 2, b\neq c=1, \text{ takes the value}$$

$$\text{Max } (a) = 3r \text{ and Min } a = -r$$

$$\text{Also, the function forms as: } a=r(b^s-1); 0<b\leq 2, 0\leq s\leq 2, b\neq 1 \dots \dots \dots (2)$$

So, accordingly  $\text{Max } (a) = 3r = 100\%$ , i.e.  $r=33.33\%$ , this is similar to the existing pass rate of degree in education system. So, the formula is consistent with the existing custom.

Now, we can express the formula as:  $a = r(b^s - 1)$ ; and the graphical representation of the formula is shown in the following:  $a = r(b^s - 1); 0 < b \leq 2, 0 \leq s \leq 2, r = 33\%$

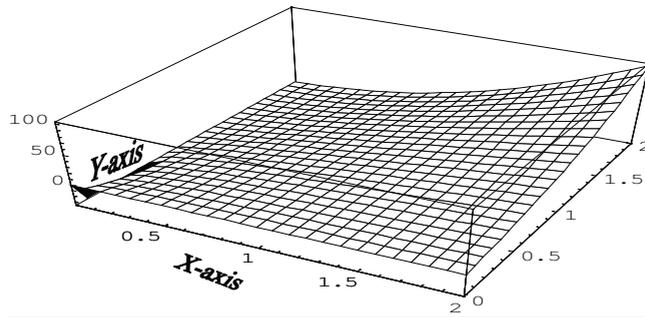


Figure: Graphical Representation of  $a=r(b^s-1)$

- 3.4 Corollary 1: If  $b = c = 1$ , then  $a$  is undefined.
- Corollary 2: If  $b = 0$ , then  $a$  is undefined.
- Corollary 3: If  $s = 0$ , then  $a = 0$ .

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