ISSN 1997 - 4248

NAEM JOURNAL

Volume 17 ■ Issue 02 ■ Serial 34 ■ July-December 2022

National Academy for Educational Management (NAEM)
Secondary and Higher Education Division
Ministry of Education

NAEM Publication no NAEM-172/2021
NAEM JOURNAL Serial no-34

A half - yearly, double - blind peer - reviewed journal published by NAEM
with financial assistance from Ministry of Education

NAEM JOURNAL

ISSN 1997 - 4248, eISSN 2959 - 4561

Volume 17 Issue 02 Serial 34 July-December 2022

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NAEM Road, Dhanmondi, Dhaka-1205

All business correspondence regarding publication issues should be addressed to the Documentation Officer, National Academy for Educational Management (NAEM)

Rates of Subscription:

Bangladesh: Tk. 170.00 per issue. Tk. 340.00 per year

Foreigh: US $15 per year (including air postage)

NAEM JOURNAL
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Volume 17 Issue 02 Serial 34 July-December 2022

Published by

National Academy for Educational Management (NAEM)
Secondary and Higher Education Division
Ministry of Education
NAEM Road, Dhanmondi, Dhaka-1205
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Published
December 2024

Printed by
Graphic Arts Institute
Satmasjid Road, Mohammadpur, Dhaka-1207

EDITORIAL BOARD

Editorial

It is matter of great pleasure that National Academy for Educational Management (NAEM) is going to publish the much-awaited volumes 34, 35, 36, and 37 of the NAEM Journal.

This current volume (Volume-34) features a collection of insightful research articles addressing critical aspects of the education system of Bangladesh. Topics include 'the Assessment System for English Language in Secondary School Certificate Examinations; Mathematics Anxiety among students in Dhaka; The challenges faced by Rural Science Labs. Besides, current issue covers some other significant studies which explore teachers' perceptions of information literacy, the feasibility of taking advantages from radio and television for blended Education, and the learning gaps caused by the COVID-19 lockdown. Furthermore, research on the use of Machine Learning in Higher Education and Primary Teachers' readiness for Blended Learning provide valuable perspectives on integrating Technology into Education.

We extend our sincere gratitude to the researchers for their valuable contributions, the editorial team for their tireless efforts. I also want to show my sincere gratitude to the Director General of NAEM and the Ministry of Education for their continuous support and funding. Your dedication has made it possible to bring this journal in this stage of publication, even amidst challenges.

As NAEM continues to organize workshops, seminars, and conferences to advance educational research, we remain committed to fostering dialogue and innovation in education. Let us work together to ensure that future volumes of the NAEM Journal reflects the same dedication and get published in due course.

Thank you for your unwavering support.

Prof. Dr. Ummay Asma
Director, Research & Documentation, NAEM
&
Editor, NAEM Journal

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https://Doi.org/10.59629/NAEM 20213202.1601

Assessing the assessment system in Bangladesh: An investigation into English Language Assessment of Secondary School Certificate Examination (SSC)

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Abstract

The study aimed at reconsidering the challenges of English language assessment system of the Secondary School Certificate (SSC) examination in Bangladesh. Attempts have been made to examine strengths and weaknesses each test item of SSC English first paper. The English first paper comprised of twelve items is designed to achieve ends of reading and writing skills of students. A noticeable gap has been found between skill getting and skill using of students who have already passed in the SSC public examination. Considering the issue the research team focused on the test construction and performance of each item. Moreover, the study laid importance on strategies of item designing without which flaws remain attached with the item for which a particular item fails to carry out its function individually and in a group. To meet this end the research project evaluated scores of the students who are examinees of the SSC-2022. In this regard, primary data was collected and analyzed quantitatively from the test administration to aforementioned examinees and thematic analyzed was done qualitatively based on questionnaires served to the question setters and moderators. In addition, the research team carried out an investigation into secondary data sources related to existing curriculum, syllabus and instruction manual of question setters and moderators. The study, moreover, took into consideration the prevailing assessment system which projected a visible dearth of reliability. Hence, the central focus of this study was to find out the challenging areas which are difficulty level, discrimination index, validity and reliability associated with test construction. The study followed the methods of empirical research which considers the process of observation, exploration, analysis and interpretation. Both the qualitative and quantitative methods were applied to explore the objectives of this study. Finally, based on the findings of this study the researchers offered some recommendations on the enhancement of validity and reliability of SSC level quality test construction and particularly on answer scripts assessment so that the test score matches with the competency of the learners.

Key words: Assessment, Evaluation, Validity, Reliability, Difficulty, Discrimination Index, Interpretation and Competency

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1.0 Introduction

The English language test construction, administration and evaluation are an uphill task in case of high stake public examination. In the above process, each plays a crucial role to help others to make the SSC examination a successful one. Moreover, with respect to designing question paper, the question setters and moderators play a vital role in this ragard. The language teachers are supposed to prepare their students by facilitating four skills together but in most cases they lay emphasis on reading and writing skills. Unfortunately listening and speaking are vehemently ignored by them like Cinderella. Thus the mission to learn language in an integrated manner remains unsuccessful. The students with half and erring knowledge of language face the public examination. . Hence, teaching approaches, methods and techniques claim a meticulous investigation in this process of research. Recently critics have the issue that in teaching-learning enterprise a large number of teachers are testing what they are not teaching. What is more menacing is that texts remain unread, on the other side guidebooks and help books flourish preparing predictable and expected questions. However, the test administration process has not yet been reached at the minimum level of standard since either school environment or public examination system has not given a favorable atmosphere to take the test of four skills together. The education administration and board authority have not been able to ensure the matter of holding the examination in accordance with the principles of Communicative system of Teaching and Testing. This is how a vital issue appears that no attempts are made to bridge the gap between linguistic competence and communicative competence. Even neither from the part of language teachers nor from education administration develops a smooth transition between skill getting and skill using. In an educational set up, in the large-scale, public examination evaluation plays a major role in the award of marks, grades and degrees. In process of evaluation, learners know their potentials, enable them to learn more about their desired topics and acclimatize creative power when they encounter challenges. This research explored depth, breadth and dimensions all sorts of summative and formative evaluation so that language teachers, teachers and teacher-educators might find the path to improve their route of evaluation of the public and school-based examination. Moreover, attempts were be made to investigate existing principles and duties of evaluators and head examiners so that they might also find innovative strategies in their ways of evaluation. More importantly in the SSC level test analysis and assessment pays a crucial issue and it is one of the most important areas in teaching learning process. It is the process of defining, selecting, designing, collecting, analyzing, interpreting, and using information to increase students' learning and development. If the assessment process is sound, it can show an authentic picture of the learners' actual strength and abilities. However, in the field of education test as a part of evaluation process plays a vital role identifying trend and potentials of learners. This research took into account the varied number of tests prevalent across the world and their application in Bangladeshi context. Besides this study would focus on different types of language test and a special attention was be given on SSC level language test items designed for examination paper to explore its individual strengths and limitations. Hence to find out the reasons of this anomaly plagued in the testing and evaluation systems is the demand of the time. When the total process of assessment is questioned, all these related items come under the purview of

language testing and assessment. Therefore, it is obvious to carry out research to bring forth the existing scenario of assessment for the sake of an authentic teaching learning atmosphere of Bangladesh in aforementioned level.

Objectives of the Study W

First, find out to what extent the test items of SSC level English language question papers employed in the public examination are following the areas of content, construct and face validity.

- Second, to find out the reliability level in terms of evaluation procedures and score assessment.
- Finally, to analyze and examine the policy documents of curriculum and syllabus, question setters, evaluators and moderators.

Review of Literature

Validity and reliability are essentially associated with test construction and assessment. Similarly difficulty level and discrimination index are two vital in the field language testing and assessment. This study addressed above-mentioned four academic issues to examine the strengths, qualities and weaknesses of SSC level language test. In this respect, Aggarwal (1986) is of the view that "another step which leads the calculation of item difficulty and item discrimination of a test is item selection based upon the judgment of competent persons as to the suitability of the item for the purposes of the test." However, in course of the analysis test items employed in the SSC level English language test paper, which we consider for a high stake achievement test through which students are issued with certificate based on the ability in two skills-reading and writing. A valid test is a tool, on which we depend much, to achieve sound judgment. Therefore, some of the views by the experts are as follows - "A test is valid when it measures what it claims to measure" (Garret, 1964: 30). Again, "a test is valid when it measures what it ought to measure"(Ebel, 1972: 463).Besides, validity of a test deserves special attention. Validity can be defined as the suitability or the appropriateness of a test for its purpose. The validity of a test has different aspects. The major aspects are content validity, construct validity, ethical validity, consequential validity, concurrent validity, predictive validity and face validity. Moreover, the researcher would meticulously endeavor to find and measure all aspects of validity in the process of the present study.

Furthermore, reliability and standardized tests matter a lot in a high stake achievement test, which claim test items to be reliable. There are many high stake tests which are purely system oriented and which are not owned by a single teacher or a paper-setter. They are created by a group of people and not made to be taken only by a single group of students. In addition standardized tests, according to Anderson (1975:384), attempts are made to provide for a measurement of individual differences in as unambiguous ways, as possible. Thus, the process of standardization allows all aspects of testing - construction, administration, scoring, reporting, and interpretation of results. Hughes (2003) and Hyland (2006) have harped on the need for training of assessors to enhance the reliability. Hence reliability is no longer regarded as a separate characteristic of test; it is treated as an aspect of validity itself.

A qualitative study was conducted by Rubina Khan on English Language assessment on English subject in Bangladesh where she has shown the strength and weaknesses of SSC level question items and she also projected the washback effect of the ssc level public examination (Khan, R. 2010). It is worth mentioning, that wash back relates to testing on teaching and learning; and it heavily influences teachers, curricula and materials. Hamp Lyons (2000: 586) rightly points out that, "impact deals with the wider influence of tests, their consequences beyond the classroom." Finally, for smooth and sound teaching, learning and testing, there needs to be a clear framework for test modeling so that content, structure, format, scoring procedures are explicit. In this regard, Bachman (1990) gives a comprehensive checklist for test specifications. In process of this study the researchers would take into account all the checklists to examine the prevailing test and assessment procedures to find out the gap between the existing test types and the mentioned areas. Hence there is a rationale for Checking reliability and validity together in this Study. Reliability and validity are the most fundamental issues in any measurement. Any statistical measurement can bear proper weightage with the appropriate application of the both. Each is, hence, an integral part of other. Validity remains insignificant without the proper intervention of reliability and vise-versa.

3. Methodology

The study followed the methods of imperical research which considers the process of observation, exploration , analysis and interpretation. both the qualitative and quantative methods were applied.

Sampling

The researchers have selected 10 schools from education board. The number of schools has been chosen both from urban and rural area. All the teachers and students of these 10 schools were taken as the sample of this study. However, research will be conducted on at least 200 students, 100 students from each board. Besides, 10 practicing teachers were selected from the aforementioned boards, 5 teachers from each board. Moreover, 10 question-setters, 10 moderators and 10 evaluators /examiners were contacted for soliciting information out of two education boards, 5 from each category from each board. However, these schools were selected as random sampling process. But it is worth mentioning that research team carefully tried to collect data almost equal number both from MPO and Government schools to make the information authentic. However, since the number of MPO schools is more than that of government ones, more data came from MPO schools.

Source of data and method of data collection

Primacy Sources:

The team endeavord to administer question papers to the SSC level students who have already prepared themselves to appear in the SSC examination. Attempts was made to design questionnaires to assess their abilities in English as foreign language. Besides the researcher designd separate questionnaires for question-setter, evaluators and moderators who were inevitably associated with test construction, administration and evaluation process.

Secondary Sources:

The research team investigated documents available in the two boards regarding the policies and principles of question-setter, moderator and evaluators. The process helped them to collect all the written materials relating to duties, responsibilities, principles and techniques of question formation, moderation and evaluation.

Methods of data analysis and presentation:

The validity and reliability are the main issues which are to be elicited and examined in order to show the prevailing state of the question items. The statistical procedure is one way to demonstrate and define the level of validity and reliability. Moreover, in order to extract level of validity and reliability, showcasing the data characteristics are the pre-requisite issues which indicate the symmetric and asymmetric level of data. To meet these crucial ends the statistical calculation such as mean, standard deviation and standard error level were measured as a vital issue of this study. Furthermore, to demonstrate different levels of validity and varied shades of reliability the statistical procedures such as correlation co-efficient and Cronbach's Alpha tools measurement are essential. More importantly, the SPSS software program was used to reveal the results of the content construct and face validity of existing tests. In the same way, the software also helped to interpret status of reliability based on the assessment of students' scores.

Data analysis and Findings

Item Analysis in Terms of Reliability:

1. Chronbach's Alpha is a way to measure the internal consistency of a questionnaire or survey.

2. Cronbach's Alpha ranges between 0 and 1, with higher values indicating that the survey or questionnaire is more reliable.

An examination was conducted to elicit the information about the level of reliability of the question items used to know reading and writing skills of English language test of the SSC level.

A total number 201 student participated in the English first paper examination process. The number of student has answered to 12 items of English first paper question.

The researchers examined internal consistency based on the following table which indicates the Cronbach's Alpha and Level of Consistency amongst the items against the total. The SPSS calculation by using Cronbach's Alpha theoretical tool has been able to show reason if any item needs to be removed or retained to ascertain internal consistency. The following table containing Cronbach's Alpha values attempts to see what would happen to reliability analysis if one or two items are deleted or corrected from the scale and also would help identify any items which may not have the performing ability to belong to the list of the questions.

The reliability of the 12 following items have been checked through SPSS software to understand level of reliability by means of Cronbach's Alpha internal consistency parameters.

The following table describes how different values of Cronbach's Alpha are usually interpreted:

Cronbach's Alpha	**Internal consistency**	
$0.9 \leq \alpha$	Excellent	
$0.8 \leq \alpha < 0.9$	Good	
$0.7 \leq \alpha < 0.8$	Acceptable	
$0.6 \leq \alpha < 0.7$	Questionable	
$0.5 \leq \alpha < 0.6$	Poor	
$\alpha < 0.5$	Unacceptable	

Table-11(a) : Cronbach's Alpha range

The researchers selected a question paper (English 1st paper) which was administered in all Education Boards in Bangladesh. A reliability analysis has been carried out through measurement of Cronbach Alpha by using SPSS software on the 12 items of this question. The names of these items are as follows:

q1 (MCQ), q2 (Short question), q3 (gap fill), q4 (complete the information) and q5 (Summary writing), q6 (Matching the sentences), q7 (re-arrange sentences and make story), q8 (writing paragraph), q9 (completing story), q10 (Describing graph), q11 (letter writing) and q12 (Dialogue writing).

The reliability can be measured through the scores of Cronbach's alpha, inter-item correlation, item-total correlations, and Cronbach's alpha if item deleted. Cronbach's alpha will explain how closely a set of test items function in a group.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.798	0.819	12

Table-11(b): Cronbach's Alpha related to reliability of test item

Table-11(c): Total item statistics for measuring Reliability

Interpretation:

The above table projects that the number of items is 12 and the value of Cronbach's α is 0.798 which indicates that the consistency of the scores is remained in the acceptable range. Hence the items belonging to both reading and writing parts are acceptable in term of relevance.

The following above table demonstrates the Cronbach's Alpha values of both columns- Cronbach's Alpha if Item Deleted and Corrected Item-Total Correlation respectively.

In case of 12 items, the Cronbach's Alpha values have reached α = 0.798 and the most of the items have hovered around the same Cronbach's Alpha α = 0.798 except a few items having a little less than 0.798. Hence, according to the expected reliability range item in the question paper bears high reliability. Therefore, it is presumed that most of the items can be taken good enough and can be regarded worthy of retention. However, the Cronbach's Alpha α of q7 (if deleted) is higher than 0.798, the items can be regarded as unreasonable items and they can be deleted. On the other hand, the items belonging to the group considered as good items and can be taken as functional ones for the purposes. As a consequence one out of 12 items, in the test paper, the value 0.801 is higher than the rest of the items, which points out that there are some problems in the q7, re-arrange sentences and make story. It is well assumed that the q7 is too easy or too difficult to some extent. Hence, the Q7 claims structural and logical improvement to correspond to the entire test paper.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q01	61.7761	196.720	0.479	0.531	0.787
Q02	61.2960	161.861	0.659	0.548	0.758
Q03	65.3731	196.585	0.319	0.439	0.794
Q04	63.7164	197.659	0.473	0.399	0.788
Q05	61.0697	196.418	0.351	0.222	0.792
Q06	63.7861	191.739	0.494	0.578	0.783
Q07	62.0846	193.308	0.255	0.484	0.801
Q08	61.4677	173.605	0.634	0.493	0.765
Q09	61.9925	163.099	0.660	0.513	0.759
Q10	62.3333	167.771	0.499	0.425	0.779
Q11	62.3607	174.593	0.381	0.446	0.795
Q12	62.0572	182.655	0.350	0.489	0.795

Validity Measurement:

The research addressed the issue of item analysis from the perspective of validity on the SSC English First Paper of 12 items which are q1 (MCQ), q2 (Short question), q3 (gap fill), q4 (complete the information) and q5 (Summary writing), q6 (Matching the sentences), q7 (re-arrange sentences and make story), q8 (writing paragraph), q9 (completing story), q10 (Describing graph), q11 (letter writing) and q12 (Dialogue writing).

Item Analysis in Terms of Validity:

The present English first paper test deserves to be checked in terms of the construct validity. Besides, it is imperative to look into a measure of the construct and how well different items correlate with each other. With the end in mind the researchers put forward the three criteria with a view to projecting the level of validity of the each individual test with its relation to the others. Besides, the researchers would like to look into how well a test functions in a total test procedure in a test paper. Moreover, the aim of this study is to see the construct validity which investigates attribute or task lies in the given tests to examine skills (reading & writing) of which the students have got and applied in the test procedures. To find construct validity in the test procedure is one of the crucial measures in the validation process of a test to determine the level of effectiveness of this tool of evaluation.

The research in terms of validity lays emphasis on the internal correlation. Besides, the study should look at the 3 types of internal correlation which can be listed as follows.

Criterion1. Firstly, the correlation between different components should be low (0.3-0.5). Criterion 2. Secondly, the correlation between two tasks in a testing component should be high (at least 0.5-0.7).

Criterion 3. Thirdly, each component should have a high correlation coefficient with the total score (above 0.7)

Exactly –1	A perfect downhill (negative)
–0.70	A strong downhill (negative)
–0.50	A moderate downhill (negative) average
–0.30	A weak downhill (negative)
0.	No linear relationship
+0.30	A weak uphill (positive)
+0.50	A moderate uphill (positive) average
+0.70	A strong uphill (positive
Exactly +1	A perfect uphill (positive)

Table-12 (a): Pearson Correlation

		Q01	Q02	Q03	Q04	Q05	Q06	Q07	Q08	Q09	Q10	Q11	Q12	TOTAL
Q01 MCQ	Pearson Correlation	1	.341**	.541**	.543**	.268**	.592**	.440**	.305**	.259**	.224**	0.010	0.019	.540**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.886	0.786	0.000
	N	201	201	201	201	201	201	201	201	201	201	201	201	201
Q02 Short Q	Pearson Correlation	.341**	1	.209**	.327**	.286**	.453**	.220**	.622**	.553**	.337**	.281**	.423**	.756**
	Sig. (2-tailed)	0.000		0.003	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000
	N	201	201	201	201	201	201	201	201	201	201	201	201	201
Q03 Read the text & Fill the gap	Pearson Correlation	.541**	.209**	1	.396**	.178*	.467**	.347**	.234**	.218**	.258**	-0.068	-.195**	.417**
	Sig. (2-tailed)	0.000	0.003		0.000	0.012	0.000	0.000	0.001	0.002	0.000	0.337	0.006	0.000
	N	201	201	201	201	201	201	201	201	201	201	201	201	201
Q04 Complete the table from the infor of the passage	Pearson Correlation	.543**	.327**	.396**	1	.206**	.433**	.181**	.349**	.268**	.279**	.202**	0.107	.532**
	Sig. (2-tailed)	0.000	0.000	0.000		0.003	0.000	0.010	0.000	0.000	0.000	0.004	0.130	0.000
	N	201	201	201	201	201	201	201	201	201	201	201	201	201
Q05 Write Summary	Pearson Correlation	.268**	.286**	.178*	.206**	1	.227**	.381**	.261**	.183**	.237**	0.088	0.061	.441**
	Sig. (2-tailed)	0.000	0.000	0.012	0.003		0.001	0.000	0.000	0.009	0.001	0.215	0.393	0.000
	N	201	201	201	201	201	201	201	201	201	201	201	201	201
Q06 Match Sentence from the Columns	Pearson Correlation	.592**	.453**	.467**	.433**	.227**	1	.543**	.351**	.274**	0.087	0.043	0.113	.568**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.001		0.000	0.000	0.000	0.217	0.545	0.111	0.000
	N	201	201	201	201	201	201	201	201	201	201	201	201	201
Q07 Rearrange sentence and write Story	Pearson Correlation	.440**	.220**	.347**	.181**	.381**	.543**	1	.268**	0.124	0.114	-.161*	-.177*	.393**
	Sig. (2-tailed)	0.000	0.002	0.000	0.010	0.000	0.000		0.000	0.078	0.108	0.022	0.012	0.000
	N	201	201	201	201	201	201	201	201	201	201	201	201	201

Q08 Write Paragraph	Pearson Correlation	.305**	.622**	.234**	.349**	.261**	.351**	.268**	1	.477**	.349**	.246**	.406**	.717**
	Sig. (2-tailed)	0.000	0.000	0.001	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000
	N	201	201	201	201	201	201	201	201	201	201	201	201	201
Q09 Write Story	Pearson Correlation	.259**	.553**	.218**	.268**	.183**	.274**	0.124	.477**	1	.529**	.475**	.405**	.755**
	Sig. (2-tailed)	0.000	0.000	0.002	0.000	0.009	0.000	0.078	0.000		0.000	0.000	0.000	0.000
	N	201	201	201	201	201	201	201	201	201	201	201	201	201
Q10 Describe the graph	Pearson Correlation	.224**	.337**	.258**	.279**	.237**	0.087	0.114	.349**	.529**	1	.427**	.158*	.641**
	Sig. (2-tailed)	0.001	0.000	0.000	0.000	0.001	0.217	0.108	0.000	0.000		0.000	0.025	0.000
	N	201	201	201	201	201	201	201	201	201	201	201	201	201
Q11 Write a letter	Pearson Correlation	0.010	.281**	-0.068	.202**	0.088	0.043	-.161*	.246**	.475**	.427**	1	.506**	.550**
	Sig. (2-tailed)	0.886	0.000	0.337	0.004	0.215	0.545	0.022	0.000	0.000	0.000		0.000	0.000
	N	201	201	201	201	201	201	201	201	201	201	201	201	201
Q12 Write a dialogue	Pearson Correlation	0.019	.423**	-.195**	0.107	0.061	0.113	-.177*	.406**	.405**	.158*	.506**	1	.500**
	Sig. (2-tailed)	0.786	0.000	0.006	0.130	0.393	0.111	0.012	0.000	0.000	0.025	0.000		0.000
	N	201	201	201	201	201	201	201	201	201	201	201	201	201
TOTAL	Pearson Correlation	.540**	.756**	.417**	.532**	.441**	.568**	.393**	.717**	.755**	.641**	.550**	.500**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	N	201	201	201	201	201	201	201	201	201	201	201	201	201
**. Correlation is significant at the 0.01 level (2-tailed).														
*. Correlation is significant at the 0.05 level (2-tailed).														

Table-12 (b): Statistics of total test items for measuring correlation

Interpretation: The following interpretation has been prepared based on the table no. 13

Q1(MCQ).

First, its correlation with q2 .341** , q3 .541** q4 543**, q6 592** q7 values with 440** and q8 305** are at the level of **(0.3-0.5).** Therefore, it has met the criterion 1

Second, correlation with q9 (259**), q10 (0.224**), q11 (0.010) and (0.019) for MCQ have failed to criterion 1 **(0.3-0.5).**

Third, the correlation with total is 0.540 which does not meet criterion 3 (**(above 0.7).**

Comments: The MCQ is question item stands at the positive weak uphill level in terms of validity. Hence, it requires a massive reconstruction to suit for this group.

Q2. Short Question:

First, short question with value 0.341** correlates with q4 0.327**, q6 0.453**, q9 0.553**, q10 0.337** and q12 0.423** match the criterion 1 (0.3-0.5) whereas its correlation with q8 0.622** stands at the moderate uphill level.

Second, short question with value 0.341** correlates q3 0.209**, q5 0.286**, q7 0.220** and q11 0.281** do not meet criterion 1.

Third, short question with value 0.341** can correlate with total score 0.756** which can meet criterion 3.

Comments: This item correlates 5 items at weak uphill positive level while the same does not function to correlate with 4 items as the values remain less than 0.3. On the contrary, its correlation a single item at the moderate uphill level and its correlation with the total meet demand of criterion 3. Therefore, this item requires a little revision to build its construct validity.

Q3 Read the Text and Fill the gaps:

First, its value 0.541** can correlate with the q4 0.396**, q6 0.467** and q7 0.347** which meet criterion 1 (0.3-0.5.

Secondly, its correlation with q5 0.178*, q8 0.234**, q 0.218** and q10 0.258** finds no linear relationship. Besides, its correlation q11 -0.068 and q12 -.195** indicates that functional power of this in group stands at weak downhill negative. Hence, values of the statistical calculation projects that this items do not meet the criterion 2.

Thirdly, its correlation with total values 0.417** miserably fails to meet the criterion 3.

Comments: This item does not meet the two major criteria. Hence it requires either deleted from the group or deserves massive revision.

Q4 Complete the table from the information of the passage:

First, q4 with its value 0.543** correlate q6 0.433** and q8 0.349** indicate that their relation stands at the weak uphill relationship. It shows that relation meets criterion 1 (0.3-0.5.

Secondly, its correlation with q5 0.206**, q7 0.181**, q9 0.268**, q10 0.279** q11 0.202** and q12 0.107 find no linear relation which indicates that the item does not meet the criterion 2.

Thirdly, its correlation with values 0.532** does not meet criterion 3 as well.

Comments: This fails two major criteria and its relation with other question is seriously low. Hence, the item should be deleted from this group.

Q5 Write summary:

Its value has the value of 0.268** which does not find any linear relation with rest of the question item. Besides, its correlation with q6 0.227**, q8 261**, q9 183** and q10 0.237** is statistically significant but finds no linear relationship and it does not meet criterion 1. On the contrary, its correlation with q11 0.088 and q12 0.068 are not statistically significant. Again its correlation with q7 0.381** is at the weak uphill level but it does not have the sufficient value to stand at least the weak uphill level.

Secondly, its functional value is so low that does not meet criterion 2 as well.

Thirdly, its correlation with total value 0.441** does not meet the criterion 3.

Comment: This item requires a massive redesign and reconstruction else it will not be able to bring out the expected writing skills of the students. If the redesign is possible, this items needs to be deleted from the question paper.

Q6 Match the sentences from the columns:

Firstly, as per criterion 1 the value of q6 stands at weak uphill level and its value also correlate with q2 0.453**, q3 0.467**, q4 0.433**, q7 0.543** and q8 0.352**which stand at the weak uphill level. They are statistically significant. Moreover, this item meets the criterion 1.

Secondly, its correlation with q10 0.087, q11 0.043 and q12 0.113 indicate that its relation with them is not statistically significant. Hence, the students find this item easy and it fails to distinguish between weak and meritorious students. Moreover, item does not meet the criterion 2.

Thirdly, its correlation with total values stand at weak uphill level which does not fill requirement of criterion 3 i.e. 0.7.

Comments: This item deserves structural redesign and requires a logical reconstruction. If it is not corrected properly, students will find it easy to answer and they will not develop their expected skills.

Q7 Re-arrange Sentences and make story:

First, its value 0.440** correlates with q3 0.347**, q5 0.381** and q6 0.543** and they are statistically significant. Its correlation meets criterion no.1. On the contrary, its correlation with q2 0.220**, q4 0.181** and q8 0.268* is statistically significant but its value does not find any linear relationship.

Secondly, its correlation with q11 -0.161* and q12 -0.177* bears a weak down hill (negative) trend which signifies that the item is highly predictable and extremely easy for students. It fails to meets the criterion 2.

Thirdly, its correlation with the total value 0.393** does not match with the criterion 3 as well. Hence, it can be assumed that the item is extremely easy.

Comments: This item does not deserve to be reformed for further use. Therefore, it requires immediate deletion form the group. It is also suggested that this item needs a massive reconstruction so that the expected skills to be brought out while students attempt it.

Q8 Write Paragraph:

Firstly, value of q8 0.305** correlates with 5 items out of 12 (q4 0.349**, q6 0.351**, q9 0.477**, q10 0.349** and q12 0.406**) which meet the criterion no. 1. its correlation is 99% statistically significant.

Secondly, its values correlates with a single item-q2 0.622** which meets criterion no. 2. On the other hand, its value finds no linear relation with q3 0.234**, q5 0.261**, q7 0.268** and q11 0.246**. Yet they are statistically significant.

Thirdly, its correlation with total value 0.717** meets criterion no.3.

Comments:

From the structural point of view the question item is well designed and it can distinguish between weak and strong students in terms of their merits. Hence, this function well in the group and for this we can restore this question item for question bank.

Q9 Write Story:

First, its value correlates 5 question items out of 12 (q2 0.553**, q8 0.477**, q10 0.529**, q11 0.475** and q12 0.405**), which meets the criterion no. 1 and they are statistically significant. On the contrary, its value does not find any linear relationship with 5 items and they are q3 0.218, q4 0.268**, q5 0.183**, q6 0.274** and q7 0.124.

Secondly, it is significant none of the question stands out to meets the criterion no. 2.

Thirdly, the value of q9 0.259** correlates with the total value of 0.755** which indicates that it meets criterion no 3 in a partial manner.

Comments: The question is moderately good in terms structural design but requires a little correction to improve its quality to stay in the group.

Q10 Describe the graph:

First, only two question items-q2 0.337** and q8 0.349** meet the criterion 1, while rest of question items-q3 0.258**, q4 0.279**, q5 0.237* find no linear relationship with q10 and they are all 99% statistically significant. Besides, q12 0.158* with its value is 95% statistically significant. Moreover, q6 0.87 and q70.114 find no linear relation with q10 and they are not even statistically significant.

Secondly, q9- a single question item meets criterion no. 2.

Thirdly, the total value of 0.641** does not meet criterion no. 3.

Comments: This question item does not have functional and logical strength to distinguish between weak and strong students in terms of merit. Hence, items claims massive revision else it can be deleted from the list.

Q11 Write a letter:

Firstly, q11 0.011 with its lowest out of all correlates only two question items-q9 0.475** and q10 0.427** and they are 99% statistically significant. They can meet the criterion no. 1. Despite the rest of three items- q2 0.281**, q4 0.202** and q8 0.246** statistically significant they harbor no linear relation with q11. On the contrary, the two items- q5 0.088 and q6 0.043 neither have linear relation nor they are statistically significant. Besides, q11-its correlation with q3 -0.068 and q7 -.161* is a weak downhill negative.

Secondly, none of items are found to stand out to meet the criterion no. 2.

Thirdly, its value correlates with the total 0.550** which does not meet the criterion no. 3.

Comments: Its correlation to meet the criterion no. 1 is partially fulfilled; hence it has a faulty structural design. Besides, its logical connection within the sentence structure is miserably low and its functional capacity in group extremely low as well. Therefore, this item needs to be deleted.

Q12 Write a dialogue:

First, q12-0.019 correlates with q2 0.423**, q8 0.406**, q9 0.405** and q11 0.506** which can meet criterion no. 1. On the other hand, q4 0.107, q5 0.061, q6 0.113 and q10 0.158* find no linear correlation with the said item. Besides, q10 is 95% statistically significant.

Moreover, q3 -.195** is 99% while q7 -177* is 95% statistically significant whereas both them stand at the level of weak downhill negative correlation.

Secondly, there is none to main a correlation which meet criterion no.2 which reveals a major weakness of this item in terms of logical connection within this item's ideas and also distinguishing power that can demarcate between weak and strong students.

Thirdly, its value correlates with total 0.500** which is 99% statistically significant but this correlation does meet criterion no. 3.

Comments: This is extremely a weakly built item which needs to be deleted.

Summary of the Validity Measurement

1. In case of Item to Item correlation (Single Item Vs Single), what is significant is that 5 out of 12 (q5, q9, q10, q11 and q12) question items are found to maintain No Linear Correlation whereas 4 out 12 question items stand at A Weak Uphill Positive Correlation. Besides, in the same case, only 3 out of 12 question items remain at the Moderate Level Correlation. It is urgent to address issue of validity that with regard to Item to Item Correlation that a greater number of Items hovers around at the No Linear Correlation and A Weak Uphill Positive Correlation level than that Moderate Level Correlation, A Strong Uphill Positive Correlation and A Perfect Uphill Positive Correlation.

Hence, we can assumed that there is a dearth of Construct and Content Validity which indicate that almost 5 out of 12 question items are not worthy of retention i.e. they are so

weakly designed that they should not belong to this group. Moreover, 4 out of 12 items require massive revision and reconstruction whereas the rest can be retained after a little modification to reach at strong uphill positive correlation and a perfect uphill positive correlation.

2. In case of Single item Vs Total Correlation, 6 (q1, q4, q6, q10, q11 and q12) out of 12 question items find their positions at the moderate level. On the other hand, in the same case, 3 (q3, q5 and q7) out of 12 items remain at the weak uphill positive correlation. However, the rest 3 items have been taken their positions at the level of A Strong Uphill Positive Correlation. For the case of Single item Vs Total Correlation, the expected correlation has been assumed that a majority number of items' Correlation would remain at least at the moderate level and the rest of the items' would hang around at A Strong Uphill Positive Correlation and A Perfect Uphill Positive Correlation. In a valid set of question neither of the items should pop up as the weak uphill positive level or less than moderate uphill positive correlation level in terms of Single Vs Total Correlation.

Summary of the Reliability Measurement:

1. In case of 12 items, the Cronbach's Alpha values reached $\alpha = 0.798$ and with respect to the measurement if deleted, q3 .794, q5 .792, q11 .795 and q12 .795 are very close to required reliability. Hence, they could be acceptable in terms Cronbach's Alpha reliability range. Similarly, the items-q1 .787, q4 .788 and q6 .783 remain a little away from acceptable of reliability but hover around the required range of reliability but question items- q2 .758, q8 .765, q9 .759 and q10 .779 do not even linger around required range of reliability. Therefore, there found a reasonable gap between existing values of the aforementioned items and the required Alpha range. Hence, there is dearth of reliability found in the said items.

2. On other hand, the Cronbach's Alpha α of q7 .801is (if deleted) is higher than 0.798, the item can be regarded as unreasonable item and it can be deleted from the group.

The final part of the article includes recommendations. The recommendations included here call for the attention of National Academy for Education and Management (NAEM) and Ministry of Education for further improvement of the test quality. Moreover, the suggestions and recommendation are meant for the setters and moderators to improve the professional quality and skills so that they can tend to more responsible in designing the test. The limitations of the study will help aspirant researcher to find their paths in the field of testing and evaluation.

Recommendations

1. Make sure that the question item should have appropriate level of difficulty level and discrimination Index so that the students cannot find the items too difficult and too easy.
2. All alternatives (Distractors) of MCQ should be plausible and arresting so that students can take time and strive to choose the right one. Importantly every distractor should have minimum tempting quality to be chosen by at least 5% students or in some cases chosen by 10% students.

3. Properly trained setters and moderators are assigned to setting and moderating and therefore, they can have ability to insert accurate level of validity and reliability so that the flaws related to item construction can be reduced a lot.
4. A short-term training on English Language Assessment should be designed for the test setters and moderators where all the issues regarding validity and reliability will be reflected while designing a test.
5. A committee of expertise on testing and evaluation needs to be formed to formulate the guidelines and principles of designing test items, test instructions and marks distributions. Moreover, they should develop separate question items based on the skills.
6. A national rubric should be provided to the examiners to minimize the range of marking discrimination from teacher to teacher.
7. A reasonable time should be given to the examiners and during this period work load should be decreased from these selected examiners to have the best output from them.

Acknowledgement

We sincerely thank the National Academy for Educational Management (NAEM) for funding this research. We also extend our gratitude to all the participants for their voluntary involvement, which was essential to the completion of this study.

References

Anderson, S. B. (1975). Encyclopedia of Educational Evaluation: Concepts and Techniques for Evaluating Education and Training Programs.

Bachman, L (1990) Fundamental Considerations in Language Testing, Oxford: Oxford University Press.

Ebel, R. (1972). Essential Educational Measurements. Prentice Hall, Inc. Englewood, Cliff. New York.

Garret, H. E. (1964). General Psychology. Eurasia Publishing House, New Delhi.

Hamp-Lyons, L (2000) Social, professional and individual responsibility in language testing, System 28, 579–591.

Hughes, A. (2003). *Testing for Language Teachers (2nd Edition)*. Cambridge: Cambridge University Press.

Hyland, K. (2006). *English for Academic Purpose: An advanced resource book. Routledge.*

Khan, R. (2010). English language assessment in Bangladesh: Developments and challenges. *Language assessment in Asia: Local, regional or global, 121-157.*

NAEM JOURNAL
ISSN 1997-4248, eISSN 2959-4561
Volume 17 Issue 02
Serial 34
https://Doi.org/10.59629/NAEM 20213202.1601

Mathematics Anxiety among Secondary School Students of Dhaka City

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Abstract

Mathematics is one of the important subjects among other compulsory subjects at secondary level. It plays an important role in developing scientific knowledge and technological advancement. The purpose of the study was to measure and analyze the status of mathematics anxiety of secondary school students of Dhaka City in Bangladesh. This study was descriptive in nature and quantitative in method. A total of 479 students (male 256 and female 223) of class 9 were included as participants from 12 different schools. Descriptive statistics, ANOVA and t-test were performed to analyze and interpret the data. It was found that 17.1% secondary school students experienced low level of mathematics anxiety, 63.3% experienced moderate level and 19% experienced high level of mathematics anxiety where the differences were statistically significant. Girls did have more anxiety levels than boys mathematically but it was not significant. There was no enough evidence in favor of difference between the school categories in math anxiety. Though student's math anxiety was slightly defended on father's education level but it was not defended on mother's education level. The study recommended that guardians should not worry about their educational level and school category for their children's math anxiety. We can encourage girls to take mathematics as subject. But we need to identify the causes and remedies of students' math anxiety as most of the students were experienced moderate and high level of math anxiety.

Keywords: Mathematics Anxiety, Secondary Level, Dhaka city

Introduction

Secondary education is the previous stage of higher education. Ali (1999) considers the level as preparatory stage of life of any student. This stage is very important in the management of education for any country and for this reason secondary education is called the backbone of educational management (Education commission of Bangladesh 1974). It is the 'gateway to life' according to the Report of International Education Commission formed for the education

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of 21st century (National Curriculum 2012, NCTB). One of the purposes of secondary education is to prepare quality students for tertiary education (Education watch, 2007). Like other country Bangladesh also wants to produce more productive and loyal citizens through its secondary education system. Mathematics is one of the important subjects among other compulsory subjects at secondary level. So, students' weakness in this subject is not expected. Bangladesh has backward in respect of mathematics education and the standard of teachers than many other countries in the world (International organization report as cited in The Daily Ittefaq 27.02.15). DSHE (2014) reported that 65% students studying in class eight and 82% of class six in Bangladesh have failed to reach the standard level of mathematics. According to the report of world economic forum (2013), the standard of mathematics education of Bangladesh is 113th out of 144 countries. The committee formed to upgrade the standard of mathematics education of Bangladesh reported (2010) that the education of secondary level of Bangladesh is not up to the mark. Besides, the committee (Formed to upgrade the standard of mathematics education in the secondary level of Bangladesh) has suggested considering the present scenario of secondary mathematics education to identify the weakness and obstacles of development as well as to ensure the overall improvement. The same committee suggested that today's world is the world of science and technology and to keep pace with the present world we have to build up our expertise in mathematics. Mathematics plays an important role in developing scientific knowledge and technological advancement. Mathematics can consider as a gatekeeper for better employment (Haciomeroglu, 2014). The extent of joy of using mathematics in personal and social life largely depends on how a child learnt mathematics (NCTB, 2013). Mathematics education is needed for the safety of a nation and quality of life and even the prosperity of a nation (NMAP, 2008).

According to the Merriam Webster Learner's Dictionary the meaning of anxiety is fear or nervousness about what might happen. Anxiety is a feeling of worry, nervousness or uneasy about something with an uncertain outcome (Oxford Dictionary). Richardson and Suinn (1972), cited by McAnallen (2010) defined mathematics anxiety as — "feelings of tension and anxiety that interfere with the manipulation of mathematical problems in a wide variety of ordinary life and academic situations (p. 544)" and also they stated that mathematics anxiety may include dislike of mathematics, worry, and fear with specific behavioral manifestations that include tension, frustration, distress, helplessness, and mental disorganization. Fennema and Sherman (1976) cited by McAnallen (2010) also believe that mathematics-related distress is accompanied by symptoms, including dread, nervousness, and an increased heart rate. Mathematics anxiety has been an important and also a common problem in learning and teaching from elementary through university levels for the last three decades (Uusimaki & Nason, 2004; Vinson, 2001 cited as Haciomeroglu, 2014). Devine, Fawcett, Szűcs and Dowker (2012) found that mathematics performance of students is negatively correlated with math anxiety. Math anxiety is also found to hinder students' working memory (Perina, 2002 as cited in Smith, 2004). He noted that math anxiety is a kind of problem facing by students and teachers. So, to improve the quality learning at first we should know about the existence of math anxiety among secondary students and how it affects students and their achievement. For this reason we are interested to conduct a study on math anxiety in secondary school students.

1.3) Rationale of the Study: Bangladesh is always serious for developing its education like other country in the world. Bangladesh wants to reach the level of developed country by 2041. So it needs to meet up SDG 4 by 2030. Bangladesh already successfully achieved the goal of Jomtien declaration 1990, Dakar Framework of Action 2000, UN Millennium Developing Goals (MDG) 2000 and Education for all (EFA) 2015. If we want to achieve our target we need to develop our educational quality by improving our teaching learning activities. As an important subject we need to improve teaching learning activities in mathematics for reducing its low achievement. Math anxiety is one of the main barriers to reduce low achievement and to improve the quality of learning at secondary level especially. To improve the effective learning at mathematics we have to minimize math anxiety from the students. Sometimes poor teaching practices, examination system, school management, parental education may affect students learning and its may increase students' math anxiety. Hambree (1990) reported that as impact of math anxiety students avoid mathematics; their career options are reduced, eroding the countries resource base in science and technology. So we need to analyze the psychological effects of our teaching learning activities which are related to student's math anxiety and its dimension. Then it will be possible to find the cause of low achievement in mathematics at secondary level. So this study will be very helpful for our education sector.

1.4) General objective of the Study: The general objective of the study was to measure and analyze the status of mathematics anxiety of secondary school students of Dhaka City in Bangladesh.

1.5) Specific objectives of the study: Specific objectives of the study were as follows.

1. To measure the mathematics anxiety level of secondary school students of Dhaka city.
2. To identify the impact of gender on mathematics anxiety of secondary school students of Dhaka city.
3. To determine the impact of school category on mathematics anxiety of secondary school students of Dhaka city.
4. To examine the impact of fathers education on mathematics anxiety of secondary school students of Dhaka city.
5. To examine the impact of mothers education on mathematics anxiety of secondary school students of Dhaka city.

1.6) Scope and Limitation of the study: According to the title in this study, it was possible to measure the mathematics anxiety level of secondary school students and how much students are experienced low, moderate or high level anxiety. It covers to measure the dimensions of student's mathematics anxiety. It was justified to identify the effect of gender, school category, father's education, mother's education, achievement and medium of instruction, grade level on mathematics anxiety. But the impact of urban and rural status of students on mathematics anxiety was not covered in this study.

There are many secondary schools in Dhaka city. But due to the restriction of time only all students of class nine of twelve schools were included which were not sufficient to generalize the result. This study was limited only on quantitative data where qualitative data might be used to triangulate the data for wider understanding at the same time. Purposive method was used to select school, which was one of the limitations. Sometimes students were not wanted to disclose his/her weakness by giving their real opinion which may hamper the actual result.

1.7) Hypotheses:

1. There is no significant difference in their anxiety level (low, medium, high) of secondary school students towards mathematics.
2. There is no significant difference in the anxiety of male and female students of secondary schools towards mathematics.
3. There is no significant difference in the anxiety of the student having different category of school.
4. Secondary school students do not differ significantly in their anxiety towards mathematics due to their father's education.
5. Secondary school students do not differ significantly in their anxiety towards mathematics due to their mother's education.

1.8) Conceptual Framework

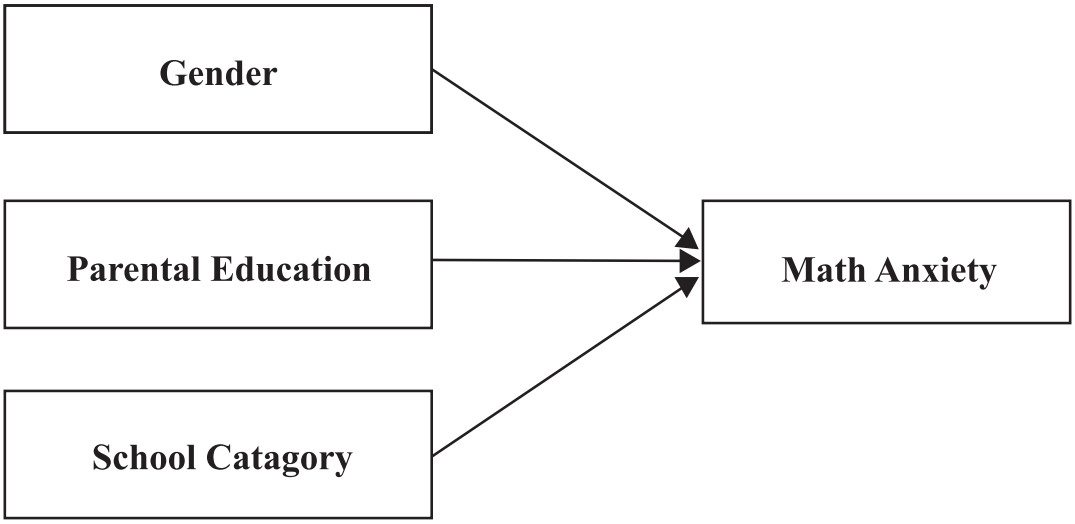

Figure 1: Conceptual framework

2.0 Methodology:

2.1) Sampling:

2.1.1) Selection of schools: There are different types of secondary schools in our country. Among them this study was focused Govt. secondary school, MPO based secondary school and private secondary school but these three types of secondary schools were not available in all thanas in Dhaka city. Therefore, two thanas were selected from each city corporation purposively. Totally four thanas were selected. Govt. girl's schools were selected from two thanas and Govt. boys schools were selected from two thanas. Then one MPO based school (Co -education) and one private school (Co - education) was selected from each thana. Thus twelve secondary schools were selected finally.

2.1.2) Selection of students: Class nine was selected as secondary level from each selected school. All available students of class nine on the selected day was considered as sample from selected twelve schools.

2.2) Source of Data and Methods of Data Collection: The opinion about mathematics as a subject of secondary school students of twelve schools of Dhaka city was data source of this study. Survey type questionnaire were used to collect data. Piloting was done to minimize any

confusion. After reaching a school, purpose of this study was described to the head teachers and the verbal consents were taken. The respondents were got the opportunity of using nick names. During data collection period, the experiences of piloting were always kept in mind.

2.3) Tools of Data Collection: To measure math anxiety in secondary school students, math anxiety scale (MAS) of Khatoon and Mahmud was used. It is a bi-dimensional and comparatively shorter instrument which was suitable for school students and where 7 items were worded positively and 7 items worded negatively. It was a 5-point Likert type instrument where the response category was 1 for strongly disagree, 2 for disagree, 3 for 'neither' agree nor disagree, 4 for agree and 5 for strongly agree for negative items and the scoring was reversed for positive items so that a high score indicated high anxiety. The positive and negative items were not arranged in the scale serially. Cronbach's alpha of math anxiety scale (MAS) was 0.87. Some demographic questions were included such as gender, parents educational qualification etc..

2.4) Methods of Data analysis and Presentation Techniques: Descriptive statistics were carried out for various categorical variables to get frequencies and percentages. Data were analyzed using computer program namely Statistical Package for Social Sciences (SPSS). Scores for each participant were computed by adding the item values. Participants' scores and the overall means and standard deviations of their scores were used to assign them into anxiety groups (i.e., low, moderate, high). Participants whose scores were at least one standard deviation below the overall mean were categorized as possessing low mathematics anxiety level, while those with scores that were at least one standard deviation above the overall mean were considered as having high mathematics anxiety level. Moderate mathematics anxiety level was assigned whose scores were not up to one standard deviation below or above the overall mean. Analysis of variance (ANOVA) and T-test were performed as significance test.

2.5 Ethical issues:

- After informing the purpose of the research, opinions were taken from the respondents.
- The respondents had the opportunity of using nick names in place of own names.
- The permission was taken from the Head Teachers at the time of data collection from the students.

- ❖ No manipulation was done in preparing results by analyzing information.
- ❖ For using all kinds of information, accurate references have been given.
- ❖ Students' opinion will not use any other purposes except research.

3.0 Results and Discussion:

3.1 Students math anxiety level:

In order to find the levels of mathematics anxiety that participants experienced, 14 items were calculated by adding their responses to each item. The negative items were reversely coded before the total scores for participants were calculated. The lowest score obtained was 15 and the highest was 66 out of the possible 70 where mean and standard deviation was 35.45 and 11.27 respectively. Then the overall means and standard deviations of their scores were used to assign them into anxiety groups as low, moderate and high. Participants whose scores were at least one standard deviation below the overall mean were categorized as possessing low mathematics anxiety level, while those with scores that were at least one standard deviation above the overall mean were considered as having high mathematics anxiety level. Moderate mathematics anxiety level was assigned to participants whose scores were not up to one standard deviation below or above the overall mean. The results indicated that 82 (17.1%) of the 479 participants experienced low level of mathematics anxiety, 306 (63.9%) experienced moderate level and 91 (19%) experienced high level of mathematics anxiety. Calculated result is shown in the figure 3.1 below.

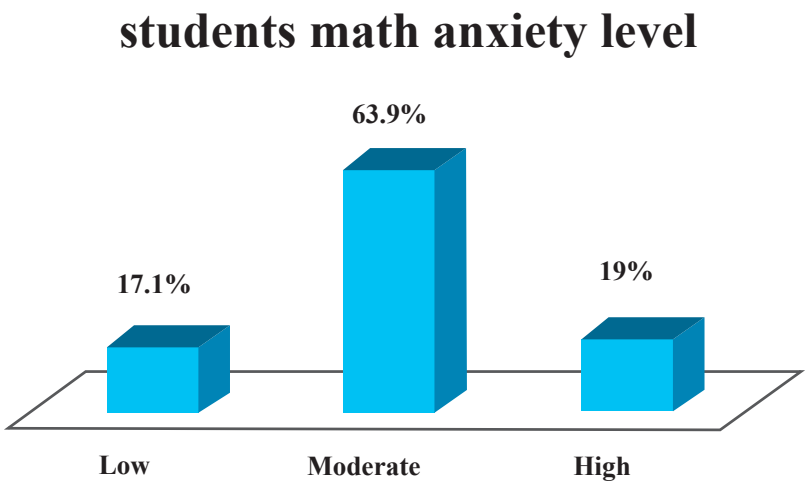

Figure 3.1: math anxiety level of the respondents

One way ANOVA was performed to compare (mean) the difference between groups of math anxiety level (Low, Moderate and High). Here $P < .01$, so, the math anxiety levels were differed and it was significant statistically at 99% confidence level. Here null hypothesis was rejected. Table 3.1(a) and 3.1(b) shows the means and ANOVA (Analysis of variance) respectively.

Table 3.1 (a): Means for math anxiety level (Low, Moderate, and High)

Math anxiety level	N	Mean (Math anxiety score)	Std. Deviation	Std. Error
Low	82	19.76	2.236	.247
Moderate	306	33.04	5.813	.332
High	61	52.46	4.947	.519
Total	479	34.45	11.274	.515

Table 3.1(b): One way ANOVA for math anxiety score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	47838.351	2	23919.176	881.619	.000
Within Groups	12914.342	476	27.131		
Total	60752.693	478			

3.2 Impact of gender on students' math anxiety:

The anxiety score of boys was 33.60 with standard deviation of 10.59 and that of girls 35.43 with SD of 11.95, where p is equal .07 with degrees of freedom 477. The results clearly indicate that girls did have more anxiety levels than males mathematically but it was not significant at 95% confidence level. So, there was no enough evidence in favor of difference between boys and girls in math anxiety. Therefore null hypothesis could not be rejected. Here levens test was not significant so variances were assumed equal.

Table 3.2: Gender and students math anxiety

	Gender	N	Mean	Std. Deviation	df	Sig.
Students math anxiety	Boys	256	33.60	10.599	477	.077
	Girls	223	35.43	11.951		

3.3 Impact of school category on students' math anxiety:

One way ANOVA was performed to compare (mean) the students' math anxiety score of difference between category of the schools. Here P > .05, so the difference was not significant statistically but it was slightly differed mathematically. So, there is no enough evidence in favor of difference between the school categories in math anxiety. Therefore null hypothesis could not be rejected. Table 3.3(a) and 3.3 (b) shows the mean and ANOVA (Analysis of variances) respectively.

Tab 3.3(a): Math anxiety score for school category

Category	N	Mean	Std. deviation
Gov. High School	149	33.40	11.308
MPO based High School	198	34.00	10.785
Private High School	132	36.32	11.802
Total	479	34.45	11.274

Tab 3.3(b): One way ANOVA for school category

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	664.218	2	332.109	2.631	.07
Within Groups	60088.475	476	126.236		
Total	60752.693	478			

3.4 Impact of fathers' education on students' math anxiety:

The difference between categories of fathers' education in students' math anxiety was significant statistically at 95% confidence level. One way ANOVA was performed and it was found that $p < .05$. Sometimes it was cleared that students' math anxiety was decreased when fathers' education level was increased. It shows the existence of the role of fathers' education level on students' math anxiety at secondary level. Here null hypothesis was rejected. Table 3.4(a) and 3.4 (b) shows the mean and ANOVA (Analysis of variances) respectively.

Tab 3.4(a): Math anxiety score and fathers' education

Category	N	Mean	Std. deviation
Upto SSC	65	35.43	11.254
HSC	106	34.54	11.469
Graduate	114	36.87	11.599
Post Graduate	194	32.66	10.744
Total	479	34.45	11.274

Tab 3.4(b): One way ANOVA for fathers' education

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1351.833	3	450.611	3.603	.013
Within Groups	59400.860	475	125.054		
Total	60752.693	478			

3.5 Impact of mothers' education on students' math anxiety:

To compare (mean) the students' math anxiety score according to their mothers' education level, one way ANOVA was performed. Here $P > .05$, so the difference was not significant statistically though it was slightly differed mathematically. So, there was no enough evidence in favor of difference between the mothers education level in math anxiety. Therefore null hypothesis could not be rejected. Table 3.5(a) and 3.5 (b) shows the mean and ANOVA (Analysis of variances) respectively.

Tab 3.5(a): Math anxiety score and mothers' education

Category	N	Mean	Std. deviation
Upto SSC	142	35.55	10.968
HSC	111	33.86	12.012
Graduate	137	34.17	11.080
Post Graduate	89	33.89	11.168
Total	479	34.45	11.274

Tab 3.5(b): One way ANOVA for fathers' education

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	249.829	3	83.276	.654	.581
Within Groups	60502.864	475	127.374		
Total	60752.693	478			

3.6 key findings

- The results indicated that 82 (17.1%) of the 479 participants experienced low level of mathematics anxiety, 306 (63.9%) experienced moderate level and 91 (19%) experienced high level of mathematics anxiety. Also the difference was significant statistically at 99% confidence level.The results clearly indicate that girls did have more anxiety levels than males mathematically but it was not significant at 95% confidence level.

- Math anxiety was not differed with the categories of schools at secondary level. It was found the existence of the role of fathers' education level on students' math anxiety at secondary levelThe impact of mothers' education on students' math anxiety was not significant.

4.0 Conclusion:

Based on the findings of the study it can be concluded that students of secondary school are experienced the different level of math anxiety such as low, moderate and high level where so many students were experienced in high level of math anxiety. The study also concludes that there was no effect of gender, school category and mothers education on students' math anxiety. This study has also found that students' math anxiety was slightly defended on fathers' education. Nobody should worry about gender, category of school and parental educational level as cause of students' math anxiety. Girls should be encouraged to take mathematics as a subject. At the same time it is needed to identify the real causes of students' math anxiety.

Acknowledgement

We sincerely thank the National Academy for Educational Management (NAEM) for funding this research. We also extend our gratitude to all the participants for their voluntary involvement, which was essential to the completion of this study.

5.0 References:

Alexander Alaina Hellum (2010). EFFECTIVE TEACHING STRATEGIES FOR ALLEVIATING MATH ANXIETY AND INCREASING SELF-EFFICACY IN SECONDARY STUDENTS, A Project Submitted tothe Faculty of The Evergreen State College In Partial Fulfillment of the Requirements for the degree Master in Teaching 2010, Retrieved from: http://archives.evergreen.edu/masterstheses/Accession89-0MIT/Hellum-Alexander_AMIT2010.pdf

Ali, M. E.(1999, P – 257). JUGE JUGE SHIlKSHA COMMISSION O SHIKSHAR UTTARON, JAGORONI PROKASHONI, DHAKA.

Ashcraft, M. H., & Faust, M. W. (1994). Mathematics anxiety and mental arithmetic performance: An exploratory investigation. *Cognition and Emotion,* 8(2) , 97-125. Retrieved from: http://www.tandfonline.com/doi/abs/10.1080/02699939408408931

Altermatt, E. R., & Kim, M. E. (2004). Can anxiety explain sex differences in college entrance exam scores? *Journal of College Admission*, 183, 6-11. Retrieved from: https://eric.ed.gov/?id=EJ682482

Betz, N.E. (1978). Prevalence, distribution, and correlates of math anxiety in college students. *Journal of Counseling Psychology,* 25(5), 441-448. Retrieved from: http://psycnet.apa.org/record/1979-24735-001

Devine et al.(2012). Gender differences in mathematics anxiety and the relation to mathematics performance while controlling for test anxiety. *Behavioral and Brain Functions* 2012 8:33. Retrieved from: http://www.behavioralandbrainfunctions.com/content/8/1/33

Dreger, R. M., & Aiken, L. R. (1957). The identification of number anxiety in a college population. *Journal of Educational Psychology,* 48(6), 344-351. Retrieved from: https://www.upress.umn.edu/test-division/bibliography/1950 1959/1957/ dreger_identification_1957

DSHE (2014): Directorate of Secondary and Higher Education (DSHE) evaluation report, 2014; Daily Prothom –alo (07.11.14). Education commission of Bangladesh (1974). Bangladesh Education (Qudrat-E-Khuda) Commission Report, 1974. Education watch report, (2007,p - 1), CAMPE, Dhaka. Retrieved from: https://www.campebd.org/Files/10042014051813pmEducation_Watch_Report_2008_Full_English.pdf

Fennema E., Sherman, J. (1976). Fennema-Sherman Mathematics Attitude Scales. *JSAS Catalog of Selected Documents in Psychology, 6*, 31 (MS. No. 1225). Retrieved from: *http://www.pearweb.org/atis/tools/55*

Furner, J. M. & Duffy, M. L. (2002). Equity for all students in the new millennium: Disabling math anxiety. *Intervention in School & Clinic,* 38(2): 67. Retrieved from: http://ourmathresource.weebly.com/uploads/5/3/4/8/53486121/disabling_math_anxiety.pdf

Ganley CM & McGraw AL (2016). The Development and Validation of a Revised Version of the Math Anxiety Scale for Young Children. Front. Psychol. 7:1181. doi: 10.3389/fpsyg.2016.01181, Retrieved from: http://journal.frontiersin.org/article/10.3389/fpsyg.2016.01181/full

Haciomeroglu, G. (2014). Elementary Pre-Service Teachers' Mathematics Anxiety and Mathematics Teaching Anxiety**,** International Journal for Mathematics Teaching & Learning; 2014, p1: Retrieved from: http://www.cimt.org.uk/journal/haciomeroglu.pdf

Halat, E. (2006). Sex-related differences in the acquisition of the van Hiele levels and motivation in learning geometry. *Asia Pacific Education Review,* Vol. 7(2), 173-183. Retrieved from: http://files.eric.ed.gov/fulltext/EJ752338.pdf,

Hembree, R. (1990). The nature, effects, and relief of mathematics anxiety. *Journal for Research in Mathematics Education.* 21(1)*,* 33-46. Retrieved from: http://www.jstor.org/stable/749455?seq1#pagescan_tab_contents

Jackson, C.D. & Leffingwell, R.J. (1999). The role of instructors in creating math anxiety in students from kindergarten through college. *Mathematics Teacher,* 92 (7), 583-586. Retrieved from: https://themathwiki.wikispaces.com/file/view .

Karp, K. (1991). Elementary school teachers' attitudes towards mathematics: The impact on students' autonomous learning skills. *School Science and Mathematics*, 91(6), 265-270. Retrieved from: http://onlinelibrary.wiley.com/doi/10.1111/j.1949-8594.1991.tb12095.x/full

Khatoon, T., & Mahmood, S. (2010). Mathematics anxiety among secondary school students in India and its relationship to achievement in mathematics. *European Journal of Social Sciences*, 16(1), 75-83. Retrieved from: www.ibrarian.net/.../Mathematics_Anxiety_Among_Secondary_School_Studen.pdf

Lee, J. (2009). Universals and specifics of math self-concept, math self-efficacy, and math anxiety across 41 PISA 2003 participating countries. Learning and Individual Differences, 19, 355–365. Retrieved from: http://www.sciencedirect.com/science/article/pii/S104160800800112,

Liu, F. (2008). Impact of online discussion on elementary teacher candidates' anxiety toward teaching mathematics. Education, 128(4), 614-629. Retrieved from: https://www.learntechlib.org/p/102050/

McAnallen,R. (2010). Examining Mathematics Anxiety in Elementary Classroom Teachers : PhD thesis, university of Connecticut, Retrieved from: http://opencommons.uconn.edu/dissertations/AAI3464333,

Mathison, M. A. (1977). Curricular interventions and programming innovations for the reduction of mathematics anxiety. Paper presented at the *Annual Convention of American Psychological Association*, San Francisco, CA, 26-30 August. Retrieved from: https://eric.ed.gov/?id=ED154330

Ma, X., & Cartwright, F. (2003). A longitudinal analysis of gender differences in affective outcomes in mathematics during middle and high school. *School Effectiveness and School Improvement*, 14(4), 413-439. Retrieved from: http://www.tandfonline.com/doi/abs/10.1076/sesi.14.4.413.17155

National Curriculum (2012).National Curriculum and Textbook Board, Bangladesh(NCTB). NCTB (2013):

NCTB (Preface, mathematics Text book 2013, Class IX), Bangladesh, Dhaka.

NMAP, (2008) . The Final Report of the National Mathematics Advisory Panel National Mathematics Advisory Pane ,U.S. Department of Education: Washington, DC, 2008, Retrieved from: https://www2.ed.gov/about/bdscomm/list/mathpanel/report/final-report

Richardson, F., & Suinn, R. (1972). The mathematics anxiety rating scale: Psychometric data. *Journal of Counseling Psychology,* 19(6), 551-554. Retrieved from: http://psycnet.apa.org/record/1973-05788-001

Reed, Kara L. (2014). DO K, 1, 2 TEACHERS WHO PARTICIPATED IN A YEAR LONG MATH COURSE HAVE LESS TEACHER MATH ANXIETY THAN THOSE WHO DID NOT PARTICIPATE?, Dissertation submitted to the Faculty of the Graduate School of the University of Maryland, College Park in partial fulfillment of the requirements for the degree of Doctor of Education, Retrieved from: http://drum.lib.umd.edu/bitstream/handle/1903/15314/Reed_umd_0117E_15124.pdf;jsessionid=A7F7E7C8AABD1B0C8A935DC03831D825?sequence,

Sloan, T., Daane, C.J., & Giesen, J. (2002). Mathematics anxiety and learning styles: What is the relationship in elementary preservice teachers? *School Science and Mathematics*, 102(2), 84-87. Retrieved from: http://onlinelibrary.wiley.com/doi/10.1111/j.1949-8594.2002.tb17897.x/abstract,

Stuart. (2000). Math curse or math anxiety? *Teaching children mathematics, 6(5*).Retrieved from: https://www.researchgate.net/publication/234647654_Math_Curse_or_Math_Anxiety

Smith. Megan R. (2004). Math Anxiety: Causes, Effects, and Preventative Measures, A Senior Thesis submitted in partial fulfillment of the requirements for graduation in the Honors Program, Liberty University, Fall Semester 2004, Retrieved from: http://digitalcommons.liberty.edu/cgi/viewcontent.cgi?article=1263& context=honors,

Sloan, T. R. (2010). A quantitative and qualitative study of math anxiety among pre-service teachers. *The Educational Forum*, *74*(3), 242-256. Retrieved from: http://www.tandfonline.com/doi/abs/10.1080/00131725.2010.483909,

Tobias, S., & Weisbrod, C. (1980). Anxiety and mathematics: An update. *Harvard Educational Review,* 50(1), 63-70. Retrieved from: https://eric.ed.gov/?id=EJ224889

Trujillo K.M, & Hadfield, O.D. (1999). Tracing the roots of mathematics anxiety through in-depth interviews with preservice elementary teachings. *College Student Journal*, 33(2), 219-232. Retrieved from: http://www.freepatentsonline.com/article/College-Student-Journal/62839422.html

Uusimaki, L. & Nason, R. (2004). CAUSES UNDERLYING PRE-SERVICETEACHERS' NEGATIVE BELIEFS AND ANXIETIES ABOUTMATHEMATICS Queensland University of Technology Proceedings of the 28th Conference of the International Group for the Psychology of Mathematics Education, 4, 369–376 : Retrieved from: https://files.eric.ed.gov/fulltext/ED489664.pdf

Vinson, B. M. (2001). A comparison of pre-service teachers' mathematics anxiety before and after a methods class emphasizing manipulatives. *Early Childhood Education Journal*, *29*(2), 89-94. Retrieved from: https://link.springer.com/article/10.1023/A:1012568711257,

Wigfield, A., & Meece, J. (1988). Math anxiety in elementary and secondary school students. *Journal of Educational Psychology*, 80(2), 210-216. Retrieved from: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.336.8626

World Economic Forum (2013): The Global Information Technology Report 2013, World Economic Forum, Geneva. Retrieved from: www.weforum.org/gitr.

Zettle, R., & Raines, S. (2002). The relationship of trait and test anxiety with mathematics anxiety. *College Student Journal*, 34, 246-258. Retrieved from: http://www.freepatentsonline.com/article/College- Student- Journal/131318271.html

NAEM JOURNAL
ISSN 1997-4248, eISSN 2959-4561
Volume 17 Issue 02
Serial 34
https://Doi.org/10.59629/NAEM 20213202.1601

State of Supervision for Ensuring Quality Secondary Education at Upazila Level in Bangladesh: Issues and Implications

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Abstract

Quality secondary education has become a second highest matter of concern of our country in the twenty-first century. In Bangladesh, achievement in secondary education is tremendous, though there is a question in quality education. In this case, there are numerous problems that resist the process of quality education at this level and lack of effective academic supervision is one of them. The study is mixed in nature and it collects relevant data from both sources through content analysis, survey, In-depth interview, Key Informant Interview (KII) and Focus Group Discussion (FGD). The study highlights on the general role and functionalities of the DEO, ADEO, USEO and Head Teacher as a supervisor in improving the teaching-learning process and to ensure quality education. It tries to make a conceptual analysis on different aspects of academic supervisor, quality education, supervision and inspection, quality assurance as well as teaching-learning. The study reveals that low support and morale, inspection rather than academic supervision, lack of dedication and professionalism, etc. are the main issues of academic supervision which hamper quality secondary education. The study recommends that DEO's, ADEO's, USEO's and head teacher role as a supervisor should assist the execution of the numerous roles and functionalities which will progress the teaching-learning situation to ensure quality secondary education in Bangladesh.

KEYWORDS: Supervision; Quality; Secondary Education; District Education Office, Upazila Secondary Education Office, Head and Assistant Head Teacher.

1.0 Introduction

Education has long been seen as a useful tool for shaping people's mindsets and outlooks, improving their diverse abilities, and promoting overall national and global growth. This is also where civilization began. The goal of education is to change people's behavior and make them fit for earning certain skills to attain bread and butter for the rest of their lives (Nuruddin, 2008).

Bangladesh's education system is divided into three tiers: primary, secondary, and tertiary, each with its own curriculum, textbooks, teaching personnel, materials, and goals and objectives. Secondary education is the second most important tier among the several levels since it deals with

the learning of young, emotionally fragile, and sensitive (NEP, 2010). This education system must be re-oriented to transmit a broad repertoire of life-skills in order to educate young people for life and work in a fast changing environment. By adequate supervision, these skills should encompass important general competencies, non-occupation-specific practical capacities, ICT, the ability to learn independently, work in teams, entrepreneurship, and civic duty (UNESCO, 2000). In school administration, the job of inspector monitoring is explicitly performed by an external agent from the inspection department, with the goal of modifying all elements impacting teacher conduct and reinforcing teaching and learning activities. For ensuring expected secondary education, it is less usually planned and carried out as a cooperative effort (Ghavifekr and Ibrahim, 2014). In schools, supervision is seen as a general leadership duty aimed at improving instructors' teaching performance (Cudjoe and Sarfo, 2016) and these are implemented with the goal of maintaining and increasing student learning quality, as well as all other aspects that affect learning and teaching in any education system (Idogho and Agholor, 2013). So, school supervision has more potential for deciding the efficiency of teaching and learning in the classroom, but it is fraught with questions and inquisitiveness, as well as supervisors' dissatisfaction with the influence of supervising on the classroom (Anton, 2005). Insufficient supervision by school officers leads the schools to poor learning and teaching quality.Numerous obstacles contribute to inefficient monitoring and oversight, and instructors' perceptions of these systems are mixed (Okendu, 2012). As a result, they will contribute to continued low performance in national exams among secondary students, a poor teaching atmosphere in the classroom, increasing drop out of students, poor teacher-student relationships in the classroom, and teacher negligence because they understand they would not be carefully supervised as needed (Paschal, et al., 2020). So, the purpose of this study is to investigate the state of supervision as quality assurance technique for enhancing teaching and learning at the secondary education in Bangladesh, with the goal of influencing the government and lawmakers to develop, design, and enforce current relevant laws and regulations, as well as providing acceptable solutions to the issues.The study will also assist us in comprehending the current scenario and the issues of academic supervision. The findings will also beneficial for education planners in better understanding of current educational supervision techniques in secondary level of schools. They can utilize the data to take the required steps to strengthen academic supervision techniques in order to ensure educational success at secondary level in Bangladesh.

1.1 Objectives of the Study

The general objective of this study is to explore the state of supervision for ensuring quality secondary education at Upazila level in Bangladesh. The specific objectives are:

- To review the existing rules, regulations and guidelines of government for supervision of secondary education in Bangladesh;
- To examine the effectiveness of the strategies and practices of academic supervision of the responsible officials for ensuring quality secondary education in Bangladesh;
- To identify the major issues and challenges those create hindrances in the way of ensuring effective supervision for quality secondary education in Bangladesh.

1.2 Methodology

This research has been conducted by using mixed method approach with explanatory sequential design. The study has been conducted in three Upazila's of three districts such as Rajshahi Sadar (forward), Gazipur Sadar (moderate) and Natore Sadar (backward)) in 2022-2023 fiscal year. From each Upazila one government boy's high school, one secondary co-education high school, one Secondary Girl's high School has been selected through stratified simple random sampling technique. Data have been collected from both primary and secondary sources. Primary sources include study fields, government's rules and regulations regarding monitoring, supervision and study respondents whereas secondary sources include relevant reports, articles, official orders, letters, proclamations, statistics, memoranda, seminar and archival materials, etc. The sample sizes of the respondents are 142 in this study (Akanda, 2019). Following table (Table 1) shows details about data collection techniques, tools, respondents and sample size of the study.

Table 1: Sampling Plan with Data Collection Techniques & Tools

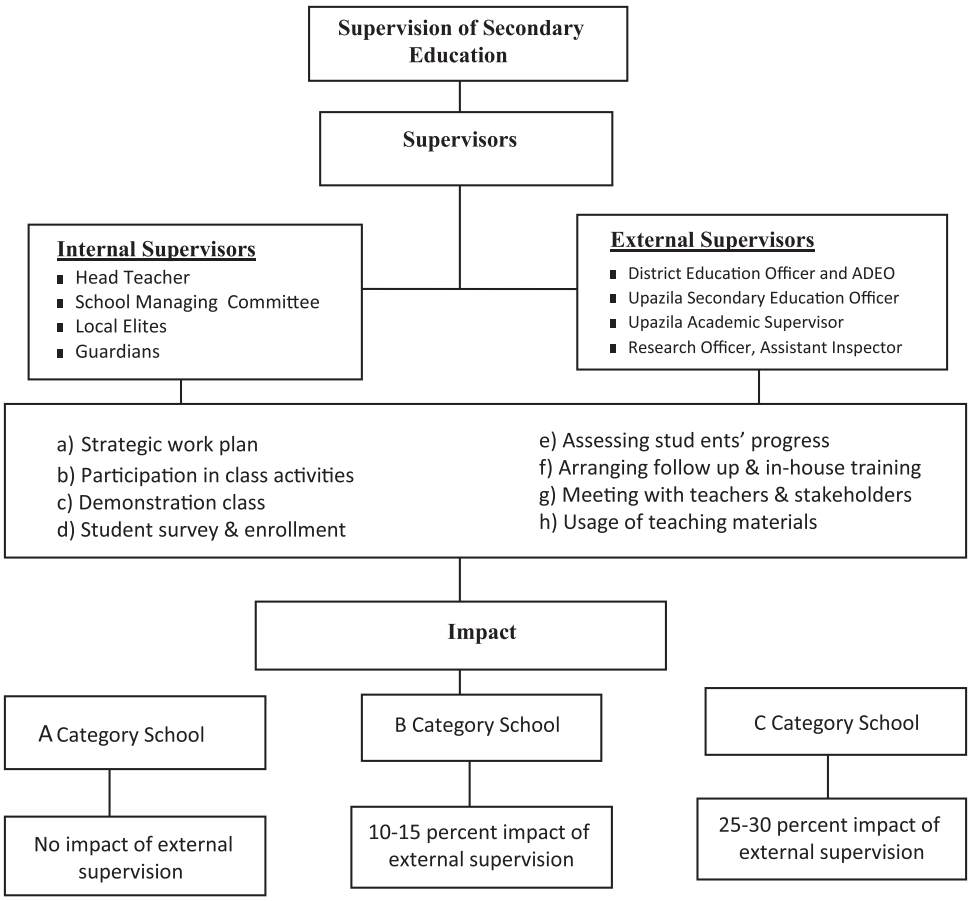
Respondents		Sampling Procedure	Data Collection Techniques & Tools		Sample Size	
			Techniques	Tools		
Head Teachers of SS (Total 09 schools, 03 from each Upazila)		Simple Random	In-depth Interview	Structured & semi-structured questionnaire	9x1	09
Asst. Teachers of SS	Co-education Schools	Purposive	FGD (1 FGD with AT in each school, total 9 FGD)	Schedule	9 FGD-X6	54
	Boys' Schools					
	Girls Schools					
DEO/ADEO, SI (Raj. Education Board) USEO/ AUSEO (Govt. Executives)		----------	In-depth Interview	Structured & semi-structured questionnaire	2X3 01	07
Local Elites & RO, AI & UAS (Officers of SESIP)		Purposive	KII	Checklist	6X3	18
School Managing Committee		Purposive	FGD (1 FGD with SMC in each school, total 9 FGD)	Schedule	9 FGDsX6	54
						142

[Here, SS: Secondary School, DEO: District Education Officer, ADEO: Assistant District Education Officer, USEO: Upazila Secondary Education Officer, AUSEO: Assistant Upazila Secondary Education Officer, RO: Research Officer, Al: Assistant Inspector, UAS: Upazila Academic Supervisor, FGD: Focus Group Discussion, KII: Key Informant Interview]

1.3 Legal Framework

Figure 1: Legal Framework

Figure 1: Legal Framework



(Source: DSHE, 2019)

1.4 Overall Scenario of Supervision for Improving Teaching-Learning Processes

Supervision has a significant effect on teaching and learning in quality of education. Various measures have been implemented by the government of Bangladesh to increase educational quality in terms of teaching-learning, and performance. As the most crucial part of teaching- learning and supervision is emphasized (Veloo, et al., 2013). Because of this, school monitoring and control has been delegated to the District and Upazila Secondary Education Office and its officers, who are ill-equipped to monitor and supervise all secondary schools under their jurisdiction. These supervisions have undoubtedly been carried out and are still being carried out, but the question remains as to how constant they are. How successful are this supervision?

Supervision is still not being carried out to their full potential and as necessary.

1.5 Observing Class Activities

Classroom supervision plays a major role in achieving quality education and the Bangladesh government seeks to implement secondary education classroom-based policies, goals, and objectives across the nation under the direction and control of DEO, USEO, and other officers (NEP, 2010). This is widely accepted to encourage teachers to collaborate and advance teaching practices, providing an opportunity to observe the teacher and students in a real-world teachinglearning setting. Supervision is very beneficial for teachers to improve their teaching-learning process and guarantee that secondary education officers will participate in class activities during the school day's supervision period (Mohanty, 2008).

Table 2: Participa tion of Supervisors in Classroom observation

Respondent (HT)-09			Respondent (AT)-54		
Opinion	**Frequency**	**Percentage**	**Opinion**	**Frequency**	**Percentage**
Yes	08	88.89	Yes	45	83.33
No	01	11.11	No	09	16.67

(**Source: Field Survey, 2022**)

Inspections of classrooms by DEO, ADEO, USEO, RO, AI, and UAS increase the visibility and appeal of the teaching-learning process. The teachers educate them better to make the lesson more engaging, fun, and participatory if this problem persists in the school. Otherwise, most teachers still teach in the old-fashioned way, which is not good for secondary school quality. According to the survey findings, 88.89% of HT and 83.33% of AT said they took part in classroom activities, whereas 11.11% HT and 16.67% AT said they didn't. When supervisors were asked this question, they replied that they always make an effort to engage in class activities, although occasionally they were unable to do so due to a lack of time or other obligations. Additionally, SMC members did not attend and consider the teaching-learning process, and local elites did not attend the school because they felt excluded from it. SMC Chairman visited the school for refreshment. Findings also reveal that the SMC members in maximum cases do not have adequate educational qualification to observe the quality of a class. Therefore, the respondents suggest that the SMC Chairman and members should have master's degree. Overall, the DEO, ADEO, USEO, RO, AI and UAS acknowledged that classroom activities of teaching-learning process should be utilized rather than inspection to assure quality secondary education.

1.6 Demonstration Class

Demonstration, which refers to carrying out a certain action in a methodical and scientific manner, may appear to be a straight forward teaching strategy. This frequently occurs when students struggle to apply theories to real-world situations or when youngsters struggle to understand how theories are applied (Kotride & Yunos, 2014). The teachers encourage the students to ask questions of their teachers and use simple language to analyze the subject in order to make the demonstration technique. Teacher demonstrations are crucial because they give students the opportunity to practice techniques that aid in learning (Tapan and Govinda, 1999).

Table 3: Demonstra tion Class

Respondent (HT)-09			Respondent (AT)-54		
Opinion	**Frequency**	**Percentage**	**Opinion**	**Frequency**	**Percentage**
Yes	02	11.12	Yes	09	16.67
No	07	88.88	No	45	83.33

(Source: Field Survey, 2022)

A demonstration class uses a visual method to evaluate concepts, information, and the learning process. The USEO, RO, AI, and UAS will perform the class as a demonstration class in front of concerned teachers in order to make the lesson engaging and fun for the students (Archibong, 2012). Table 3's survey results show that 11.12% of HT and 16.67% of AT believed that they had taken part in demonstration classes, whereas 88.88% HT and 83.33% AT said that they had not taken part in such classes in order to further the teaching-learning process. In response to this question of demonstration class, USEO, RO, AI and UAS expressed their opinion, they have to fill up an "inspection report" which encourages them to inspect school rather than supervise and it is really an "inspection report" form and they need about two hours to fill up the form. If they conduct a demonstration class, time is short to fill up the form. Moreover, there are 23 indicators and about 150 sub-indicators in this form where supervision position is very poor. In contrast, they opted out of the demonstration class out of respect for the teachers. One UAS said that in addition to academic activities, UNO offers them additional official pursuits.

1.7 Student Survey and Enrollment

Student survey is also one strategy to strengthen the relationship between DEO, ADEO, USEO, RO, AI, UAS, teachers, and parents in order to raise the likelihood of enrollment, success, and a dropout rate that is at or below zero. Many secondary school systems in Bangladesh use the teacher's student survey and enrollment program as a way to develop relationships with parents in order to increase in-school parent involvement, which in turn will increase student achievement and decrease dropout rates at secondary education (Wright, et al., 2018). However, in the majority of cases, the officers did not carry out these duties personally and instead directed teachers to carry out the student survey and program for home visits, which most of the teachers accomplished infrequently and virtually rather than physically.

Table 4: Participation in St udents' Survey and Enrollment

Respondent (HT)-09			Respondent (AT)-54		
Opinion	**Frequency**	**Percentage**	**Opinion**	**Frequency**	**Percentage**
Yes	01	11.12	Yes	04	07.40
No	08	88.89	No	50	92.60

(Source: Field Survey, 2022)

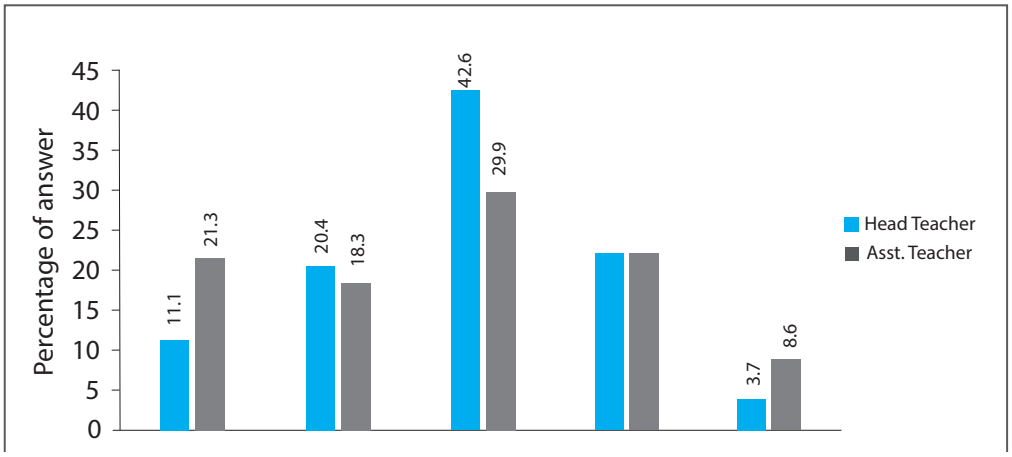
In response to this question, it was discovered that 11.11% of HT and 07.40% of AT said that they had taken part in home visits for dropout kids, while 88.89% HT and 92.60% AT accusingly responded that they do not take part in student surveys or home visits for students who are about to drop out of school. Additionally, the researcher conducts interviews

responsible officers, and they kindly acknowledge that they do not take part in this program. The majority of them expressed the opinion that they are ignorant of the law regarding student surveys and that this is a very motivating stimulus to stop dropouts, but the majority of students are poor and engage in child labor. However, the majorities of parents marry their daughters while they are in secondary school and use them as domestic helpers. In addition, UAS claimed that some students use phones. They bully the teachers if they are told to come to class. Finally, the officers said that in order to ensure that everyone in Bangladesh has access to high-quality secondary education; they should take student surveys and enrolment into account.

1.8 Duration of Stay in School

The DSHE passed the "Enhance Quality Education at Secondary Level-2019" law, which stated that a USEO would inspect and oversee 20 schools in a month and take part in all educational activities carried out by the teachers and authorities of the concerned school, but that they would not have enough time to do so. A RO, AI, and UAS on the other hand, will inspect 15 and 20 schools, respectively, in a month. The USEO and other officials typically visited five to six schools in a day that were located next to a single road within their control (Alam and Haq, 2001). An UAS will stay all day long in school to inspect and supervise to ensure quality education at primary level in Bangladesh (DSHE, 2019). A survey of nine head teachers and 54 assistant teachers was conducted, and the findings show that 11.1% of HT and 21.3% of AT said officers stay in schools for one to thirty minutes, 20.4% of HT and 18.3% of AT said officers stay in schools for thirty to sixty minutes, 42.6% of HT and 29.9% of AT said officers stay in schools for one to two hours, 22.2% of HT and 22.0% of AT said officers stay in schools for three to four hours and 3.7% HT and 8.6% HT replied, they stay in a school four to six hours or all day long to monitor or supervise.

Figure 2: Duration of Stay in School by them



[Source: Field Survey, 2022]

The results of those teachers' survey show that, on average, 6.15% of officers spend the entire day in a school where the law is broken. In response to this inquiry, USEO stated that no one attend school all day, and as a result, neither does he. They further acknowledged that it is

an offense. In the interview response, a UAS noted that there are roughly 82 schools under his control, the majority of which have politically active teachers who frequently disrupt learning. Additionally, the majority of SMC members are opposed to school development in terms of teaching and learning that does not result in new student enrollment or financial gain. They won't accept them in their school all day if he/she stays there all day, he/she will become their adversary. Besides, the UAS must carry out a variety of tasks that have been delegated by the UNO, including: old age allowance, freedom fighter allowance, Union Parishad activities, local and national elections, and various public examinations for BOU, NU, JSC, SSC, and HSC. An UAS sometimes seems to be a UNO co-up officer.

1.9 Twining Program

Twining of school is known as "partnership among school" under which two schools come together for greater exposure. The aim is to promote shared learning among students and teachers with focus to encourage learning inside and outside the classroom. In this system one school students and teachers will go another school to participate in assembly, observe/ visit of school library, laboratory, nursery, playground, drinking water and sanitation facilities, cocurricular and cultural activities, science/math fair and any other display of innovative and best practices by host school (MOE, 2008)? The officers did not arrange twining program among their school and most of them have no idea about this.

Table 5: Arrangement of Twining Program in School

Respondent (HT)-09			Respondent (AT)-54		
Opinion	**Frequency**	**Percentage**	**Opinion**	**Frequency**	**Percentage**
Yes	00	00.00	Yes	00	00.00
No	09	100.00	No	54	100.00

(Source: Field Survey, 2022)

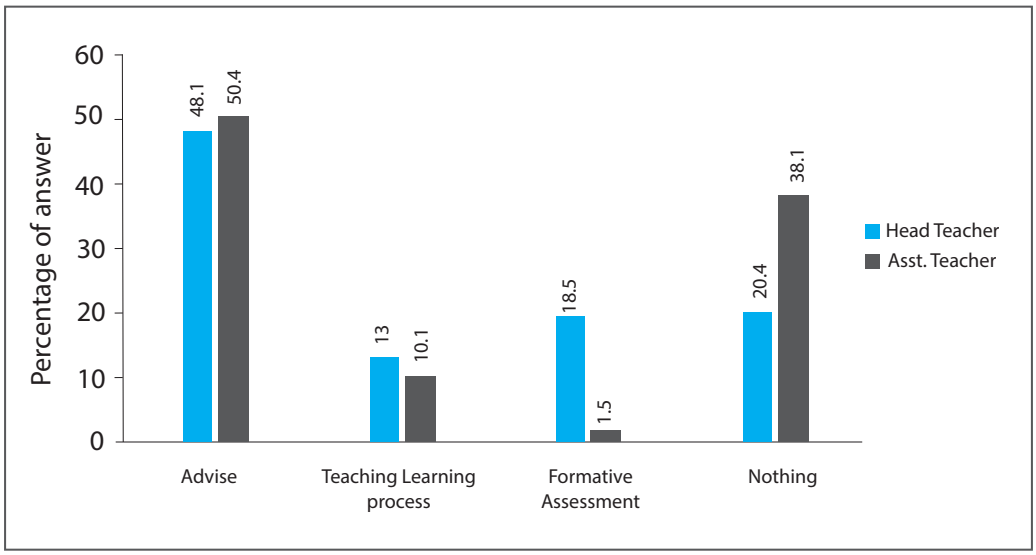
As part of the twining program, private and government school will be linked with each other through audio-visual classrooms to help teachers and students with better course content. This results in increased interaction amongst students and teachers, sharing of experiences, ideas and best practices. A survey is conducted in this question and the results is, 100% HT and AT said, they do not arrange twining program in school and they are not aware about this. The officers do not tell them about this. In the interview's response, the DEO, ADEO, USEO, RO, AI, and UAS indicated that no one had set up such a program in Bangladesh and that the weak school authorities would not allow students to travel to good/best schools for their viewpoint exchange. Uncovering a school's situation through the implementation of such a program may be shameful for poor schools, but it may also be a good program for Bangladesh's secondary education system. Therefore, they must endeavor to set up such a school curriculum.

1.10 Activities of DEO/ADEO/USEO/RO/AI/UAS in School

A school is a place where children, predominantly juvenile children go to gain knowledge about the topics of reading, writing, reviewing and arithmetic from a teacher. Learners spend most of the time in a classroom or a place where usually 30 to 40 pupils sit to engage in

learning conversation. These functions are conducted by a teacher in the school and they will maintain the teachers to improve and ensure these educational activities to ensure quality secondary education (DSHE, 2019). Most of the officer's activities are administrative, traditional, advisory and not demonstrative. They also have to fill out a detailed form on the status/situation of school. They make statements with regard to the performance of the school. If the form is characterized, then ¾ are an inspection type of visit and ¼ are support to supervision type (Alam and Haq, 2001).

Figure 3: Activities of DEO/ADEO/USEO/RO/AI/UAS in School



[Source: Field Survey, 2022]

Survey was conducted to find out the outcome of the question and 48.1% HT and 50.4% AT replied, they only advise them about different things, 13.0% HT and 10.1% AT gladly said, they advise them about improving class-base teaching-learning process, 18.5% HT and 1.5% AT replied with amusement, they assist them to learn formative assessment system which is very positive stimulus for students to ensure quality education and 20.4% HT and 38.1% AT blamed with upset, they do not do anything with them about teaching-learning process in classroom base and the teachers also claimed that the officers are also the impediment to ensure quality education. They appear to be an educational officialor a teacher's adversary rather than a manager. They acknowledged in their response to this question that some officers shared their sentiments and that if they grow close to them, they would stop respecting them. They also understand that they (officials) are powerless. Thus, they occasionally treat them harshly.

1.11 Key Findings

In Bangladesh, secondary school supervision is largely conventional, reluctant, and more symbolic, mechanical and practical than intellectual and pedagogical. It mainly promotes identifying "Faults or Mistakes," which are often handled by the education officials of

DEO and USEO offices. In the current system, education officers serve less as supervisors, facilitators, and "critical friends" of the teachers in the school and more as administrators and inspectors with a policing role. The average distance between schools and the DEO office is two to forty kilometers, and the DEO, ADEO, USEO, and AUSEO have a tendency to visit the nearby school more frequently than the detached ones. It has been noted that all high-quality schools received full attention from them, while low-quality schools only received their minimal attention. There is also no advice or pressure from them to improve and guarantee quality education in secondary schools. Without administrative oversight, they provide no benefits to the schools. The majority of the time, they visits to the school were ceremonial or administrative in nature. The majority of USEOs and AUSEOs neither visit schools frequently nor did they fully carry out their jobs and responsibilities. Even if they showed up, they would just examine the many registers, records, financial transactions, and administrative matters while enjoying refreshments in the head teacher's room. They would not support improving student learning or overseeing classroom teaching. Instead of giving suggestions to the teachers, they were harsh to the teachers for any minor administrative lapses (attendance, duration of staying in school) etc. The teachers are subjected to humiliation by the USEO when they apply for services like time scales, leave adjustments, area bills, pensions, loans from GP funds, and efficiency bar crosses. The government did not provide its vehicle for the Upazila secondary education office, and the government did not create a necessary post of AUSEO for a cluster (15-20 schools in a cluster) in an upazila according to the number of secondary schools. Because of this, an AUSEO has to monitor and supervise about 80 secondary schools as a cluster in an Upazila. They did not reach in all schools to monitor of their jurisdiction within a year. A monthly inspection form with 23 indications and over 150 sub indicators is used by the DEO, USEO, RO, AI, and UAS to monitor and inspect 5, 20, 15, 15, and 20 schools. Some officers submit the paperwork to the head teacher so that s/he can fill it out because s/he doesn't have enough time. It takes time to fill out the form because it has more overlapping or less significant indicators than academics.

In DEO and USEO offices, the RO, AI, and UAS are project officers, whereas the DEO and USEO are revenue officers. The government official and the teachers that were named are temporary project officers. As a result of the nature of their work, project officers have poor morals as well. The majority of the officers, office workers, and teachers refused to let them in, and they rarely participated in their own activities. Additionally, they are used by UNO, DEO, and USEO in a variety of activities (particularly UNO), including the distribution of VGD, VGF, TR, Kabikha, Kabitha, allowance for freedom fighters, student scholarships, and the administration of various JSC, SSC, and HSC exams as well as local, regional, national and SMC elections, as well as a variety of school-related cases other than academics.

1.12 Recommendations

Supervision requires the officers to oversee, assess, evaluate and direct teachers as well as school authorities to ensure an educational institution is meeting its goals. To ensure clinic supervision, the government should provide the necessary vehicle for the USEO office and create the post of AUSEO for 10-15 secondary schools as a cluster office at the Union Parishad

level, and the officers should lodge in their working place. Government should make free the USEO, AUSEO, RO, AI and UAS from project officers and the tag officers of UNO. The majority of the head teachers disobeyed the DEO/USEO and project officials' instructions. So, to control teachers, DEO/USEO and project officers of RO, AI, and UAS should be given the authority to withhold salary in addition to SMC and head teachers. To provide them necessary training for making patriotic academic supervisors and professionals rather than school inspectors of police.

The study finds that the DEO office and USE Office should be in the vanguard of achieving quality secondary education by ensuring the excellence of schools with the help of central to local government, SMC, different educational implementation committees and communities. The concerned DEO/USEO should also involve themselves and encourage others to participate in the teaching-learning process and educational activities to implement the law of secondary school instead of carrying their weapons on teachers. Most of the laws are very good, but some are outdated, and in practice, those are virtually ignored and little gets done to ensure quality secondary education. The study unfolds that there is a huge gap between written policies and their implementations. The overlapping of local jurisdiction should be consolidated, and one agency should be established in each Upazila to supervise secondary educational activities. The DSHE should take the appropriate actions to update the form by emphasizing academic indicators in order to guarantee Bangladesh's secondary education is of high quality. In the education board, only a school inspector and assistant school inspector oversee more or less nine thousand schools. So, in order to provide effective monitoring and high-quality education, the government should take the required steps to increase the post school inspector and assistant school inspector in this institution. In public schools, there is an "Esprit de Corps" relationship between the DD, DEO, and head teacher. As a result, they did not visit the school for monitoring and inspection and government should take necessary steps to recover this post from government school teachers grip and provide posting education cadre officer in this post to establish chain and command in secondary education sector at field level.

Moreover, the government may provide sufficient professional staff, prosecutorial power and financial backing for District Education Office and Upazila Education Office to get the job done effectively to ensure quality secondary education in Bangladesh.

Acknowledgement

We sincerely thank the National Academy for Educational Management (NAEM) for funding this research. We also extend our gratitude to all the participants for their voluntary involvement, which was essential to the completion of this study.

References

Akanda, M. A. S. (2019). *Research Methodology: A Complete Direction for Learners*. Dhaka, Bangladesh: Academic Publishers. 226-230.

Alam, M., and Haq, M. N. (2001). *A Question of Quality: State of Primary Education in Bangladesh-III*. Dhaka, Bangladesh: University Press Limited. 22-23.

Anton, D. G. (2005). Improving Quality through School Based Management: Learning from International Experiences. *International Review of education*, *51(4),* 269-287. DOI:10.1007/s11159-005-7733-1

Archibong, I. F. (2012). Instructional Supervision in the Administration of Secondary Education: a panacca for quality assurance. *European Scientific Journal*, *8(13),* 61-70. https://core.ac.uk/download/pdf/328023413.pdf

Cudjoe, B., & Sarfo, F. K. (2016). Supervisors' Knowledge and Use of Clinical Supervision to Promote Teacher Performance in Basic Schools. *International Journal of Education and Research*, *4(1),* 87-100. https://www.ijern.com/journal/2016/January-2016/08.pdf

DSHE. (2019, September, 25). *To enforce supervision activities for ensuring quality education at secondary level in Bangladesh.* Directorate of Secondary and Higher Education. https://dshe.portal.gov.bd/site/page/b248fb28-7b6d-48b2-8695-fcc837e12125/nolink/%E0%A6%AA%E0%A6%BF%E0%A6%AA%E0%A6%BF%E0%A6%AA%E0%A6%BF-%E0%A6%B8%E0%A7%87%E0%A6%B2

Ghavifeker, S., and Ibrahim, M. S. (2014). Head of Departments' Instructional Supervisory Role and Teachers' Job Performance: Teachers' Perceptions. *Asian journal of Social sciences and Management studies*, *1(2)*, 45-55. https://www.asianonlinejournals.com/index.php/AJSSMS/article/view/434

Idogho, D. P., and Agholor, J. (2013). Monitoring and Supervision of Schools, As Quality Assuarance Strategy for Effective Teaching and Learning: Issues/Challenges. *Journal of Resourcefulness and Distinction, 6(1),* 1-8. https://www.globalacademicgroup.com%20of%20School%20As%20Quality%20Assurance.pdf

Kotirde, I. U., and Yunos, J. B. M. (2014). The supervisor's role for improving the quality of teaching and learning in Nigeria secondary school educational system. *International Journal of Education and Research*, 2(8), 53-60. https://www.ijern.com/journal/2014/August-2014/07.pdf

MOE. (2008, August, 19). *Role and Responsibilities of Deputy Director, District Education Officer and Upazila Secondary Education Officer.* Ministry of Education. https://documents1.worldbank.org/curated/en/475391468205169076/pdf/ICR9250BD0P044101Official0Use0Only1.pdf

Mohanty, J. (2008). *Educational administration supervision and school management*. NewDelhi,Deep&DeepPublications.https://scholar.google.com/scholar?q=Mohanty,+J.+(2008).+Educational+administration+supervision+and+school+management.+New+Delhi,+Deep+%26+Deep+Publica

NEP. (2010). *National Education Policy-2010*. Dhaka, Bangladesh: Ministry of Education. http://reliefweb.int/sites/reliefweb.int/files/resources/02

Nuruddin, M. (2008*). Social Change through Logical Erudition*. Dhaka, Bangladesh: Panjeree Publications Ltd. pp. 1.

Okendu, J. N. (2012). The influence of instructional process and supervision on academic performance of secondary schools of River State in Nigeria. *Academic Research International Journal, 3(1),* 147-151.

http://www.savap.org.pk/journals/ARInt./Vol.3(1)/2012(3.1-39).pdf

Paschal, M. J., and Mkulu, D. G. (2020). Teacher-students' Relationship and Students "Academic Performance in Public Secondary Schools in Magu District, Tanzania. *Journal of Research in Education and Society*, *11(1),* 20-33. https://www.google.com/search?q=Paschal%2C+M.+J.%2C+and+Mkulu%2C+D.+G.+(2020.

Tapan, S., and Govinda, R. (1999). *Quality education through school-based supervision and support.* Paris, France: International Institute for Educational Planning.

UNESCO. (2000). Counseling regional training seminar on guidance and counseling mode: Zambia Rebmany. UNESCOR Educational Trust Fund on Education. *The UNESCO Magazine on Education*, 1(1), II.56-57. https://www.google.com/search?q=UNESCO.+%282000%29.

UNESCO. (2000). *Dakar Framework for Action, Education for All: Meeting our Collective Commitments.* France: World Education Forum.

Veloo, A., Komati, A. M., and Khalid, R. (2013). The effects of clinical supervision on the teaching performance of secondary school teachers. *Procedia-social and Behavioral Sciences*, *93(2013),* 35-39. https://www.researchgate.net/publication/275542607

Wright, B. K., Shields, M. S., Black, K., & Waxman, C. H. (2018). The Effects of Teachers Home Visits on Student Behavior, Student Academic Achievement, and Parent Involvement. *School Community Journal*, *28(1),* 1-24. http://www.schoolcommunitynetwork.org/SCJ.aspx

NAEM JOURNAL
ISSN 1997-4248, eISSN 2959-4561
Volume 17 Issue 02
Serial 34
https://Doi.org/10.59629/NAEM 20213202.1601

Understandings and Perceptions of Bangladeshi Teachers towards Information Literacy

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Abstract

This study investigates the information literacy (IL) knowledge and competencies of Bangladeshi secondary school teachers, as well as their views on incorporating IL into the curriculum. A quantitative approach was employed, using a semi-structured questionnaire distributed to 390 teachers across Bangladesh. Findings indicate that teachers generally have a limited understanding of IL and insufficient IL competencies, often overestimating their abilities. Additionally, many teachers did not receive IL training during their professional education, and the majority do not teach IL skills or collaborate with school librarians. The study concludes that the integration of IL in Bangladeshi secondary schools is hindered by inadequate teacher training, poorly structured curricula, limited resources, and linguistic barriers. However, these challenges can be addressed through collaborative efforts to enhance IL training and curriculum integration. Such interventions will equip teachers with the necessary skills to effectively teach IL, ensuring that students have access to comprehensive IL programs across all academic disciplines.

Introduction

In today's globalized world, technological advancements have drastically enhanced access to knowledge. With the world increasingly functioning as a global community, large segments of the population now have the ability to access information through both online and offline platforms. Over the past few decades, the use of online resources has grown exponentially, resulting in an unprecedented amount of information becoming widely available. However, this increased access brings challenges, particularly the risk of information overload. To manage this abundance of information effectively, individuals must develop strong information literacy (IL) skills, which are essential for evaluating, selecting, and using information efficiently.These

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challenges are particularly relevant in developing countries like Bangladesh, where the rapid expansion of internet access and digital tools has outpaced the development of comprehensive digital literacy programs in education.

Information literacy (IL) plays a crucial role in fostering problem-solving, critical thinking, and responsible citizenship. It enables individuals to become proficient learners, effective contributors to society, and confident, informed citizens. At its core, IL requires educational support, knowledge acquisition, and a sense of societal responsibility, all of which empower individuals to access, evaluate, and use information effectively (American Library Association, 1989). Without these essential components, a lack of IL skills can hinder a person's ability to navigate and apply information in their daily lives. To address this gap, education must focus on developing students' analytical, evaluative, and synthesis skills.

Strong information literacy skills are vital not only for academic success but also for navigating professional and personal challenges. IL is recognized as a critical competency in education, the workplace, and broader society (Secker, 2014). It empowers individuals to communicate effectively, make informed decisions, and adapt to the evolving information landscape. Globally, IL is increasingly seen as essential for participation in the knowledge economy and as a foundation for lifelong learning (Corrall, 2008). Scholars have also highlighted the role of IL in promoting political engagement and social justice, as it enables individuals to access, evaluate, and use information to advocate for their rights and participate in democratic processes (Smith, 2013).

Developing strong information literacy skills requires not only acquiring knowledge but also understanding one's societal responsibilities. Many modern educational programs now emphasize IL alongside critical thinking, research skills, problem-solving, and collaboration. These competencies are often integrated into the curriculum through hands-on, inquiry-based learning and collaborative projects that encourage students to apply what they learn in real-world scenarios (King, 2011). Such approaches help learners develop the skills to navigate today's complex information landscape.

One innovative approach to fostering information literacy and digital skills is tele-mentoring, where students are guided by experts, such as educators, librarians, and IT specialists, through online platforms. This instructional method is especially effective in courses that incorporate inquiry-based learning and digital media literacy (Yukawa, 2011). As the need for digital competence grows, it has become a critical skill for educators and students alike. Information literacy, with its emphasis on practical application, is now an integral part of 21st-century education, helping prepare students for the challenges of a rapidly evolving digital world (Oman, 2001).

Statement of the Problem

Teachers' perceptions of information literacy (IL) are critical, as these views directly influence their approach to teaching IL skills. While some studies have explored teachers' perspectives, the findings suggest that although teachers acknowledge the importance of IL and believe these skills should be taught to students, many do not integrate IL into their teaching

practices (Stockham & Collins, 2017). This indicates that there may be additional barriers or gaps in teacher training that prevent IL instruction. Therefore, this study investigates teachers' knowledge and understanding of IL and the factors that influence their ability to teach these skills.

Rationale of the Study

In today's knowledge-driven society, the ability to store, create, retrieve, and effectively use information is crucial. As the volume and complexity of available data increase, information literacy skills become essential for navigating the vast amounts of information people encounter daily. These skills are especially important for teachers, who must guide their students through an ever-evolving information landscape. In this context, the study seeks to understand how Bangladeshi teachers perceive IL and how prepared they are to equip students with these critical competencies.

There is growing concern about the lack of adequate information literacy (IL) skills among teachers, which directly impacts their ability to effectively teach IL to students. This gap in teachers' IL knowledge and instructional capabilities is a critical issue that has not been fully addressed in previous research. To fill this gap, the primary objective of this study is to explore how different factors—regulative (policy-driven), normative (professional standards), and cultural-cognitive (teachers' internal beliefs and understanding)—influence the information-seeking behaviors and IL competencies of Bangladeshi secondary school teachers.

Theoretical framework of the study

This study is informed by social constructivist theory, which posits that learning occurs through social interaction and collaboration, with individuals actively constructing knowledge through experience and reflection (Vygotsky, 1980). From this perspective, teachers' internalization of information literacy (IL) skills is shaped not only by direct instruction but also by their professional and social environments, including collaboration with peers, school leaders, and participation in professional development activities. Social constructivist theory emphasizes that teachers do not passively receive information but actively engage in meaning-making processes through their interactions within educational settings.

In the context of Bangladeshi secondary school teachers, this theory helps explain how teachers may internalize IL skills by participating in collaborative learning environments, where they share strategies, knowledge, and approaches to IL instruction. Teachers' existing beliefs about knowledge, learning, and technology, shaped by cultural and cognitive factors, also play a significant role in how they perceive and integrate IL into their teaching. For instance, teachers who view IL as a crucial skill for preparing students for the information-rich, digital world are more likely to prioritize its inclusion in their classrooms.

Additionally, social constructivism highlights the role of external influences, such as educational policies and professional development opportunities, in shaping teachers' understanding of IL. In environments where structured IL training or guidance is limited, such as in the Bangladeshi education system, teachers may struggle to fully develop or apply these

competencies. Therefore, by employing a social constructivist lens, this study seeks to explore not only the level of IL knowledge among teachers but also the external and internal factors that influence how they come to understand and teach these skills.

This theoretical approach provides a nuanced framework for interpreting the findings, as it recognizes the complex interactions between teachers' individual experiences, their professional communities, and the broader institutional and cultural contexts in which they operate.

Methodology of the Study

The study was conducted utilizing a quantitative research methodology. Thus, the information was collected through the administration of semi-structured questionnaires.

Sample and Sampling Techniques

The study's population was comprised of all current secondary school teachers in Bangladesh. Due to the enormous number of secondary school teachers in Bangladesh, a formal calculation of power was performed to estimate the sample size for the teacher surveys. The total number of instructors was entered into the Raosoft online sample size calculator. The margin of error was set at five percent, and the degree of confidence was set at 95%, which are the most usual requirements. This calculator suggested a minimum sample size of 370 surveys from teachers. After factoring in the 5% non-respondent error, the final respondent count was 388. After scrutinizing all of the questionnaires filled in by the respondents and removing the ones found to be incomplete, the remaining 390 questionnaires were considered for the final analysis. The sample was then selected using simple random sampling techniques.

Tools of Data Collection

The researchers used online and offline versions of the semi-structured questionnaire and sent it to each secondary school teacher from the sample. With the help of the schools' management, the questionnaire was distributed to all teaching staff. The questionnaire aimed to determine how well the participants understood IL, whether it was covered in their training courses, and whether they instructed IL in the classroom. The questionnaire utilized in this study was derived from the earlier research conducted by McKeever (2016).

Methods of Data Analysis and Presentation

Quantitative data were analyzed using Statistical Package for the Social Science (SPSS) V.26 to count the frequency of the responses.

Ethical Consideration

All participants and school principals gave consent. Before data collection, field researchers asked potential respondents to sign a consent form that outlined privacy, anonymity, and confidentiality provisions. The study's goal and confidentiality were informed to all participants. Participants were also informed that they could withdraw from the study at any time.

Limitation of the Study

This study focuses on the perceptions of secondary school teachers in Bangladesh regarding information literacy. However, it is important to acknowledge certain limitations. The findings rely on self-reported data, which may introduce bias or inaccuracies in responses. Additionally, the study is limited to secondary school educators, which may restrict the generalizability of the results to teachers at other educational levels, such as primary or tertiary education.

Findings

a. *Demographic characteristics of the respondents*

A total of 410 of the approximately 1,000 teachers who received the questionnaire completed it and returned it. There were 390 total responses because 20 of these respondents did not finish the survey. The response rate, therefore, was 39.0%.

Table 1: Cross-tabulation of the respondents' prior knowledge of IL and sources

Sources	Gender				Total (Yes)
	Male		Female		
	Prior knowledge of IL				
	Yes	No	Yes	No	
Diploma in Primary Education (DPEd)	0	0.75%	0	0.38%	0
Bachelor of Education (one year)	16.60%	20.00%	12.83%	17.36%	29.43%
Master of Education (MEd)	3.02%	8.30%	3.40%	7.17%	6.42%
Have no professional degree	2.26%	4.53%	1.89%	1.51%	4.15%
Total	21.88%	33.58%	18.12%	26.42%	40.00%

Men comprised 57.8% of the respondents, while women comprised 42.2%. The respondents' mean age was 39.62 (SD = 8.95) years, with a mean of 13.14 (SD = 9.08) years of teaching experience. Assistant teachers comprised 88.11% of the respondents, followed by headmasters (6.7%) and assistant headmasters (5.18%). Regarding their organizations, 45.32% worked in secondary schools that were partially government-run, 28.10% in non-government institutions, and 26.59% in government institutions. 42.01% of respondents said their schools were in urban areas, 36.98% were in rural areas, and 21.01% were in semi-urban areas. Their classrooms typically had 65.97 students (SD = 30.28). In terms of educational background, 74.19% of respondents hold postgraduate degrees, 24.63% hold graduation degrees, 0.59% hold higher secondary school certificates, and the remaining 0.59 % hold Master of Philosophy degrees. A total of 32.61% of respondents earned their most recent degree in the arts and humanities, compared to 28.26% from the sciences, mathematics, and technology, 18.94% from social science, 10.25% from business, 9.00% from education, and the remaining (0.93%) from other fields. When asked about their professional degrees, 67% of respondents reported that they had a Bachelor of Education (BEd), 21.6% reported that they had a Master of Education, 1.1% reported that they had a Diploma in Primary Education, and 10.3% reported that they had none at all Regarding the number of trainings on teaching-

learning that respondents had received, 41.8% had received 1–5 training, 13.8% had received 6–10 training, 2.0% had received 11–15 training, 1.4% had received 16–20 training, 0.6% had received more than 20 training, and 40.4% had received no such training.

b. *Understanding and proficiency with information literacy*

The initial query in this survey segment pertained to whether the participants possessed a comprehensive apprehension of the notion before perusing the accompanying information sheet that was furnished alongside the questionnaire. In response to the inquiry, 40.00% of participants provided an affirmative answer.

The study found that 21.88% of male participants and 18.12% of female participants had prior knowledge of Information Literacy prior to their involvement in the study. The informants who reported prior knowledge of IL were queried regarding how they obtained said knowledge during their participation in this study. According to the survey results, 29.4% of participants reported that they acquired knowledge on this topic during their Bachelor of Education degree. By contrast, a proportion of 6.12% reported obtaining knowledge about the subject during their Master's degree studies, while 4.15% indicated that they did not engage in any formal degree program but acquired information literacy skills independently.

The third inquiry within this segment pertained to how the informants discerned the competencies associated with information literacy as outlined in the provided passage with the questionnaire. Subsequently, the teachers were queried about which terminology they would employ when alluding to this particular repertoire of competencies. Participants were given the option to choose multiple statements that were applicable. The majority of the participants, 63.08%, precisely reported that they recognized the abilities as information literacy skills. According to the data, 44.00% of respondents identified the skills as communication skills, while 30.46% considered them to be research skills, and 30.15% categorized them as study skills. As per the informants' responses, a mere 12.92% identified the skills as library skills, while a minor 2.15% of the participants did not provide any terminology for these skills.

Table 2: Cross-tabulation of teachers' perceptions to identify the information literacy skills

Defined the set of skills	**Gender**		**Total**
	Male	Female	
Information literacy skills	38.15%	24.92%	63.08%%
Study skills	16.62%	13.54%	30.15%
Library skills	8.62%	4.31%	12.92%
Communication skills	29.54%	14.46%	44.00%
Research skills	20.00%	10.46%	30.46%
Don't have a name for this set of skills	0.62%	1.54%	2.15%

Among the surveyed individuals, 16.28% reported receiving formal instruction on information literacy as a component of their professional degree. Of this group, 9.30% were male. Conversely, 17.28% reported having undergone instruction in information literacy during their enrollment in a professional degree program that shares similarities with their current program but bears a distinct terminology.

Table 3: Cross-tabulation of IL training received as a part of professional training

Responses	Gender		Total
	Male	Female	
Training Received as a part of Professional Training			
Yes	9.30%	6.98%	16.28%
No	49.13%	34.59%	83.72%
Training Received under a different name			
No	46.51%	36.21%	82.72%
Yes	11.63%	5.65%	17.28%

c. *Information literacy training in the workplace*

Regarding IL skills training in the workplace, a significant majority (87.80%) of respondents reported not having received any IL training at their place of employment. According to the survey results, a subset of participants (13.31%) said having undergone instruction in these competencies under an alternative terminology.

Table 4: Cross-tabulation of IL training received at workplace

Responses	Gender		Total
	Male	Female	
IL Training Received as In-service Training			
Yes	7.14%	5.06%	12.20%
No	51.19%	36.61%	87.80%
Training Received under a different name in In-service			
Yes	49.35%	37.34%	86.69%
No	7.47%	5.84%	13.31%

d. *Recognition and comprehension of information literacy.*

The respondents were questioned about how familiar they believed secondary school teachers were with the idea of IL. Around 64.90% of the respondents provided a negative response to this particular inquiry.

Table 5: Perception regarding secondary school teachers IL

Response	Gender		Total
	Male	Female	
Yes	18.58%	16.52%	35.10%
No	39.82%	25.07%	64.90%

The following table illustrates the various justifications to substantiate affirmative and negative responses to this inquiry.

Table 6: Justifications of the secondary school teachers' IL skills inquiry

Causes	Teachers have IL knowledge	
	Yes	No
Due to their professional demand	5.56%	
Everyone is conscious	3.42%	0.43%

Causes	Teachers have IL knowledge	
	Yes	No
Information literacy is a new topic	0.43%	2.56%
Information literacy is essential for collecting information, evaluation, and information identification.	0.43%	
It is an essential skill in the modern era	6.84%	0.43%
Lack of access to technology	0.85%	0.85%
Lack of awareness		8.55%
Lack of promotional activities on information literacy		1.71%
Lack of proper training & coordination		44.44%
Most of the teachers create digital materials and complete the task of uploading and downloading the materials. The second reason is that teachers must perform many tasks online. Most of the teachers participate in various online platforms operated by government and non-governmental organizations, which is the third reason.	0.43%	
Included in the New Curriculum of 2021	0.85%	
Not included in the curriculum		1.71%
Teachers are burdened with excessive workload		0.85%
Teachers are not interested in Information Literacy		1.28%
Teachers have ICT training	8.14%	
Teachers only focus on what's in the books to help students pass the test.		0.43%
Technological advancement and easy to access them	9.83%	

e. *The inclusion of information literacy in the secondary school curriculum of bangladesh*

The perspectives of teachers regarding IL and the curriculum of secondary schools in Bangladesh were solicited. Initially, the participants were queried regarding their perception of whether the IL competencies, as stipulated in the information sheet, were encompassed within the curriculum of secondary schools in Bangladesh. Approximately 37.50% of the respondents indicated that they believed the curriculum encompassed IL skills, albeit under a different name. A notable proportion of the participants, precisely 24.39%, expressed uncertainty regarding the inclusion of the skills in the curriculum. Meanwhile, 10.06% of the respondents believed these skills were not incorporated into the curriculum. On the other hand, a significant percentage of the participants, precisely 28.05%, thought that these skills were indeed included in the curriculum and were referred to as IL skills.

Table 7: IL integration into the secondary curriculum

Existence in curriculum	Gender		Total
	Male	Female	
Included and called information literacy skills	17.99%	10.06%	28.05%
Yes, but they are not called information literacy skills	21.04%	16.46%	37.50%
Not included	5.18%	4.88%	10.06%
Not sure	14.33%	10.06%	24.39%

The next question was whether the teachers believed that their main subject addressed IL. 47.55% of respondents believed that these skills were covered in their primary subjects but weren't referred to as IL skills. 14.42% of respondents claimed that their primary subject did not cover these skills. 16.56% believed these skills were covered in their primary subjects and were referred to as IL, while 21.47% were unsure.

Table 8: Information literacy in the core subjects taught by respondents

Existence in core courses	Gender		Total
	Male	Female	
Included and called information literacy	11.04%	5.52%	16.56%
Yes, but they are not called information literacy	26.38%	21.17%	47.55%
Not addressed in the main subject	9.82%	4.60%	14.42%
Not sure	11.35%	10.12%	21.47%

When asked if they believed that IL featured more prominently in the Bangladeshi Secondary School Curriculum at various stages, 21.07% of respondents said they believed it to be the same at all levels of education, while 33.96% of respondents believed it to be more prominent at the secondary level and 34.91% believed it to be more prominent in higher education, and 10.06% believed it to be more prominent at the primary level.

Table 9: Differences in information literacy emphasis across educational levels

Incorporation in Different Levels of Education	Gender		Total
	Male	Female	
It is more prominent at the primary level	6.60%	3.46%	10.06%
It is more prominent at the secondary level	21.38%	12.58%	33.96%
It is more prominent in higher education	21.07%	13.84%	34.91%
No, it is the same at different stages	10.06%	11.01%	21.07%

Discussion

The subsequent four research inquiries have directed the present study:

a. How much do secondary school instructors in Bangladesh understand IL?

b. What do teachers think about the inclusion of IL in the curriculum?

a. *How much do secondary school instructors in Bangladesh understand IL?*

In the contemporary digital era, effectively navigating and utilizing information has become increasingly vital, making IL competencies indispensable. It is widely acknowledged that developing information literacy skills is necessary to effectively participate in modern society and succeed in school, work, and life (Corrall, 2008). The proliferation of online information necessitates cultivating robust information literacy competencies among individuals in every corner of the world. This is imperative to enable them to effectively navigate the digital terrain, acquire the ability to think critically, and become lifelong learners. It has been determined that students are not receiving instruction or developing these skills while they are enrolled in secondary education; hence, students continue to enter higher education and the working world with skills that are not fully developed (McKeever, 2013). Williams & Wavell

(2006) have found that teachers don't know much about IL. However, possessing IL skills is imperative for teachers to provide academic assistance to their students. According to social constructivist learning theory, if teachers don't know about IL, they can't help their students succeed academically by catering to their individual needs (Gecer, 2012). The present study has revealed that a considerable number of teachers exhibited a deficiency in comprehending information literacy competencies and had not undergone structured instruction in this domain. The present chapter will explicate the outcomes of the investigation, scrutinize the causes behind the insufficient level of knowledge and instruction, and propose measures to enhance the circumstances.

This study found that many teachers did not know what IL was before participating. Initial teacher education programs rarely taught IL. Most participants scored poorly despite rating their IL skills as average. Most respondents thought IL was taught, but few explicitly taught IL skills. Teacher-librarian collaboration was rare. IL's absence from instructional practices was due to time constraints, assumptions about librarians' IL instruction, and a lack of IL skill assessment.

The research revealed that a mere 21.88% of male and 18.12% of female participants had prior knowledge of IL skills before their involvement in the study. The deficiency in knowledge regarding IL may be ascribed to the absence of explicit instruction on IL competencies in the majority of teacher training curricula. The research reveals that a mere 29.4% of participants acquired knowledge pertaining to these competencies in their Bachelor of Education program, whereas a mere 6.12% of respondents gained familiarity with them during their Master of Arts studies. These findings are substantiated by research that emphasizes the insufficiency of IL instruction in teacher training curricula (Lee et al., 2012).

Furthermore, the research revealed that a noteworthy segment of teachers had categorized information literacy competencies as distinct skill sets. As an illustration, 44.00% of respondents regarded the aforementioned abilities as communication skills, while 30.46% identified them as research skills and 30.15% classified them as study skills. The lack of understanding regarding the various aspects of information literacy skills can be attributed to the absence of structured education in these competencies during their academic endeavors. According to Majid et al. (2016), teachers may lack a complete understanding of the significance of IL skills and may also face challenges in imparting these skills to their students. However, according to Williams et al.'s (2014), it has been observed that the lexicon pertaining to information literacy lacks familiarity in various domains, leading to the utilization of alternative terminology to denote the same concept.

Additionally, the research revealed that a limited proportion of teachers had undergone structured instruction in information literacy competencies. Merely 16.28% of the participants reported having obtained formal instruction as a component of their professional degree, whereas 17.28% received instruction in a professional degree program under a distinct appellation. By contrast, a significant proportion of teachers (87.80%) reported not having undergone any form of IL training in their workplace. The present study's results align with prior research that has identified a dearth of structured educational programs for teachers to enhance their information literacy competencies (Duke & Ward, 2009; Kovalik et al., 2011).

The absence of formal instruction may be explained by insufficient knowledge of information literacy competencies as a crucial element of pedagogy. The perceived lack of relevance of IL skills to specific subject areas among teachers may hinder their participation in training programs. Additionally, school leaders' prioritization of IL skills training may be inadequate, restricting teachers' access to such opportunities (Merga et al., 2021).

b. *What do teachers think about the inclusion of IL in the curriculum?*

The integration of IL into the curriculum is imperative for students' academic achievements and future employability in the current digital era (Derakhshan & Singh, 2011). This skill is deemed crucial in navigating the vast amount of information available. The third objective of this research was to examine the perspectives of secondary school teachers in Bangladesh regarding the incorporation of IL into the educational program, as well as its assimilation into various levels of education and primary subjects.

The results of the study indicate that a proportion of 37.50% of the participants acknowledged the presence of IL skills in the curriculum, albeit not being explicitly denoted as such. Meanwhile, 24.39% of the respondents expressed uncertainty regarding the inclusion of these skills. The absence of a clear understanding among teachers regarding the incorporation of IL in the curriculum is a cause for concern. According to Williams & Wavell (2006), the majority of the teachers who participated in their study held the belief that IL was integrated at various points throughout the curriculum. This underscores the necessity for additional professional development opportunities for teachers to enhance their IL competencies and effectively integrate them into the curriculum.

Approximately 50% of the participants expressed that the aforementioned competencies were being instructed, albeit not explicitly labeled as IL skills. Conversely, 14.42% of the respondents reported that these proficiencies were not covered in their primary area of study. The aforementioned discovery underscores the necessity for greater uniformity in the pedagogical approach to information literacy competencies across diverse academic disciplines. According to the findings of the research, a notable proportion of the participants, precisely 16.56%, demonstrated a proactive approach towards integrating IL skills into their pedagogical practices. This observation suggests that these individuals possess a favorable comprehension of the significance of IL skills in achieving academic excellence and enhancing career opportunities.

The results of the study indicated that 33% of the participants believed that IL skills were more prevalent in higher education, whereas another 33% believed that it was more prevalent at the secondary level. The aforementioned discovery implies that there could be a necessity to enhance the emphasis on IL competencies during the primary education phase. Moreover, a notable proportion of the participants, specifically 21.07%, expressed the view that information literacy competencies hold the same level of significance across all educational tiers. This underscores the necessity for greater uniformity in the pedagogical approach to imparting information literacy skills across diverse Key Stages.

It is evident that there is a necessity for increased professional development opportunities for teachers regarding IL skills and their incorporation into the academic curriculum (Rader, 2002). The results indicate that although certain teachers in Bangladesh possess a commendable comprehension of IL and its significance in the academic program, there exists a requirement for greater uniformity in the pedagogical approach to IL competencies across diverse disciplines and educational levels. The research findings indicate a noteworthy absence of lucidity among teachers with regard to the integration of IL competencies into the academic syllabus, a development that is disconcerting. In order to equip students with the essential competencies required to thrive in the contemporary digital era, it is imperative to prioritize the integration of IL skills into the curriculum and furnish teachers with sufficient training on the most effective methods of imparting these skills.

Contribution of the Research

This study's findings can be used to improve teachers' information-seeking behaviors and motivate them to research uninteresting topics. By minimizing theories, texts, and concepts, this study aimed to facilitate future scholarly inquiry and provide a deeper analysis of the research issue. The suggestions could form the basis for further research and practical measures to improve high school students' information literacy.

Recommendations for Fostering Information Literacy Skills

Fostering information literacy (IL) among Bangladeshi secondary school teachers and students presents several challenges, but there are clear strategies that can be implemented to improve IL skills across the education system. First, integrating IL into the national curriculum at all educational levels is essential. By embedding IL skills such as critical thinking, information evaluation, and ethical information use from an early age, students can develop the competencies necessary for navigating today's complex information landscape.

Second, teachers and librarians must receive ongoing professional development focused on IL. Regular, targeted training sessions should cover research methods, critical evaluation of sources, and the ethical use of information. Workshops and seminars, both online and in-person, should be accessible to educators across the country to ensure that IL training is consistent and widespread. Institutions should also encourage collaboration between teachers and librarians, fostering a supportive environment for the exchange of strategies and resources.

Finally, educational institutions should adapt to the evolving information environment by offering structured IL courses and modules tailored to the needs of both teachers and students. These courses should be flexible and updated regularly to address the latest advancements in technology and information literacy practices. By aligning IL with national education policies and providing teachers with the tools they need, schools can ensure that IL becomes an integral part of both teaching and learning.

Conclusion

Information literacy in Bangladeshi secondary schools presents both challenges and opportunities. Promoting information literacy in secondary school students is difficult due

to limited information resources, instructional strategies, assessment constraints, and teacher professional development. However, information literacy in the curriculum, digital libraries and online resources, teacher professional development, critical thinking and evaluation skills, and collaborative learning are being used to address these issues. Continuously advocate for information literacy in the curriculum, offer teachers ongoing professional development, and improve access to quality information resources to improve information literacy in Bangladeshi secondary schools. Critical thinking, evaluation, and collaboration skills can also help students become critical information consumers and creators in the digital age. Secondary schools in Bangladesh can better prepare students to thrive in the information-rich world and become information literate by addressing these challenges and leveraging opportunities.

Acknowledgment

The authors would like to express our sincere gratitude to the National Academy for Educational Management (NAEM) for their generous financial support through the research grant for the 2022-2023 period (Memo NO 37.04.0000.500.35.001.22.387). This study would not have been possible without their funding and continued encouragement. The authors also appreciate the NAEM Institutional Review Board for their thorough review of the research proposal and final report, ensuring that all ethical standards were met. Special thanks go to the secondary school teachers of Bangladesh who participated in this study, as well as the school administrators and education officers who facilitated data collection. Their cooperation and insights were invaluable in bringing this project to fruition.

References

American Library Association. (1989). *Presidential committee on information literacy: Final report* (d6c68ac5-a84a-4035-93ba-e887da74cb6b). https://www.ala.org/acrl/publications/whitepapers/presidential

Corrall, S. (2008). Information literacy strategy development in higher education: An exploratory study. *International Journal of Information Management*, *28*(1), 26–37. https://doi.org/10.1016/j.ijinfomgt.2007.07.002

Derakhshan, M., & Singh, D. (2011). Integration of information literacy into the curriculum: A meta-synthesis. *Library Review*, *60*(3), 218–229. https://doi.org/10.1108/00242531111117272

Duke, T. S., & Ward, J. D. (2009). Preparing information literate teachers: A metasynthesis. *Library & Information Science Research*, *31*(4), 247–256. https://doi.org/10.1016/j.lisr.2009.04.003

Gecer, A. (2012). An Examination of Studying Approaches and Information Literacy Self-Efficacy Perceptions of Prospective Teachers. *EGITIM ARASTIRMALARI-EURASIAN JOURNAL OF EDUCATIONAL RESEARCH*, *12*(49). https://avesis.kocaeli.edu.tr/yayin/d130ce0e-0e7a-49a1-b7fd-ea5e70f36a1a/an-examination-of-studying-approaches-and-information-literacy-self-efficacy-perceptions-of-prospective-teachers

King, K. P. (2011). *Instructional Design: Concepts, Methodologies, Tools and Applications* (I. R. Management Association, Ed.). IGI Global. https://doi.org/10.4018/978-1-60960-503-2

Kovalik, C., Jensen, M., Schloman, B., Tipton, M., & Kent State University. (2011). Information Literacy, Collaboration, and Teacher Education. *Comminfolit*, *4*(2), 145. https://doi.org/10.15760/comminfolit.2011.4.2.94

Lee, E. A., Reed, B., & Laverty, C. (2012). Preservice Teachers' Knowledge of Information Literacy and Their Perceptions of the School Library Program. *Behavioral & Social Sciences Librarian*, *31*(1), 3–22. https://doi.org/10.1080/01639269.2012.657513

Majid, S., Chang, Y.-K., & Foo, S. (2016). Auditing information literacy skills of secondary school students in Singapore. *Journal of Information Literacy*, *10*(1), 44. https://doi.org/10.11645/10.1.2068

McKeever, C. M. (2013). Information literacy skills in Year 14 school leaving pupils—Are they ready for third level study? *Journal of Information Literacy*, *7*(1), 99–106. https://doi.org/10.11645/7.1.1784

McKeever, C. M. (2016). *Teacher understandings and perceptions of information literacy* [PhD]. Ulster University.

Merga, M. K., Roni, S. M., & Malpique, A. (2021). School leadership and whole-school support of struggling literacy learners in secondary schools. *Educational Management Administration & Leadership*, *49*(3), 534–550. https://doi.org/10.1177/1741143220905036

Oman, J. N. (2001). Information Literacy in the Workplace. *Information Outlook*, *5*(6), 32–43.

Rader, H. B. (2002). Information literacy 1973—2002: A selected literature review. *Library Trends*, *51*(2), 242–259.

Secker, J. (2014). Broadening the scope of information literacy in 2015: Beyond libraries. *Journal of Information Literacy*, *8*(2), 1–2. https://doi.org/10.11645/8.2.1960

Smith, J. K. (2013). Secondary teachers and information literacy (IL): Teacher understanding and perceptions of IL in the classroom. *Library & Information Science Research*, *35*(3), 216–222. https://doi.org/10.1016/j.lisr.2013.03.003

Stockham, M., & Collins, H. (2017). Information Literacy Skills for Preservice Teachers: Do They Transfer to K-12 Classrooms? *Education Libraries*, *35*(1–2), 59. https://doi.org/10.26443/el.v35i1-2.316

Vygotsky, L. S. (1980). *Mind in society: Development of higher psychological processes* (M. Cole, V. Jolm-Steiner, S. Scribner, & E. Souberman, Eds.). Harvard University Press. https://doi.org/10.2307/j.ctvjf9vz4

Williams, D. A., & Wavell, C. (2006). *Information literacy in the classroom: Secondary school teachers' conceptions.* https://rgu-repository.worktribe.com/output/247593/information-literacy-in-the-classroom-secondary-school-teachers-conceptions

Williams, D., Cooper, K., & Wavell, C. (2014). *Information Literacy in the Workplace. An annotated bibliography.* (p. 38). Robert Gordon University Institute for Management, Governance & Society (IMaGeS) in association with InformAll. http://www.researchinfonet.org/wpcontent/uploads/2014/01/Workplace-IL-annotated-bibliography.pdf

Yukawa, J. (2011). *Instructional Design: Concepts, Methodologies, Tools and Applications* (I. R. Management Association, Ed.). IGI Global. https://doi.org/10.4018/978-1-60960-503-2

NAEM JOURNAL
ISSN 1997-4248, eISSN 2959-4561
Volume 17 Issue 02
Serial 34
https://Doi.org/10.59629/NAEM 20213202.1601

Assessing Feasibility of Using Radio and Television Media as a Means of Implementing Blended Education in Bangladesh

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Abstract

The study investigated blended education in Bangladesh, which combines different learning methods and media for flexible learning experiences. Collaborative efforts from the government and development partners led to the creation of remote learning content for TV, radio, and the internet. The research aimed to assess the effectiveness, inclusivity, and challenges of blended education using radio and television media. The study used a mixed-method research design and collected data through surveys, assessments, observations, interviews with parents, teachers, and experts, and content analysis. The findings revealed that while radio lessons had low student participation, the majority had access to televisions, but regular engagement was limited to only 43% among the students who watch the lessons on television due to various reasons. However, televised lessons were considered helpful by students and educators, aiding in better understanding and self-study, leading to slightly improved performance in language and math for participants. Despite these benefits, the study identified shortcomings in the televised lessons, including inadequate practice opportunities at home, limited support for students with disabilities, diverse learners, or ethnic minorities, and insufficient feedback and integration with physical classrooms. To address these issues, the study recommended reassessing the effectiveness of radio programs, ensuring access to televisions and choosing accessible channels, and meeting the specific needs of marginalized students. It also stressed the importance of proper planning, coordination, and stakeholder involvement to overcome challenges and effectively implement blended education in Bangladesh.

Key words: Blended education, education through media, effectiveness, inclusiveness, access and participation, assessment and feedback

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Introduction

Blended education encompasses a wide range of technology-based educational methods, including high-tech, low-tech, and no-tech approaches, in both physical and online environments, allowing for synchronous and asynchronous interaction between teachers and students (Aspire to Innovate [a2i] Programme, 2022; UNICEF, 2020; EdTechHub & UNICEF, 2021). The goal is to provide flexible and meaningful learning experiences to achieve better learning outcomes compare to only physical or remote learning modality. Considering the flexibility of education, emergency context and 4th industrial revolution, in September 2021 the Government of Bangladesh has formed a National Blended Education Taskforce to formulate a Master Plan by incorporating all the ministries and agencies involved in providing preschool to post-graduate education (Akteruzaman, 21 March 2022). The taskforce has formulated a Blended Education for All (BEFA) framework which is considered as the foundation of National Blended Education Master Plan (2022-2041). In line with this framework, Bangladesh has already piloted some of remote learning interventions relevant to implementation of blended education during and after Covid-19 pandemic when nationwide school closures disrupted the learning process for around 36.8 million students (The Daily Star, 2021). Remote learning approaches during Covid-19 pandemic included online learning, television and radio broadcast of lessons, audio and text-based psychosocial and lesson support through mobile phone, instructions and assessment by using assignment and worksheets etc. Development partners along with government also developed and distributed high-tech, low-tech and no-tech resources as part of Covid-19 education responses. Along with physical modality/no-tech solutions, technology is the important part of blended education. However, implementing blended education effectively posed several challenges. Economic accessibility to technology was a major concern as a significant portion of the population lacked access to smartphones, computers, and the internet ((*Bangladesh Sangbad Sangstha* [BSS], 28 December 2021). As a result, low-tech solutions like radio and television were considered viable alternatives to reach a broader audience.

After COVID-19 pandemic, the Bangladesh COVID-19 School Sector Response (CSSR) Project aimed to minimize learning loss and protect vulnerable children during the pandemic. It involved developing remote learning content and rolling out lessons through multiple platforms, including television and radio. However, there was a lack of specific guidelines for assessing students' learning progress during remote learning, creating challenges for teachers and authorities. Thus, the study highlighted the need for comprehensive research to explore the effectiveness and inclusiveness of the remote learning solutions used during the pandemic. It is essential to assess students' access, participation, engagement, and diverse learning needs to inform future policies and strategies for blended education in Bangladesh. So, this study aimed to explore the effectiveness, inclusiveness and challenges of radio and television broadcasted lessons for implementing blended education in Bangladesh. In order to do this, three subsidiary research questions led this study:

1. To what extent the radio and television-based were effective to implement in school level in terms of access, participation and engagement?

2. How efficiently the lessons were designed and delivered to resolve the diverse needs of the learners?

3. What were the scopes and challenges of the media to integrate into blended education?

Literature Review

Blended education, which combines traditional face-to-face instruction with digital and broadcast media, has gained significant attention as a viable educational approach, especially in regions with limited access to the internet and modern technologies. Bangladesh, a developing country with various socio-economic challenges, has recognized the potential of blended education delivered through radio and television media to address educational disparities. This literature review aims to explore existing research related to the effectiveness of blended education via radio and television in Bangladesh.

Numerous studies have explored the role of educational technology in developing countries, highlighting the potential benefits and challenges. Researchers have found that leveraging radio and television for educational purposes can overcome some barriers related to access to education, reaching remote communities, and improving learning outcomes (Ally & Samaka, 2013; Akyeampong et al., 2016; Akyeampong et. Al., 2020; Tadesse, & Muluye, 2020). Blended learning approaches, including the use of radio and television, have been studied extensively in various educational contexts. Studies conducted in other developing countries have shown that blended learning can enhance students' academic achievement and engagement (Graham, 2019; Zhonggen, 2021; Tong, et. Al., 2022; Su, et al., 2023). However, the applicability of these findings to the Bangladeshi context needs further investigation.

Bangladesh has made significant progress in improving access to education, but challenges persist, particularly in rural areas. Studies have reported on the impact of radio and television programs in increasing access to educational content for students in remote regions (Nicolai et. Al., 2023; Sarkar et. Al., 2021). Research has examined the design and effectiveness of educational content delivered through radio and television media. Studies have explored the use of interactive learning formats, storytelling, and local content to enhance student engagement and learning outcomes (Nicolai et. Al., 2023; Gray & DiLoreto, 2016; Multisilta & Niemi, 2015).

Effective implementation of blended education requires adequate teacher training and support. Investigations have shown that providing teachers with appropriate training and resources positively influences the quality of education delivered through radio and television (Kintu, Zhu, & Kagambe, 2017; Khan et. Al., 2022; Prahmana et. Al., 2021). The success of blended education in Bangladesh heavily relies on the country's technological infrastructure and the digital divide. Studies have explored the challenges posed by limited access to technology and electricity in rural areas, affecting the reach and effectiveness of blended education initiatives (Noor & Shaoun, 2021; Chowdhury, 2019; Alam, Ogawa, & Islam, 2023; Saleh et. Al., 2023).

Blended learning, which combines different instructional methods like face-to-face and distance learning (Singh, 2021; Tayebinik & Puteh, 2013), is gaining popularity for its ability

to personalize learning and differentiate instruction (Rasheed et al., 2020). The pedagogy of blended learning aligns well with cognitive load theory and constructivist learning theory. Constructivist learning theory emphasizes learning from experience and problem-solving (Gomboc-Turyan, 2013), while cognitive load theory focuses on managing information processing to optimize learning (Musallam, 2010; Pass, Renkl, and Sweller, 2004). These theories support the use of blended education, where pre-learning through distance learning is followed by classroom interactions.

Blended learning is also supported by the personalized learning model, which tailors education to each student's strengths, needs, and interests (Patrick et al., 2013, p. 4), using technology platforms to provide flexible pathways for mastery (Lesser, 2016). However, personalized learning implementation requires support from information technology platforms (The New Media Consortium, 2015; Murray & Perez, 2015, p. 26; Grant and Basye, 2014; Sturgis, Patrick, and Pittenger, 2011; Wolf, 2010).

Thus, the study was guided by the theoretical framework of blended learning, cognitive load theory, constructivist learning theory, and personalized learning model. Based on these theories, this study aimed to explore blended education in Bangladesh, specifically the integration of radio and television media in the modality and examined the dimensions of personalized learning, learners' access, participation, engagement, inclusiveness, and the challenges and opportunities of blended education.

Methodology

The study aimed to explore the feasibility of implementing blended education through the use of radio and television media in Bangladesh. To address the research objectives and answer key questions, a multi-strategy mixed method research design (Robson, 2011) was employed, involving both qualitative and quantitative data collection and analysis. This design is recognized as valuable in social science research (Cohen, et.al., 2011; Creswell, 2008; Johnson and Christensen, 2017; Robson, 2011) and ensures the validity and reliability of the results through data triangulation (Robson, 2011; Cohen, et. al., 2011).

The sampling process involved students, parents, teachers, education officers, and education experts. A total of 20 schools were selected from Dhaka, Barishal and Rajshahi divisions, and surveys were conducted with all students of class II to class V to identify those who participated in the lessons broadcasted on television and radio. From the identified participants, 10 students were randomly selected from each class for interviews and observations, maintaining a gender balance that comprised 40 students from each school – 20 boys and 20 girls.

Various data collection methods were utilized, including short survey forms, structured questionnaires, focus group discussions, and semi-structured interviews. Data enumerators, properly oriented before fieldwork, collected data directly from the field. Besides, tools were piloted on small portion of the sample who were excluded from the final data collection and revised accordingly based on the piloting result. To ensure data quality, team leaders and members accompanied the enumerators and conducted inter-rater reliability tests, which

showed a high rate of reliability. Three main techniques were used for data collection: short survey forms were used to identify student participants who participated radio and television broadcasted lessons, structured questionnaires to explore experiences and opinions of the students regarding the lessons, focus group discussions to gather feedback from parents/ caregivers, and semi-structured interviews to understand the perspectives of teachers, officers, and education experts. A performance test on grade level literacy and numeracy test was also conducted among the learners by using an adapted tools from the Annual School Education Report (ASER) developed by Pratham India to check whether media-based intervention created any impact on students' performance. Besides, observations were conducted on students' learning by using checklists to assess content usability, and then content analysis was performed on audio and audio-visual files broadcasted through radio and television.

Data analysis included both quantitative and qualitative approaches. Descriptive statistics were employed for quantitative data, using MS Excel and SPSS 25. Qualitative data underwent data-driven thematic analysis suggested by Braun and Clarke (2006), where the data were read repeatedly to identify themes and concepts that summarized similar contents map (Cohen et. Al., 2011; Braun and Clarke, 2006). Ethical considerations were given priority throughout the study. Informed consent was obtained from all respondents, and their privacy and confidentiality were assured. No harm was caused to the participants, and the research objectives were clearly explained before data collection.

Findings and Discussion

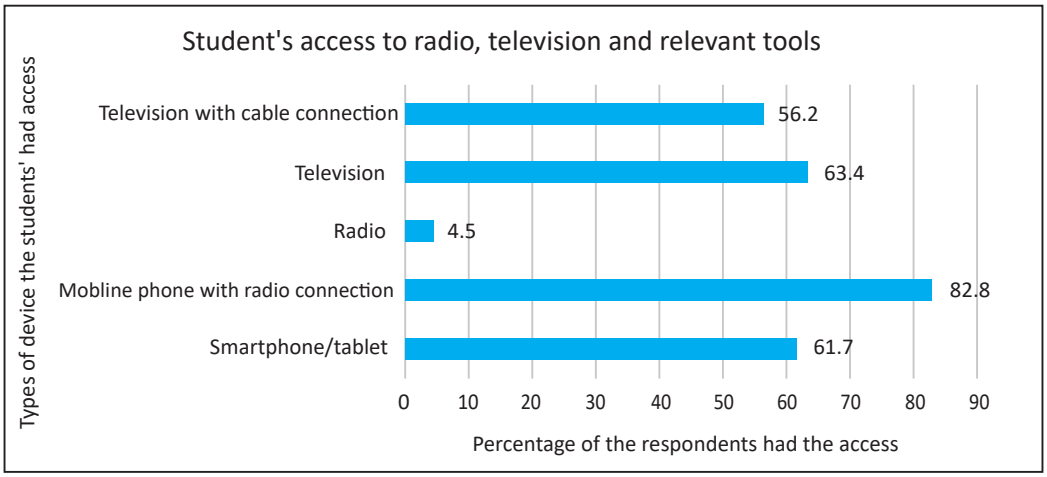
The findings are presented in terms of learners' access, participation, engagement and achievement. Engagement was examined in terms of active participation and scope of assessment and feedback. Besides, inclusiveness of using radio and television media, its scopes and challenges to implement as a tool of blended education are presented below.

Access to radio and television broadcasted lessons

The text presents survey data regarding students' access to television and radio. Among the 4,835 students surveyed, around 63% had access to television and 56% had access to television with cable connection. In contrast, only 4.5% reported having access to radio, but around 83% had mobile sets with radio connection. Additionally, around 62% reported having access to smartphones or tablets, indicating widespread access to technology among the respondents.

Figure 1

Respondent students' access to radio and television



Parents and teachers confirmed the high rate of television access among students, with most households having televisions. However, the availability of cable connection was cited as a hindrance to participation in television lessons. The use of radio was deemed uncommon nowadays, and access to smartphones was also limited in rural areas.

No students reported participating in radio lessons, so no further questions were asked regarding radio broadcasting. Concerning the timing of television lessons, 83.5% of respondents knew the broadcast schedule, while 16.5% did not. Some students mentioned that the timing was inconvenient as they were either at school or on their way home during the broadcast. Parents also expressed limited knowledge of the exact broadcasting time. Teachers mentioned receiving the schedule through email from the Upazila Education Office.

Participation in the lessons

In terms of participation, 53.2% of the students surveyed watched at least one lesson on television, with around half of them watching multiple lessons on an irregular basis. Approximately 23% students watched the lessons regularly. There was no significant difference in participation between girls and boys, but a slightly higher percentage of girls participated regularly compared to boys.

Table 1

Participation of students in the lessons broadcasted on radio and television

	Boy (N=2295)	Girl (N=2540)	Total (N=4835)
At least once listened the lesson broadcasted on radio	0	0	0
Sometimes listened the lesson broadcasted on radio	0	0	0
Regularly listened the lesson broadcasted on radio	0	0	0
At least once listened the lesson broadcasted on television	54.9	52.5	53.2
Sometimes listened the lesson broadcasted on television	23.6	24.7	24.2
Regularly listened the lesson broadcasted on television	21.4	23.3	22.6

According to teacher interviews, 50% to 80% of students participated in the televised lessons, with 20% to 35% being regular and active. Some teachers noted a decrease in participation over time. Parents expressed mixed opinions, stating that their children attended a few lessons but were not regular viewers. They mentioned that their children were more engaged during the COVID-19 school closure but now watched the program less frequently.

Reasons for irregular participation included inconvenient timing, lack of awareness about the lessons, parents' restrictions, and load shedding. However, access to television was not a prominent issue, as no participants reported access-related problems. The majority of respondents (94%) correctly mentioned the channel name, indicating they were aware of the lessons and had access to televisions.

In contrast, no students participated in the radio broadcasted lessons, and none of them had listened to any lessons on the radio. Reasons for non-participation included lack of radio usage at home, inconvenient timing, lack of awareness about the schedule, and a knowledge gap regarding the radio broadcasted lessons. Teachers and parents attributed the lack of participation in radio lessons to the declining use of radios in households, with most people now relying on televisions and smartphones.

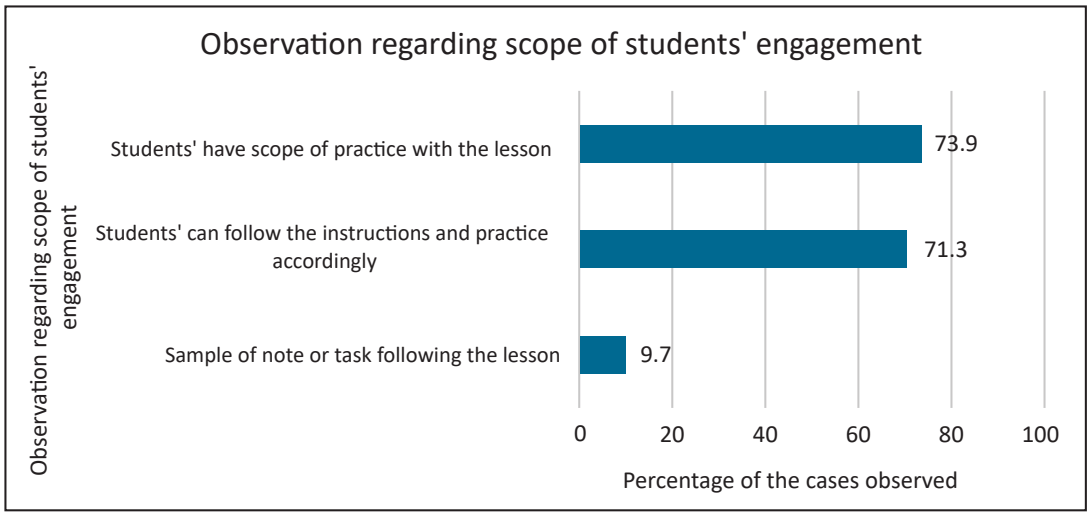
Engagement in the lessons

The text discusses students' engagement, assessment, feedback, and achievement in lessons broadcasted on television. The given text discusses students' engagement in lessons delivered through television and radio broadcasts. The study found that no students participated in radio lessons, while 99% of respondents reported being able to follow and practice the instructions provided in television lessons. Around 93% of respondents stated that they could learn and practice the desired skills, and approximately 91% reported completing tasks following the lessons. However, only 14% felt that the lessons provided enough practice opportunities at home.

Observations revealed that 74% of students had the opportunity to practice the competences taught in the lessons, and 71% could follow instructions and practice accordingly. Around 10% of students had examples of note-taking or completed tasks based on the televised lessons. Parents expressed concerns about their children limited active participation, as they felt that teachers could not monitor comprehension or address students' questions effectively. Parents acknowledged that their children assessed themselves based on the televised instructions, and they supported their children's education by evaluating their performance.

Figure 2

Observation regarding scope and practice of students' engagement in the lessons



According to teachers, only a few students regularly attended the television lessons, but those who did were actively involved in learning activities. The lessons attempted to enhance interactivity by introducing student characters who interacted with the teacher and asked questions. This innovative approach aimed to engage remote learners and create opportunities for practice. The teacher provided relevant instructions before each task, allowing students to practice competences alongside the student characters.

For respondents who could not follow the instructions, various challenges were identified, including teachers speaking quickly, difficulty understanding instructions, insufficient time for topic elaboration or instruction delivery, lack of two-way communication hindering interest, and absence of someone nearby to assist with comprehension.

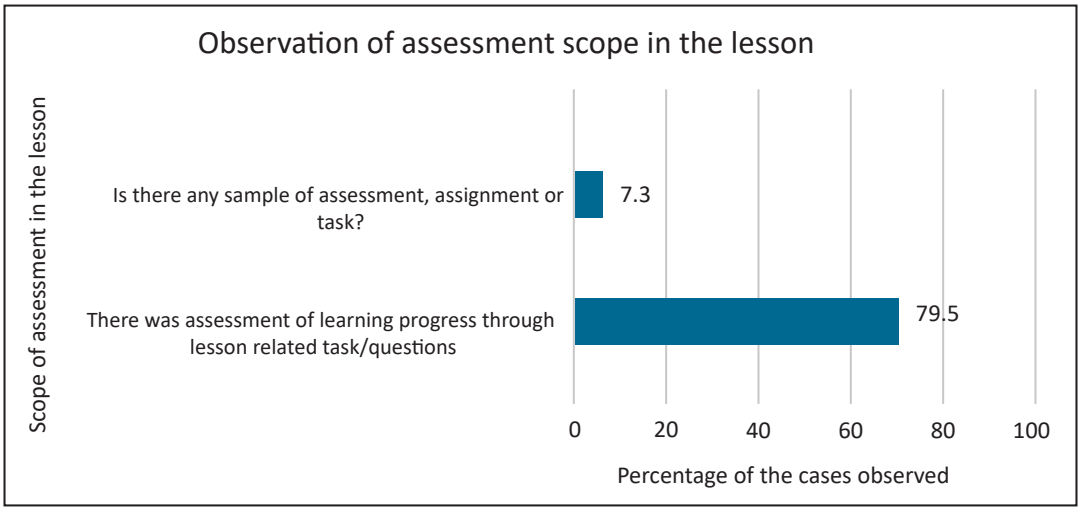
Assessment and feedback

The text discusses the assessment practices in teaching-learning activities conducted through television lessons. The study aimed to determine if assessments were incorporated into the lessons and how they were conducted. The findings revealed that all students reported the presence of an assessment process in the lessons, with approximately 90% of respondents stating their participation in assessments.

Observations indicated that assessments were indeed included in the lessons, as teachers asked learning outcome-related questions and provided tasks to assess students' progress. To facilitate assessments, teachers allowed a pause for student responses, and sometimes student characters on screen answered the questions. Students were able to assess themselves based on the questions or tasks provided. However, only a small percentage (7.3%) had tangible evidence of assessments in their workbooks.

Figure 3

Observation regarding scope and practice of assessment in the lesson



Parents expressed concerns about the limited scope of assessments in television lessons, as teachers could not gauge students' responses and provide appropriate feedback. However, some parents and teachers believed that assessments were conducted, and students or their parents assisted in the assessment process following the instructions of the TV lessons.

While assessments were integrated into the lessons, the provision of feedback or remedial support was found to be very limited. The majority of respondents (92.5%) reported receiving no feedback based on their assessments or learning progress. Parents and teachers stated that direct feedback was not possible in television lessons. They suggested that if the lessons were linked to regular classes in school, teachers could assess students and provide feedback accordingly. However, such practices were rarely observed.

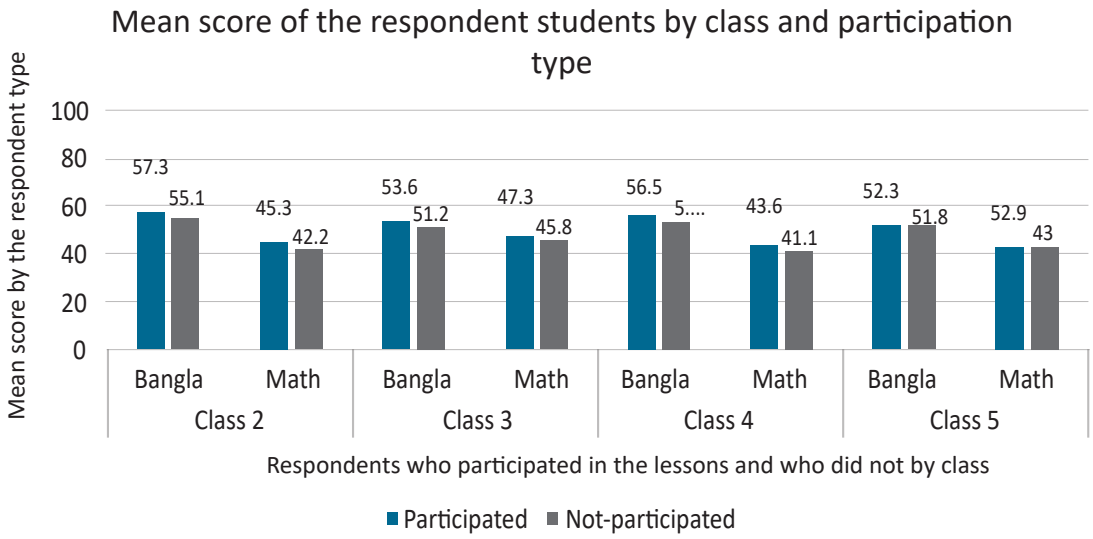
The content analysis and program review revealed that there was no mechanism for instant feedback since the lessons were pre-recorded and students were in front of the television screen. However, if there were proper integration between the telecasted lessons and face-to-face lessons in school, teachers could check learning progress and provide feedback or remedial support based on students' needs. However, no instructions were given for this type of integration. Some students (7.5%) received feedback or remedial support from their parents or private tutors. In a few cases, motivated teachers checked assessment sheets in school and provided relevant feedback or remedial support.

Achievement of the learners

The text describes an assessment conducted among a sample of school students. The results showed that, with the exception of Math in class 5, students who participated in television broadcasted lessons performed slightly better in both Bangla (language) and Math compared to those who did not participate. However, the difference in performance was minimal, and it is unclear whether the television lessons were the sole cause. Other factors such as family support, coaching, and socio-economic background should be considered before drawing any conclusions. Further study is recommended in this regard.

Figure 4

Mean score of the students by class and participation type



According to teachers, students who regularly attended TV lessons achieved the learning outcomes at a rate of 70% to 80%. They believed that the audio-visual presentations and engaging techniques used in the lessons helped students understand the content and scaffolded their classroom learning. However, some teachers expressed skepticism about the effectiveness of the lessons in achieving learning outcomes. They felt that the short duration and one-sided presentation lacked interaction and direct feedback mechanisms, making it challenging to meet the diverse needs of students in a 10-minute class.

Overall, the assessment indicated a slight improvement in performance among students who participated in television lessons, but the impact of the lessons on learning outcomes and the influence of other factors requires further examination. Teachers had differing opinions on the effectiveness of the lessons, with some acknowledging their positive impact and others expressing concerns about their limitations.

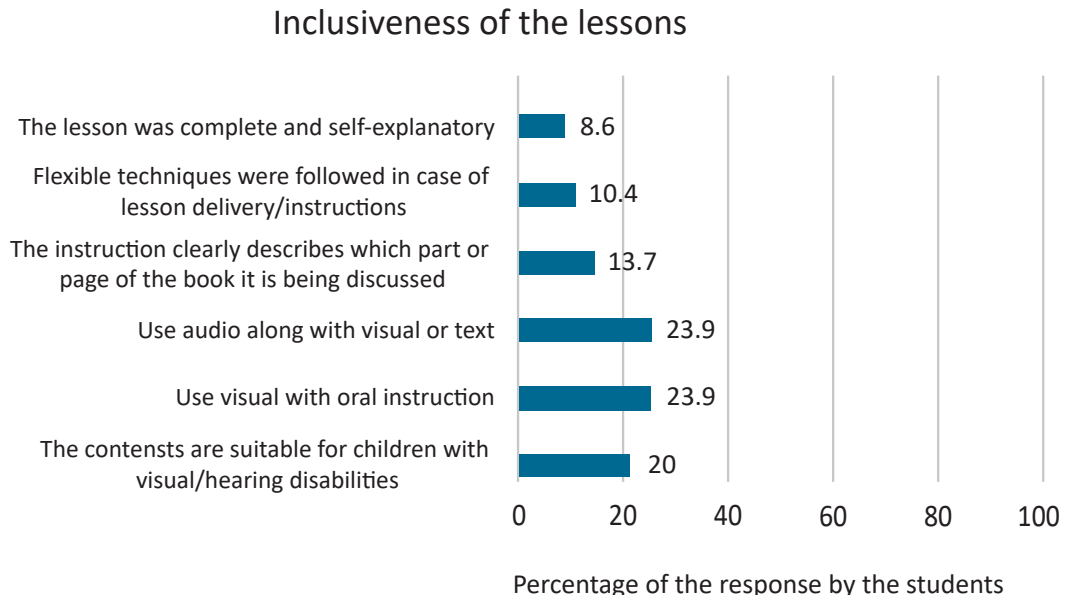
Inclusiveness of the lessons to address the needs of diverse learners

The text discusses the importance of inclusiveness in learning design and its relevance to personalized learning. The findings show that the telecasted lessons were comprehensible for all students, and the majority could understand and respond to the relevant questions. Most students did not feel difficulty keeping up with the speed of the lessons and reported being able to learn at their own pace.

However, when assessing the inclusiveness of the lessons, it was found that only a small percentage of respondents believed the content was suitable for children with visual or hearing disabilities. The content did not adequately consider the needs of students with disabilities, ethnic minorities, or other challenges. There was a lack of sign language or visual clues for learners with hearing or visual impairments. The lessons did not address diverse learners' needs or consider individual learning differences.

Figure 5

Students' response regarding inclusiveness of the lessons



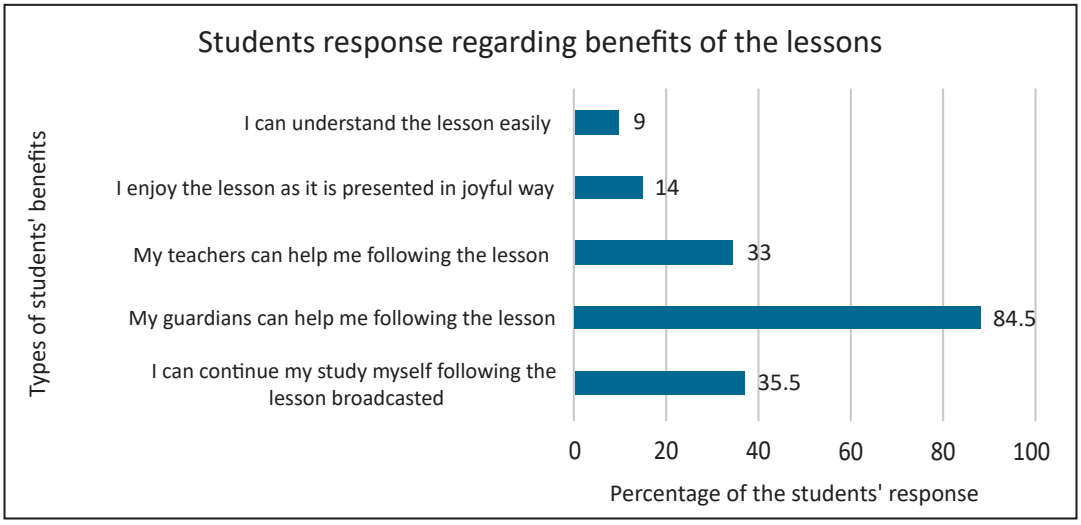
Parents expressed similar concerns, stating that the lessons did not cater to individual learning needs and lacked classroom interaction. The lessons also failed to address the needs of ethnic minority children, as they were primarily developed in Bangla without content or instructions in their language. It is suggested that zonal TV channels and radio stations could be used to broadcast content in ethnic minority languages, considering the needs of all children.

Scopes of radio and television broadcasted lessons

The text presents findings that indicate the positive impact of television lessons on students' learning. Approximately 85% of students reported that their guardians could help them with their education based on the televised lessons. Furthermore, 36% of students stated that they could continue studying independently after watching the television lessons. Parents also found the lessons helpful, as they facilitated better understanding through interactive audio-visual presentations. The lessons were seen as joyful and enjoyable, enabling students to grasp the content easily. The use of television as a low-tech solution was discussed as a viable option for blended education in Bangladesh, where access to ICT devices is limited. This approach would allow students to watch lessons at home and engage in classroom discussions the following day.

Figure 6

Students' response regarding benefits of the lessons



Teachers highlighted several benefits of television lessons, such as providing joyful and interactive content, promoting self-study, and bridging the gap between online and offline learning. The use of audio-visual media in conjunction with classroom lessons was seen as a way to enhance sustainability. Parents and caregivers also found value in the televised lessons, as they could follow along and support their children's learning, even without formal education.

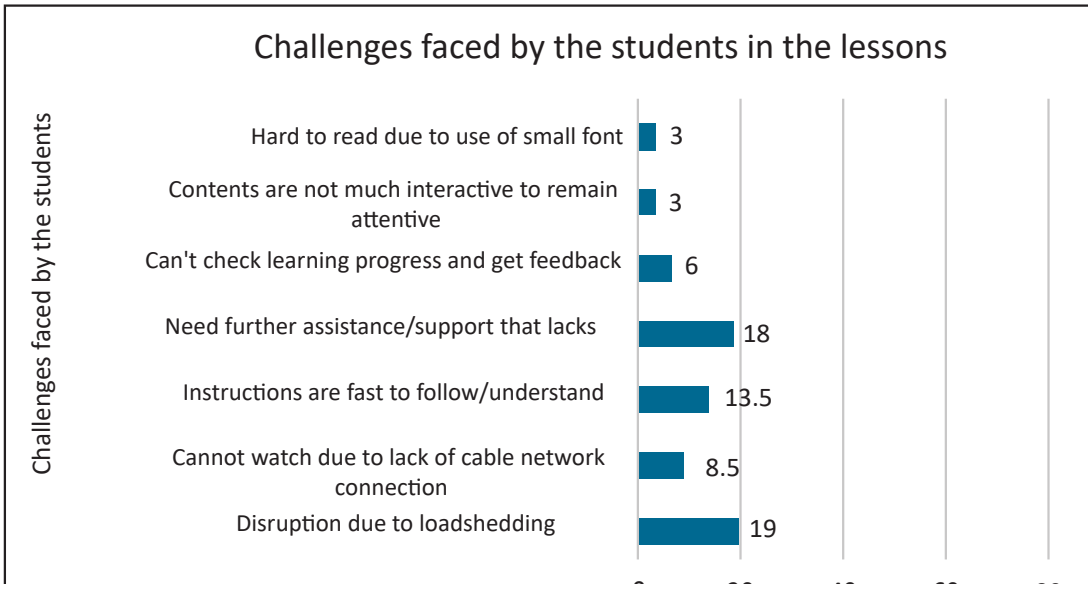
Overall, the findings suggest that television lessons have the potential to improve learning outcomes, especially for first-generation learners and those lacking support at home. The interactive and enjoyable nature of the lessons, combined with the involvement of parents and caregivers, contributes to increased engagement and understanding. Additionally, incorporating television lessons as part of a blended learning approach allows for more effective utilization of classroom time and promotes experiential learning.

Challenges of using radio and television to broadcast lessons

The text highlights the challenges associated with the implementation of televised lessons for blended education. The challenges are identified from both the users' and implementers' perspectives. Student respondents reported various obstacles to participating in the television lessons, including lack of access to television and cable networks, disruption due to power outages, inconvenient lesson times, insufficient time allocation, and lack of coordination between school and TV routines. Students also faced difficulties following fast-paced instructions, requiring further assistance that couldn't be provided due to the lack of integration between distance learning and physical classrooms. Additionally, the absence of assessment, follow-up, and feedback systems prevented tracking and monitoring of learning progress.

Figure 7

Challenges faced by the students by percentage



Parents echoed similar concerns, citing load shedding, lack of television with cable connections, inconvenient lesson times, and insufficient time allocation as challenges for their children to attend the televised lessons. Teachers also identified barriers, such as limited access to televisions and cable networks, load shedding interruptions, and parental restrictions on watching the lessons. The use of Shangshad Bangladesh Television as the broadcasting channel created accessibility issues for families without cable connections. Furthermore, the short duration of each lesson, inadequate coverage of the curriculum, and the absence of integration between distance and face-to-face learning were highlighted as challenges.

The lack of assessment and feedback systems, as well as the absence of clear plans for integrating distance and face-to-face learning, posed additional hurdles. Insufficient

orientation for teachers and parents on utilizing the lessons and providing support, as well as the lack of coordination between relevant stakeholders, were also identified as challenges. The need for proper planning, coordination, and stakeholder involvement, including education and technology experts, was emphasized to address these challenges and ensure effective implementation of blended education in Bangladesh.

Conclusion

In conclusion, the feasibility of implementing lessons through radio and television as a means of education was explored, considering learners' access, participation, engagement, and achievement. The study revealed significant differences in access to television and radio among students, with television being widely available while radio usage declined. Engagement in televised lessons was relatively high, with a majority of students participating irregularly, but challenges such as inconvenient timing and limited awareness were reported. In contrast, no students participated in radio lessons, primarily due to the declining use of radios in households.

Television lessons demonstrated high levels of engagement and reported ability to follow instructions. However, the scope for assessment and feedback was limited, and improvements in integration with regular classroom instruction were suggested. The impact of televised lessons on learning outcomes showed a slight improvement, but other factors must be considered before drawing conclusive results. Moreover, inclusiveness was lacking, as the lessons did not adequately cater to students with disabilities or diverse learning needs.

Despite challenges, televised lessons presented numerous scopes, including improved learning outcomes, support for first-generation learners, and enhanced parent and caregiver involvement. Nevertheless, implementing televised lessons in a blended education approach requires addressing access, integration, and coordination challenges.

Overall, the study highlights the potential benefits of using television for education in contexts with limited ICT access, while stressing the need for inclusive and well-coordinated efforts to maximize its effectiveness. Further research and improvements in design and implementation are essential to create a more inclusive and impactful blended education system in Bangladesh.

Recommendations

Low-tech solutions like radio and television are comparatively newer introduction as means of education in Bangladesh though radio and television have been used for broadcasting nonformal education program of Bangladesh Open University for long-time in the country. However, for mainstream education it was not used before Covid-19 school closure. So, different challenges including lack of preparedness and coordination was seen in case of design and implementation of education program. Here some recommendations are drawn to reduce the challenges/gap so that radio and television program for implementing blended education can be effectively design and administer.

Efforts should be made to ensure widespread access to television and other technology devices like smartphones or tablets. In rural areas, where access to television and ICT devices might be limited, the government and educational institutions should explore providing subsidized or free access to these technologies.

To increase participation, broadcasting schedules should be well-publicized, and lesson timings should be adjusted to accommodate students' daily routines. Teachers, parents, and students should be informed about the broadcast schedules through multiple channels, such as emails, SMS, and school announcements.

The content of televised lessons should incorporate more interactive elements to keep students engaged. Utilizing student characters and encouraging active participation can make the lessons more interesting and conducive to learning.

The incorporation of comprehensive assessment mechanisms in televised lessons is vital to gauge students' progress accurately. Teachers should be trained to provide feedback and remedial support based on these assessments. Consideration should also be given to integrating televised lessons with face-to-face instruction to enable more personalized feedback.

Efforts should be made to cater to diverse learners' needs, including students with disabilities and ethnic minorities. Sign language and visual clues should be included to make the lessons accessible to learners with hearing or visual impairments. Broadcasts in various languages should be considered to ensure inclusivity.

Close coordination between relevant stakeholders, including education experts, technology providers, teachers, and parents, is essential for the successful implementation of blended education. Adequate training and orientation should be provided to all stakeholders involved.

More research is necessary to understand the full impact of televised lessons on learning outcomes and to identify other factors influencing students' performance. Long-term studies can shed light on the effectiveness of televised lessons over time and their potential role in improving education in the context of Bangladesh.

By implementing these recommendations, the education system in Bangladesh can leverage the potential of televised lessons as a valuable tool for providing accessible and engaging education to a broader audience while ensuring inclusivity and improving learning outcomes.

Acknowledgement

We sincerely thank the National Academy for Educational Management (NAEM) for funding this research. We also extend our gratitude to all the participants for their voluntary involvement, which was essential to the completion of this study.

References

A2I. (2022). *National Blended Education Master Plan (2022-41).* Dhaka: Government of Bangladesh.

Alam, M. J., Ogawa, K., & Islam, S. R. B. (2023). e-Learning as a Doubled-Edge Sword for Academic Achievements of University Students in Developing Countries: Insights from Bangladesh. *Sustainability, 15(9)*, e7282. MDPI AG. Retrieved from http://dx.doi.org/10.3390/su15097282

Ally, M., and Samaka, M. (2013). Open Education Resources and Mobile Technology to Narrow the Learning Divide. *International Review of Research in Open and Distance Learning 14*(2), p.14-27. DOI: 10.19173/irrodl.v14i2.1530

Akteruzzaman, M. (21 March 2022). Blended education: Solution for inclusive development of Bangladesh. *The Daily Observer.* Retrieved on 29 May 2022 from https://www.observerbd.com/news.php?id=358173

Akyeampong, K., Pryor J., Westbrook, J., Abraham, R., Adane, T. and Wolde, S. (2016) Research into the Speed School Curriculum and Pedagogy in Ethiopia. Research Monograph 1: Centre for International Education, University of Sussex.

Akyeampong, K., Westbrook, J., and Pryor, J. (2020). The Speed School pedagogy and how it unlocks the creative and learning potential of disadvantaged children in Ethiopia. University of Sussex.https://hdl.handle.net/10779/uos.23478908.v2

Braun, V. and Clarke, V. (2006). 'Using thematic analysis in psychology', *Qualitative Research in Psychology,* 3(2), pp. 77–101. Doi: 10.1191/1478088706qp063oa.

BSS. (28 December 2021). Economically accessible technology is major challenge for blended learning. Bangladesh Sangbad Sangstha. Retrieved on 29 May 2022 from https://www.bssnews.net/news/35798

Chowdhury, F. (2019). Blended learning: how to flip the classroom at HEIs in Bangladesh? *Journal of Research in Innovative Teaching & Learning.* ahead-of-print. 10.1108/JRIT-12-2018-0030.

Cohen, L., Manion, L. and Morrison, K. (2011). *Research methods in education.* 7th edn. London: Routledge.

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research.* 4th ed. Boston, MA: Pearson.

EdTechHub & UNICEF. (2021). *A Theory of Change for A Technology-Enhanced Education System in Bangladesh* (Working Paper). Doi: 10.53832/edtechhub.0044

Gomboc-Turyan, J. L., 2013. Impact of Learning Theory Methods on Undergraduate Retention and Application of Software in a Studio Setting. International Journal of Distance Education Technologies. https://doi.org/10.4018/IJDET.2020100105

Graham, C. R., Borup, J., Short, C. R., and Archambault, L. (2019). K-12 Blended Teaching: A Guide to Personalized Learning and Online Integration (1st ed.), 1. EdTech Books. https://dx.doi.org/10.59668/2

Grant, P., & Basye, D. (2014). Personalized learning: A guide for engaging students with technology. Eugene, OR: International Society for Technology in Education.

Gray, J. A. and DiLoreto, M. (2016). The Effects of Student Engagement, Student Satisfaction, and Perceived Learning in Online Learning Environments. *NCPEA International Journal of Educational Leadership Preparation, 11*(1).

Johnson, B. and Christensen, L. (2017). *Educational Research.* 6th ed. Sage Publications, Inc.

Lesser, M. (2016). Why we badge: The potential for digital credentials. Education Digest, 81(5), 43–48.

Khan, M., Smith, T., Anand, K., Hossain, T., & Islam, M. (2022). Crisis-led approaches to teaching and learning in Bangladesh: Towards a blended learning framework: Final Report. 10.13140/RG.2.2.17414.65602.

Kintu, M.J., Zhu, C. & Kagambe, E. (2017). Blended learning effectiveness: the relationship between student characteristics, design features and outcomes. *Int J Educ Technol High Educ 14*(7). https://doi.org/10.1186/s41239-017-0043-4

Multisilta, J., and Niemi, H. (2015). Digital storytelling promoting twenty-first century skills and student engagement. *Technology Pedagogy and Education, 25.* doi: 10.1080/1475939X.2015.1074610.

Murray, M. C., & Pérez, J. (2015). Informing and performing: A study comparing adaptive learning to traditional learning. Informing Science, 18, 111–125.

Musallam, R. (2010). The effects of screen casting as a multimedia pre-training tool to manage the intrinsic load of chemical equilibrium instruction for advanced high school chemistry students, Doctoral Dissertation, University of San Francisco, 2010.

New Media Consortium (2015). NMC Horizon Report: 2015. Higher Education Edition.

Nicolai, S., Jordan, K., Adam, T., Kaye, T., and Myers, C. (2023). Toward a holistic approach to EdTech effectiveness: Lessons from Covid-19 research in Bangladesh, Ghana, Kenya, Pakistan, and Sierra Leone. *International Journal of Educational Development,*

27, p.102841. doi: 10.1016/j.ijedudev.2023.102841. Epub ahead of print. PMCID: PMC10293898.

Noor, S., & Shaoun, S. P. (2021). Online Education and Community Participation in Bangladesh: Challenges and Opportunities to Ensure Inclusive Learning During COVID-19 School Closure. *Indian Journal of Public Administration, 67*(4), p.620–638. https://doi.org/10.1177/00195561211044531

Paas, F., Renkl, A., and Sweller, J. (eds.). (2004). Cognitive load theory. Instruct. Sci. 32(1-2; special issue).

Patrick, S., Kennedy, K., & Powell, A. (2013). Mean what you say: Defining and integrating personalized, blended and competency education. [Report]. Retrieved Sept. 27, 2019 from The International Association for K–12 Online Learning (iNACOL): http://www.inacol.org/wp-content/uploads/2015/02/mean-what-you-say.pdf

Prahmana, R., Hartanto, D., Kusumaningtyas, D., Ali, R., and Muchlas. (2021). Community radio-based blended learning model: A promising learning model in remote area during pandemic era. *Heliyon, 7.* e07511. 10.1016/j.heliyon.2021.e07511.

Rasheed, R. A., Kamsin, A., & Abdullah, N. A. (2020). Challenges in the online component of blended learning: A systematic review. Computers & Education, 144,1,03701.

Robson, C. (2011). *Real world research: A resource for users of social research methods in applied settings.* 3rd ed. Chichester: Wile

Saleh, M. A., Khan, M. I., Banerjee, S., & Safi, F. (2023). A tale of online learning during COVID-19: A reflection from the South Asian Association for Regional Cooperation (SAARC) countries. Heliyon, 9(6), e16347. doi.org/10.1016/j.heliyon.2023.e16347.

Sarkar, S. S., Das, P., Rahman, M. R., and Zobaer, M. S. (2021). Perceptions of Public University Students Towards Online Classes During COVID-19 Pandemic in Bangladesh. *Frontiers in Education, 6.* https://doi.org/10.3389/feduc.2021.703723

Singh, H. (2021). Building effective blended learning programs. Ln B. Khan, S. Affouneh, S. H. Salha, & Z. N. Khlaif (eds). Challenges and opportunities for the Global Implementation of E-Learning Frameworks (pp. 15-23). IGI Global.

Sturgis, C., Patrick, S., & Pittenger, L. (2011). It's Not a Matter of Time: Highlights from the 2011 Competency-Based Summit. In International association for K-12 online learning.

Su, et al. (2023). Student engagement and teaching presence in blended learning and emergency remote teaching. *Journal of Computer Education*. https://doi.org/10.1007/s40692-023-00263-1

Tadesse, S. and Muluye, W. (2020) The Impact of COVID-19 Pandemic on Education System in Developing Countries: A Review. *Open Journal of Social Sciences, 8*, p.159-170. doi: 10.4236/jss.2020.810011.

Tayebinik' M" & Puteh, M' (2013). Blended learning or e-learning? arXiv preprint arXiv, 1306.4085

The Daily Star. (30 July 2021). *Towards a blended learning framework for post-pandemic Bangladesh.* Dhaka: The Daily Star. Retrieved on 27 May 2022 from https://www.thedailystar.net/youth/education/news/towards-blended-learning-framework-post-pandemic-bangladesh-2140756

Tong, D. H., Uyen, B. P., and Ngan, L. K. (2022). The effectiveness of blended learning on students' academic achievement, self-study skills and learning attitudes: A quasi-experiment study in teaching the conventions for coordinates in the plane, *Heliyon, 8*(12), e12657, https://doi.org/10.1016/j.heliyon.2022.e12657.

UNICEF. (2020). *Guidance on Distance Learning Modalities to Reach All Children during School Closures: Focusing on Low and No-tech Modalities to Reach the Most Marginalized.* Kathmandu: UNICEF Regional Office for South Asia.

Wolf, M. (2010). Innovate to education: System [re]design for personalized learning. A report from the 2010 symposium. Washington, DC: Software& Information Industry Association. Retrieved from http://siia.net/pli/presentations/PerLearnPaper.Pdf.

Zhonggen, Y. (2021). A meta-analysis of effects of blended learning on performance, attitude, achievement, and engagement in different countries. 10.21203/rs.3.rs- 536691/v1.

NAEM JOURNAL
ISSN 1997-4248, eISSN 2959-4561
Volume 17 Issue 02
Serial 34
https://Doi.org/10.59629/NAEM 20213202.1601

The Learning Gap of the Secondary School Students of Bangladesh due to COVID-19 Lockdown

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Abstract

This study aimed to investigate the learning gap of Grade 6 and Grade 8 students in Bangla and Mathematics during the COVID-19 pandemic in Rajshahi division of Bangladesh. Despite continuous government supports and diverse initiatives of teachers and schools to continue education remotely, the 59-week closure of educational facilities had a substantial negative impact on students' learning. The major objectives of this study were to evaluate the amount of learning gap, identify the causes of the learning gap, and suggest solutions to the problems that students encounter. In doing so, purposive sampling was used to select 10 secondary schools, and simple random sampling was used to select 357 student respondents (180 from Grade 6 and 177 from Grade 8) for performance testing. Key informant interviews were conducted with 10 headteachers from the selected schools. Findings showed a substantial learning gap in mathematics between students in the two classes, whereas students performed significantly better in Bangla. Most of the students' performance belonged to band 2 or below in Mathematics, and a large percentage of students performed at band 3 or below in Bangla. The study further found that students performed lower in both Bangla and Mathematics compared to the LASI 2015. The study highlighted gender disparities in student performance, with girls outperforming boys in both subjects, particularly in Grade 6. The study highlighted several factors that have affected students' achievement, including limited access to technology and digital resources, lack of access to teachers, difficult economic conditions, poor mental and emotional health, and disruptions to routines and structures. The study concluded by highlighting the urgent need for policymakers to take immediate action to address the learning gap and recommends several interventions, such as targeted learning support, teacher training, and access to digital learning resources.

Key Words: Learning Gap, COVID-19 Education, Students' Performance, Bangladesh

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1. Introduction

The closure of educational institutions in Bangladesh due to the COVID-19 pandemic started on March 18, 2020, and schools reopened on September 12, 2021. Schools have been closed for 59 weeks rating Bangladesh as the country with the longest duration of school closure (UNESCO, 2021). This has undoubtedly left scratches on education despite the efforts of private and public schools to continue the learning process through electronic means, such as broadcasting classes through television, radio, and online mediums. However, not all children have had equal access to these resources, especially children from poor and vulnerable families and communities. In order to continue the learning, in Bangladesh, the Ministry of Education and the Ministry of Primary and Mass Education have introduced alternative learning initiatives including radio and TV classes, online classes on various learning platforms and social medias, and mobile-based messaging to the parents. Furthermore, both ministries have developed comprehensive school reopening guidelines to ensure a safe back to school for all learners.

Closures of academic institutions and other learning places suddenly obstructed 94 percent of the world's student population, with up to 99 percent in developing and least developed countries. About 38 million students and nearly a million teachers were affected by Bangladesh's COVID-19 school closures. After the situation improved, classes partially resumed at the institutions on September 12, 2021. Students, parents, teachers, and education officials were faced with several challenges following the lockdown.

According to the Bangladesh Bureau of Educational Information and Statistics, there were 2.16 million students in 133,002 primary educational institutions and 1.02 million students in 20,849 secondary schools. The main government response was television-based learning programs (World Bank, 2021) for these students. However, within months of the schools closing, it was clear that student learning, particularly among teenagers, was at risk, and many students also went through learning loss (Pasani et al., 2021). A joint study by PPRC and BRAC Institute of Governance and Development (BIGD) showed that due to the prolonged school closures induced by the epidemic, around 22% of students and 30% of high school students were at risk of learning gap. This could lead to a greater dropout rate. There was no guarantee that simply reopening the schools would help students make up for the time they have lost due to the shutdown. As a result of the learning gap, learners gradually lose their ability to be human resources in the future. The learning gap happened in two ways, one, learning that did not take place while schools are closed, which was directly related to quality schooling, and another, the learning already acquired that was lost or forgotten when students lost their engagement with the education system (Rahman & Sharma, 2021). The COVID-19 pandemic was unique in that it caused widespread school closures and learning gaps, although those issues had always been key contributors to learning deficits and losses, particularly for Bangladeshi children (Hassan et al., 2021).

Consequences of such continual school closures include increased learning gaps, including mental suffering; a higher chance of dropping out of structured education; and an increase in child labor and marriage. More than a million children have already been affected,

and many more will be in the future. A generation's future is at stake; consequently, every effort must be made to guarantee to mitigate the learning gap. Otherwise, overcoming the learning gap will be difficult.

Therefore, the study underscored the importance of addressing the learning gap as soon as possible. This study would help the audience to gain a better understanding of the learning gap induced by the pandemic. It also calls on governments and partners to strengthen the strategies for bridging the gap. Therefore, this study would suggest supplementary remedial programs that are essential to bridge the gap for secondary-level students. This study also provided insights into how learning gap can be mitigated through prioritizing strategies. Furthermore, this study would help the authorities in preparing a roadmap for creating coherent, aligned systems of support for educators and students to address the learning gap encountered during covid-19.

Conceptual Framework

Evidence from empirical studies showed that COVID-19 exacerbated students learning worldwide significantly. For every 100 children in low and middle-income countries, 53 children were in learning poverty before covid, and ten additional children were in learning poverty due to COVID-19 (World Bank, 2021). Additionally, the closure of the school expanded the cultural, economic, and structural disparities, which affect how parents and kids behave psychologically and amplify learning gaps and inequities (Goudeau et al., 2021). Vulnerable people were less likely to have access to online learning resources and to resume their education after a crisis, such as children with disabilities, members of ethnic minorities, refugees, and displaced populations (World Bank, 2021). These were also applicable to the children of Bangladesh, and thus, this study considered these contributing factors to the learning gap. Examining their contribution to the learning gap would guide us to identify the required actions to recover the gap.

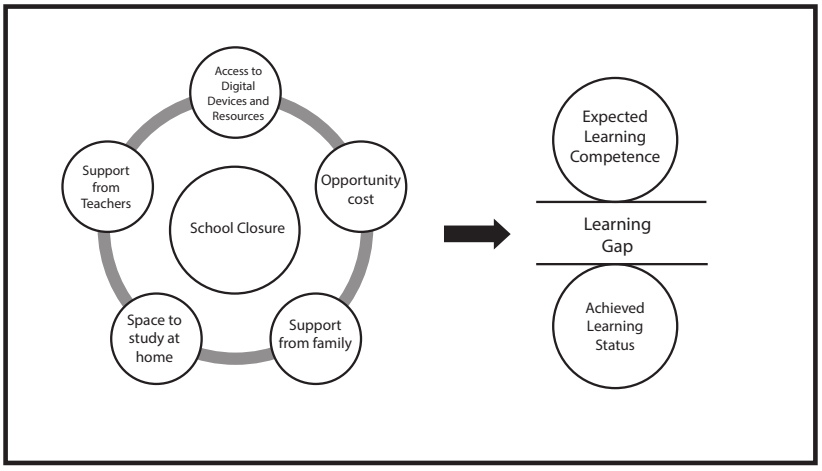

Figure 1: Conceptual Framework of the Study

Objectives of the study

The primary purpose of the study was to figure out the learning gap of students of grades 6 and 8 at secondary schools due to the last 1.5 years of school closure induced by the COVID-19 pandemic. The specific objectives of the study were to-

- Assess the learning gap of secondary school students in Grade 6 and Grade 8 resulting from 1.5 years of school closures.
- Evaluate students' performance in Bangla and Mathematics based on NCTB competency, differentiating between Grade 6 and Grade 8.
- Identify the contributing factors to the learning gap among secondary school students in Grade 6 and Grade 8 and propose strategies to mitigate this gap.

Scope and Limitation of the Study

This study covered only language and mathematics, as literacy and numeracy were considered the most crucial tools of learning for children. This study included students of class 6 and class 8 as the current study budget was not sufficient to cover all the grades. However, grade 6 was the beginning of the secondary level, while grade 8 was the end line of the lower secondary level. Along with students' performance tests, other stakeholders i.e., teachers, relevant to the school were also consulted in this study as their experience and observation were important.

Though the study was intended to disclose the learning gap of secondary-level students, there were a few limitations that may influence this study -

- The study covered a limited part of the population to draw conclusions for all secondary-level students.
- Perceptions of the respondents could have added value to this study, which could depict the societal and cultural hindrance that impedes potential learners from accessing technical education.

2.1 COVID-19's contribution to learning gap: Global Perspective

The world has made decades of strides in education, achieving the highest enrollment rates in history. With the outbreak of COVID-19, progress in education was in jeopardy (Parker, 2021). In a recent report, the Global Education Evidence Advisory Panel (GEEAP) found that school closures have a negative and long-lasting effect on children's learning and well-being, which will have an effect on all long-term development objectives for education (World Bank, 2022). As the third year of the COVID-19 pandemic approaches, classrooms remain partially or fully closed for up to 647 million schoolchildren around the world, even where schools have reopened, many students are still falling behind (Fore & Malpass 2021). It is a spiteful practicality that students have learned less during the COVID-19 pandemic.

Coronavirus disease was first detected in December 2019 in China Wuhan (Ngwacho, 2020). With 55 million students in the United States out of school owing to the COVID-19 pandemic, education systems are struggling to meet the demands of schools and families. Due to closure, the majority of school districts offer some virtual instruction during the final months of the school year, as cited in (Aurini & Davies, 2021). However, it remains unclear how effective virtual learning will be, given that most students and teachers have little experience with online instruction and large gaps in technology access exist in many parts of the country. Through ICT integration and remote learning efforts, all countries have attempted to cope with the overwhelming situation. There is a lot of evidence that remote learning efforts are ineffective. Across the world, educational disruptions have caused millions of children to significantly miss out on the academic learning they would have gained had they been in the classroom, with younger and more marginalized children suffering the greatest loss (UNICEF, 2022).

A learning gap can be defined as a specific or general loss of knowledge and skills or a reversal in academic progress, most commonly due to prolonged gaps or discontinuities in a student's education (Hevia et al., 2022). Before the pandemic, learning loss and competency gaps were associated with the summer holidays, when a decline in school performance and a widening achievement gap among students were observed (Kuhfeld et al., 2020). However, with the pandemic, there has been increased interest in measuring learning gap to reduce learning gaps and inequalities in learning and dropping out (Azevedo et al., 2020; Donnelly & Patrinos, 2021; Hevia et al., 2022).

Basic numeracy and reading skills could be declined among children for many reasons. According to the World Bank, school closures caused by a pandemic could push the proportion of 10-year-olds who can't read simple text to around 70% in low- and middle-income countries (Fore & Malpass, 2021). The COVID-19 pandemic, as well as the resulting disruptions in teaching and learning, posed a serious threat to approximately 110 million students in the Middle East and North Africa region, ranging from pre-primary to higher education. Even before the pandemic, an estimated 15 million children in the region aged 5 to 14 were out of school, with nearly two-thirds of children unable to read proficiently by the age of ten. This unprecedented disruption is estimated to have impacted an entire generation of children, with long-term implications for mental health, wellbeing, socialization, and employment prospects (UNICEF & UNESCO, 2021).

In a study in the US of McKinsey and Company (Dorn et. al., 2020), it was found that the hastily assembled online education currently available is likely to be both less effective, in general, than traditional schooling and to reach fewer students as well. In Ethiopia, it was estimated that primary school students learned 30 to 40% of the math they would have learned in a normal school year (UNICEF, 2022). Schoolchildren in South Africa were between 75% and a full school year behind where they should be.

According to a study on the general and differential effects of COVID-19-related school closures in spring 2020 on student achievement in primary and secondary education, school

closures had a negative impact on student achievement, particularly among younger students and students from low-income families (Hammerstein et al., 2021).

According to UNESCO, approximately 420 million people could be lifted out of poverty if all adults completed secondary education (Parker, 2021), which has become uncertain due to the pandemic. COVID-19 has been linked to high rates of anxiety and depression in children and adolescents, with girls, adolescents, and those living in rural areas being the most vulnerable. More than 370 million children lost daily nutrition as a result of school closures around the world (UNICEF, 2022).

2.2 Learning gap in South Asia

Since its outbreak in 2020, the COVID-19 pandemic has interrupted education systems internationally, affecting the most vulnerable learners widely. It has created inequalities and increased a pre-existing learning gap (UNESCO, 2021). A sub-regional situational analysis provides a snapshot of educational responses and impacts of COVID-19 in education across South Asia, including the eight countries in the subregion (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka) (UNICEF, 2021). In the South Asia region, there was a very serious risk of a learning gap because of school closures and lack of access to distance learning materials which would erode countries' cognitive capital in the future. The students showed greater achievement gaps in mathematics than in reading outside of school for school closure (Kuhfeld et al., 2020). The extent to which this was the case depended heavily on the scope and quality of learning gap mitigation interventions (UNICEF, 2021).

In Sri Lanka, the global pandemic has led to widespread disruption to teaching and a continuation of structured schooling for about 4.2 million students and 235,000 teachers (UNESCO, UNICEF & World Bank, 2021). With over 530,000 schools in Indonesia closed due to the COVID-19 outbreak, the importance of effective education technology platforms as a concrete response to curbing the loss of academic learning has been highlighted (UNICEF, 2021; Yarrow et al., 2020). An analysis shows that Indonesia, like most other countries around the world, was ill-prepared to deal with the impact of the COVID-19 pandemic, and this is already having a large negative impact on student learning outcomes.

The World Bank's pre-COVID-19 response to learning poverty showed that only 10 percent of children in low-income countries could read and understand a simple story by age 10, compared to 90 percent of children in high-income countries (Rahman & Sharma, 2021). Kuhfeld and Tarasawa (2020) performed a prospective analysis using data from students in grades 3 through 8. Two main findings are common to the analyzed countries. First, children who have recently left school perform far behind children who continue to attend school. Second, the gap in basic reading skills between these two groups widens with age. School closures caused by COVID-19 have affected more than 276 million children and youth enrolled in primary and secondary schools in India and 311 million, including tertiary education. Although the extent of learning loss in India is not known, it has very likely worsened sharply since COVID. The extent of learning loss depends on the reach and effectiveness of distance learning programs implemented by governments and schools (Van Cappelle et al., 2021).

Changing the way education systems work can be seen as a matter of global urgency, especially given pre-COVID-19 literacy levels across the Asian region and the expected learning losses for many children as a result of the pandemic (UNICEF, 2021). Twenty-six percent of low-income countries, 18 percent of lower-middle-income countries, 10 percent of upper-middle-income countries, and 6 percent of high-income countries have attempted to reduce learning losses through more classroom time (UNICEF, 2020, 2021). The expected learning loss in students consists of two components. First, learning does not occur on lost school days (i.e., days when schools are closed, and students are not effectively reached through an alternative modality). Second, some of the learning already acquired is lost or forgotten when students lose their attachment to the education system. Research shows that prolonged absences from schooling can result in a learning loss of 25 to 30 percent.

All countries in the region quickly developed plans and acted after schools closed to keep children learning and reach large numbers of learners. Despite this quick response, the learning loss will be high for many children across the region. Governments and teachers have limited data on the extent of learning loss, and teachers are often unprepared to respond to the specific needs of individual learners when whole-class didactic instruction is often the norm (UNICEF, 2021).

2.3 Learning Gap during the Covid-19 situation in Bangladesh

School closures related to COVID-19 in Bangladesh began on March 18, 2020, and continued through 2021, affecting approximately 38 million students and nearly a million teachers. The main government response was television-based learning programs (World Bank, 2021). However, within months of the schools closing, it was clear that student learning, particularly among teenagers, was at risk, and many students also went through learning loss (Pasani et al., 2021). According to Rahman and Sharma (2021), the total learning loss for any enrolled child is enormous, even with most learning losses for the Covid-19 situation. The learning gap was happening in two ways, one, learning that did not take place while schools were closed, which was directly related to quality schooling, and another, the learning already acquired that was lost or forgotten when students lost their engagement with the education system (Rahman & Sharma, 2021). Widespread school closures and learning gaps are distinctive to the Covid-19 pandemic; school closures and learning disruptions due to emergencies have always been major causes of learning deficits and losses, especially for children living in Bangladesh (Hassan et al., 2021). They suggested that the school closures triggered by Covid-19, which effectively kept most children out of school for long periods of time in 2020, could also have an immediate negative impact on children's learning and acquisition of basic skills. Determining the prevalence and extent of such a learning gap was key to designing preventive and corrective interventions (Conto et al., 2021). It should be noted that previous studies have indicated school closures signify that any disruption in learning can result in significant learning loss (Conto et al., 2021). The current situation disrupted the planned activities of the school year and, in the worst case, could lead to a complete loss of a learning year (Ahmed, 2019). The lockdown and closure of educational institutions have shown a negative impact on student academic performance. In particular, they lagged behind in spelling and math (Roy et al., 2021).

Closing schools to stem the spread of Covid-19 carried a significant risk of students underachieving when learning online, what was known as the learning gap. School closures also led to various social and economic problems. Learning losses were experienced more severely by students who come from families with parents who were less educated and have weak economic conditions (Pasani et al., 2021). Now, a key predictor of the new normal was school performance. This was seen as especially important during physical school closures, and their shortage further compounded the learning losses caused by the Covid-19 pandemic.

Approximately 90% of students worldwide were affected by these closures and had a learning gap. The average result showed that they experienced learning losses, which corresponds to 3 and 1.5 months of learning math and reading, respectively. (Pasani et al., 2021). Prolonged school closures and the length of time students stay in distance learning led to the experience of higher learning losses (Engzell et al., 2021). In both low-income areas and middle- and high-income countries, there was an unequal ability to respond and plan to cope with the learning losses from school closures (Nusrat, 2021). To ensure this, the first step was to assess student learning when they returned to the classroom and identify learning gaps through formative assessment of literacy and numeracy skills. It was crucial to train teachers in formative and summative assessment and remedial education to help students catch up on learning gaps after schools reopen. This was important because one of the biggest predictors of early school leaving is falling behind in academics, particularly from low-quality schools (Branson et al., 2014), and amid the impact of the pandemic, learning gap was likely to be severe for most children, particularly among the most vulnerable groups (Rahman & Sharma, 2021). Some educators even thought that schools and all other educational institutions should reopen soon to keep students and teachers safe, and a two-year learning recovery plan should be taken (Roy et al., 2021). For example, school attendance could be seen as a key indicator to be monitored after schools reopen to counteract the high risk of reduced school attendance and persistent learning gap. Administrative data could serve as an early warning signal to identify students who were most likely to drop out. Another potential indicator was the percentage of students who received regular support from teachers (Li et al., 2021). Furthermore, the learning gap encountered during online instruction, if not addressed, was likely to have a financial impact on society in the form of reduced productivity and development. (Oruche, 2021).

3. Methodology of the Study

Since both qualitative and quantitative data were required to determine the objectives of the study mentioned above, this study employed a multi-strategy mixed method research design (Robson, 2011). This research used performance tests for students and Key Informant Interviews (KII) for teachers to gather data from the field.

Sample and Sampling Strategy

The geographic coverage of this study was limited to Rajshahi district. The study population were-

- Total of 10 Secondary Schools from Rajshahi
- All the Grade 6 and Grade 8 students at these selected secondary schools
- Headteachers and teachers at these secondary schools.

Based on this tentative estimation, the representative sample size for the study was 355 students considering a confidence level of 95% and confidence interval of ±5. Finally, 180 students of Grade 6 and 177 students of Grade 8 from the selected secondary schools participated in the test as sample. The study team interviewed 10 head teachers and assistant teachers (where head teachers were not available) purposively selected from those schools to collect data related to teaching-learning practices during pandemic, challenges faced by schools, students' performances and the factors contributed to the learning gap.

Data collection tools

The performance test was conducted to explore the current education status and the learning gap of the children in the selected location following the framework of Learning Assessment of Secondary Institutions (LASI) 2015 (DSHE, 2016). In addition, for collecting data from head teachers and assistant teachers of secondary schools, a KII questionnaire was used. The data collection tools were piloted in two schools in November and were modified and finalized. The data enumerators were engaged in this stage so that they get acquainted with the tools and data collection process.

There was nothing in the study which are harmful to respondents regarding legal or medical grounds. No one was forced to provide information for the study. The objectives of the study were clearly explained to all the respondents before collecting data from them. The enumerators abstained from collecting data from those who denied or showed any kind of disinterest in providing information. Thus, verbal consent of the respondents was taken prior to any data collection or any interaction which contributed to the deliverables. Confidentiality of data was maintained, and in the report name of the respondents were not revealed. Nevertheless, the child safeguarding policy was employed at every stage of this research, and the team members complied with the Child Protection Policy.

Data analysis method

This mixed method study collected both quantitative and qualitative data. Quantitative data was analyzed using MS Excel and SPSS. These data were compared to the data from the LASI 2015 to measure the learning gap. In addition, qualitative data was analyzed following data-driven thematic strategy proposed by Braun and Clarke (2006, p. 87) in a systematic way, with quantitative findings feeding into qualitative findings to clarify provable reasons for quantitative findings and leading to compelling study conclusions.

4. Findings

The sample of students in this study consisted of a relatively equal number of girls and boys. In total, there were 171 (48%) girls and 186 (52%) boys, indicating a slight majority of male students in the sample. However, the difference between the number of girls and boys was not significant.

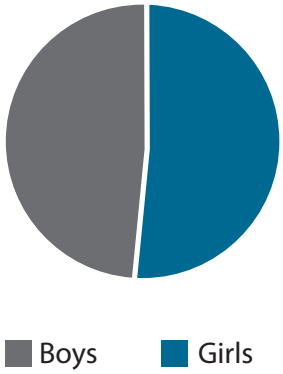

Figure 3: Demographic information of the students

When we look at the breakdown by grade level, we see a similar pattern in both grade 6 and grade 8. In grade 6, there were 85 girls and 95 boys, and in grade 8, there were 86 girls and 91 boys. Again, the difference between the number of girls and boys was not significant.

Table 3: Gender and Grade-wise Students' Information

Gender	Grade 6	Grade 8	Total
Girls	85	86	171 (48%)
Boys	95	91	186 (52%)
Total	**180**	**177**	**357**

This gender balance in the sample is important because it allows us to analyze the impact of the pandemic on both boys and girls equally. It also provides us with a comprehensive view of the performance of students in different grades and how it has been affected by the pandemic. However, we need to keep in mind that the sample is limited to a specific region and may not be representative of the entire population of students in Bangladesh.

4.1 Students' Performance in Bangla

Before assessing students' competencies, setting benchmarks for Bangla Language was necessary. The study followed a benchmark for Bangla Language proficiency with five bands adopted from LASI, DSHE, 2016.

According to the LASI 2015 (DSHE, 2016), as they move up the scale, students demonstrate the aptitude or capacity to carry out more challenging tasks. The scale clearly shows that Level 2 and below kids can only read simple texts when it comes to reading. Additionally, they can only access information that is prominently and openly expressed. The middle level students (Levels 3 and 4) read increasingly complicated texts and demonstrate the capacity to recover information from such texts even when it is not immediately obvious. They also start to make basic interpretations of the information. Students complete more challenging activities, such making inferences, at higher levels (Level 5 and above). They also demonstrate the capacity to understand more complicated data. This level corresponds to responses that ask

pupils to write back. Students can draw relatively sophisticated conclusions at the top level of this scale. Students advance in vocabulary by employing more challenging, less common phrases and words in context. They also become better at spelling longer, uncommon words. On this scale, a mid-level talent is the ability to apply punctuation and grammatical ideas like tense correctly in context.

The findings suggest that there has been a decline in Bangla language competency among students in both grade 6 and grade 8, as compared to LASI 2015. Specifically, a large majority of students in both grades performed at Band 3 or below. This is concerning as Band 3 indicates only a basic understanding of the language, which is not sufficient for effective communication or comprehension of complex texts.

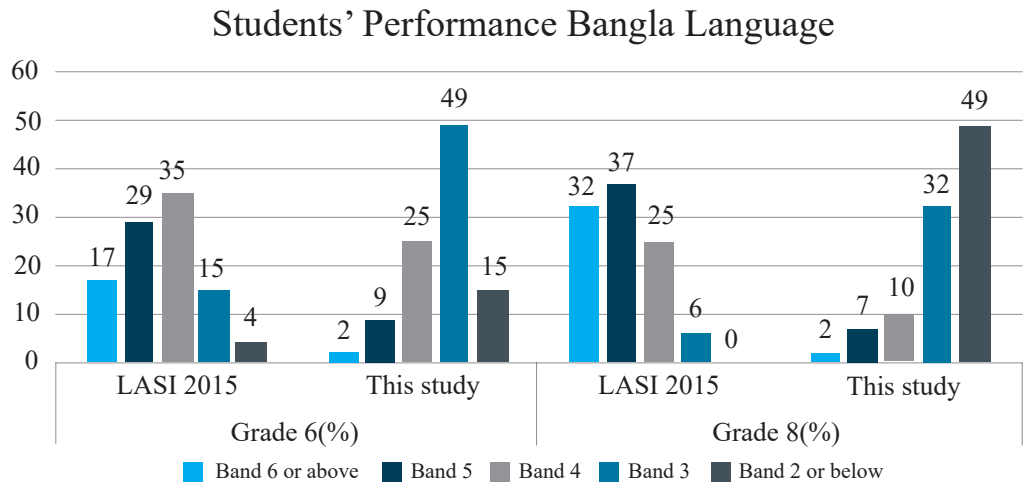

Figure 4: Students' Performance in Bangla

Furthermore, in LASI 2015, a small percentage of students in grade 6, and none in grade 8, performed at Band 2 and below. Whereas, in this study, findings show that 15% in grade 6 and 49% in grade 8 performed at this band level. At this level, students can only understand simple phrases and locate information in basic texts, indicating a significant learning gap.

A significant number of students performed at band five or above in LASI 2015, which decreased significantly after the COVID-19 pandemic in this study.

It is worth noting that the lower performance in the upper bands may be attributed to the pandemic-induced disruptions to the education system, as students may not have received adequate support or opportunities to develop their language skills. However, further research is needed to investigate the underlying causes of the decline in language competency and to develop effective strategies to address the learning gap.

4.3 Students' Performance in Mathematics

Assessment of students' competencies in mathematics required benchmarks. Thus, based on the items and skills assessed in LASI 2015, the following scale for Mathematics was adopted in this study.

As per the LASI 2015 report (DSHE, 2016), students in band two or lower in mathematics are capable of performing elementary arithmetic operations, formulating mathematical expressions from straightforward circumstances, making straightforward conclusions from data, and identifying well-known 2D and 3D shapes. Students in Bands 3 and 4 are capable of handling more challenging assignments including multi-step problem solving and setting up and resolving straightforward algebraic equations. working with geometrical concepts in straightforward situations where pupils are familiar with the mathematical techniques to solve them. The complexity of the exercises increases at the higher level, and students are expected to apply the mathematical concepts they have learned in one area to others as well as to challenging familiar scenarios that they may not be familiar with. Students in this band are expected to defend the procedures and work out feasible solutions.

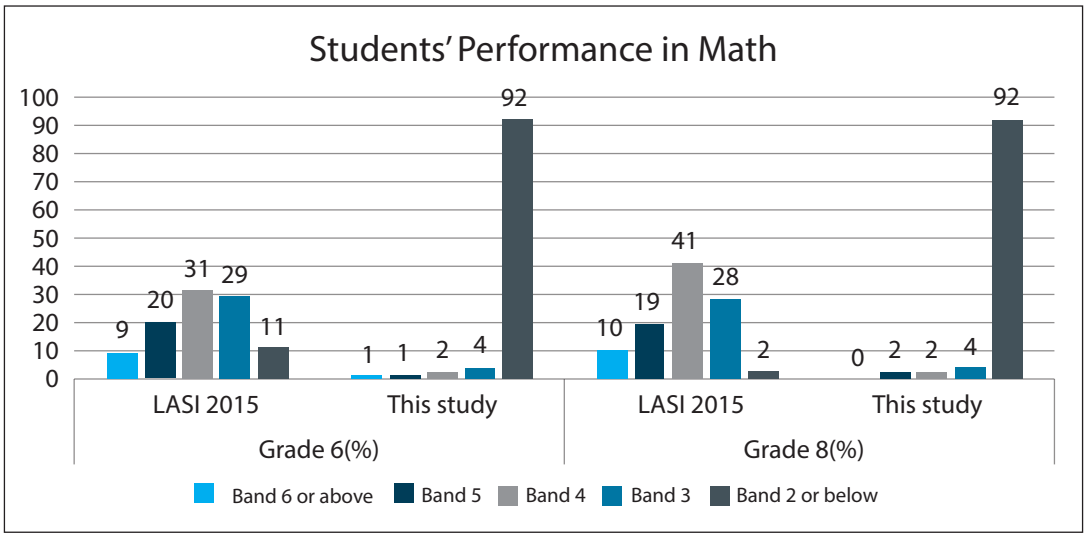

Figure 5: Students' Performance in Mathematics

Data shows that students performed at lower bands in mathematics in both grades 6 and 8. Most of the students (92%) performance belongs to band two or below in both grades, which was only 1% in grade 6 and 2% in grade 8 before the pandemic. About one-third of students of both grades in LASI performed at band five or above, which is completely reversed in this study. Students' performance in the LASI formed a normal curve throughout the bands, which has been changed in this study. For instance, the mathematical competence of 31% of students in grade 6 and 41% in grade 8 are in band 4, whereas only 2% of students in grade 6 and grade 8 were found in this band in this study. It shows a huge achievement gap in students' performance in math.

The findings of the study indicate a significant decline in students' mathematical competencies in both grades 6 and 8 during the pandemic. The majority of students performed at lower bands, which is a matter of concern as the ability to perform at higher bands is an important indicator of mathematical proficiency. The pandemic seems to have had a negative impact on student's ability to perform at higher levels of mathematical competence, as evidenced by the reduction in the proportion of students performing at bands 4 and above.

This significant decline in students' mathematical competence can be attributed to the COVID-19 pandemic, which disrupted regular classroom teaching and learning for a considerable period. The reverse trends of students' performance, from a large percentage of students in higher bands to most students in lower bands, indicate a widening achievement gap. This finding suggests that there is a need for interventions to support students' learning to bridge the learning gap. Teachers and education experts, along with policymakers, need to develop appropriate strategies to ensure that students acquire a strong foundation in mathematics, which is essential for their future academic success.

4.4 Grade and Subject wise Overall Performance

The test results indicate that there is a significant learning gap in mathematics among students in both grade 6 and grade 8. This could be due to a variety of reasons, such as a lack of access to quality online resources, inadequate support from teachers and parents, and the difficulty of learning mathematics remotely. On the other hand, the better performance of students in Bangla language skills could be attributed to the fact that it is their mother tongue, and they have more exposure to it in their daily lives.

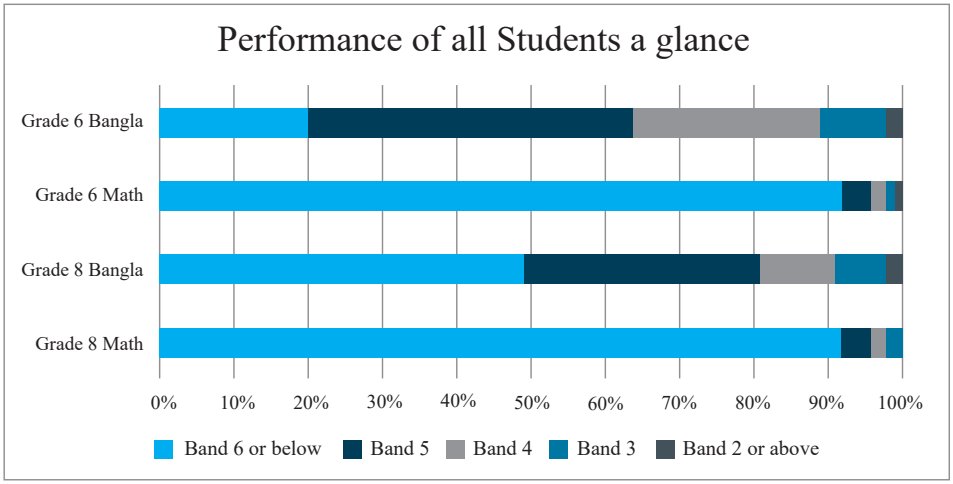

Figure 6: Performance of the students in the test

It is also noteworthy that the performance of grade 6 students is better than grade 8 students in Bangla. This could be because grade 6 students may have received better support and guidance from their teachers and parents during remote learning, as they are still new to the school environment.

Overall, the results highlight the urgent need for targeted interventions to address the learning gap in mathematics among students in both grades. Schools, teachers, parents, and policymakers must work together to identify and implement effective strategies to support students in their learning, especially in subjects like mathematics, where the gap is the widest.

4.5 Grade, Subject, and Gender wise Overall Performance of the Students

The data from the study suggests that in most cases, girls performed better than boys in both Bangla and Mathematics. Girls in grade 6 outperformed boys in both subjects, whereas girls in grade 8 performed better than boys only in Bangla but not in Mathematics. The reasons for this gender gap in performance could be multifaceted and complex. It is possible that girls were more motivated to study and perform well in academics, or they might have had more support from their families in terms of study time and resources. On the other hand, boys might have been more involved in income-generating activities, such as farming or other work, due to economic hardship during the pandemic. It is important to further investigate the factors that contributed to the gender gap in performance to design targeted interventions to address this issue.

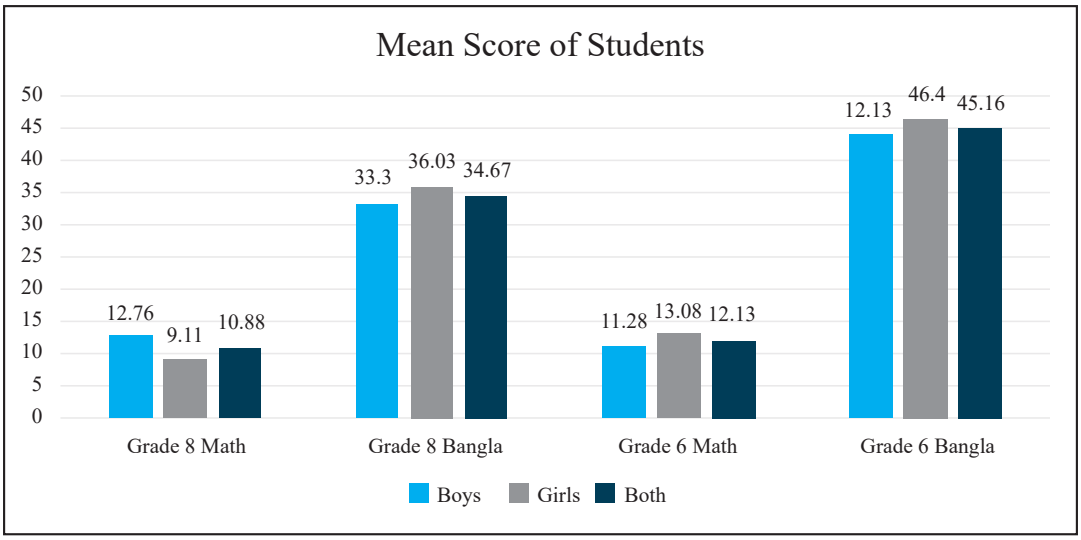

Figure 7: Grades and Subjects wise average score of the students in the test

4.6 Factors Impacting Students' Learning

There were several factors that impacted students' learning negatively during the pandemic. Some of these factors include:

- **Lack of access to technology and digital resources:** The shift to online learning during the pandemic left many students without access to the necessary technology or digital resources to keep up with their studies.

- **Lack of access to teachers:** Students had limited access to their teachers during the

pandemic, which made it difficult for them to get the help they needed to understand the material.

- **Economic hardship:** Many families experienced economic hardship during the pandemic, which made it difficult for them to provide their children with the necessary resources and support to continue their education.
- **Mental health and emotional wellbeing:** The pandemic had a significant impact on student's mental health and emotional wellbeing, which may have affected their ability to focus on their studies.
- **Disruption to routines and structures:** The disruption to students' routines and structures during the pandemic may have affected their ability to learn and retain information.

5. Discussion, Conclusion, and Recommendations

Most of the teachers agreed that the pandemic affected students' literacy and numerical skills drastically. Although the government broadcasted digital classes on TV and schools on their own initiated online classes through different social media platforms, most of the students were out of these arrangements due to not having access to devices and the internet. Other reasons included the illiteracy and unawareness of the parents and community people.

Besides the online classes, teachers assigned homework using worksheets and assignments provided by DSHE to the students, which could not succeed for the same reasons mentioned earlier. As one of the heads teachers opined-

> *"We have provided worksheets to evaluate students' literacy and numeric skills. In most cases, the initiatives have failed to evaluate the students as most of them didn't participate in this activity. The school authority has not taken any particular step to evaluate the learning loss, and still, they don't have any particular planning to do so in the future."*

The pandemic has created a great learning gap though the government and other stakeholders have taken several steps. To minimize the learning gap, many schools have taken various initiatives, e.g., establishing a community-based committee to find out the dropout children and bring them back to the schools, meeting with parents and caregivers, community-based small learning groups, etc. Although many students participated in the worksheet activities, this support was inadequate from every dimension, and students did not submit their worksheets to schools.

Furthermore, the teachers, students, and parents didn't have any training or orientation on distance learning or related issues. Similarly, they didn't get any advantage from the online teaching-learning activities run by the government. Almost half of the students missed or couldn't find any way to participate in online education activities.

The students (even many teachers also) did not understand the homework they were given. Teachers noticed that they got the homework given was written by someone else. It might happen that there was someone educated at home or students of senior classes who helped.

Students faced challenges regarding access to educational opportunities as a significant portion of them lacked devices and internet connections to join online classes. But a portion of the students got access and continued their education due to these initiatives. Sometimes, it affects them negatively as some children are reported for mobile addiction due to overuse of mobile phones during this period.

While addressing the crisis of the learning gap, we should take a strength-based approach, focusing on what they know rather than how far behind they have fallen. The possibilities are endless if we accept this approach. Funding for educational technology must be included in education investments, considering what has worked well in various contexts around the world. Evidence shows that keeping schools and preschools open should be prioritized, as should ensuring teachers have adequate support to help children learn, adjusting instruction to support children's learning needs, and focusing on important foundational skills.

Kuhfeld et al. (2020) suggest six fundamental guidelines that districts might put into practice in order to guarantee a pleasant and productive educational experience despite the difficulties caused by the pandemic. They first recommend developing customized three-year lesson plans for each child, taking into account their academic, social, and emotional requirements and using data to guide the planning process. Second, it is critical to give top priority to efforts that aim to re-engage and assist students who have been most negatively impacted by the disruptions caused by the pandemic. Thirdly, it is advised to use early diagnostic systems, longer learning time, and tutoring to help youngsters improve their early math and literacy skills. Along with the safe reopening of schools for in-person education, it is encouraged to offer at least one high-quality remote learning alternative. Another recommendation is to test out alternative learning frameworks, like flexible scheduling and new methods for subject mastery. A supportive learning environment must be fostered by developing systems of support for educators and families that are consistent and aligned. Schools can attempt to provide a comprehensive and successful approach to education during these type of difficult situations by putting these concepts into practice.

6. Recommendations and conclusion

To address the learning gap among students in Grades 6 and 8, several key recommendations are proposed. Firstly, prioritize teacher quality and training through comprehensive professional development and adequate teaching materials. Secondly, implement modern teaching methods, like active learning and problem-based learning, to foster student engagement and performance. Thirdly, integrate technology thoughtfully into the learning process to enhance student participation while considering the digital divide. Fourthly, conduct formal reviews of relevant content at the beginning of subsequent grades to remediate mild learning gaps. Additionally, develop curriculum materials and assessments aligned with national standards to

improve learning outcomes. Improving the learning environment with essential facilities such as libraries and labs is essential. Engaging parents and the community in the education process and supervising remedial activities through education offices can further support students' progress.

Based on the data collected from 10 purposively selected secondary schools in Rajshahi, it is evident that the COVID-19 pandemic has caused a significant learning gap among students in Bangla and Mathematics. The data shows that students' performance in both subjects has declined, with most students performing at band two or below in Mathematics, which was only 1% in grade 6 and 2% in grade 8 before the pandemic. Similarly, most students' language performance is at Band 3 or below in Bangla, which was better in LASI 2015. Furthermore, the data indicate that girls outperformed boys in most cases, especially in grade 8 in both subjects. This could be attributed to the fact that boys were more involved in income-generating activities, such as farming, during the pandemic, leading to reduced study time. Teachers, in their in-depth interview, mentioned that the online classes were not accessed by many of the students as they did not have access to devices and internet facilities. However, teachers followed another strategy by giving assignments to the students, which was also doomed to failure because of the unawareness of students and their guardians. Due to the pandemic, schools were closed for almost one and a half years. Thus, students forgot their learning, and thus, they performed poorly on the test.

However, it is important to note that this study only collected data from a specific region and a small number of subject areas, which limits the generalizability of the conclusions. Additionally, the data was collected from students when they were about to finish their school year, and by this time, already one year had passed after school reopening. Thus, the study can only tell part of the story of learning during the pandemic. In conclusion, the study highlights the urgent need for measures to address the learning loss and achievement gap caused by the pandemic, especially in Mathematics. Policymakers and educators need to come up with targeted interventions that address the needs of disadvantaged students, including boys and those from low-income families, to ensure that they are not left behind.

Acknowledgement

We sincerely thank the National Academy for Educational Management (NAEM) for funding this research. We also extend our gratitude to all the participants for their voluntary involvement, which was essential to the completion of this study.

Reference

Ahmed, M. (2019). Education Response to Covid-19 in Bangladesh – A Missing Opportunity? Bangladesh Education Journal. 18(1). pp 7-22.

Aurini, J., & Davies, S. (2021). *COVID-19 school closures and educational achievement gaps in Canada: Lessons from Ontario summer learning research.* Canadian Review of Sociology. https://doi.org/10.1111/cars.12334

Azevedo, J. P., Goldemberg, D., Montoya, S., Nayar, R., & Rogers, H. (2021). Will Every Child be Able to Read by 2030? *Policy Research Working Paper: World Bank*. https://gaml.uis.unesco.org/wp-content/uploads/sites/2/2021/03/Azevedo-et-al-2021_Will-Every-Child-Be-Able-to-Read-by-2030.pdf

Branson, N., Hofmeyr, C., & Lam, D. (2014). Progress through school and the determinants of school dropout in South Africa. *Development Southern Africa, 31*(1), 106–126. https://doi.org/10.1080/0376835X.2013.853610

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology,* 3(2), p.77–101.

Conto, C. A., Akseer, S., Dreesen, T., Kamei, A., Mizunoya, S., & Rigole, A. (2020). COVID-19: *Effects of school closures on foundational skills and promising practices for monitoring and mitigating learning loss* (pp. 1-30). UNICEF Office of Research-Innocenti.

Directorate of Secondary and Higher Education (DSHE). (2016). *Learning Assessment of Secondary Institutions* (LASI) 2015. Dhaka.

Donnelly, R., & Patrinos, H. A. (2021). Learning loss during Covid-19: An early systematic review. *PROSPECTS*. https://doi.org/10.1007/s11125-021-09582-6

Dorn, E., Hancock, B., Sarakatsannis, J., & Viruleg, E. (2020). COVID-19 and student learning in the United States: The hurt could last a lifetime. *McKinsey & Company*.

Engzell, P., Frey, A., & Verhagen, M. D. (2021). Learning loss due to school closures during the COVID-19 pandemic. *Proceedings of the National Academy of Sciences, 118*(17), e2022376118. https://doi.org/10.1073/pnas.2022376118

Fore, H. H., & Malpass, D. (2021, December 20). *Reversing the pandemic's education losses.* World Bank Blogs. https://blogs.worldbank.org/voices/reversing-pandemics-education-losses

Goudeau, S., Sanrey, C., Stanczak, A., Manstead, A., & Darnon, C. (2021). Why lockdown and distance learning during the COVID-19 pandemic are likely to increase the social class achievement gap. *Nature human behaviour, 5*(10), 1273-1281. https://doi.org/10.1038/s41562-021-01212-7

Hammerstein, S., König, C., Dreisörner, T., & Frey, A. (2021). Effects of COVID-19-related school closures on student achievement-a systematic review. *Frontiers in psychology, 12,* 746289.

Hassan, H., Islam, A., Siddique, A., & Wang, L. C. (2021). "Low-tech" distance education: A remedy of the learning loss due to the COVID-19 pandemic. CDES Policy Brief Series: Monash University. https://www.monash.edu/__data/assets/pdf_file/0008/2705057/CDES-PB2021N02-V1.pdf

Hevia, F. J., Vergara-Lope, S., Velásquez-Durán, A., & Calderón, D. (2022). Estimation of the fundamental learning loss and learning poverty related to the COVID-19 pandemic in Mexico. *International Journal of Educational Development, 88,* 102515. https://doi.org/10.1016/j.ijedudev.2021.102515

Kuhfeld, M., Soland, J., Tarasawa, B., Johnson, A., Ruzek, E., & Liu, J. (2020). *Projecting the potential impacts of COVID-19 school closures on academic achievement*. https://doi.org/10.26300/CDRV-YW05

Li, Z., Sharma, U., & Matin, M. (2021). Impact of COVID-19 *on Primary School Students in Disadvantaged Areas of Bangladesh.* Asian Development Bank. https://doi.org/10.22617/BRF210471-2

Ngwacho, A. G. (2020). COVID-19 pandemic impact on Kenyan education sector: Learner challenges and mitigations. *Journal of Research Innovation and Implications in Education, 4*(2), 128-139.

Nusrat, M. (2021). Educational Response Toward Covid-19 Pandemic: Perception, Problems and Prospects; A Bangladeshi Context. *European Journal of Education and Pedagogy, 2*(5), 25–32. https://doi.org/10.24018/ejedu.2021.2.5.163

Oruche, C. A. (2021). COVID-19 Pandemic: The Impact of Online Schooling on Students' Engagement with School Work and Physical Activity. *OIRT Journal of Humanities and Social Sciences, 1*(1), 1–4. https://doi.org/10.53944/ojhss-2101

Parker, A. (2021). Solutions to Pandemic-Induced Global Learning Loss. *Borgen Magazine*. https://www.borgenmagazine.com/global-learning-loss/

Pasani, C. F., Amelia, R., & Hassan, Z. (2021). Learning loss and education inequality in Indonesia (mapping the potential, consequences, and the covid-19 crisis). *Review Of International Geographical Education Online, 11*(10).

Rahman, T., & Sharma, U. (2021). *A Simulation of COVID-19 School Closure Impact on Student Learning in Bangladesh.* World Bank. https://doi.org/10.1596/35043

Robson, C. (2011). *Real-world research: A resource for users of social research methods in applied settings.* 3rd ed. Chichester: Wiley.

Roy, A. K., Mou, S. I., Kabir, H., & Hasan, M. K. (2021). The aftermath of prolonged academic institutions' closure: Time to reopen safely. *Bioresearch Communications, 7*(2), 1038–1041. https://doi.org/10.3329/brc.v7i2.54379

UNESCO (2021). Recovering Lost Learning: what can be done quickly and at scale? UNESCO COVID-19 *Education Response*. https://unesdoc.unesco.org/ark:/48223/pf0000377841

UNESCO, UNICEF & World Bank (2021). *COVID-19 Learning Losses Rebuilding Quality Learning for All in Middle East and North Africa. (2021)*. https://www.unicef.org/mena/media/14501/file/Executive%20Summary%20

UNICEF. (2022). *Learning loss must be recovered to avoid long-term damage to children's well-being, new report says:* Press Release. https://www.unicef.org/bangladesh/en/press-releases/learning-loss-must-be-recovered-avoid-long-term-damage-childrens-well-being-new

UNICEF. (2021). *The future of 37 million children in Bangladesh is at risk with their education severely affected by the COVID-19 pandemic: Press Release.* https://www.unicef.org/bangladesh/en/press-releases/future-37-million-children-bangladesh-risk-their-education-severely-affected-covid

UNICEF. (2020). *How COVID-19 Changed Lives - Voices of Children.* https://www.unicef.org/georgia/stories/how-covid-19-changed-lives-voices-children

UNICEF & UNESCO. (2021). *Bangladesh Case Study: Situational Analysis on the Effects of and Responses to COVID-19 on the Educator in Asia*. https://www.unicef.org/rosa/media/16481/file/Bangladesh%20Case%20Study.pdf

Van Cappelle, F., Chopra, V., Ackers, J., & Gochyyev, P. (2021). An analysis of the reach and effectiveness of distance learning in India during school closures due to COVID-19. *International Journal of Educational Development, 85,* 102439. https://doi.org/10.1016/j.ijedudev.2021.102439

World Bank. (2022, January 26). *Learning loss must be recovered to avoid long-term damage to children's wellbeing and productivity, a new report says.* Retrieved from https://www.worldbank.org/en/news/press-release/2022/01/26/learning-loss-must-be-recovered-to-avoid-long-term-damage-to-children-s-wellbeing-and-productivity-new-report-says

World Bank. (2021). *Keeping Bangladesh's Students Learning During the COVID-19 Pandemic.* https://www.worldbank.org/en/results/2021/04/18/keeping-bangladesh-s-students-learning-during-the-covid-19-pandemic

Yarrow, N., Masood, E., & Afkar, R. (2020). Estimates of COVID-19 impacts on learning and earning in Indonesia: How to turn the tide. https://openknowledge.worldbank.org/server/api/core/bitstreams/fe106b4f-edf3-5f1b-9272-7c52136edef0/content

NAEM JOURNAL
ISSN 1997-4248, eISSN 2959-4561
Volume 17 Issue 02
Serial 34
https://Doi.org/10.59629/NAEM 20213202.1601

Assessing the Level of Using Machine Learning Approaches in Higher Educational Institutions of Bangladesh: A Study of Three Science and Technology Universities

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Abstract

This study aimed at assessing the current state of machine learning (ML) adoption in Bangladesh's higher education system. A survey among 162 respondents revealed that 55% of students find ML techniques unsatisfactory, with major challenges such as lack of skilled manpower, budget constraints, high AI costs, and government support. However, 68.4% of students believe ML presents an opportunity, while 26.5% do not. To address these challenges, the study proposes three recommendations: organizing seminars, securing funding, and procuring technology. By investing in skilled manpower, resources, and technology, Bangladesh can become better prepared for ML-driven digital learning and unlock the full potential of AI and ML in the education sector. Future research should focus on evaluating the effectiveness of proposed solutions and exploring additional strategies to ensure successful integration of ML techniques in higher education, ultimately leading to improved teaching and learning outcomes.

Keywords: Machine learning, Higher education, Bangladesh, and Challenges

1. Introduction

Bangladesh has made significant progress towards digitization while mainly depending on its agro-based economy. Almost every area of life has changed as a result of industrialization, automation, and innovation (Fahmida, 2021). At the heart of these developments is the use of machines to replace manual methods to everyday issues. Machine learning is a crucial element of Bangladesh's Fourth Industrial Revolution (4IR) standards, which are being pursued (Shibli, 2022). By utilising techniques from mathematics, statistics, and computer science, the "artificial intelligence" (AI) component of machine learning (ML) automates the biological

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learning process in humans. By using layers of artificial neurons to abstract the underlying issue and generate ground-breaking findings in numerous domains, Deep Learning (DL), a novel subject, enables ML. From an academic and teaching-learning standpoint, the higher education (HE) sector is a challenge domain for employing DL to address open questions (Hannan et al., 2021). In order to address unresolved challenges from an academic and teaching-learning perspective, DL is being used in the higher education (HE) sector (Hannan et al., 2021). Particularly in higher education, where data mining, pattern recognition, and predictive analysis are utilised to understand problems with learning systems, ML is swiftly gaining ground. These approaches support the creation of initially impractical solutions. As a result, ML is thought to be the HE sector's most leveraged component (Bates, T. et al., 2020). As a developing country, Bangladesh must overcome a number of challenges in order to include ML into its higher education system.

Teachers are the front line in higher education, as they are in all levels of education. Digital tools and software can drastically change how traditional classroom instruction is delivered. The lack of training in data-driven analytical skills, research-oriented data interpretation, ML resource management, perspectives on human-machine interaction, and the use of robots to perform repetitive tasks are just a few of the difficulties teachers and instructors face in adjusting to this change (Rahman, M., 2022). Additionally, explaining modern technical breakthroughs to students might be difficult.

Machine learning (ML) has a substantial impact on Bangladesh's higher education system, providing chances for improvements in virtual teaching assistants, individualised tutoring programmes, and intelligent educational content. Deep learning chatbots can perform as virtual professors, analyse domain-specific data, and offer individualised tutoring services on online learning platforms like Coursera, edX, and Udacity.

1.1 Statement of the problem

With a total population of 160 million and a population density of 962 persons per square kilometre, Bangladesh, a country in South Asia, is one of the most densely inhabited nations in the world. According to UNICEF 2010 data, adult literacy now stands at 54% and primary school enrollment is at 81%. The government is working to develop inclusive education and achieve universal education.

Building on its digitization initiatives from the previous decade, Bangladesh has used artificial intelligence (AI) as a catalyst to facilitate the nation's digital transformation. According to the Honorable Prime Minister Sheikh Hasina, the government plans to introduce 5G by 2023, along with the rapid integration of big data, block chain technology, artificial intelligence, robots, and the Internet of Things. Given that AI is seen as a crucial technology that will influence the future, this AI strategy document serves as a model for the nation's upcoming technological advancement.

Nevertheless, with over 163 million residents, including over 40 million students, living in a 147,570 km2 territory, Bangladesh has serious job issues. The main concern is the potential loss of employment prospects brought on by the introduction of AI, which could eventually

supplant human abilities. In 2021, nations with high population densities like Bangladesh, where the majority of talent is low-level, should pay particular attention to this issue. The World Economic Forum predicts that robotics and artificial intelligence will likely create more jobs than they destroy. With an estimated 133 million new jobs forecast to be generated by the Fourth Industrial Revolution, adoption of AI and related technologies is anticipated to boost economic growth and offer a myriad of new job opportunities.

The prediction is not wholly rosy, though, as 75 million jobs may be lost by 2022, according to estimates. Retraining the populace in the proper skills is necessary for a smooth transition to the new period of the fourth industrial revolution. Graduates from higher education must work to create the capital infrastructure of the future and change Bangladesh's labor-intensive manufacturing strategy into knowledge-intensive ecosystems.

1.2 Rationale of the study

Significant discussions have been sparked by the quick development of technology and the ensuing disparities in learning possibilities. Big data and AI in particular have seen the exponential expansion of technical developments, which has led to the creation of a new paradigm and novel learning environment. For instance, the Nokia 1100 was a popular mobile phone in 2002, 20 years ago. Nevertheless, 75% of people in sub-Saharan Africa use cell phones that are many generations more modern (GSMA Intelligence, 2020). The COVID-19 pandemic has made it clear that the hurdles to entry are changing from technical needs to the willingness and need for adoption. To allow for the creation of tools and the improvement of abilities, higher education (HE) systems must incorporate machine learning (ML). In teaching-learning activities, a thorough ML system will assist in bridging the gap between teachers and students. Additionally, it will give teachers the ability to automate time-consuming administrative tasks and enhance student outcomes. Early exposure to technology will improve students' preparation for the job market because they will need to access ML-driven employment markets in the future.

The teacher-to-student ratio in Bangladesh is approximately 1:30, which makes it difficult to provide individualized instruction depending on each student's needs (Staff correspondent, 2021). However, recent technical developments have demonstrated that a machine learning (ML)-based intelligent education system is capable of efficiently delivering lectures, grading exams, and giving feedback. Experience-based education has long been promoted by problem-based learning methodologies (Hmelo-Silver, C. E., 2004). A customized curriculum can be imagined as the future of higher education with the aid of ML.

Numerous ML educational uses have been made possible by the ongoing technology revolution, and the list keeps expanding. A thorough demographic analysis of such intelligent systems might help us better comprehend their application, spot problems, and find solutions. The results of this study is help to understand the extent to which machine learning is useful in the community, motivate the early adoption of machine intelligence (artificial intelligence and machine learning) as well as deep learning in Bangladesh's higher education system, and serve as a resource for the future.

1.3 Objectives of the study

The objectives of the research are:

1. To assess the level of using machine learning techniques in higher education institutions,
2. To investigate the existing barriers to applying ML to the HE system, and
3. To discover the challenges of using ML approaches in the university

1.4 Review of literature

Significant discussions have been sparked by the quick development of technology and the ensuing disparities in learning possibilities. Big data and AI in particular have seen the exponential expansion of technical developments, which has led to the creation of a new paradigm and novel learning environment. For instance, the Nokia 1100 was a popular mobile phone in 2002, 20 years ago. Nevertheless, 75% of people in sub-Saharan Africa use cell phones that are many generations more modern (GSMA Intelligence, 2020). The COVID-19 pandemic has made it clear that the hurdles to entry are changing from technical needs to the willingness and need for adoption. To allow for the creation of tools and the improvement of abilities, higher education (HE) systems must incorporate machine learning (ML). In teaching-learning activities, a thorough ML system will assist in bridging the gap between teachers and students. Additionally, it will give teachers the ability to automate time-consuming administrative tasks and enhance student outcomes. Early exposure to technology will improve students' preparation for the job market because they will need to access ML-driven employment markets in the future.

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On the other hand, online education is insufficient, according to the authors of (Mollah, A. H., and Parvin, 2020), to replace conventional classroom instruction in Bangladesh's higher education system. This is because practical exams, lab tests, field trips, and other HE activities

are required. Additionally, their research suggests that online education might be advantageous in emergency situations like the COVID pandemic. Long-term online education does, however, confront obstacles like a lack of ICT gadgets, inconsistent Internet connectivity, and health issues related to extended computer and smartphone use. The obstacles of online education, including the roles of institutions and governments, the digital divide, and public perception, were examined in another paper (Chowdhury, M. K., & Behak, F. B. P. (2022)).

For online teaching-learning, however, it is possible to address issues like the government's digitization strategy, the lack of seats in public universities, session backlog reduction, and permitting concurrent work and study. The authors of (Ehsan, S., 2021) explored the potential effects of AI on the future RMG business and advised that academic institutions should modify their course curricula accordingly. In another study (Hossin, M. S., et al., 2021), the authors looked at how HRM may be used to boost Bangladesh's industry. They discovered that integrating AI into HE courses could increase students' employability. Virtual reality (VR), augmented reality (AR), mobile platforms, and other technologies may be used to create an engaging learning environment without the requirement for an instructor's direct physical help (Khan, H. et al., 2021). The authors of this study created a system that enables students to learn in an immersive environment using AR and VR technologies. It can be accessed through a web interface even with inexpensive equipment. The authors claim that the method can assist students in comprehending complex subjects, and that because it doesn't rely on tutors, it is a cost-effective educational option. The literature makes it obvious that Bangladesh is transitioning towards a digital education system, so it is important to assess the performance of our HEI now and in the future. Therefore, before carrying out a sizable survey in the future, a pilot study in a controlled setting (like a science and technology university) is required.

Conceptual framework

The presented conceptual framework Table 4 provides an overview of the study's focal point: students' difficulties when utilizing machine learning in higher education institutions. The data collected through primary data collection methods, such as the survey questionnaire and face-to-face interviews, serve as inputs. The activities undertaken include descriptive and inferential

Table 1 Structure of conceptual framework

Problems	Inputs	Activities	Outputs	Outcomes	Impact
Limited use of machine learning in higher education	Primary data from respondents, Semi-structured questionnaire, Face-to-face interview	Gathering and analyzing data on machine learning use in higher education	Identification of current state and issues in machine learning implementation, Suggestions for improvement	Enhanced use of machine learning in higher education, Improved learning outcomes, increased institutional efficiency, Facilitated research environment	Advancement of the education system, Positive impact on society and economy

statistical analyses to determine the mean, mode, median, standard deviation, and frequencies of various variables that describe and characterize the population. The study's outputs comprise various visual aids, including graphs, tables, figures, and charts generated for analysis. The study's outcomes entail identifying diverse ways machine learning can enhance personalized learning, facilitate skill acquisition, foster collaborative learning environments, facilitate data sharing and storage, improve institutional efficiency, and provide researchers with an accessible research environment. Ultimately, the study aims to contribute to developing effective strategies for integrating machine learning in higher education institutions, which would enhance the quality of education and improve students' skills. There are specific concepts identified in this study. These concepts have been explained briefly in Table 4 and also here to provide a clear conception of this study.

Methodology

The study's methodology is covered in detail in this section, with an emphasis on the research methods used, sample approaches, data gathering tools, data collection processes, and data analysis processes.

3.1 Study areas

The study is focus on Computer Science and Engineering (CSE) and Statistics departments in three distinct science and technology universities: Noakhali Science and Technology, Sylhet Shahjalal Science and Technology, and Bangabandhu Sheikh Mujibur Rahman Science and Technology. The present study is based on primary data, which are obtained from participants who serve as the data source. The nature of the study follows qualitative approach.

3.2 Sampling

Table 2 outlines the sampling frame of the study.

Table 2 Data sampling frame

Selected University	Selected Department	Questionnaire distributed	Responded questionnaire	Finally selected	Percentage (%)
Noakhali Science and Technology	CSE	50	33	29	58
	Statistics	50	35	31	62
Shahjalal Science and Technology	CSE	50	27	22	44
	Statistics	50	26	20	40
Bangabandhu Sheikh Mujibur Rahman Science and Technology	CSE	50	32	30	60
	Statistics	50	28	24	58
Total		300	181	156	53.67

Two students were selected from each department at the universities chosen to participate in the study. However, two incomplete questionnaires resulted in a final sample of 10 respondents. Additionally, the heads of departments from six departments across the three universities were chosen to participate in the study.

Table 3 The demographic profiles of the valid respondents (current students)

Characteristics		Frequency	Percentage
Gender	Male	96	61.53
	Female	60	38.47
Age	21 to 23 years	88	56.41
	24 to 26 years	53	33.97
	26 years above	15	9.62
Level of study	Undergraduate final year	91	58.33
	Graduate	65	41.67

Table 3 presents the demographic characteristics of the valid respondents (N=156) asymmetrically distributed across gender, age, and level of study. Of the respondents, 96 (61.53%) were male, and 60 (38.47%) were female. The majority of participants, 56.41% (n=88), were between the ages of 21 and 23 years, while 33.97% (n=53) were between 24 and 26 years, and a minority of 9.62% (n=15) were 26 years and above. Concerning the level of study, approximately 58.33% (n=91) of participants were in their final (4th) year of undergraduate study, and 41.67% (n=65) were enrolled in graduate programs.

3.3 Data collection method

To give a complete picture of how machine learning is used in higher education institutions, especially in science, a number of factors are taken into account. Face-to-face interviews were used to administer semi-structured questionnaires to acquire primary data. To gather the data and verify its accuracy, a field supervisor and a data collector were hired. In order to confirm its validity, one data collector double-checks the questionnaire of another data collector.

3.4 Data analysis

Determining the mean, mode, median, and frequency of numerous variables describing and characterizing the population were the main goals of the descriptive statistical study. For analysis, pertinent graphs, tables, figures, and charts were produced. For the sake of inferential statistics, SPSS software was used to process ordinal data on respondents' opinions and viewpoints. The following tests and strategies were part of the inferential statistical plan.

3.6 Ethical consideration

The investigation adhered to the updated standards of the Helsinki Declaration. It was explained to respondents what the purpose of the study was, how it would be conducted, how long it would take them to participate, and how the findings would be used, including how they would be disseminated. This information was also included in the informed consent form. Respondents received guarantees that the information they provided would remain anonymous and that the research findings would always be presented as a whole rather than separately. The safety of the responders came before the project's objectives for the researchers.

Findings and discussion

The goal of the current study is to assess how widely machine learning methods are used in Bangladesh's higher education institutions. This section includes an examination of the demographic details of the study subjects, who offered significant context for the application of machine learning techniques.

4.1 Current student opinion regarding the current state of using machine learning techniques

Table 4 Student views of the current state of using machine learning techniques

Item	Never (%)	Rarely (%)	Undecided (%)	Sometimes (%)	Often (%)	Average score	Results
Did you ever implement any Machine learning techniques?	43	40	7	1	9	1.60	Rarely
Use of classification techniques	12.5	40.3	8.5	21.3	17.4	1.73	Rarely
Use of various regression techniques.	3.8	18.8	5.6	32	40	3.14	Sometimes
The usability of the decision Tree technique	40	35	12	5	8	1.48	Never
Have you ever used machine learning approaches to improve learning in higher education?	4.5	15.5	40	25	15	1.61	Rarely

According to Table 4, 40% of the students rarely use machine learning approaches. Around 42% of the students never implemented any machine learning approaches. While only 9% of students often use it. So, we may conclude that students do not frequently use different machine learning techniques. The table also depicts that almost 40% of the respondents rarely use some or any of the classification techniques.

On the other hand, just 17% of students often use different classification approaches, which is a low percentage. While 12.5% of the respondents never use any classification techniques. The result reflects that students lack proper knowledge about the usability of classification techniques. The study shows that nearly 40% of the respondents sometimes use some or all of the regression techniques. On the other hand, almost 32% of students consistently use different regression approaches, which is not so bad.

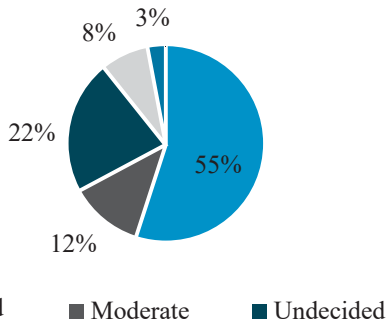
On the other hand, 3.8% and 18.8 % of the students, respectively, use it rarely or never. So, we may conclude that students have average knowledge about the usability of regression techniques. But it should be increased.

According to the above table, nearly 40% of the students never use the decision tree techniques. And around 35% of them rarely use decision trees. Whereas only 5% of the respondents sometimes use it. Nearly only 8% of the students often use decision trees. We may infer that the respondents have a scarcity of knowledge about decision trees' applicability.

The utilization of machine learning approaches to improve learning in higher education is demonstrated in the table above. Almost 40% of the respondents are undecided about this statement, and about 40% said they had used machine learning techniques. In contrast, a substantial portion of respondents, nearly 20%, never or rarely used it. The findings thus suggest that we should enhance its usability.

4.2 Student's view regarding the present status of machine learning techniques used in the department

Figure 1 Respondent views regarding the present status of machine learning techniques used in the department



Above pie chart shows that in response to the question about the present status of using the machine learning (ML) approach, almost 55% replied that this situation is terrible. In comparison, nearly 12% said moderate,which means not so good, and negligible noted that the statement is good or excellent. Overall, the scenario is worst in the university, so it should be increased with proper guidelines.

4.3 Alumni views regarding the current state of using machine learning techniques

Based on Table 5, it can be inferred that a significant percentage of alumni have limited or no experience with machine learning techniques. The data shows that 50% of alumni rarely

used machine learning approaches, and 29% never implemented them. Only 8% of alumni reported using machine learning approaches often. Therefore, it can be concluded that most alumni lack familiarity with machine learning techniques. The table also depicts that almost 50% of the respondents rarely use some or any of the classification techniques.

On the other hand, just 25% of students sometimes use different classification approaches, which is a low percentage. While 10% of the respondents never use any classification techniques. The result reflects that students lack proper knowledge about the usability of classification techniques. The study shows that nearly 40% of the respondents sometimes use some or all of the regressions.

Table 5 Alumni views the current state of using machine learning techniques

Item	Never (%)	Rarely (%)	Undecided (%)	Sometimes (%)	Often (%)	Average score	Results
Did you ever implement any Machine learning techniques?	29	50.5	10.5	2	8	1.23	Never
Use of classification techniques	10.4	50	12.5	25.6	11.5	1.82	Rarely
Use of various regression techniques.	2.5	15.5	12	40	30	3.56	Often
The usability of the decision Tree technique	48.5	30	10	8.5	3	1.39	Never
Have you ever used machine learning approaches to improve learning in higher education?	1.5	28.5	12	43	15	3.1	Sometimes

techniques. On the other hand, almost 30% of alumni consistently used different regression approaches, which was not so bad. On the other hand, 2.5% and 15.5 % of the students, respectively, use it rarely or never. So, we may conclude that alumni have average knowledge about the usability of regression techniques. But it should be increased. According to the above table, nearly 48% of the alumni never used the decision tree techniques. And around 30% of them rarely use decision trees. Where only 8.5% of the respondents sometimes use it. Nearly only 3% of the alumni often use decision trees, which is very low. We may infer that the respondents have a scarcity of knowledge about decision trees' applicability.

The utilization of machine learning approaches to improve learning in higher education is demonstrated in the table above. Almost 58% of the respondents said they had used machine

learning techniques. In contrast, a substantial portion of respondents, nearly 30%, never or rarely used it. The findings thus suggest that we should enhance its usability.

4.4 Respondent views regarding the familiarity of the ML approach

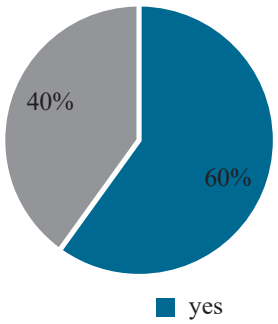
Table 6 Familiarity with the ML approach

Respondents	Rarely	Often	Almost	Regular
Students	18.8	42.5	29.1	8.8
Alumni	39.5	35.5	11.5	12.5

As shown in Table 6, the finding outlines that close to 42.5% of the students are often familiar with machine learning approaches. And around 29% of them are familiar with it. And only 18.8% of the respondents are rarely aware of it. Almost 9% of the students are consistently familiar with it. We may infer that the respondents have an extensive understanding of machine-learning approaches.

4.5 AI and ML have an Impact on your job

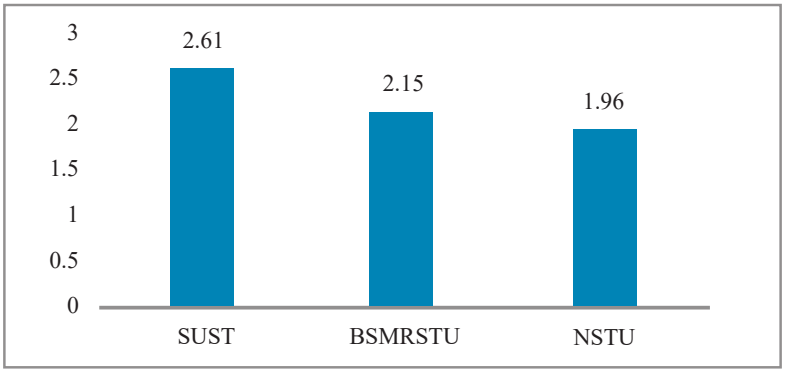
Figure 2 AI and ML have impact on jobs



The pie chart in Figure 2 shows that 60% of alumni think ML and AI impact their jobs. This means that ML significantly affects advancement opportunities, better compensation, less expected job stress, and job satisfaction.

4.6 Comparative Score of three selected university on the level of usability of ML approach

Figure 3 Comparative score of the different universities on the level of usability of the ML approach



The respondent overall scores for the usability of the ML approach are respectively 2.61, 2.15, and 1.96, which respondents rarely use on the issues that ML techniques do not adequately address in these universities. Therefore, using ML techniques in these universities is inadequate on the rating scale.

Conclusions

The development of machine learning (ML) methodology has the potential to enhance student teaching and learning outcomes in various industries, including education. However, the use of ML in higher education is not sufficient in Bangladesh's higher education sector, with only 55% of current students stating that the techniques are lousy. The majority are undecided about the situation, with only 4% of students believing machine learning presents an opportunity and 26.5% not. Nearly 55% of respondents use ML-based technologies for academic purposes, while 39.7% are unsure about their benefits.

Most students are comfortable with digital education, with 48% comfortable with digital education, while 7% are not comfortable with the concept. The main challenges faced in implementing AI and ML in universities include lack of skilled manpower and insufficient budget. The high cost of AI solutions and lack of government support contribute to these challenges.

Alumni respondents believe that AI and ML impact their job, with skilled graduates having more employment opportunities than unskilled graduates. Most respondents believe that the lack of AI and ML education is the primary cause of job dissatisfaction. Despite these challenges, a survey conducted among stakeholders from three science and technology universities revealed that 55% of respondents use ML-based technologies for academic purposes, while 39.7% are unsure about their usefulness.

Recommendation

- The Government can take the initiative to ensure the availability of infrastructural resources for the Institutions. Both government and universities should take proper steps to create more positive awareness and benefits of AI and ML to their stakeholders.
- Skilled manpower and insufficient budget raises,
- Workshop, training, and seminars for teachers should be increased,
- Increasing the budget for this education sector can resolve matters and help create more skilled manpower through training and development,
- Conduction of an adequate awareness program is necessary to educate faculty, and students especially science background to remove the perception gap of AI and ML based services.
- Collaboration with other researchers and industry.

Acknowledgement

We sincerely thank the National Academy for Educational Management (NAEM) for funding this research. We also extend our gratitude to all the participants for their voluntary involvement, which was essential to the completion of this study.

References

Khatun F. (2021, March 26). 50 Years of Bangladesh: Accelerating export-led industrialization, The Daily Star.

Shibli A. (2022, Feb 13). The economic impacts of the 4IR on Bangladesh, The Daily Star.

Hannan, Erin & Liu, Shuguang. (2021). AI: new source of competitiveness in higher education. Competitiveness Review: *An International Business Journal. ahead-of*-print. 10.1108/CR-03-2021-0045.

Roberts, B. W., and W. F. DelVecchio. 2000. The rank-order consistency of personality traits from childhood to old age: A quantitative review of longitudinal studies. Psychological Bulletin 126: 3–25.

Pocius, Gerald L. (1991) A Place to Belong. Community Order and Everyday Space in Calvert, Newfoundland. Montréal, Mc-Gill-Queen's University Press, 350 p. (ISBN 0-8203-1330-0)

Bates, T., Cobo, C., Mariño, O., & Wheeler, S. (2020). Can artificial intelligence transform higher education?, *International Journal of Educational Technology in Higher Education, 17*(1), 1-12.

Hosen, M. S. (2022). THE ICT ON THE EDUCATION SYSTEM AND IT'S FUTURE PROSPECTS IN BANGLADESH, AGPE *THE ROYAL GONDWANA RESEARCH JOURNAL OF HISTORY, SCIENCE, ECONOMIC, POLITICAL AND SOCIAL SCIENCE, 3*(2), 48–60. Retrieved from https://www.agpegondwanajournal.co.in/index.php/agpe/article/view/91

Rahman, M. (2022). Teacher Education: Theory and Practice in Bangladesh. *In Handbook of Research on Teacher Education* (pp. 111-140). Springer, Singapore.

Sultana, Nahida & Tamanna, Marzia. (2022). Evaluating the potentials and challenges of IoT in education and other sectors during pandemic: A case of Bangladesh. Technology in Society. 68. 101857. 10.1016/j.techsoc.2021.101857.

Lakshmi, Y. V., & Majid, I. (2022). Chatbots in Education System. Lakshmi, VY & Majid, I.(2022). Chatbots in Education System. University News: *A Weekly Journal of Higher Education, 60*(8), 15-18.

Singh, N., Gunjan, V. K., Mishra, A. K., Mishra, R. K., & Nawaz, N. (2022). SeisTutor: A Custom-Tailored Intelligent Tutoring System and Sustainable Education. Sustainability, 14(7), 4167.

Gupta, S. L., and Mishra, N. (2022). Artificial Intelligence and Deep Learning-Based Information Retrieval Framework for Assessing Student Performance. *International Journal of Information Retrieval Research (IJIRR)*, 12(1), 1-27.

Okeleke K., and Suardi S., (2020). The Mobile Economy Sub-Saharan Africa 2020, GSMA Intelligence, https://www.gsmaintelligence.com

Staff Correspondent (2021, Jun 18). UGC approves Tk 10,000 crore budget for public universities, The Daily Star.

Hmelo-Silver, C. E. (2004). Problem-Based Learning: What and How Do Students Learn? Educational Psychology Review, 16(3), 235–266. http://www.jstor.org/stable/23363859

IGI Global (2021). What is Higher Education Institution? Available online: https://www.igi global.com/dictionary/higher-educationinstitution/13096 (accessed on 7 September 2021).

Wahid-Uz-Zaman, M. G. M. (2019). Bracing Artificial Intelligence for Socio-economic Development: Opportunities, Implications and Challenges for Bangladesh: NDC E-JOURNAL, 18(1), 1-22.

Latif, W. B., Pervin, K., & Karim, M. (2021): THE IMPACT OF THE FOURTH INDUSTRIAL AGE (I4. 0) ON HIGHER EDUCATION (HE4. 0): IN THE PERSPECTIVE OF BANGLADESH, *International Journal of Education and Social Science Research, ISSN 2581-5148,* Vol. 4, No. 05; Sep-Oct 2021, DOI: http://dx.doi.org/10.37500/IJESSR.2021.4501

Chowdhury, A. I. (2021). Empowering Bangladesh with the Aid of Artificial Intelligence & Industry 4.0. Academia Letters, 2.

Islam Chowdhury, Atiqul. (2021). Empowering Bangladesh with the Aid of Artificial Intelligence & Industry 4.0. 10.20935/AL3137.

Mollah, A. H., & Parvin, S. (2020). Online higher education during Covid-19 pandemic in Bangladesh: Benefits, Problems and Prospects. Journal of International Politics, 2(4), 23-28.

Chowdhury, M. K., & Behak, F. B. P. (2022). Online Higher Education in Bangladesh during Covid-19: Its Challenges and Prospects. Utamax: *Journal of Ultimate Research and Trends in Education,* 4(1), 15-28.

Ehsan, S. (2021). Artificial Intelligence and the Future of Labor Market in Bangladesh. 10.1007/978-3-319-31816-5_4359-1.

Hossin, M. S., Ulfy, M. A., & Karim, M. W. (2021). Challenges in Adopting Artificial Intelligence (AI) in HRM Practices: A study on Bangladesh Perspective. *International Fellowship Journal of Interdisciplinary ResearchVolume, 1.*

Khan, H., Soroni, F., Mahmood, S. J. S., Mannan, N., & Khan, M. M. (2021). Education System for Bangladesh Using Augmented Reality, Virtual Reality and Artificial Intelligence, *In 2021 IEEE World AI IoT Congress (AIIoT)* (pp. 0137-0142). IEEE.

Dhawan, Shivangi & Batra, Gopal. (2021). Artificial Intelligence in Higher Education: Promises, Perils, and Perspective.

Ali, Mohammed & Kayed, Mohammed. (2020). Bibliographical Analysis of Artificial Intelligence Learning in Higher Education: Is the Role of the Human Educator and Educated a Thing of the Past? Bibliographical Analysis of Artificial Intelligence Learning in Higher Education. 10.4018/978-1-7998-4846-2.ch003.

Russell, S.; Norvig, P. (2003) Artificial Intelligence: A Modern Approach; Pearson: London, UK.

Bank of England (BoE). 2020. "The Impact of COVID on Machine Learning and Data Science in UK Banking." Quarterly Bulletin 2020 Q4. https://www.bankofengland.co.uk/quarterly-bulletin/2020/2020-q4/the-impact-of-covid-on-machine-learning-and-data-science-in-uk-banking.

McKinsey. 2020b. "The State of AI in 2020: Survey." https://www.mckinsey.com/business-functions/mckinsey-analytics/our-insights/global-survey-the-state-of-ai-in-2020.

Mosavi, A., Faghan, Y., Ghamisi, P., Duan, P., Ardabili, S. F., Salwana, E., & Band, S. S. (2020). Comprehensive Review of Deep Reinforcement Learning Methods and Applications in Economics. *Mathematics, 8*(10), 1640. MDPI AG. Retrieved from http://dx.doi.org/10.3390/math8101640

Sutton, Richard. (1996). Generalization in Reinforcement Learning: Successful Examples Using Sparse Coarse Coding.

Ilić, Milena & Popovic Sevic, Nevenka & ristić, bojan. (2020). Integrating Human Resources and Customer Relationship Management for Student Satisfaction in Higher Education: Gaining a Competitive Advantage.

Popenici, S.A.D., Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. *RPTEL* 12, 22, https://doi.org/10.1186/s41039-017-0062-8

Murad, Dina & Heryadi, Yaya & Dw, Bambang & Isa, Sani & Budiharto, Widodo. (2018). Recommendation System for Smart LMS Using Machine Learning: A Literature Review. 113-118. 10.1109/ICCED.2018.00031.

Sciarrone, Filippo. (2018). Machine Learning and Learning Analytics: Integrating Data with Learning. 1-5. 10.1109/ITHET.2018.8424780.

Romero, Cristóbal & Ventura, Sebastian. (2010). Educational Data Mining: A Review of the State of the Art. Systems, Man, and Cybernetics, Part C: Applications and Reviews, *IEEE Transactions on.* 40. 601 - 618. 10.1109/TSMCC.2010.2053532.

Romero, Cristóbal & Ventura, Sebastian. (2013). Data Mining in Education. Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery. 3. 10.1002/widm.1075.

Huang, Jiahui & Saleh, Salmiza & Liu, Yufei. (2021). A Review on Artificial Intelligence in Education. *Academic Journal of Interdisciplinary Studies.* 10. 206. 10.36941/ajis-2021-0077.

Chen, L.; Chen, P.; Lin, Z., (2020). Artificial Intelligence in Education: A Review. IEEE Access, 8, 75264–75278. [CrossRef].

Guan, Chong & Mou, Jian & Jiang, Zhiying. (2020). Artificial intelligence innovation in education: A twenty-year data-driven historical analysis. *International Journal of Innovation Studies.* 4. 134-147. 10.1016/j.ijis.2020.09.001.

NAEM JOURNAL
ISSN 1997-4248, eISSN 2959-4561
Volume 17 Issue 02
Serial 34
https://Doi.org/10.59629/NAEM 20213202.1601

Primary Teachers' Knowledge, Attitudes and Practice Toward Blended Education in Bangladesh

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Abstract

This study explores the knowledge, attitudes, and practices of primary school teachers in Bangladesh regarding blended education. 198 teachers from 40 government primary schools were involved in this study. The study employed a mixed-method approach to collect quantitative and qualitative data. Exploratory Factor Analysis (EFA) was utilized to determine the factor structure of the blended education instruments. The findings indicate that teachers generally need more knowledge about blended education. While neutral, they express opposing views on certain aspects, preferring traditional face-to-face teaching over online methods. Disparities were noted between teachers, such as male and female, rural and urban, and senior and junior staff. Despite many teachers having experience with both synchronous and asynchronous online classes, the study suggests that more effective practice of blended education is necessary. Addressing the identified issues is paramount to successfully implementing blended education in Bangladesh.

Key Words: Blended Education, Online Teaching, Face to face Teaching. Primary Education.

1. Introduction

The COVID-19 pandemic has had a profound and far-reaching impact on all aspects of human life, particularly the education sector. Bangladesh was not spared, like many other nations, experiencing an unprecedented 18-month school closure from March 2020 to September 2021. This drastic measure was part of the global effort to contain the virus's rapid spread, but it led to significant disruptions in regular classroom activities. In response to this crisis, the Bangladeshi government introduced a 'Blended Education' approach, utilizing platforms such as YouTube, television, radio, and other social media channels to deliver educational contents during the school closure.

While blended education has widespread adoption in higher education, its implementation in primary education still needs to be improved, particularly in low-income countries such

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as Bangladesh. The government of Bangladesh has undertaken various initiatives to ensure continued access to education during the pandemic, including accelerated learning programs, teacher home visits, and remote learning through television, radio, YouTube, and Zoom, among other platforms. However, the success of these blended learning initiatives hinges on teachers' knowledge, attitudes, and practices.

Despite teachers' critical role in effectively implementing blended education, more research is needed on primary school teachers' knowledge, attitudes, and perceptions toward this mode of teaching and learning in Bangladesh. This study aims to fill this gap by investigating the knowledge, attitudes, and perceptions of primary school teachers in

Bangladesh regarding blended education.

Statement of the Problem

Teachers are pivotal in successfully implementing any educational program, and primary educators are no exception. As Bangladesh introduces a blended approach across all levels of education, primary school teachers will be instrumental in executing and facilitating blended teaching and learning at the foundational level. However, the extent of their willingness to integrate this approach into their teaching practices and their confidence in utilizing digital technologies still needs to be explored more. A thorough understanding of primary teachers' knowledge, attitudes, and practices regarding blended education is essential for developing and implementing effective policies and practices to ensure the successful adoption of blended education in Bangladesh.

The rationale of the study

The rationale for conducting a study on blended education within the primary education sector of Bangladesh is grounded in several key considerations. Firstly, the COVID-19 pandemic has significantly disrupted traditional face-to-face learning, necessitating the exploration of alternative educational approaches to ensure the continuity of education during such crises. Secondly, as a developing nation with limited resources and infrastructure, Bangladesh stands to benefit from blended education, which presents a cost-effective and scalable solution for enhancing access to education. Thirdly, blended learning can improve the quality of education by leveraging technology to deliver personalized and interactive learning experiences (Shrestha et al., 2022). Moreover, it allows teachers to incorporate innovative teaching strategies and tools, enhancing student learning outcomes. By examining blended education in the context of Bangladesh, this study aims to assess the feasibility and effectiveness of this approach within the country's educational system.

Objective of the Study

1. This study examines primary teachers' knowledge, attitudes, and practices concerning blended learning in Bangladesh. Additionally, it aims to identify the challenges and opportunities associated with implementing blended education approaches within the Bangladeshi context and to offer recommendations for scaling up successful models. The findings will provide valuable insights for policymakers to make informed

decisions about integrating this hybrid education system into the broader educational framework. To achieve the study's objectives, the following research questions will be addressed:

2. What is the current knowledge level among Bangladesh's primary teachers regarding blended education?
3. What are the attitudes of primary teachers in Bangladesh toward blended learning?
4. What are the current practices of primary teachers in Bangladesh in implementing blended education?

Limitation of the Study

Due to the study's specific focus, the findings are generalizable exclusively to Bangladesh's Government Primary School (GPS) teachers. Although GPS teachers represent a significant proportion of the primary education workforce, the narrow scope of this research may need to capture the broader landscape of blended education practices across different educational institutions in Bangladesh. Consequently, the results should be interpreted with caution when considering their applicability to the wider educational context in the country.

2. Literature Review

Several studies have demonstrated a positive correlation between adopting blended learning methods and improved student achievement across various countries. For instance, Hasanah et al. (2020) reported significant enhancements in students' critical thinking and communication skills due to implementing a blended approach to education. Similarly, Shrestha et al. (2022) observed that blended learning had a favourable impact on student engagement and academic performance compared to traditional classroom instruction. Furthermore, Mali et al. (2021) found that blended learning positively influenced student achievement, motivation, and engagement, surpassing the outcomes associated with conventional teaching methods.

A key advantage of blended learning is its inherent flexibility, highlighted by numerous researchers. Singh et al. (2021) characterized blended learning as a versatile approach that allows educators to combine the strengths of face-to-face and online learning environments. In a study conducted by Chakraborty et al. (2021) during the COVID-19 pandemic, students expressed comfort and satisfaction with learning through digital devices. Given the effectiveness and flexibility of blended learning, many developing nations have embraced this model as a practical educational approach both during and after the COVID-19 pandemic (Anthony et al., 2020).

The government has drafted a blended learning policy in Bangladesh, as informed by several studies conducted across different educational sectors. Salman et al. (2021) found that high school students in Bangladesh actively participated in distance learning activities during

COVID-19 and found the experience enjoyable, even during evening and nighttime sessions. This study also highlighted the cost-effectiveness of blended education compared to other educational approaches. Additionally, Lapitan et al. (2021) argued that blended teaching

and learning is particularly suitable for low-income countries, emphasizing that teacher preparedness is crucial for the successful implementation of this policy.

Conceptual framework

Tang and Chaw (2013) identified six critical aspects of learning that can be used to assess students' readiness for adopting blended learning. These aspects include learning flexibility, online learning, study management, technology, online interaction, and classroom learning. However, in a study conducted in Trinidad and Tobago—a developing country—Birbal et al. (2018) observed variations in these learning aspects. Specifically, they identified a new aspect, the "online environment," which replaced the original aspect of study management. This study adopts the six aspects identified by Birbal et al. as the conceptual framework for its analysis.

The following figure illustrates the conceptual framework employed in this study:

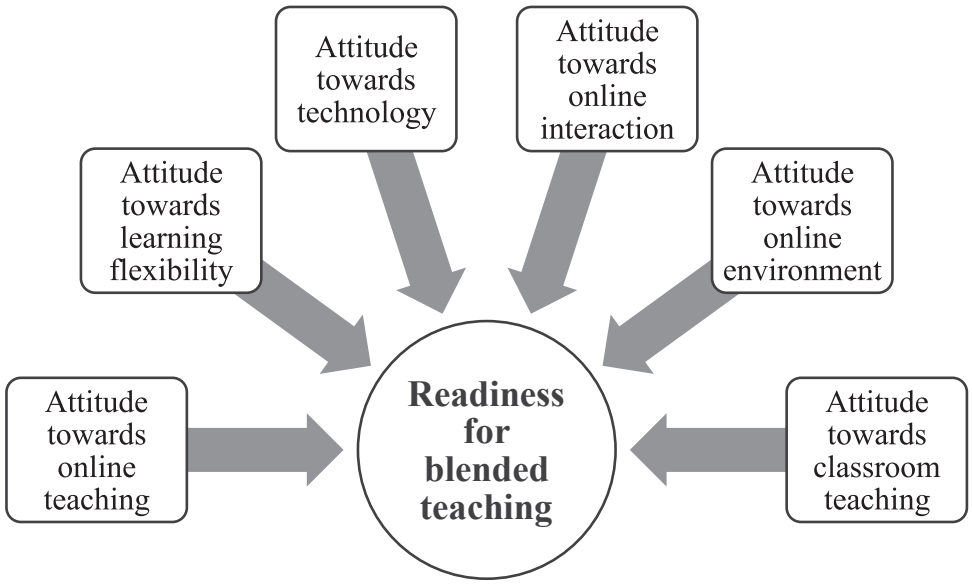

Figure 1: Conceptual Framework of the study

3. Methodology

Study Area and Period

This research focuses on two administrative divisions of Bangladesh, Dhaka and Sylhet, as the designated study areas. Within these divisions, two districts from each were selected for data collection, resulting in four specific districts being targeted: Sylhet, Habiganj, Gazipur, and Manikganj. The field data collection was conducted over an extended period, from December

10, 2022, to June 23, 2023.

Nature of the Study

The study employed an explanatory sequential design within a mixed-method research approach. Initially, quantitative data were collected and analyzed, followed by the subsequent collection and analysis of qualitative data. This approach facilitated data triangulation, enhancing the robustness of the interpretation of the findings.

Procedure of Sampling

Due to the study's large population size and budget constraints, the research team employed a systematic sampling approach to select two administrative divisions out of eight in Bangladesh. Within each chosen division, two districts were randomly selected, resulting in four districts being identified from a total of 64. Subsequently, eight upazilas (two from each district) were selected. From these upazilas, five government primary schools per upazila were chosen through simple random sampling, culminating in a total of 20 schools. All teachers from these selected government primary schools (GPSs) were included in the sample for this study. According to BANBEIS (2021), the average number of teachers in GPSs in Bangladesh is five. Thus, the study anticipated a sample size of 200 teachers. Ultimately, 198 teachers (33 head teachers and 165 assistant teachers) participated in the study.

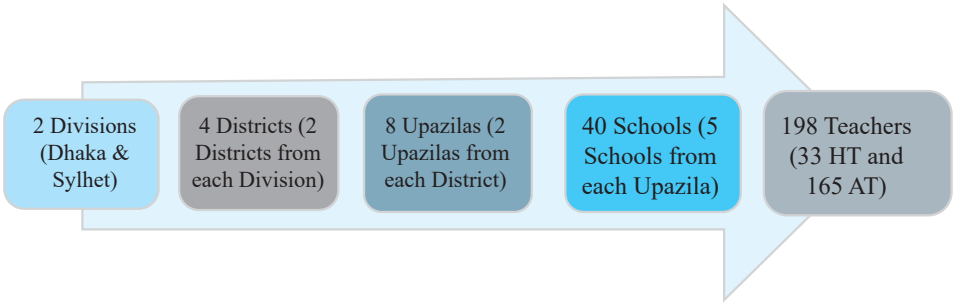

Figure 2: Sampling Methods

Data Collection Methods

Quantitative data regarding primary-level teachers' attitudes were gathered using a Likert-type scale from 198 government primary school teachers. Qualitative data were obtained through Focus Group Discussions (FGDs) conducted with a semi-structured interview schedule. The researcher distributed the questionnaires at the sampled schools and collected the completed forms after five working days. The data were then analyzed, leading to the selection of four focus groups based on the analysis results. The researcher conducted the FGDs in four distinct locations, with the assistance of two research assistants, throughout the qualitative data collection process.

Data Analysis

Exploratory Factor Analysis (EFA) was utilized to determine the factor structure of the blended education instruments. Both descriptive and inferential statistics were applied

to address the research questions. Statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS v.26). Descriptive statistics provided insights into the research questions. In contrast, inferential statistical tests, including t-tests, Pearson product-moment correlations, and analysis of variance (ANOVA), were employed to analyze the data further.

The results were presented using tabular formats and graphical representations.

Ethical Consideration

All research ethics were rigorously adhered to throughout the study. Informed consent was obtained from all participants prior to the commencement of data collection. Additionally, the information gathered will be utilized exclusively for this research.

4. Findings and Discussion

Results

- The study participants exhibit limited knowledge of blended education, primarily understanding it as a combination of online and offline classes.
- Participants expressed a need for more excellent knowledge about blended education. For instance, one participant noted, "I do not know what blended education is, despite having conducted a class on Zoom during COVID-19."
- Another participant commented, "I use a laptop and projector to display pictures and videos, which I consider blended education."
- The overall mean score of 2.975 reflects a neutral attitude among the participating teachers towards the blended education approach. However, many teachers, particularly those with more experience, have a positive attitude (mean score of 4.32) toward the technological aspects of blended education.
- The learning environment during online classes is a significant concern. Many teachers believe the need for more interaction between teachers and students could positively impact the learning experience.
- A notable percentage of teachers (11.1%) do not utilize available technology in their classrooms, and the reasons for this lack of engagement need to be clarified.
- More internet access in some rural areas must be addressed to facilitate practical classroom activities using digital devices.

Interpretations and Presentation

Mean and standard deviation were computed to explore the most perceived factors among the six. Table 1 revealed that participants' teachers perceived Technology (M 4.32) as the most critical factor. Teaching flexibility (M 4.13) was perceived as the second most important,

followed by online interaction (M 3.03) and online environment (2.74). Online teaching (M 2.23) and classroom teaching (M 1.40) are the least important factors.

Table 1: Mean and Standard Deviation of the Factor

Factors	N	Mean	SD
Technology	198	4.32	.53551
Teaching flexibility	198	4.13	.73777
Online Interaction	198	3.03	.91611
Online environment	198	2.74	.85070
Online teaching	198	2.23	.69750
Classroom teaching	198	1.40	.45208

A significant difference has been found in the case of teaching flexibility according to gender as well as the location of the schools. Female teachers are more likely to support the flexibility it has in teaching online than male teachers. Likewise, Rural teachers favour this aspect more than urban teachers. In the case of other factors, no significant differences were found. Table 2 below shows detailed information regarding this issue-

Table 2: T-test results comparing Rural-Urban and male-female Teachers' attitudes.

Factor	Location of school					Gender				
		N	Mean	SD	Sig		N	Mean	SD	Sig
Online Interaction	Urban	80	3.0094	0.87280	.284	Female	132	3.0284	.91460	.832
	Rural	118	3.0508	0.94765		Male	66	3.0455	.92602	
Classroom teaching	Urban	80	1.4375	0.50394	.064	Female	132	1.4072	.45755	.825
	Rural	118	1.3665	0.41304		Male	66	1.3712	.44342	

Technology	Urban	80	4.2875	0.55743	.311	Female	132	4.3258	.56103	.171
	Rural	118	4.3339	0.52170		Male	66	4.2939	.48386	
Online environment	Urban	80	2.6583	0.80953	.374	Female	132	2.7146	.83614	.720
	Rural	118	2.7910	0.87684		Male	66	2.7828	.88384	
Teaching flexibility	Urban	80	4.1167	0.62101	.047*	Female	132	4.2045	.66367	.028*
	Rural	118	4.1384	0.80987		Male	66	3.9798	.85311	
Online teaching	Urban	80	2.2750	0.71899	.930	Female	132	2.2475	.73634	.165
	Rural	118	2.1977	0.68388		Male	66	2.1919	.61619	

This study found significant differences between the primary teachers regarding the online environment factor. Mean scores increase with years of teaching. Teachers with 21-30 years (M 3.05) of teaching experience are more likely to support the online environment than teachers with less experience. However, no significant difference was found in the case of other factors. The table below 3 demonstrates the primary teachers' attitudes towards the online environment-

Table 3: Mean and standard deviation by teaching experience.

Factor	Years	N	Mean	Std. Deviation
Online environment	0-10 years	87	2.5594	0.82043
	11-20 years	85	2.8235	0.85695
	21-30 years	26	3.0513	0.82566
	Total	198	2.7374	0.85070

5. Conclusion

Primary-level teachers require additional knowledge and understanding of blended education, which must be addressed before implementing this new educational approach. The study findings indicate that while there is some awareness and interest in blended education among primary school teachers in Bangladesh, considerable challenges remain. The research underscores the necessity for enhanced training and professional development to improve teachers' competencies in delivering blended education effectively. Additionally, it highlights the critical need for schools to be equipped with the requisite infrastructure and resources, including reliable internet connectivity and digital devices, to support the successful adoption of blended education.

6. Recommendations

Firstly, ensuring schools can access the necessary technology and infrastructure to support blended education, including reliable internet connectivity, computers, and other digital devices, is essential. Secondly, teachers need necessary training and professional development opportunities to help them develop the necessary skills and knowledge to deliver blended education effectively. Last, a clear and comprehensive policy framework for blended education that outlines its purpose, objectives, and implementation strategies is required.

Acknowledgements

The authors acknowledge the financial support provided by the National Academy for Educational Management (NAEM), Bangladesh, which facilitated the conduct of this study.

References

Anthony, B., Kamaludin, A., Romli, A., Raffei, A.F.M., Phon, D.N.A., Abdullah, A. and Ming, G.L., (2020). Blended learning adoption and implementation in higher education: *A theoretical and systematic review. Technology, Knowledge and Learning, pp. 1–48*. Bangladesh Bureau of Educational Information and Statistics, (2021). Ministry of Education. Retrieved from https://banbeis.portal.gov.bd/sites/default/files/files/

banbeis.portal.gov.bd/files/95b55c7a_0bdb_4e2d_8d00_e08b6a44d7cb/edu%20stat%202021.pdf

Birbal, R., Ramdass, M. & Harripaul, C. (2018). Student Teachers' Attitudes towards Blended *Learning. Journal of Education and Human Development, 7*(2), pp. 9-26

Chakraborty, P., Mittal, P., Gupta, M. S., Yadav, S., & Arora, A. (2021). Opinion of students on online education during the COVID-19 pandemic. *Human Behavior and Emerging* Technologies, 3(3), 357–365.

Hasanah, H., & Malik, M. N. (2020). Blended learning in improving students' critical thinking and communication skills at university. *Cypriot Journal of Educational Sciences, 15*(5), 1295-1306.

Lapitan, L. D., Jr., Tiangco, C. E., Sumalinog, D. A. G., Sabarillo, N. S., & Diaz, J. M. (2021). An effective blended online teaching and learning strategy during the COVID-19 pandemic. *Education for Chemical Engineers,* 35, 116–131.

Mali, D., & Lim, H. (2021). How do students perceive face-to-face/blended learning due to the Covid-19 pandemic? *The International Journal of Management Education*, 19(3), 100552.

Salman, S. A., Alkathiri, M., & Bawaneh, A. K. (2021). School off, learning on Identification of preference and challenges among school students towards distance learning during COVID-19 outbreak. *International Journal of Lifelong Education,* 40(1), 53–71.

Shrestha, S., Haque, S., Dawadi, S., & Giri, R. A. (2022). Preparations for and practices of online education during the Covid-19 pandemic: A study of Bangladesh and Nepal. *Education and Information Technologies, 27*(1), 243–265.

Singh, J., Steele, K., & Singh, L. (2021). Combining the best online and face-to-face learning: Hybrid and blended learning approach for COVID-19, post-vaccine, & post-pandemic world. *Journal of Educational Technology Systems, 50*(2), 140–171.

Tang, C. M., and Chaw, L. Y., (2013). Readiness for blended learning: understanding attitude of university students. *International Journal of Cyber Society and Education, 6* (2). 79-100.

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