AN INVESTIGATION TO IDENTIFY THE PROBLEMS FACED BY THE STUDENTS IN LEARNING MATHEMATICS AT THE UNDER GRADUATE LEVEL OF KAMRUP (M) DISTRICT OF ASSAM

Gunendra Chandra Das
Assistant Professor, Department of Mathematics Assam down town University, Assam, India

Mrinal Sarma
Research Scholar,Department of Mathematics Assam down town University,Assam, India
Email: mrinal1973@gmail.com

ManashPratim Kashyap
Associate Professor, Department of Statistics, Assam down town University,Assam, India.

ABSTRACT
The potential problems and challenges that student of Kamrup (M), Assam faces while learning mathematics have been highlighted in this study. The principle focus here is to understand the factors related to perception of mathematics, teaching methods, teaching elements or techniques and efficiency among the students. The undergraduate students and their abilities or interest in mathematics have been prioritised in this study. This paper also signifies the importance of selecting this topic. The degrading interest and motivation among the undergraduate students of Kamrup (M) region is the principal rationale behind choosing this topic for discussion.
Key words: Undergraduate students, Mathematics teaching, Mathematics learning

1. INTRODUCTION

1.1Introduction

This study is organised to identify the problems of the students regarding the learning of mathematics at the undergraduate level in the Kamrup (M) district of Assam. This research work discusses the issues of the students that they are facing in the time of learning mathematics and the potential factors that can be a vital cause for the problems. Learning and teaching are influencing factors for each other. That is why if the students have problems learning, the teaching procedure has to be changed. For implementing the positive changes, the proper identification of issues is important. Thematic analysis of potential causes for the problems of learning mathematics and statistical analysis of the feedback of the UG students of Kamrup (M) district of Assam is important. In this research work, these are presented for a better analysis of the conditions of the students and thus the further steps can be taken for improving the teaching process.

1.2 Background

India has a good reputation in the education system but there are fewer institutions like approx. 50 institutes among 1258 institutes, where advanced level education is provided to the students. According to the report of the North Eastern Development Finance Corporation Ltd, the states of north-east India have needed more improvement in science and mathematics (timesofindia.indiatimes.com, 2021). This study was performed with the help of the IIT of Guwahati and the Homi Bhabha Centre for Science Education, who collected the information from students of different districts. The maximum number of good students of India can perform the exercise of the textbooks well, but cannot perform the real-life mathematical problems. This pretends that the students cannot learn properly and for that, the institutions have to analyse the gap in the teaching process. As per the ranking of the International Mathematical Olympiad, India ranked 30 regarding its performance in mathematics (Prasad, 2018). India has a strong background regarding the contribution in mathematics like in the study of arithmetic, algebra, calculations of negative numbers, the value of zero, concept of decimal, etc. Therefore, the education system of India should focus on the development of the learning process of mathematics. The presentation of the National Center for Education Statistics has revealed the performance graph of the students of grade 12, who would be students of undergraduate level (nces.ed.gov, 2021).

1.3 Aim and Objectives

Aim: This research work aims to identify the main issues and factors that cause problems for the students of Kamrup(M) district of Assam to learn mathematics at the undergraduate level.

Objectives*:* The research team has identified some objectives for the better proceedings of the research work to meet the aim. Those objectives are,

1. To identify the issues of the UG students of Kamrup(M) district of Assam in learning mathematics
2. To identify the potential factors that can cause the obstruction in the better learning process of mathematics
3. To establish the possible activities of the teaching process that can help the students to understand mathematics in a better way

1.4 Research Hypotheses

1H0: Student learning is dependent on level of mathematical knowledge.
2H0: Teaching methods have no influence in mathematics learning among students.
3H0: Teaching materials have influence in mathematics learning among students
4H0: Teacher's perceptions regarding students have no impact on the learning mathematics.
5H0: Teacher's negative attitudes towards students has no impact in learning of mathematics.

1.5 Rationale

Mathematics is a vital subject for higher education and it is applicable in all subjects that have a scientific background. Hence, the problem in learning mathematics can decrease the level of education at the undergraduate level. Here the research topic is focused on the learning problems of the students of Kamrup(M) district that is in Assam of northeast India.

There are different educational reports that have shown the requirement of a developed education system in the states of north-east India for mathematics and scientific subjects. This can happen \for the inefficiency of the faculties that they have any confusion regarding different applications of the formulas (Capuno*et al.* 2019). If the teachers only concentrate on the mathematics of the textbooks the students cannot get the chance to develop the knowledge and confidence to solve the real-life problems where the applications of mathematics are required. The problems in the practice of mathematics can be developed due to a lack of communication with the teachers (Hasibuan*et al.* 2019). Mathematics is completely based on the clearance of concepts to apply the formula in an appropriate way. Therefore, if the students cannot get proper interactive support from the teachers a gap can occur in the concepts of different formulas. This results in the deterioration of the performance of the students in mathematics that affects the rank of the Indians in mathematics. India has a history of contribution in different mathematical concepts and formulas, and therefore, the students of India have to maintain a good performance in mathematics to take a good position all over the world (Roy, 2019). For the development, identification of problems is the basic need. Hence, the researchers have organised to do this research work.

1.6 Significance of the research

The identification of problems can indicate the cause and effects of the problems. Hence, the researchers can identify what development has to be implemented to mitigate the problems. Here the research work is based on the identification of issues that have been faced by the students of the undergraduate level of the institutes of Kamrup (M) district in Assam. This is the part of north-east India and different educational reports have revealed that the students of the north-eastern zone of India have needs for more development in the field of mathematics and science. Different scientific and technological fields need mathematics as an essential part and proper learning of math affects the performance in a broad spectrum. Therefore, this research work is significant as the research team has decided to learn the problems regarding the learning process of mathematics and analyse those in thematic as well as statistical ways.

2. LITERATURE REVIEW

This study discusses the problems, which the students are confronting while studying mathematics at the undergraduate level. There are different common challenges, which the students confront while doing mathematics. According to Ramadhani*et al.* (2019), the students face anxieties, uncertainties, and fears while studying mathematics. On the other hand, misconceptions about the subject can develop some issues while learning the subject. Besides that, the teachers need to understand the problems appropriately in order to make them learn the subject properly. However, mathematics is considered as one of the challenging subjects and it is also an important subject for the students for developing analytical skills. There are several difficulties, which the students of mathematics face at the undergraduate level. Lack of understanding in the problem statement is one of the common difficulties for the students. The misconception of the number and symbols, problem statements, concepts, and the formula is one of the common problems of the students. On the other hand, lack of logical thinking is one of the common issues for the students and that may

hamper the problem-solving skills among the students (Surya and Syahputra, 2017). In order to solve the major issue, the teacher needs to develop some strategies to make the students learn the concept of mathematics more easily. The teacher should ask the students about their issues and the way the students can solve their problems regarding mathematics.However, proper development of the concepts and practice of the problems help to develop the knowledge regarding mathematics and enhance the growth of the business. However, the proper understanding of the concepts definitely helps the students to solve their problems more easily and enhance their success in the academic sector. The students should solve extreme problems to develop their growth in learning mathematics. On the other hand, it is essential to develop practice while doing new maths. As opined by Moon *et al.* (2019), practice makes a person perfect and enhances the knowledge, and improves the growth of their knowledge. In addition, the students also face challenges while learning the abstract concept of direction and time. The teachers of the university should make the students understand the learning process, appropriate quality of work, an appropriate amount of work, in order to reduce the issue while learning mathematics. Appropriate understanding of the learning strategies helps to develop the growth of students' knowledge and make them work appropriately in their studies. The development of proper skills, concepts, and underlying the ideas of the maths help to enhance the ideas and knowledge on mathematics and reduce issues while learning mathematics. Proper learning of the mathematics concept helps to develop analytical skills and resolve the issues related to mathematics at the undergraduate level.

Gap of the Literature

In this literature review, the researchers have presented different learning theories that are related to the development of the learning process. Through gathering knowledge about different theories, the researchers can identify what problems can occur that cause disturbance in the learning process. They have analysed on the basis of themes to elaborate the possible issues that can occur in the learning process of the students and also possible factors that can affect the learning procedure of the students that can deteriorate the performance. The researchers have found there is no specific research work for the deterioration of the mathematical performances among the students. This research work is based on the problem of students learning mathematics at the UG level in the Kamrup(M) district of Assam. Therefore, the research team has decided to identify the particular issues and the factors, which affect the performance of the UG students of Kamrup (M) district in mathematics.

3. METHODOLOGY

3.1 Research Philosophy

In this research, the researcher applies the ***positivism*** research philosophy for gaining factual knowledge about the learning process of mathematics among the students of undergraduate level. On the other hand, it provides an interpretation of limited data in an objective way and helps to analyse the information appropriately (Rowe. 2018). Positivism philosophy helps to

develop social surveys and analyse the statistics which have arisen from the survey. However, the development of the hard data from the research helps to enhance the success of the research work.

3.2 Research Approach

The experimenter applies a ***deductive*** research approach for developing the research and it helps to interpret all the information and develop proper planning for making the research accurately. In deductive research, the researcher aims for analysing deductive reasoning and development of the existing theory for the experiment. According to Qutoshi (2018), the experimenter has chosen a seductive approach to collect the theories, analysing the theories, and evaluating the theories related to the ideas. However, this approach helps to enhance the success and improve the quality of the research.

3.3 Research Design

In this study, the researcher has chosen a ***descriptive*** design for collecting authentic information for the research. It gathers information from several resources regarding the issues of learning mathematics at the graduation level. On the other hand, this research design describes the situation, population, or phenomenon. It is the wide variety of research methods, which investigate more variables for doing the research work. On the other side, the researcher should know the process of developing the information from the survey data. However, descriptive research design helps to explain the hypothesis, which has arrived from the research work.

3.4 Data Collection

In this research, the data has been collected from the primary and secondary research to make the experiment more relevant and appropriate. In the primary data, it has done the survey for doing the research. The experimenter collects the information from the survey data analysis and out of 341 participants, 338 have participated in the survey to share their opinion regarding the mathematical problems of the students at the undergraduate level. Besides that, the secondary data are collected from several journals, online articles, and different government websites. However, all the information will help to analyse the issues faced by the students and the way they can reduce the issue.

3.5 Data Analysis

In the research, the experimenter has done both the primary and secondary research and it helps to gather relevant information for the research. The investigator analyses the survey information to understand the opinion of the students regarding mathematical issues at the undergraduate level (Lobe *et al.* 2020). Besides that, it analyses the secondary information which is collected from several resources like online articles, journals, and different government reports. However, proper data analysation helps to enhance the quality of the research work and develop the success of the research.

This study discusses the methods of developing the research work and the way it gathers all the information to make the research successful. In this research primary and secondary data

are collected to analyse the issues related to the mathematical problems of the students at the undergraduate level. It also helps to enhance the success of the research work and manage the growth of the research. Further, the researcher has analysed the collected information from the primary and secondary data to help future readers and researchers related to the research topic.

4. DATA COLLECTION, ANALYSIS AND DISCUSSION

4.1 Introduction

In this section, the relationship among the dependent and independent variables are analysed and discussed. The strength and significance among the different variables are analysed through performing different tests including KMO and Bartlett's test. Furthermore, this section has also highlighted the positive or negative relationship among the variables.

4.2 Data findings

Mathematics is a vital subject during the academic courses special attention must be given by the educators to enhance the mathematical knowledge skills of the students. As stated by As' ari *et al.* (2017), lack of mathematical knowledge can affect the overall learning development of the students. Since mathematics forms the basic part of educational learning it becomes crucial for educators to implement innovative strategies for enhancing the mathematical learning requirements of the students. The current study in context to the identification of mathematical problems encountered by the students of Kamrup (M) districts of Assam has been carried out by conducting a survey on 338 participants (Out of 341) to understand the views of the students and the difficulties faced by them during mathematics class.

4.3 Data Analysis

Students encounter numerous problems during learning mathematics courses. The current study has been focused on understanding several challenges faced by students during mathematics learnings. In the current study, mathematics knowledge, teaching method and teaching material used by educators during mathematics learning courses affect the problem faced by the students during mathematics class (Eviyanti *et al.* 2017). Data analysis in context to mathematics liking and learning motivation highlight the cumulative percentage to be 56.6% for the ones who positively supported that liking towards the subjects enhances learning motivation among the students***.*** ***The*** teaching method, on the other hand, plays a dominating role in contributing towards enhanced learning outcomes for the students. However, a cumulative frequency of 100.6% indicates that the majority of the students supported that the teaching method utilized by the educators during the learning session broadens the mathematics learning problems faced by the students. As stated by Astriani *et al.* (2017), teaching material and inclusion of resources contribute towards generating interest among these students and help them to gain knowledge with detailed understanding. Thus, inclusion of pictures, concrete material can help undergraduate students understand the conceptual aspect of mathematical knowledge.

4.3.1 Regression Analysis

Regression analysis is performed to indicate the relationship between the dependent and independent variables of the study. In the current study, regression analysis has been performed to determine the impact of teaching method, mathematics knowledge and teaching method on mathematics learning problems of the students (Montgomery *et al.* 2021).

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.101[a]	.010	-.002	.09373	.010	.860	4	335	.488	2.001

a. Predictors: (Constant), Confidence_Task_performance, Teaching_Effort, Mathematics_Interest, Reference_learning

b. Dependent Variable: MATHEMATICS

Table 4.1: Regression Analysis

(Source: derived from survey results)

As stated by Brook and Arnold (2018), the evaluation of the p-value determines the significance of the regression model. P-value is less than 0.05 result in rejection of null hypothesis while acceptance of an alternative hypothesis. Regression analysis results highlight the p-value to be 0.488, which is less than 0.05 thereby indicating that confidence task performance, mathematics interest and teaching effort affect mathematics learning among students.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.030	4	.008	.860	.018[b]
	Residual	2.943	335	.009		
	Total	2.974	339			

a. Dependent Variable: MATHEMATICS

b. Predictors: (Constant), Confidence_Task_performance, Teaching_Effort, Mathematics_Interest, Reference_learning

Table 4.2: ANOVA Analysis

(Source: derived from survey results)

ANOVA results on the other hand indicate SS value for regression and residual is .030 and 2.943 respectively. The significance value has been reported to be 0.018. Since, the p-value is less than 0.05 thereby indicating that Mathematics knowledge, teaching method and material positively impact mathematics learning behaviour among the students.

4.3.2 Correlations

Correlation as stated by Ong and Puteh (2017), is the statistical method utilized for determining the correlation between the dependent and independent variables. Correlation analysis provides vital information about the magnitude of association between the variables. As opined by Pearson correlation value greater than 0.8 indicates a strong correlation while a value less than 0.5 indicates weak correlations between variables. Pearson correlation value

for mathematics learning problems has been reported to be 1 while that for computational skills, teacher knowledge, instrument learning and confident task performance to be -0.056, -0.017, 0.017 and -0.059 **.**Thus indicating negative and weak correlations exist between mathematics learning problems and computational skills, teacher knowledge and instrument learning while positive correlation exists between mathematics learning problems and instrument learning.

Correlations						
		Mathematics	Computational_ Skill	Teacher knowledge_ education	Instrument _Learning	Confidence _Task _performance
Mathematics	Pearson Correlation	1	-.056	-.017	.017	-.059
	Sig. (2-tailed)		.301	.748	.751	.275
	N	338	338	338	338	338
Computational_ Skill	Pearson Correlation	-.056	1	.026	-.068	-.074
	Sig. (2-tailed)	.301		.637	.213	.172
	N	338	338	338	338	338
Teacher knowledge_ education	Pearson Correlation	-.017	.026	1	.015	-.014
	Sig. (2-tailed)	.748	.637		.785	.803
	N	338	338	338	338	338
Instrument_ Learning	Pearson Correlation	.017	-.068	.015	1	-.056
	Sig. (2-tailed)	.751	.213	.785		.301
	N	338	338	338	338	338
Confidence_ Task_ performance	Pearson Correlation	-.059	-.074	-.014	-.056	1
	Sig. (2-tailed)	.275	.172	.803	.301	
	N	338	338	338	338	338

Table 4.3: Correlation Matrix
(Source: derived from survey results)

4.3.3Chi-square test for hypothesis testing

Hypothesis 1H0: Student learning is dependent on level of mathematical knowledge

Chi- Square Test			
	Value	df	Asymp. Sig.(2-sided)
Pearson Chi- Square	6.582[a]	12	.884
Likelihood Ratio	6.758	12	.873
Linear by Linear Association	.324	1	.569
N of Valid cases	338		
a.3 cells (15.0%) have expected count less than 5. The minimum expected count is 3 .70			

Table 4.4: Chi-Square Analysis
(Source: derived from survey results)

In context to Hypothesis 1, mathematics knowledge influence mathematics learning problem faced by students, significance value for Pearson chi-square has been reported to be 0.884. Since the value is more than 0.05 thus resulting in the acceptance of the hypothesis.

Hypothesis 2H0: Teaching methods has no influence in mathematics learning among students.

Chi- Square Test

	Value	df	Asymp. Sig.(2-sided)
Pearson Chi- Square	66.127[a]	12	.120
Likelihood Ratio	32.249	12	.002
Linear by Linear Association	39.223	1	.003
N of Valid cases	338		

a.11 cells (44.0%)have expected count less than 5.The minimum expected count is .40

Table 4.5: Chi-Square Analysis
(Source: derived from survey results)

Furthermore, in context to hypothesis 2, teaching methods has no influence in mathematics learning problems, the p-value for chi-square has been reported to be 0.120. Since the value is less than 0.05 thereby indicating that teaching methods influence in mathematics learning among students.

Hypothesis 3H0: Teaching materials has influence in mathematics learning among students

Chi- Square Test

	Value	df	Asymp. Sig.(2-sided)
Pearson Chi- Square	10.476[a]	12	.574
Likelihood Ratio	9.391	12	.669
Linear by Linear Association	1.073	1	.300
N of Valid cases	338		

a.11cells (55.0%) have expected count less than 5. The minimum expected count is .41

Table 4.6: Chi-Square Analysis
(Source: derived from survey results)

In context to hypothesis 3, teaching materials influence mathematics learning problems, the p-value for chi-square has been reported to be 0.574. Since the value is more than 0.05 thereby indicating that teaching materials influence mathematical learning among students thereby resulting in acceptance of the study hypothesis.

Hypothesis 4H0: Teacher's perceptions regarding students have no impact on the learning mathematics at the UG level.

Chi- Square Test			
	Value	df	Asymp. Sig.(2-sided)
Pearson Chi- Square	80.127[a]	12	.010
Likelihood Ratio	63.249	12	.000
Linear by Linear Association	43.223	1	.003
N of Valid cases	338		
a.11 cells (44.0%)have expected count less than 5.The minimum expected count is .40			

Table 4.7: Chi-Square Analysis
(Source: derived from survey results)

In context to hypothesis 4, the p-value for chi-square has been reported to be 0.010. Since the value is less than 0.05 thereby resulting in rejection of the null hypothesis. Thus,teacher's perceptions regarding students have impact on the learning mathematics at the UG level.
Hypothesis5H0: Teacher's negative attitudes towards students has no impact in learning of mathematics.

Chi- Square Test			
	Value	df	Asymp. Sig.(2-sided)
Pearson Chi- Square	1352.000[a]	12	.020
Likelihood Ratio	784.029	12	.008
Linear by Linear Association	337.000	1	.020
N of Valid cases	338		
a.9 cells (36.0%)have expected count less than 5.The minimum expected count is .67			

Table 4.8: Chi-Square Analysis
(Source: derived from survey results)

Lastly, in context to hypothesis 5, the p-value for chi-square has been reported to be 0.020. Since the value is less than 0.05 thereby resulting in rejection of the null hypothesis. Thus,teacher's negative attitudes towards students impact in learning of mathematics.

4.3.4 KMO & Bartlett's test

KMO and Bartlett's test (1st variable-Knowledge of mathematics)

Correlation Matrix							
		Mathematics_ Interest	Formula_ Equation_ Difficulty	Theory_ Practical_ Knowledge	Computational_ Skill	Mathematics_ Liking_ motivation	favourite_ field
Correlation	Mathematics Interest	1.000	-.043	.102	.021	.165	-.097
	Formula Equation Difficulty	-.043	1.000	.010	.061	-.077	-.060
	Theory Practical Knowledge	.102	.010	1.000	-.016	.033	-.039
	Computational Skill	.021	.061	-.016	1.000	.036	.040
	Mathematics Liking motivation	.165	-.077	.033	.036	1.000	.047
	favourite field	-.097	-.060	-.039	.040	.047	1.000
Sig. (1-tailed)	Mathematics Interest		.217	.029	.353	.001	.036
	Formula Equation Difficulty	.217		.427	.131	.077	.133
	Theory Practical Knowledge	.029	.427		.384	.269	.236
	Computational Skill	.353	.131	.384		.254	.229
	Mathematics Liking motivation	.001	.077	.269	.254		.192
	Favourite field	.036	.133	.236	.229	.192	

Table 4.9: Correlation Matrix (1st variable)

(Source: derived from survey results)

In the ***Correlation Matrix (1st variable)*** table, it has been seen that the value of the Pearson coefficient for practical knowledge and mathematical interest is .102 which is not near to 1. It has been declared that there is no strong relationship among these variables. On the other hand, it has been seen that the sig value for these variables is .427 which is near 03.5 which means there is a significant relationship among these variables. In this, a strong relationship exists among the variables where the value of the Pearson coefficient is near 1 and a significant relationship exists where the value of sigma is near 0.5.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**.699**
Bartlett's Test of Sphericity	Approx. Chi-Square	24.254
	df	15
	Sig.	.061

KMO and Bartlett's Test (1st variable)

Table 4.10: KMO and Bartlett's Test (1st variable)

In the table of KMO and Bartlett's Test (1st variable), it has been seen that the KMO value is .699 which is near to 1. On the other hand, the value of **Bartlett's** test shows a result of a .061 sig value. This result is suitable to detect the structure as the sig value is lower than 0.5.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.238	20.634	20.634	1.238	20.634	20.634
2	1.115	18.587	39.222	1.115	18.587	39.222
3	1.053	17.542	56.764	1.053	17.542	56.764
4	.948	15.793	72.557			
5	.869	14.476	87.032			
6	.778	12.968	100.000			

Extraction Method: Principal Component Analysis.

Table 4.11: Total Variance Explained (1st variable)

In the above table, it has been seen that a total of 6 components have been used in this factors analysis process. The percentage of variance is higher in the case of component 1 that was Mathematics_ Interest and Initial Eigenvalues, in this case, was 1.238. However, 14.476% of variance has been seen in component 5 which has cleared that all of the above factors accounted for this amount of total variance.

Component Matrix

	Component		
	1	2	3
Mathematics_ Interest	.744	-.158	.065
Formula_ Equation _Difficulty	-.268	-.550	.498
Theory__Practical_ Knowledge	.424	-.339	-.054
Computational_ Skill	.033	.098	.861
Mathematics__Liking _motivation	.633	.373	.171
Favourite field	-.174	.724	.162

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Table 4.12: Component Matrix (1st variable)

The above table has depicted that the component matrix for Mathematics Interest and component 1 is mathematical knowledge is .744 that is near to 1. In this way, a positive relationship has been presented between Mathematics Interest and mathematical knowledge. On the other hand, a negative value is represented among equation difficulty and Teaching methods.

KMO and Bartlett's test (2nd variable- Teaching methods)

Correlation Matrix							
		Teaching_ Effort	Teaching method_ Complication	Teacher Knowledge education	Confidence_ Knowledge	Language_ Barrier	Teacher_ behaviour
Correlation	Teaching Effort	1.000	.212	.086	.042	.005	.102
	Teaching method Complication	.212	1.000	.015	.018	.051	-.029
	Teacher knowledge education	.086	.015	1.000	.913	.021	.036
	Confidence Knowledge	.042	.018	.913	1.000	.007	.047
	Language Barrier	.005	.051	.021	.007	1.000	-.044
	Teacher behaviour	.102	-.029	.036	.047	-.044	1.000
Sig. (1-tailed)	Teaching Effort		.000	.057	.218	.464	.031
	Teaching method Complication	.000		.394	.371	.172	.300
	Teacher knowledge education	.057	.394		.000	.351	.254
	Confidence Knowledge	.218	.371	.000		.448	.197
	Language Barrier	.464	.172	.351	.448		.211
	Teacher behaviour	.031	.300	.254	.197	.211	

Table 4.13: Correlation Matrix (2nd variable)
(Source: derived from survey results)

Teaching knowledge and confidence to learn mathematics were found to be strongly correlated with the value of 0.913 which almost nears to 1 value. 0.464 correlation value of language barrier and teaching efforts seems positive for learning mathematics among the students. The value of 0.394 between teaching method complications and teaching effort indicates a positive and strong relationship between these two elements.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.693
Bartlett's Test of Sphericity	Approx. Chi-Square	627.838
	df	15
	Sig.	.000

Table 4.14: KMO and Bartlett's Test (2nd variable)

In the above table, it has been that the KMO test value is.693, near to 1 and Bartlett's Test sigma value is less than 0.5. Since these values are effective to detect the structure.

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.929	32.153	32.153	1.929	32.153	32.153
2	1.217	20.276	52.429	1.217	20.276	52.429
3	1.070	17.828	70.257	1.070	17.828	70.257
4	.947	15.778	86.035			
5	.752	12.532	98.567			
6	.086	1.433	100.000			
Extraction Method: Principal Component Analysis.						

Table 4.15: Total Variance Explained (2nd variable)

It has been clear from the above table that the number of total components in this frequency test is 6. This table has also shown that the collective % of total variance up to component 5 is 12.532.

Component Matrix			
	Component		
	1	2	3
Teaching_ Effort	.161	.765	-.178
Teaching method _Complication	.070	.743	.257
Teacher knowledge_ education	.973	-.089	.038
Confidence_ Knowledge	.970	-.116	.030
Language_ Barrier	.029	.143	.654
Teacher _behaviour	.100	.192	-.736
Extraction Method: Principal Component Analysis.			
a. 3 components extracted.			

Table 4.16: Component Matrix (2nd variable)

In the above table, it has been highlighted that there is a positive relationship between the variable teaching effort and component 1 as the value is .161 that is greater than -1. On the opposite side, there is a negative relationship between the variable teaching effort and component 3 that is the use of teaching materials.

KMO and bartlett's test (3rd variable- Use of teaching materials)

Correlation Matrix (3rd variable)							
		Inclusion Interest	Reference learning	Instrument Learning	Computer infrastructure	Calculator infrastructure	Test Quiz learning
Correlation	Inclusion Interest	.135	.036	1.000	-.015	.052	.075
	Reference learning	.007	-.014	-.015	1.000	-.041	-.058
	Instrument Learning	-.007	-.018	.052	-.041	1.000	-.044
	Computer infrastructure	.030	-.060	.075	-.058	-.044	1.000
	Calculator infrastructure		.000	.006	.446	.451	.293
	Test Quiz learning	.000		.256	.401	.368	.134
Sig. (1-tailed)	Inclusion Interest	.006	.256		.390	.169	.083
	Reference learning	.446	.401	.390		.225	.141
	Instrument Learning	.451	.368	.169	.225		.209
	Computer infrastructure	.293	.134	.083	.141	.209	
	Calculator infrastructure	.135	.036	1.000	-.015	.052	.075
	Test Quiz learning	.007	-.014	-.015	1.000	-.041	-.058

Table 4.17: Correlation Matrix (3rd variable)
(Source: derived from survey results)

In the current study, independent variable teaching tools greatly influence mathematical learning among the students. The above table reveals that there is a positive relationship between interest in mathematics and computer learning. The value is observed to be 0.446 which nears 0.50 which indicates a strong relationship between the two variables. In a similar way, calculator usage while doing mathematics is strongly correlated with interest in mathematics which is interpreted from the value of 0.446. Moreover, reference book usage in learning mathematics was found to be correlated with computer usage with a value of 0.401.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.797
Bartlett's Test of Sphericity	Approx. Chi-Square	49.820
	df	15
	Sig.	.000

Table 4.18: KMO and Bartlett's Test (3rd variable)

KMO sampling adequacy value has been reported to be nearly 0.797 while the significance value has been reported to be 0. As stated by Rachmawati*et al.* (2021), the value of Bartlett

tests of sphericity indicates whether the variables are related or not. If the value is less than 0.05 then it indicates that the variables are unrelated. Since Bartlett tests, sphericity value is more than 0.797 thereby it indicates that a strong correlation exists between teaching tools used during the mathematical learning of the students.

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.359	22.655	22.655	1.359	22.655	22.655
2	1.108	18.467	41.122	1.108	18.467	41.122
3	1.041	17.358	58.480	1.041	17.358	58.480
4	.983	16.385	74.865			
5	.850	14.165	89.031			
6	.658	10.969	100.000			
Extraction Method: Principal Component Analysis.						

Table 4.19: Total Variance Explained (3rd variable)

Total variance denotes the amount of variation contributed by the components within each variable.In context to teaching tools and mathematical learning of the students, the percentage of variance for extraction sum of squared loadings has been reported to be nearly 22.655, 18.467, 17.358 thus indicating that the components are closely related to each other. Thus, it can be stated that teaching tools components collectively influence mathematical learning among the students.

Component Matrix			
	Component		
	1	2	3
Inclusion_ Interest	.807	-.031	-.061
Reference_ learning	.747	-.280	.018
Instrument_ Learning	.385	.518	.100
Computer_ infrastructure	-.033	-.491	-.224
Calculator_ infrastructure	.003	.204	.862
Test_ Quiz _l earning	.027	.691	-.484
Extraction Method: Principal Component Analysis.			
a. 3 components extracted.			

Table 4.20: Component Matrix (3rd variable)

According to the above table, there is a positive relationship between variable inclusion interest and component 1 that was the teaching method. On the other hand, the relationship between test quiz learning and component three that was the use of teaching materials is negative.

KMO and bartlett's test (4th variable- problems in mathematics learning)

Correlation Matrix (4th variable)							
		Assessment _pressure	Expectation _stress	Skill_ requirement	Confidence_ Task performance	Confusing	Mathematics_ career
Correlation	Assessment pressure	1.000	.018	.008	-.030	-.021	.001
	Expectation stress	.018	1.000	.008	.027	.243	-.002
	Skill requirement	.008	.008	1.000	.043	.023	.068
	Confidence Task performance	-.030	.027	.043	1.000	.061	.050
	Confusing	-.021	.243	.023	.061	1.000	-.119
	Mathematics career	.001	-.002	.068	.050	-.119	1.000
Sig. (1-tailed)	Assessment pressure		.371	.445	.293	.350	.491
	Expectation stress	.371		.441	.312	.000	.484
	Skill requirement	.445	.441		.216	.335	.104
	Confidence Task performance	.293	.312	.216		.132	.177
	Confusing	.350	.000	.335	.132		.014
	Mathematics career	.491	.484	.104	.177	.014	

Table 4.21: Correlation Matrix (4thvariable)

(Source: derived from survey results)

The correlation matrix table shows a correlation value of 0.445 for correlation between skills requirements and stress level. It is also known that whenever the value ranges between 0.50 and 1, the correlations tend to be stronger. In this case, mathematics careers and strong expectations are found to be strongly correlated with each other. On the other hand, a mathematical career and confidence in performance tasks possess a correlation value of approximately 0.050 which indicates a weak relationship between the two.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.591
Bartlett's Test of Sphericity	Approx. Chi-Square	31.019
	df	15
	Sig.	.009

Table 4.22: KMO and Bartlett's Test (4th variable)

In the current study, problems in mathematics learning are the dependent variables that are largely influenced by the mathematical knowledge of the students, teaching tools and

teaching methods. KMO adequacy value has been reported to be 0.591 while that of the significance value of 0.009. Since the sphericity value is more than 0,.05 thus it indicates a close association between problems in mathematics learning among the students and teaching methods, teaching tools and mathematical knowledge of the students.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.279	21.320	21.320	1.279	21.320	21.320
2	1.112	18.525	39.845	1.112	18.525	39.845
3	1.017	16.955	56.800	1.017	16.955	56.800
4	.944	15.733	72.533			
5	.929	15.480	88.013			
6	.719	11.987	100.000			

Extraction Method: Principal Component Analysis.

Table 4.23: Total Variance Explained (4th variable)

According to the above table, the number of total factors in this factor analysis was 6. Component 1 has shown a greater value of 21.320. The percentage variance value of third factors has cleared that total variance of percentage for all of the above factors up to 5 was 15.480%.

Component Matrix

	Component		
	1	2	3
Assessment_ pressure	-.035	-.079	.895
Expectation stress	.714	.103	.204
Skill requirement	.042	.606	.226
Confidence Task performance	.197	.557	-.322
Confusing	.798	-.022	-.022
Mathematics_ career	-.300	.645	.142

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Table 4.24: Component Matrix (4th variable)

The above table highlights the component matrix value in context to the mathematical problem faced by students during class. Values obtained indicate that Assessment pressure, expectation stress, skills requirements along with confidently performing tasks affect the rate of mathematics learning among the students. It has been seen that a positive relationship among the variables assignment pressure and use of teaching material exists. On the other hand, a negative relation among the variables mathematical career and mathematical knowledge exists.

4.3.5 Data analysis summary table

Data Analysis Summary Table							
Items	**Knowledge of mathematics**	**Teaching methods**	**Teaching materials used**	**Student learning problems**	**Chi-square test**	**Variance Explained**	**Importance of the Factor****
Mathematics_ Interest	.744				.884	1.238	20.63%
Formula_ Equation_ Difficulty	.498					1.115	18.58%
Theory_ Practical_ Knowledge	.424					1.053	17.54%
Computational_ Skill	.861					.948	15.79%
Mathematics_ Liking_ motivation	.633					.869	14.47%
Favourite fields and pictures	.724					778	12.96%
Teaching_ Effort		.765			.954	1.929	32.15%
Teaching method_ Complication		.743				1.217	20.27%
Teacher knowledge_ education		.973				1.070	17.82%
Confidence_ Knowledge		.970				.947	15.77%
supervision of teachers		.654				.752	12.53%
Language_ Barrier		.654			10.476	.086	1.43%
Teacher_ behaviour		.736				1.359	22.65%
Inclusion_ Interest			.807			1.108	18.46%
Reference_ learning			.747			1.041	17.35%
Instrument_ Learning			.518			.983	16.38%
Computer_ infrastructure			.491		.574	.850	14.16%
Calculator_ infrastructure			.862			.658	10.96%
Test_ Quiz_ learning			.691			1.279	21.32%
Assessment_ pressure				.895		1.112	18.52%
Expectation_ stress				.714		1.017	16.95%
Skill_ requirement				.606		.944	15.73%
Confidence Task_ performance				.557		.929	15.48%
Confusing				.798		.939	11.98%
Mathematics career				.645		.719	21.32%
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.							

Table 4.25: Data analysis

The current study on context to problems faced by the UG students during mathematics learning has been conducted by considering Problems of mathematics learning as the dependent variable and mathematics knowledge, teaching tools and teaching method as the independent variable. Study results highlight the R^2 value to be 0.10 for theoretical-practical knowledge and confidence task performance. Thus, indicating that task performance and practical knowledge help students to develop an interest in mathematics learning.

4.4 Summary

Depending on the above discussion, it can be stated that the teaching approaches of the teachers, use of effective formulas and equations are effective to learn mathematics easily. On the other hand, sufficient efforts of the teachers are necessary to improve the teaching method. Additionally, language barriers and teachers' inappropriate behaviours are the major issues in mathematical learning.

5. CONCLUSION

Depending on the above discussion it can be concluded that the major problems that the undergraduate students of Kamrup (M) face are mathematical formula memorizing, lack of infrastructure, and inappropriate behaviours of teachers. Additionally, the tutors and parents play an important role in the memory development of the students. It has been highlighted that technological advancement is a key moderator of learning. The stress level among students increases due to the lack of parents' support and bullying in educational institutions. Cognitive teaching methods are effective to help students learn mathematics. Lack of teaching material such as text and reference books discouraged both students and teachers to discuss different aspects of mathematics.

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