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Research Article

A Study on Academic Performance of Students in Mathematics in Assam, India

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Abstract

The significance of Mathematics is well known across the globe. Mathematics as a discipline of learning is included in curriculum at different stages of education. National Curriculum Framework, 2005 has given importance to learning of Mathematics in India. But it has seen that Academic performance of Students in Mathematics is not up to the required standard in Assam. In view of this, we thought to study the Academic performance of Secondary school Students in Mathematics in Dibrugarh district, Assam, India. The significance of the study is profound and multifaceted. It impacts various aspects of Mathematical education, teaching methodologies, learning outcome and experience of Students and society at large. It helps to find out the learning gaps as well as the factors associated with Academic performance of Students. The study is imperative to enhance educational outcomes in Mathematics and cultivate a conducive learning environment. We adopted Descriptive cum Normative survey method and Cross-Sectional design. We observed that Students showed overall poor Academic performance in Mathematics. However urban school Students exhibit better performance than rural school Students. Certain Students exhibited a pronounced enthusiasm and curiosity for learning Mathematics, whereas majority displayed signs of anxiety or indifference. Teachers, policymakers and communities can work together to create an environment that fosters Mathematical proficiency and set Students on a path to academic and professional success.

Keywords: Academic performance, Mathematics, Secondary schools, Students, 10th grade.

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1. Introduction

Mathematics is conceptualized as "The scientific discipline wherein calculations are of paramount importance." It is emphasized in National Policy on Education (1968) that "Mathematics ought to be perceived as instrument for cultivating a child's capacity

to think, reason, analyze, and articulate in a logical manner. In addition to being a discrete subject, it should be regarded as an integral component of any subject that entails analysis and interpretation". As articulated by Bertrand Russell, "Mathematics maybe characterized as domain wherein we remain unaware of the subject

matter under consideration, nor can we ascertain the veracity of our assertions". In the words of Galileo, "Mathematics constitutes the lexicon through which GOD has inscribed the Universe".

The term "Mathematics" is utilized in two distinct contexts, namely, one as a methodology for addressing issues related to quantity, spatial dimensions, and order, and other as a compendium of laws or generalizations of truth that are unveiled through inquiry.

Mathematics is recognized as an academic field with significant applicability in realms of science and technology (Singh, 2015), and Charles-Ogan and Alamina (2014) have observed that a robust foundation in Mathematics is indispensable for numerous vocational paths and employment opportunities in contemporary technological landscape. Furthermore, Mathematics cultivates critical thinking, logical reasoning, and problem-solving capabilities that are required for academic success and achievement in higher education and professional spheres.

Educational process in Mathematics plays an important role in fostering cognitive development. Engagement with Mathematics stimulates cognitive abilities such as memory and attention, thereby contributing to overall cognitive advancement and Academic performance.

Mathematics serves as a foundational requirement for various advanced academic pursuits. A comprehensive understanding of Mathematical principles lays the groundwork for assimilation of other subjects, including science, technology, engineering, and economics. Expertise in Mathematics facilitates access to diverse career trajectories and higher educational opportunities. Academic achievement is characterized as a quantifiable assessment of knowledge, comprehension, or proficiency within a specific subject or a collection of subjects, and can be delineated as a successful attainment within a designated academic domain (Verma, 2016).

A strong background of Mathematics significantly enhances overall Academic performance and intellectual growth. It is instrumental in creating a skilled workforce, thereby propelling economic progress, innovation, and social advancement. Countries exhibiting elevated levels of Mathematical proficiency frequently experience enhanced innovation and technological progress.

Mathematics constitutes a fundamental competency requisite for academic excellence across a multitude of disciplines. Academic success of Students in Mathematics profoundly influences their future educational and vocational opportunities, thereby augmenting their earning potential. In evaluating Academic performance and potential of Students in Mathematics, attitudes towards learning of Mathematics are often cited as significant factors influencing success.

2. Literature Review

In this section, we review literature on Academic performance of Students in Mathematics and its influencing factors.

Obiero (2018) noted that inadequate performance in Mathematics has emerged as a global challenge,

notwithstanding the empirical investigations conducted on various factors identified as potential influencers of Mathematics achievement. Poor performance in Mathematics is recognized as a learning impairment and a principal contributor for academic failure (Dela Cruz, 2018). Hence, it is imperative to ascertain the factors that may influence Mathematics attainment of Students, thereby enabling Teachers and administrators to devise interventions aimed at enhancement.

Numerous studies have demonstrated that achievement motivation, study habits, learning environments, attitudes, beliefs, emotions, community dynamics, gender, geographical location, parental involvement, and socio-economic status are correlated with Academic performance of Students in Mathematics.

Achievement motivation is critically significant in pedagogical process (Hasan & Sarkar, 2018), as it is characterized as an intrinsic drive within Students to succeed; lack in motivational drive adversely impacts Academic performance. Sharma and Vyas (2016) posited that effective study habits correlate positively with academic success, whereas ineffective study habits lead to subpar academic outcomes. Arora (2016) articulated that foundational study habits should be instilled at an early educational stage, with collective efforts of parents and educational institutions to create environments conducive for cultivation of effective study habits to mitigate academic failure. Enhancing both achievement motivation and study habits (Daniel, 2015) among Students may serve to elevate their Mathematics proficiency.

A plethora of researchers have demonstrated that educational environment significantly influences Mathematics achievement (Shamaki & Ado, 2015; Adnan, Abdullah, Puteh & Che, Maat, 2014; Hoang, 2008; Papanastasiou, 2002; Dorman, 2001).

Sarangi (2015) investigated correlation between achievement motivation and Academic performance in relation to community, geographical location, and gender. The findings indicated a notable relationship between achievement motivation and Academic performance among non-tribal, female, rural, and urban students; conversely, no significant relationship was seen among tribal and male students. In contrast, research conducted by Hasan and Sarkar (2018) revealed a non-significant correlation between achievement motivation and Academic performance of Students. Moreover, Obiero (2018) discovered a positive yet weak and statistically insignificant relationship between achievement motivation and Students' Mathematics achievement.

Existing literature presents two principal explanations for gender disparity observed on Academic performance in Mathematics. Advocates of biological theories propose that variations in brain structure (Cahill, 2005), hormonal differences (Davison and Susman, 2001), or spatial abilities (Kucian et al., 2005) contribute to this gap. In contrast, an alternative body of research attributes gender gap in Mathematics performance to an intricate array of sociocultural factors, rather than purely biological distinctions. Societal or cultural frameworks addressing gender gap suggest two potential hypotheses. Firstly, boys and girls may experience disparities in

educational inputs that influence Mathematics outcomes. Secondly, despite girls possessing equivalent observable characteristics as boys, they may be influenced by those characteristics in a divergent manner (Dickerson et al., 2015). For instance, boys may benefit from family and school resources more than girls due to the stereotype that Mathematics is a male domain.

The empirical findings of the investigative study conducted by Vukovic et al. (2013) demonstrated that involvement of parents significantly impacts children's performance in Mathematics by alleviating Mathematics anxiety. Galindo (2012) established that institutional endeavors aimed at fostering communication and engagement with families were predictive of enhanced parental involvement in educational settings and correlated with elevated levels of Students' achievement in domain of Mathematics. Powell et al. (2012) affirmed that parental engagement is intrinsically linked to Students' achievements in Mathematics. Dumont et al. (2012) carried out an investigation involving eighth-grade Students and discerned that parental interference and conflict adversely affected Students, whereas parental support and competences were positively correlated with their achievements in Mathematics.

Recent investigations have illuminated a significant correlation between parents' socioeconomic status and Students' overall Academic performance (Igobo et al., 2014; Yelkpiari, 2016; Ayibatonye & Okere, 2018), including specific achievements in Mathematics (McConney & Perry, 2010; Farooq et al., 2011; Alghazo, 2015). Within Indian educational context, recent research has indicated a positive and significant correlation between Students' socioeconomic conditions and their Academic performances (Prabha & Gupta, 2000; Choudhury & Das, 2016). There exists a positive correlation between socioeconomic status and Students' academic achievements. The socioeconomic status of a family is associated with the academic accomplishments of their offspring at the primary educational level.

3. Rationale of the Study

Kothari Commission (1964-66) suggested that "Science and Mathematics should be taught on a compulsory basis to all pupils as a part of general education during first ten years of schooling".

Mathematics is mandated as a core subject in School education. Academic performance of Students in Mathematics bears significant ramifications for their future educational trajectories and career prospects. Despite its critical importance, numerous Students encounter difficulties in Mathematics, resulting in poor Academic performance and challenges in their educational and professional pursuits. As such, investigating this issue is vital for discerning the underlying causes and implications, formulating effective interventions, enhancing educational outcomes, and addressing existing disparities. To study Academic performance of Students in Mathematics is a pressing concern for Teachers, policymakers, and stakeholders, aimed at addressing the challenges and promoting improvements.

In this context, while several studies have been conducted, there exists a paucity of substantial research pertaining to Academic performance in Mathematics in Dibrugarh district of Assam, India. Consequently, we have decided to study Academic performance of Secondary school Students in Mathematics in Dibrugarh district, Assam, India. A variety of cultural and socioeconomic factors exert influence on educational outcomes in Dibrugarh district, Assam, India. Therefore, investigating Academic performance of Students in Mathematics is of particular significance in Dibrugarh district, Assam, India.

4. Significance of the Study

The importance of this investigation is both profound and multifaceted. It influences numerous dimensions of Mathematical education, pedagogical approaches, educational outcomes, and learning experiences of Students and society at large. This research aids in identifying learning gaps, and the factors influencing Academic performance and professional trajectories of Students. The study is crucial for advancing educational outcomes in Mathematics and fostering an environment conducive to learning. The implications of this research transcend the confines of the classroom.

Examining Students' Academic performance in Mathematics facilitates identification of learning obstacles and specific domains in which Students encounter difficulties, thereby empowering Teachers to provide customized support and resources, which in turn enhances Students' comprehension of Mathematical concepts and subsequently improves Academic performance.

Investigations into Students' Academic performance engender reforms in educational policies. Trends in Academic performance enable policymakers to allocate resources effectively, ensuring that institutions characterized by lower Academic performance levels receive necessary assistance and support. Academic performance of Students is instrumental in guaranteeing that all Students have equitable access to quality education, irrespective of their backgrounds or circumstances, thereby forming effective educational planning. Data pertaining to Students' Academic performance equips Teachers to formulate more efficacious curricula that better address the needs of Students while aligning with educational standards and diverse learning styles.

Insights gained from issues related to Academic performance enhance Teacher training and professional development. Analyzing Academic performance aids in pinpointing effective instructional strategies and identifying areas where Teachers may require supplementary training and support. Moreover, this contributes to professional advancement of Teachers, thereby enabling them to provide enhanced support to Students and refine instructional methodologies.

Research on Students' Academic performance is vital for monitoring and assessing educational outcomes. Academic performance data offer benchmarks for evaluating efficacy of educational programs and interventions. Consistent assessment of Academic

performance is crucial for ensuring that quality of education is sustained and improved over time. Schools are positioned to implement targeted interventions and support initiatives aimed at enhancing Student outcomes.

Analysis of Students' Academic performance data facilitates identification and rectification of disparities in educational opportunities and outcomes correlated with socioeconomic status. A thorough study of socioeconomic factors paves the way for formulation of targeted interventions designed to mitigate educational inequalities and support underprivileged Students.

Research into Academic performance can elucidate the extent to which cultural attitudes towards Mathematics influence Students' engagement and achievement. Addressing cultural biases while promoting positive perceptions of Mathematics can lead to improvements in educational outcomes.

Academic performance of Students in Mathematics carries significant long-term economic implications. Elevating Mathematical proficiency among Students contributes to the development of a more skilled workforce and stimulates innovation and economic advancement.

Ongoing research into the determinants of Academic performance in Mathematics, along with evaluation of diverse interventions, can facilitate development of more effective strategies aimed at enhancing educational outcomes.

5. Objectives of the Study

The objectives of the study are as follows:

1. To study the Academic performance of Secondary school Students in Mathematics in the district of Dibrugarh, Assam, India.
2. To compare the Academic performance of Secondary school Students in Mathematics between academic sessions: 2019-2020 and 2020-2021, 2019-2020 and 2021-2022, 2019-2020 and 2022-2023, 2020-2021 and 2021-2022, 2020-2021 and 2022-2023 and 2021-2022 and 2022-2023

3. To find out the influence of variables-gender, locality and socio-economic status on Academic performance of Secondary school Students in Mathematics.

6. Hypotheses of the Study

In accordance with the nature of objectives, the following hypotheses were formulated

H₀₁: There is no significant difference in Academic performance mean scores of Secondary school Students in Mathematics for the academic sessions: 2019-2020 and 2020-2021, 2019-2020 and 2021-2022, 2019-2020 and 2022-2023, 2020-2021 and 2021-2022, 2020-2021 and 2022-2023 and 2021-2022 and 2022-2023

H₀₂: There is no significant difference in Academic performance mean scores of male and female Secondary school Students in Mathematics.

H₀₃: There is no significant difference in Academic performance mean scores of urban and rural Secondary school Students in Mathematics.

H₀₄: There is no significant difference in Academic performance mean scores of Secondary school Students in Mathematics belonging to high and low socio-economic status

7. Delimitations of the Study

The Study has been delimited to

1. 10th grade Students in the district of Dibrugarh, Assam, India
2. Variable: gender, locality and socio-economic status

8. Method Adopted for the Study

We adopted Descriptive cum Normative survey method in this study. This method was used as it revealed the present scenario of Academic performance of Students in Mathematical. We adopted Cross Sectional design.

8.1 Population of the Study

Population consists of Students of all the Secondary schools of both rural and urban areas under six blocks of Dibrugarh district, Assam, India.

Table 1 Population of the Study

District	Block	No. of Secondary Schools	No. of Secondary Schools		No. of Students	
			Rural	Urban	Male	Female
Dibrugarh	Barbaruah	33	21	12	2434	2938
	Joypur	30	25	5	2312	3038
	Khowang	30	30	0	2081	2402
	Lahoal	16	9	7	1377	1355
	Panitola	12	9	3	1337	1627
	Tengakhat	25	25	0	1738	2071

8.2 Sample of the Study

For representing total population of the study, we thought appropriately to select a sample of 10% of total No. of Secondary schools from both rural and urban areas under each block of Dibrugarh district, Assam,

India by making use of Proportionate Stratified Random Sampling technique. The sample includes 17 Secondary schools under the six blocks of Dibrugarh district, Assam, India.

Table 2 Sample of the Study

District	Block	No. of Secondary Schools	No. of Secondary Schools	
			Rural	Urban
Dibrugarh	Barbaruah	3	2	1
	Joypur	4	3	1
	Khowang	3	3	0
	Lahoal	2	1	1
	Panitola	2	1	1
	Tengakhat	3	3	0

8.3 Participants of the Study

Participants are 10th grade Students from selected 17 sample Secondary schools under six blocks of Dibrugarh district, Assam, India. A Proportionate Stratified

Random Sampling technique was used to ensure representation from six different blocks and educational settings within Dibrugarh district, Assam, India. The students belong to diverse socioeconomic background.

Table 3 Participants of the Proposed Study

District	Block	No. of Secondary Schools	No. of Secondary Schools		No. of Students in 10 th grade		No. of Students in 10 th grade	
			Rural	Urban	Male	Female	Rural	Urban
	Joypur	4	3	1	85	108	131	62
	Khowang	3	3	0	77	86	163	0
	Lahoal	2	1	1	51	49	43	57
	Panitola	2	1	1	49	58	51	56
	Tengakhat	3	3	0	65	74	139	0

8.4 Tools used for Data Collection

For collection of quantitative data, the following tools were used.

1. Upadhyay (2019). Socio-Economic Status Scale, SESS-UKS was used to measure Socio-economic status of Students. The scale consists of 31 items and responses were scored according to the scoring key provided in the manual.
2. Academic achievement scores in Mathematics in State 10th grade Board Examination were collected from official school record of 17 sample schools and www.sebaonline.org

For collection of qualitative data, the following tools were used:

1. Interviews
2. Focus Groups
3. Classroom Observations

8.5 Data Analysis

Quantitative data were analysed by making use of descriptive and influential statistics in relation to gender, locality and socio-economic status as independent variables.

Interviews, focus groups, classroom observations had provided qualitative data which were thematically analysed to identify Academic progress of Students in Mathematics. Focus Groups explored on teaching practices, curriculum design and cultural influences on Academic performance of Students in Mathematics. Classroom observations threw light into implementation of Mathematics curriculum and its impact on Academic performance of Students in Mathematics.

9. Analysis and Interpretations of Result

Objective 1

To study the Academic performance of Secondary school Students in Mathematics in the district of Dibrugarh, Assam, India

For achieving the **Objective 1**, we had physically visited the selected 17 sample schools under six blocks of Dibrugarh district, Assam, India and we collected data pertaining to Academic performance of 10th grade Students in Mathematics from school record for academic sessions: 2019-2020, 2020-2021, 2021-2022 and 2022-2023 as provided by concerned authorities of the schools. Collected data were tabulated and put to descriptive statistics.

Table 4 Descriptive Statistics for Academic Performance of 10th grade Students in Mathematics

Academic Sessions	Sample Size(N)	Mean Scores	Standard Deviation(σ)	Pass Per cent	Per cent of	Per cent of
					Students above Mean Score	Students below Mean Score
2019-2020	771	39.57	22.18	64.31	43.97	56.03
2020-2021	876	51.73	16.89	98.09	42.12	57.88
2021-2022	807	36.01	22.34	53.79	46.84	53.16
2022-2023	888	42.11	23.09	64.78	52.6	47.4
2019-2020	3342	42.56	22.13	70.24	48.68	51.32

to
2022-2023

Figure 1 Session wise Academic Performance Mean Scores of 10th grade Students in Mathematics

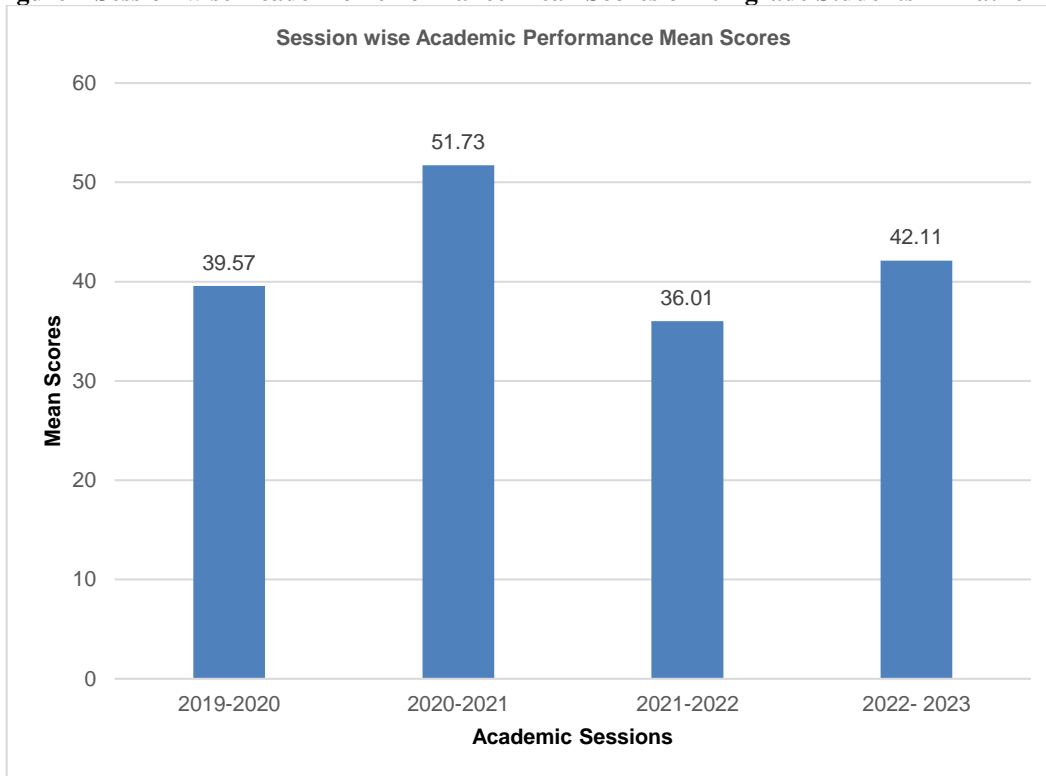
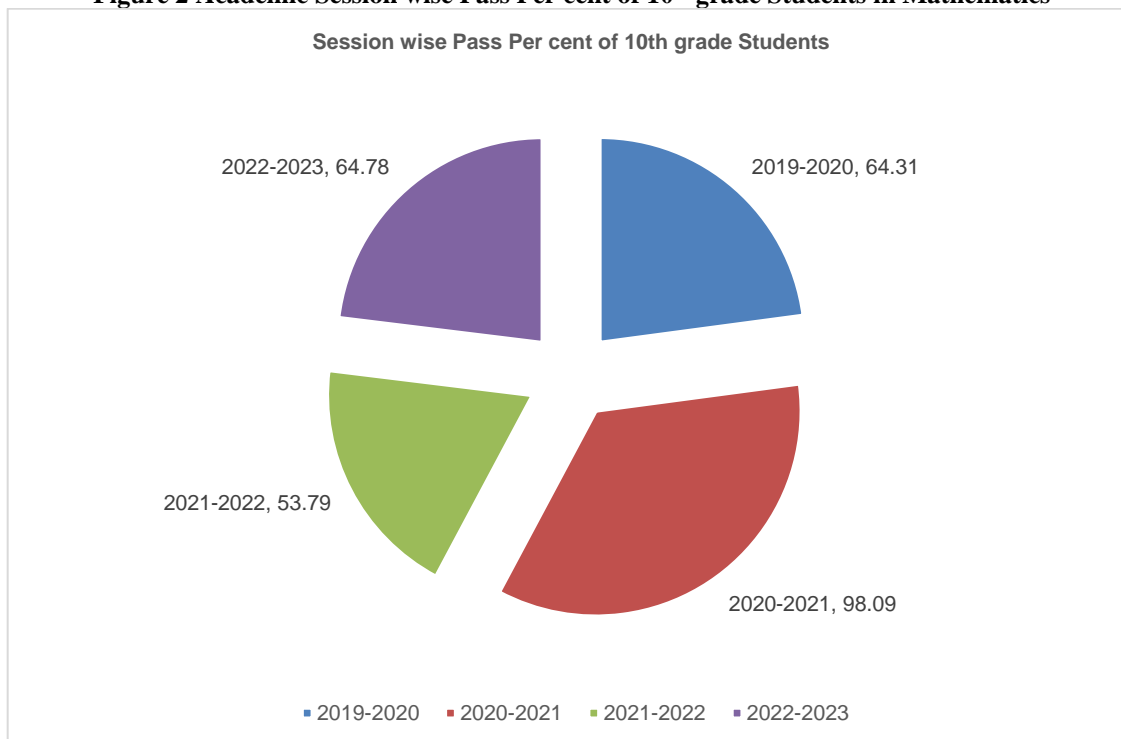


Figure 2 Academic Session wise Pass Per cent of 10th grade Students in Mathematics



Interpretations

Table 4 and Figure 1 indicates Academic performance mean scores of 10th grade Students in Mathematics to be 39.57, 51.73, 36.01 and 42.11 out of 100 marks for the sessions: 2019-2020, 2020-2021, 2021-2022 and 2022-2023 respectively. These mean scores indicate extremely

poor performance. We found that more than 50% of Students were below mean scores. 43.97%, 42.12%, 46.84%, 52.6% of Students were found to be above mean scores for the sessions: 2019-2020, 2020-2021, 2021-2022 and 2022-2023 respectively. Further, we computed combined mean score of 10th grade Students

in Mathematics from academic sessions: 2019-2020 to 2022-2023 and it came out to be 42.56 which is again a very low and poor score. Overall, 51.32% of Students were found to be above mean score for the sessions 2019-2020 to 2022-2023. This is also a clear indication of poor Academic performance of Students in Mathematics.

Table 4 and Figure 2 reveal the pass per cent of 10th grade Students in Mathematics for the sessions: 2019-2020, 2020-2021, 2021-2022, and 2022-2023 to be 64.31, 98.09, 53.79 and 64.78 respectively. The session 2020-2021 is showing highest pass per cent of 98.09. State 10th grade Board examination was not held for the session 2020-2021 due to COVID. The Students were promoted to 11th grade on the basis of internal assessment.

Objective 2

To compare the Academic performance of Secondary school Students in Mathematics between academic sessions: 2019-2020 and 2020-2021, 2019-2020 and 2021-2022, 2019-2020 and 2022-2023, 2020-2021 and 2021-2022, 2020-2021 and 2022-2023 and 2021-2022 and 2022-2023

H₀₁: There is no significant difference in Academic performance mean scores of Secondary school Students in Mathematics for the academic sessions: 2019-2020 and 2020-2021, 2019-2020 and 2021-2022, 2019-2020 and 2022-2023, 2020-2021 and 2021-2022, 2020-2021 and 2022-2023 and 2021-2022 and 2022-2023

For achieving the **Objective 2** and testing the hypothesis (**H₀₁**), we compare data of two academic sessions as per **Table 5**.

Table 5 t-test for Academic Performance of 10th grade Students in Mathematics

Academic Session	Sample Size(N)	Mean Scores	Standard Deviation(σ)	Standard Error of the Mean (SE _D)	Degree of Freedom(df)	t-value
2019-2020	771	39.57	22.18	0.98	1645	12.39
2020-2021	876	51.73	16.89			
2019-2020	771	39.57	22.18	1.12	1576	3.17
2021-2022	807	36.01	22.34			
2019-2020	771	39.57	22.18	1.11	1657	2.28
2022-2023	888	42.11	23.09			
2020-2021	876	51.73	16.89	0.97	1681	16.18
2021-2022	807	36.01	22.34			
2020-2021	876	51.73	16.89	0.96	1762	10.00
2022-2023	888	42.11	23.09			
2021-2022	807	36.01	22.34	1.10	1693	5.52
2022-2023	888	42.11	23.09			

Interpretations

We compared the Academic performance of 10th grade Students in Mathematics in the district of Dibrugarh between the academic sessions: 2019-2020 and 2020-2021, 2019-2020 and 2021-2022, 2019-2020 and 2022-2023, 2020-2021 and 2021-2022, 2020-2021 and 2022-2023 and 2021-2022 and 2022-2023

Table 5 reveal the computed t-values came out to be 12.39, 3.17, 16.18, 10 and 5.52 for sessions: 2019-2020 and 2020-2021, 2019-2020 and 2021-2022, 2020-2021 and 2021-2022, 2020-2021 and 2022-2023, and 2021-2022 and 2022-2023 respectively which are significant at .01 level of significance for their respective degree of freedom 1645, 1576, 1681, 1762, 1693. Hence, the formulated hypothesis got rejected except for the sessions 2019-2020 and 2022-2023. The computed t-value for sessions 2019-2020 and 2022-2023 came out to be 2.28 which is lesser than criterion t-value (2.58) and computed t-value (2.28) has not considered significant at .01 level of significance for 1657 degree of freedom. Hence, the sessions: 2019-2020 and 2022-2023 have not shown any significant difference in

Academic performance of 10th grade Students in Mathematics.

Generally, it is seen that Academic performance of 10th grade Students in Mathematics showed session-wise difference, but Students did not show any improvement in their Academic performance right from academic session: 2019-2020 to 2022-2023. It is a matter of great concern for educational functionaries.

Objective 3

To find out the influence of variables-gender, locality and socio-economic status on Academic performance of Secondary school Students in Mathematics

Objective 3(i)

To find out the influence of gender on Academic performance of Secondary school Students in Mathematics

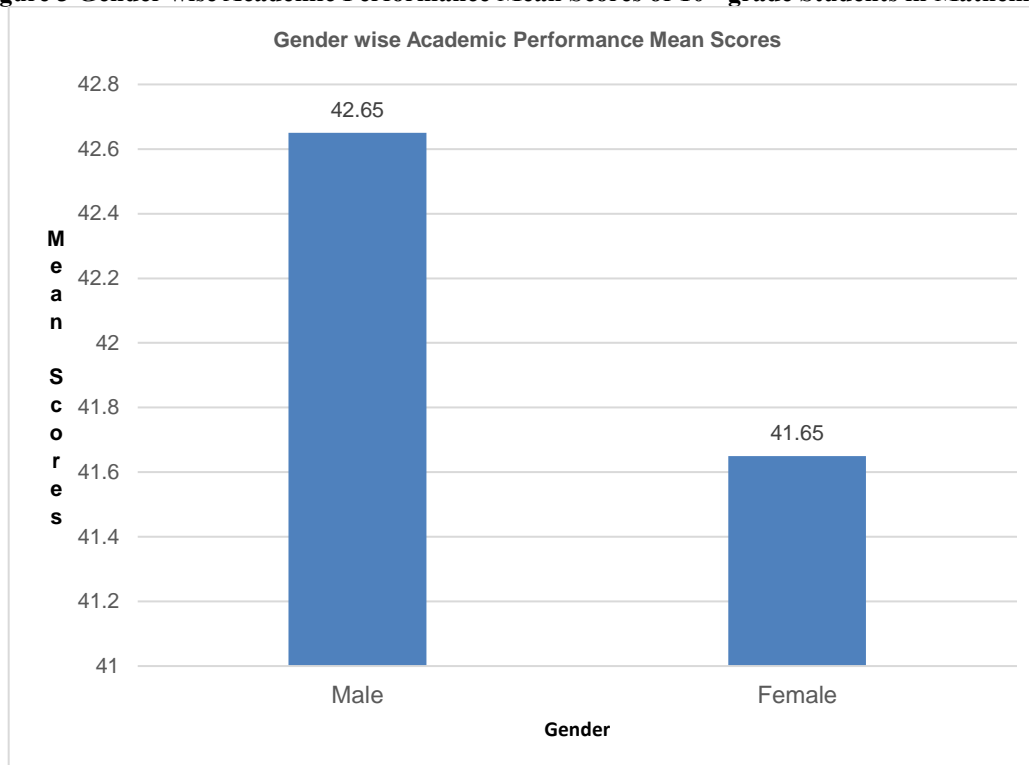
Hypothesis H₀₂: There is no significant difference in Academic performance mean scores of male and female Secondary school Students in Mathematics.

For achieving the **Objective 3(i)** and testing the hypothesis (**H₀₂**), we analysis data gender wise as per **Table 6**

Table 6 t-test for Academic Performance of male and female 10th grade Students in Mathematics

Gender	Sample Size(N)	Mean Scores	Standard Deviation(σ)	Standard Error of the Mean (SE _D)	Degree of Freedom(df)	t-value
Male	408	42.65	23.11	1.57	886	0.63
Female	480	41.65	23.68			

Figure 3 Gender wise Academic Performance Mean Scores of 10th grade Students in Mathematics



Interpretations

Table 6 and Figure 3 indicate Academic performance mean scores of male and female 10th grade Students in Mathematics to be 42.65 and 41.65 respectively. It is seen that mean score of male Students is little better than female Students. **Table 6** reveals that computed t-value came out to be 0.63 which is lesser than criterion t-value (2.58) and computed t-value (0.63) has not considered significant at .01 level of significance for 886 degree of freedom. Therefore, the formulated hypothesis: “There is no significant difference in Academic performance mean scores of male and female Secondary school Students in Mathematics” got retained. It means that male and female Students do not differ significantly in

their Academic performance in Mathematics. From this, it is understood that male and female Students exhibit equal Academic performance in Mathematics.

Objective 3(ii)

To find out the influence of locality on Academic performance of Secondary school Students in Mathematics

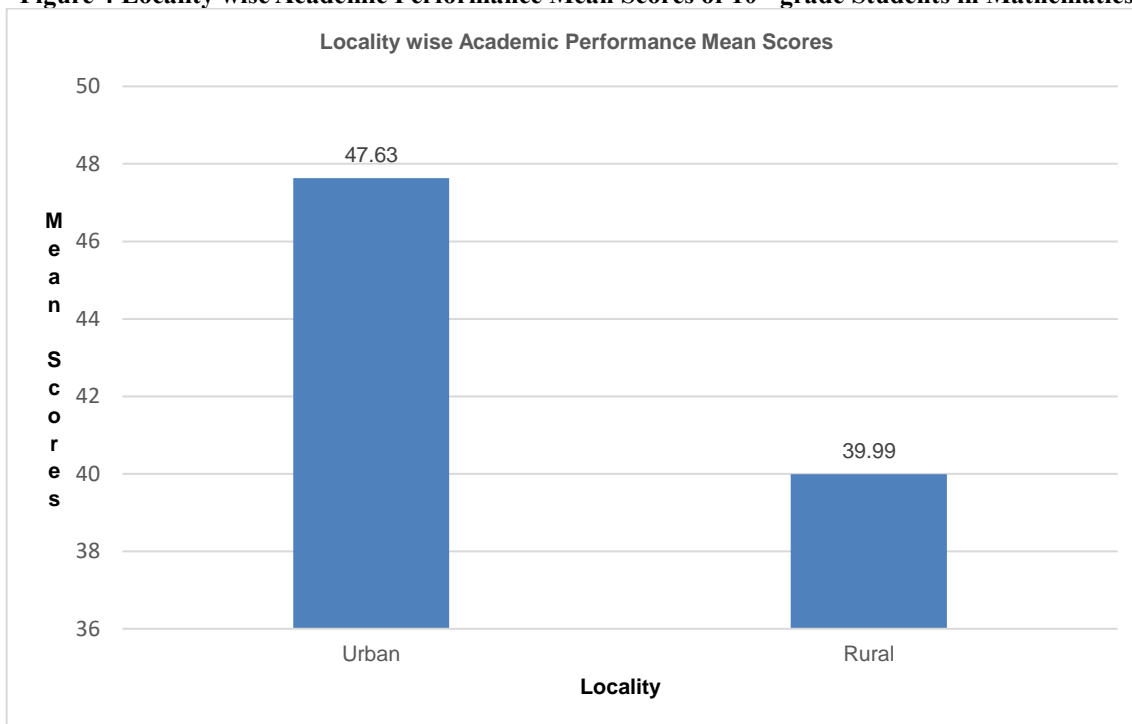
H₀₃: There is no significant difference in Academic performance mean scores of urban and rural Secondary school Students in Mathematics.

For achieving the **Objective 3(ii)** and testing the hypothesis (**H₀₃**), we analysis data locality wise as per **Table 7**

Table 7 t-test for Academic Performance of urban and rural 10th grade Students in Mathematics

Locality	Sample Size(N)	Mean Scores	Standard Deviation(σ)	Standard Error of the Mean(SE _D)	Degree of Freedom(df)	t-value
Urban	246	47.63	25.15	1.83	886	4.18
Rural	642	39.99	22.37			

Figure 4 Locality wise Academic Performance Mean Scores of 10th grade Students in Mathematics



Interpretations

Table 7 and Figure 4 indicate Academic performance mean scores of urban and rural 10th grade Students in Mathematics to be 47.63 and 39.99 respectively. Urban 10th grade Students show better mean score than rural 10th grade Students in Mathematics. **Table 7** indicates that computed t-value came out to be 4.18 which is greater than criterion t-value (2.58). Hence, the computed t-value (4.18) has been considered significant at .01 level of significance for 886 degree of freedom and the formulated hypothesis:” There is no significant difference in Academic performance mean scores of urban and rural Secondary school Students in Mathematics” got rejected. It means that urban Students differ significantly in their Academic performance in Mathematics than rural Students. It has seen that Students of urban schools show better Academic performance in Mathematics as compared to rural Students.

Finally, it is concluded that variable: locality has its influence on Academic performance of Students in Mathematics

Objective 3(iii)

To find out the influence of socio-economic status on Academic performance of Secondary school Students in Mathematics

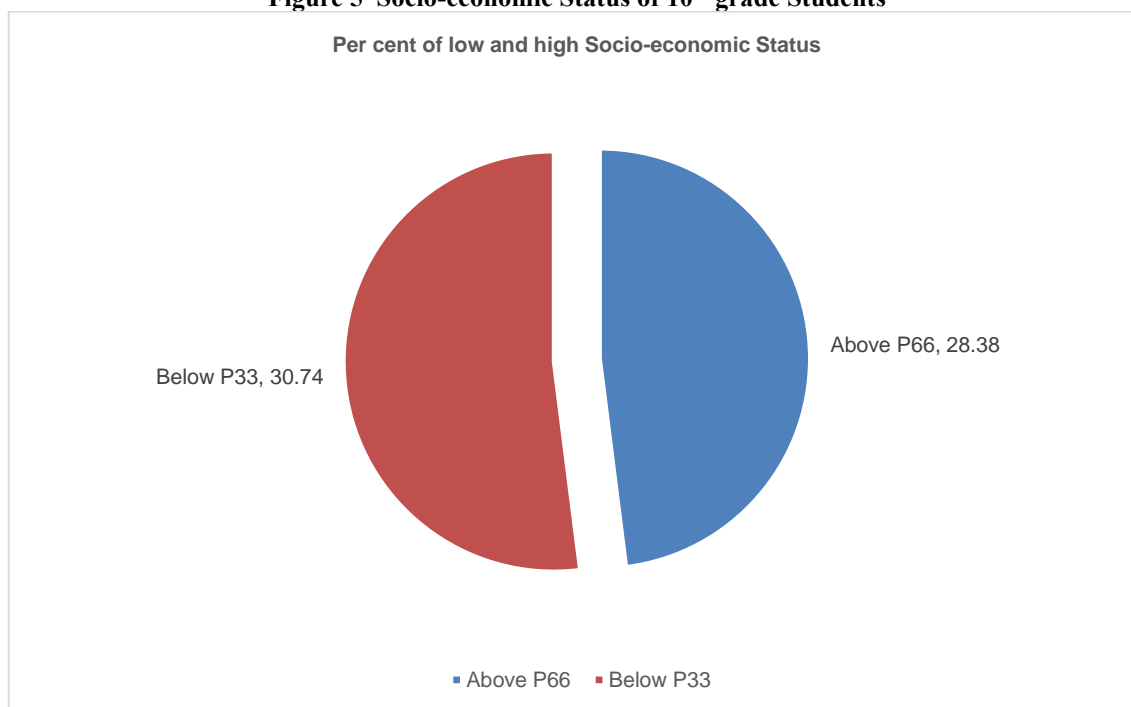
H₀4: There is no significant difference in Academic performance mean scores of Secondary school Students belonging to high and low socio-economic status in Mathematics

For achieving the **Objective 3(iii)**, we physically visited the selected 17 sample schools under six blocks of Dibrugarh district, Assam, India. We collected required data from 10th grade Students pertaining to their socio-economic status by using *Socio-Economic Status Scale*. Responses were scored, tabulated and put to descriptive statistics.

Table 8 Descriptive Statistics of Socio-Economic Status of 10th grade Students

Socio-economic Status	Sample Size(N)	Mean Score	Standard Deviation(σ)	Per cent of Students above P ₆₆ Value	Per cent of Students below P ₃₃ Value
	888	60.58	9.87	28.38	30.74

Figure 5 Socio-economic Status of 10th grade Students



Interpretations

We computed P_{33} and P_{66} values on socio-economic status scores of 10th grade Students of Dibrugarh district, Assam, India. Students who were found above P_{66} value were considered as high socio-economic status and Students who were found below P_{33} value were considered as low socio-economic status. **Table 8 and Figure 5** reveal that 28.38% of Students belong to high

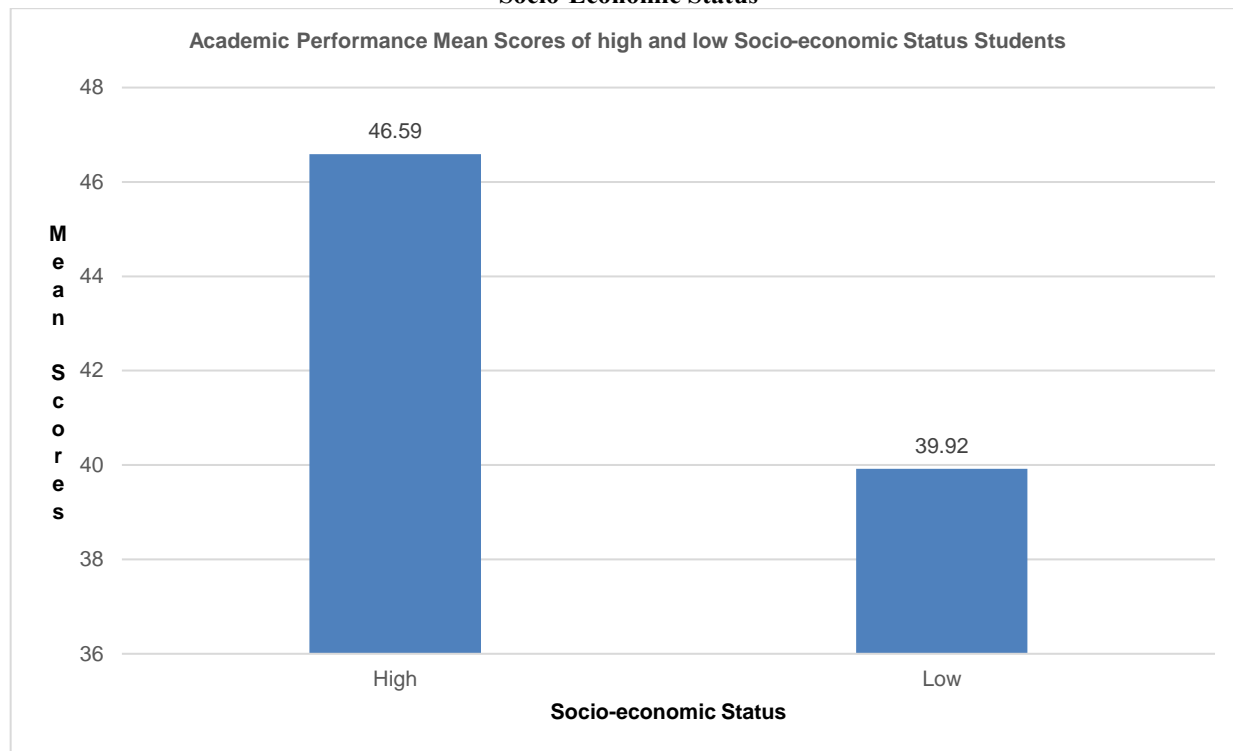
socio-economic status and 30.74% of Students belong to low socio-economic status. Socio-economic status mean score of 10th grade Students is 60.58 which is average socio-economic status according to *Socio-Economic Status Scale, SESS-UKS* (Upadhyay, 2019).

For testing the hypothesis (**H₀₄**), we analysis the data of Students belong to high and low socio-economic status as per **Table 9**

Table 9 t-test for Academic Performance of 10th grade Students belonging to high and low Socio-economic Status

Socio Economic Status	Sample Size(N)	Mean Scores	Standard Deviation(σ)	Standard Error of the Mean (SE _D)	Degree of Freedom(df)	t-value
High	252	46.59	24.46	2.08	523	3.21
Low	273	39.92	23.00			

Figure 6 Academic Performance Mean Scores of 10th grade Students in Mathematics belonging to high and low Socio-Economic Status



Interpretations

Table 9 and Figure 6 show Academic performance mean scores of 10th grade Students belonging to high and low socio-economic status to be 46.59 and 39.92 respectively. It is seen that mean score of high socio-economic status Students is higher than low socio-economic status Students.

Table 9 shows that computed t-value came out to be 3.21 which is greater than criterion t-value (2.58) at .01 level of significance for 523 degree of freedom. Hence, the computed t-value (3.21) has been considered significant and the formulated hypothesis: "There is no significant difference in Academic performance mean scores of Secondary school Students belonging to high and low socio-economic status in Mathematics" got rejected. From this, it is interpreted that Students belonging to high socio-economic status differ significantly in their Academic performance in Mathematics than Students belonging to low socio-economic status. Further, it has found that Students coming from well to do families have shown better Academic performance in Mathematics as compared to Students belong to low socio-economic background. It is evident that variable: Socio-economic status has some impact on Academic performance of Students in Mathematics.

10. Summary and Findings

The research indicates that Academic performance of Students in Mathematics is influenced by a multitude of factors.

Academic Performance of Students in Mathematics

Students demonstrated a generally subpar Academic performance in Mathematics. Several contributing factors to this poor Academic achievement in

Mathematics include attitudes, beliefs, emotions towards the subject, lack of interest in the subject, achievement motivation as many students perceive Mathematics as a challenging discipline due to absence of a robust foundational knowledge acquired during elementary stage. Community, gender, locality were also found to have influence on Academic performance. Additionally, educational level of parents plays a significant role; many were found inadequately educated and thus lack awareness regarding critical importance of Mathematics for future career prospects. Consequently, they are unable to provide effective guidance to their offspring for enhanced future opportunities. Furthermore, their limited educational background hinders their ability to assist their children with homework. The absence of proper study habit and conducive study environment at home also contribute to this issue. Moreover, Students were found to engage or assisting their parents in earning livelihood due to their low economic condition. Regular school attendance is often impeded by various personal challenges. Additionally, Students face difficulties in affording essential stationery required for academic endeavors. Male and female Students exhibit comparable Academic performance in Mathematics. It was found that both male and female Students demonstrate equivalent levels of intelligence and career orientation, resulting in equal interest in Mathematics. They actively seek to improve their Academic performance in Mathematics to secure better career opportunities. Students tend to favor studying science at higher educational levels. In contemporary times, female Students are not trailing behind their male counterparts; they have stepped forward to compete on equal footing. Both male and

female Students were observed to cultivate a more positive attitude towards Mathematics.

It was found that geographical location significantly influences Academic performance of Students in Mathematics, as students from urban schools benefit from greater access to opportunities, educational resources, extracurricular activities, and superior quality Mathematical instruction compared to their rural counterparts. Schools of urban areas possess modern technological tools, libraries, and well-maintained classrooms, along with high-quality infrastructure that collectively improve learning experience and performance of Students in Mathematics. Urban schools frequently attract and retain highly qualified and experienced Teachers capable of delivering high-quality instruction and support. The disparities in Academic performance in Mathematics between urban and rural Students can be attributed to more favorable economic conditions, superior study facilities, supportive home environment conducive to studying, parental involvement, and a career-oriented mindset, all of which collectively enhance learning experiences and Academic performance. Parents of urban Students are more educated, exhibit a heightened concern for their children's career trajectories, and provide encouragement and financial support. They play a pivotal role in guiding their children towards a prosperous future and assist with homework, thus contributing positively to academic outcomes.

Students from higher socio-economic backgrounds demonstrated superior academic achievement in Mathematics compared to their counterparts from lower socio-economic backgrounds. Consequently, socio-economic status significantly influences Academic performance of Students. Individuals hailing from affluent socio-economic backgrounds frequently possess enhanced access to educational resources and opportunities. Students belonging to rich families are able to afford reference materials, educational technologies, and private tutoring, thereby augmenting their learning outcomes and performance in Mathematics. Families with high socio-economic status are capable of financing extracurricular activities that offer supplementary educational experiences. Parents with elevated socio-economic status typically provide assistance with homework, educational support, and an optimal learning environment in the home. Students from higher socio-economic backgrounds exhibit elevated educational aspirations and a favorable disposition towards academic success, which in turn affects their performance and motivation in the subject matter.

Certain Students exhibited a pronounced enthusiasm and curiosity for learning Mathematics, whereas majority displayed signs of anxiety or indifference. Positive interactions among peers and a supportive classroom atmosphere were noted in a limited number of schools, contributing to students' engagement and motivation in the pursuit of Mathematics learning.

Teaching Methods, Curriculum Relevance and Classroom Observations

Interactive and experiential pedagogical techniques were conspicuously absent in all the selected 17 schools. The extent of Students' engagement and enthusiasm for Mathematics learning was found to be suboptimal. Teachers appeared predominantly focused on textbook content only.

Perceived Difficulty and Peer Influence

Students' perceptions of Mathematics as a daunting and challenging discipline appear to negatively affect their Academic performance in the subject. Instances of peer interactions and collaborative learning were recorded in only few schools.

Cultural Factors

Cultural convictions and societal expectations appeared to exert influence on Academic performance in the field of Mathematics.

11. Recommendations for Future Research

In light of the findings, several recommendations can be articulated to enhance Students' Academic performance in Mathematics.

Professional Development for Teachers

An extensive, continuous professional development initiative should be instituted for Teachers, facilitating their adaptation to contemporary pedagogical methodologies, technology integration, and differentiated instructional strategies in Mathematical education.

Enhancing Instructional Practices

Implementation of effective instructional methodologies has potential to elevate Students' comprehension and performance in Mathematics.

Curriculum Reforms

Mathematics curriculum necessitates regular revision and updating to incorporate real-world problems and applications, thereby illustrating practical utility of Mathematical concepts.

Assessment Strategies

Regular formative and summative assessments should be conducted to monitor Students' progress, with timely feedback aiding in identification of areas requiring additional support and in adjustment of their learning strategies.

Providing Additional Support to Students

Extending supplementary assistance to economically disadvantaged Students and who are poor in Mathematics can address specific challenges, thereby enhancing their overall performance.

Fostering a Positive Learning Environment

Establishment of a conducive learning environment can stimulate Student engagement in Mathematics, ultimately leading to improved performance.

Engaging Families and Communities

Members of families and communities ought to proactively contribute to support Students in their Mathematical education through optimal means, thereby facilitating Students in surmounting various learning obstacles and consequently enhancing their Academic performance.

Equity in Education

Implementation of policies and programs that are designed to mitigate educational disparities among Students of diverse socioeconomic backgrounds will enhance Academic performance.

Data Driven Instruction

Utilization of data-driven methodologies is pivotal in reforming instructional practices and enhancing Student outcomes. Systematic analysis of Student performance data allows for identification of trends and addresses specific learning needs and gaps.

Research-based practices

Application of research-backed strategies and methodologies serves to elevate academic instruction. Implementation of evidence-based strategies, substantiated by educational research, guarantees that interventions are firmly grounded in established methodologies.

Conclusion

Investigating Academic performance of Students in Mathematics involves analysis of various metrics, identification of influencing factors and studying its broad impact on academic achievement, social wellbeing, educational and economic outcomes, and educational system. Students demonstrated a generally subpar Academic performance in Mathematics. It is necessary for a positive change and need to ensure that all Students have equitable opportunities to succeed in Mathematics and beyond.

This study holds paramount importance for numerous reasons. It yields critical insights into academic success, reforms educational policy, aids in curriculum development, Teachers' training, resource allocation, and addresses socioeconomic and cultural disparities. Stakeholders are positioned to enhance educational outcomes, cultivate a more equitable educational system, support Student intellectual and personal development, and contribute to community and societal advancement as well as individual growth for the future. This investigation highlights the necessity for ongoing research and targeted interventions aimed at improving Academic performance of Students and ensuring their success in education and beyond.

Academic performance of Students in Mathematics is influenced by a myriad of factors, including schools, Teachers, educational system, instructional quality, classroom environment, curriculum design, textbooks, family support, learning habits of Students, learning environment, attitudes, interests towards the subject, sociocultural factors, gender, locality, and socioeconomic status.

Addressing these factors necessitates a comprehensive approach that includes enhancing instructional practices, fortifying curriculum design and assessment strategies, providing support to Students beyond the classroom, tackling gender, locality, socioeconomic and cultural influences, promoting positive attitudes and motivation, and utilizing data and research effectively.

By effectively implementing these strategies, Teachers, policymakers, stakeholders, and communities can collaboratively assist Students in establishing a robust foundation in Mathematics at the elementary level, thereby creating an environment conducive to Mathematical proficiency and setting Students on a trajectory toward academic and professional success.

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