An Analysis of The Achievement of Students in Mathematics

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Abstract

The main purpose of this study was to analyze the achievement of students in mathematics. One of the key subjects in general education is mathematics. Students' analytical thinking and problem-solving abilities are developed through mathematics. The purpose of sending kids to school is to help them grow up to be productive members of society who improve society as a whole. This goal is achieved through mastering mathematics. Achieving success in mathematics is necessary for a brighter future. The techniques and methods of instruction employed in schools were compared to the mathematical achievement of the students. It has been shown that the vast majority of maths teachers are aware that the lecture approach is sufficient for teaching mathematics; yet, the lecture method misplaces the material that is intended to be taught, thus there is an urgent need for teachers who are adept at teaching using a variety of techniques that enable students to get the better achievements in mathematics. There was a variation in the way that questions were posed, how the whiteboard was used, how the material was presented and explained, how the students participated in the lessons, and how the notes were dictated in the form of questions within the specific teaching approach (Nisbitt, 2018).

Methodology: This provides a description of the research method which is applied to go through the study practically. Moreover, a descriptive survey method of study and a quantitative approach was used to accord this research study. The Likert Scale 5.0 questionnaire was used to collect the data. The study's main goal was to analyze the achievement of students in mathematics in order to recommend appropriate changes to the way teaching of mathematics is undertaken during the academic session. The study revealed that the teaching methods have a significant impact on achievement of students in mathematics.

Keywords: Achievement, Students, Mathematics, School, Analysis.

Determining what constitutes a student's mathematical achievement is a topic of constant discussion. Achievement is typically thought to have the ability to provide a result for a subject (McLeod, 1994). Experts have assessed children' mathematical achievement using a variety of tools. The accomplishment measuring of continuous learning of mathematics subject, a tendency to engage in or avoid mathematical activities, a belief that measuring once

overall learning in mathematics, and a belief that mathematics is useful or useless are some of the ways that different researchers have advocated that students' achievement in mathematics is reflected by raising their rate of involvement in mathematics learning, achievement of student in mathematics is crucial to their success in that particular subject (Ashby, 2009).

One needs a strong foundation in mathematics to be able to lead a fulfilling social and personal life. The purpose of sending children to school is to develop into productive members of society who can advance the welfare of their nation and society. Pakistani educational institutions, particularly those under government control, are delivering remarkably poor results especially in achievement of students in mathematics is harshly affected. This demonstrates the significant and pervasive obstacle to Pakistan's economic expansion. A report released by the Pakistan Alliance for Mathematics and Science in association with Alif Ailan made this public. There are various domains in which students' performance in mathematics is deemed inadequate. It demonstrates that the majority of students did not understand maths overall as was previously mentioned, student success in mathematics is a crucial component of the success in subject matter knowledge. The purpose of this research was to investigate the achievement of students in mathematics in light of the review of related literature. In order to investigate the reasons behind the issue that prevents students from performing well in mathematics, the following objectives were aligned for better understanding of achievement of students in mathematics (Akhter, & Akhter, 2018).

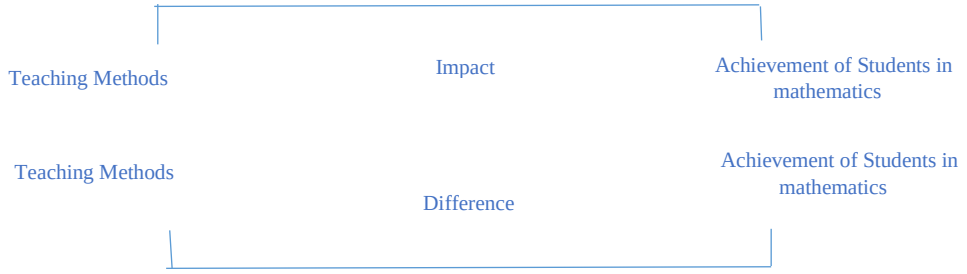
Objectives

1. To investigate the impact of the teaching method on achievement of students in mathematics.
2. To evaluate the difference between the teaching methods and achievement of students in mathematics on gender basis.

Hypothesis

1. There is no significant impact of the teaching method on achievement of students in mathematics.
2. There is no significant difference between the teaching methods and achievement of students in mathematics on gender basis

Conceptual Framework



(Self-Developed 2024)

The study envisioned to analyze the achievement of students in mathematics which will be helpful for the teachers to teach the mathematics subject with quality of teaching methods that can result in better institutional outcomes. This research is study will also be treasured

for the students to understand the achievement in mathematics. This research is study will also be valuable for the policy maker to consider the main inputs for better teaching of mathematics subject that helps to develop a better teaching and learning environment. This research study was delimited to all the Public secondary schools of Hyderabad District. Teachers and Students of Hyderabad District were considered as the respondents for the study.

Since mathematics is characteristically centered to the integration of practical involvement, numerous learners are dissatisfied to find that the mathematics they is taught is neither interesting nor boring but somehow, interchanges on the extent to which it is being taught, and it may relate to their interests or expectations, A large number of teachers teaching mathematics feel overworked, underappreciated, and lacking in resources. Several essential presumptions supported the need to raise the standing and ability of teaching mathematics (Nickerson, 2020).

The hands-on aspect of education up until now, there has been less of an emphasis on the applied constituent which is a dire need of time to overcome the gaps in teaching mathematics that can enhance the achievement of students in mathematics. The inspiration for being the part of this study was to develop the teaching methods for better achievement of students in mathematics. It is generally accepted that mathematics should be taught to all students as a fundamental subject and that encouraging scientific literacy should be the main goal of teaching mathematics for better achievement of students in this particular subject (Mathematics). Though, this area has rarely been met by teaching mathematics in our classrooms. Achievement of students in mathematics drive focus on developing scientific literacy and assisting students in reaching the specified outcomes. This declaration envisions the actual state of teaching mathematics in most schools fluctuates from that of what it is intended for the course of study (Nisbitt, 2018).

The teachers are the only resource that helps in developing students' interest in learning mathematics which can help in better achievement of students in mathematics, they demonize mathematics as a mater of creating an in-depth understanding of the actual what it meant to produce. There are numerous benefits of doing things well as per the need of time, including the ability for students to investigate and pose numerous questions, making mathematics more physical and real, and allowing them to consider various occurrences and formulate inquiries about them. Students get an understanding of how mathematics poses questions and how to find answers by engaging in practical activity. subsequently, the work done in the better interest of the students in the classroom are connected and play a crucial role in the educational institutions for productive teaching and learning process that results in achievement of students in mathematics (Olatoye & Ogunkola, 2018).

The achievement of students in mathematics was examined in a study of the relationship between the teaching methods and approaches used at the school level. It has been discovered that a huge majority of teachers teaching mathematics realize that lecture method is enough to teach mathematics however, the lecture method misplaces the matter what is meant to be taught hence, there is a dire need of teachers skilled in teaching with different techniques that enable students to get the better achievements in mathematics. There was a variances in the questioning strategies, use of the whiteboard, presentation and explanation and the students' participation in instructional activities, and dictation of notes in the form of

questions inside the particular teaching methodology (Nisbitt, 2018).

There are several aspects that are linked to how well schoolchildren learn mathematics. There is a wealth of data supporting the several possible educational advantages of practical involvement. Numerous experts have conducted ongoing studies and discovered a strong correlation between students' academic success in mathematics and their practical involvement. The success of pupils in mathematics and the methods used to teach it are strongly positively correlated. Notwithstanding the current state of cognitive ability, students' achievement is impacted by the essential resources, motivating attitudes, and emotional learning environments that they employ to acquire mathematics. Many researchers have found that a student's success in mathematics is largely dependent on the way they are taught. Grey (2006) found that students who were actively involved in mathematical activities without regard to gender performed better in mathematics (Setapa, Mustaphal, Kanafiah, & Zaman, 2016).

Mathematically proficient teachers view their students` wrong responses as evidence of their comprehension in progress and their reasoning as a tool for future learning. These students are not like empty vessels that sit around, waiting for their instructors to fill them with the information needed to pass the test. it can draw the conclusion that school administrators must alter the way they do their duties. To put it briefly, schools in the twenty-first century must change the way they do their business. When working alone or in groups, they must teach their students how to synthesize, analyses, and assess important material. Additionally, schools should offer an atmosphere where students can hone their creative abilities and look for novel approaches to mathematical issues (Kanafiah & Jumadi, 2013).

The constructivist method also helps students develop the social and emotional competencies that the twenty-first century demands. Instead of having students follow someone else's step-by-step directions, constructivist learning settings provide them the chance to figure out the solutions on their own. The development of mathematical reasoning and critical thinking abilities is the main objective of a constructivist classroom. As a result, student-centered techniques can help students become more adept at working in group environments, exchanging ideas with others, and honing their capacity to improve others' ideas. The country's development of these skills has led to excellence in all spheres of life. It is clear that school administrators must alter the way they do their duties. In summary, a student's achievement in postsecondary education and their future employment are significantly influenced by their mathematical accomplishments. Mathematical proficiency is required for many different types of jobs (KaKrishnan, 2018).

Appropriate methods for teaching mathematics as a topic are among the variables that can lead to pupils achieving more in the subject. While several courses can be taught using a variety of methods and strategies, teaching mathematics has unique requirements, hence it is imperative that teachers possess the necessary skills to teach mathematics in addition to other disciplines. Consequently, student performance in mathematics can become the basis for real measurement. Teachers must concentrate more emphasis on end-of-session results if they want to see an improvement in students' mathematical achievement. However, the practical component is still required., it was shown that in order to get better results in the achievement of students in mathematics (Shahid, & Shah, 2008).

Methodology:

This provides a description of the research method which is applied to go through the study practically. Moreover, a descriptive survey method of study and a quantitative approach was used to accord this research study. The Likert Scale 5.0 questionnaire was used to collect the data. The study's main goal was to analyze the achievement of students in mathematics in order to recommend appropriate changes to the way teaching of mathematics is undertaken during the academic session.

The population was consisting of number of Schools, Head Teachers, and students studying in Secondary Schools of Hyderabad district

S. No	Name of District	No of Schools and Head Teachers	No of boy students	No of girl students	Total No of Students
1	Hyderabad	66	7239	4136	11375

Source: Office of the Director School Education ES&HS, Hyderabad Region Hyderabad (2021)

The Krejcie and Morgan (1970) table was used to determine the sample size for the research study using a random sampling procedure. The computation in this table was predicated on p=0.05.

Table 3.1

Table for Determining Sample Size of a Known Population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	1000000	384

Note: N is Population Size; S is Sample Size *Source: Krejcie & Morgan, 1970*

S. No	Name of District	No of Schools and Head Teachers	No of boy Students	No of girl Students	Total No of Students
1	Hyderabad	56	215	160	375

Determined sample size

order to ensure that the instrument was appropriate for data collection, measures for the validity and reliability of the research tool were also conducted; the reliability was determined to be greater than 0.7, which is deemed appropriate. SPSS 26 was used to assist with the data analysis.

As the data was found normal hence, the parametric test was applied to get the better statistical results of the study.

Objective:

To investigate the impact of the teaching method on achievement of students in mathematics.

Hypothesis: There is no significant impact of the teaching method on achievement of students in mathematics.

To achieve the objectives the Regression analysis (Parametric Test) as per the need of the problem was applied for prediction of the impact.

Regression Analysis Table

Hypothesis	Regression Weight	Beta Coefficient	R Square	F-value	P-value	Hypothesis Supported
Ho	TM-ASM	6.318	.289	43.878	.000	Not Supported

The table of the statistical analysis represents the p-value+.000, which reveals that there is a significant impact of the teaching method on achievement of students in mathematics hence, statistical evaluation supporters the alternative hypothesis which is accepted whereas, the null hypothesis is rejected

Objective:

To evaluate the difference between the teaching methods and achievement of students in mathematics on gender basis.

Hypothesis: There is no significant difference between the teaching methods and achievement of students in mathematics on gender basis.

Independent sample t-test Table

Variable	**n**	**df**	**t-value**	**p-vale**
Male	215	375	.031	1.88
Female	160			

The table of the independent sample t-test analysis represents the p-value 1.88, which reveals that there is no significant difference between the teaching methods and achievement of students in mathematics hence, statistical evaluation reveals that the alternative hypothesis is rejected whereas, the null hypothesis is accepted.

Findings:

The study reveals that there is a significant impact of the teaching method on achievement of students in mathematics which shows that the teaching method can bring a positive change in achievement of students in mathematics. The teaching methods experience different teaching techniques for getting the better results in the form of achievement of students in mathematics. The students can produce better results when they put a regular hand on practice this kind of involvement of the students in mathematics subject varieties them towards the better awareness about varied effects, when they go through the regular practice. The participation of students in solution of multiple problems can lead them towards their expertise in their field of study. Moreover, their critical thinking and the consistency of discovering things is also advanced. Innovative ideas can better be generated through the students by doings things on the regular basis. The study also revealed that there is no significant difference between the variables which reveals that the teaching method similarly effects on achievement of students in mathematics either in male or female, the same can be expected in action as if, the suitable method of teaching mathematics is not applied, can decrease the students` achievement of students in mathematics. The students` achievements specially in mathematics depends upon the teaching quality of the teachers using different techniques to involve students in variety of engagements. Teaching mathematics subject has a core value in throughout the course of study. It has a prominent dependence to have the regular hands on practice which helps to enhances the students` level of understanding effectively. The findings of this research study are also aligned with the study of Mohd, Mahmood, & Ismail, (2011) in factors that influence students in mathematics achievement which reveals that the teaching method is a fundamental factor that positively effects on students in mathematics achievement. The teaching methods and techniques used at the classroom level has a pivotal role in enhancing students' skills in learning mathematics it is also crucial in developing their students` interest in learning mathematics which is directly associated with the better achievement of students in mathematics.

Conclusion:

The findings of the study advocate that the teaching method has a positive impact on achievement of students in mathematics. Which is strongly associated with the students learning outcomes in the subject mathematics. There are variety of teaching methods which can be used to increase the achievement of students in mathematics. Multiple techniques are used to develop students` concentration towards learning mathematics. Especially student-centered approach can better engage students in different techniques as per the interest of the students for better achievement of students in mathematics. It is concluded that the teachers` teaching method is an essential factor that can enhance students` achievement in mathematics. The better students` learning outcomes can be availed by quality teaching applying different methods which can enhance an environment at the institutional level that can compete the challenges at the global level.

Recommendations:

The recommendations based on the findings of the research study support that, the teachers should focus on their teaching skills. Teachers should use different teaching methods to

create innovative ideas and critical thinking among the students which can help to enhance the achievement of students in mathematics. The school administration should take initiatives to develop teachers` teaching quality keeping in view the nature of the subject taught at the school level through different training sessions throughout the academic year. The need for ongoing professional development is particularly significant when it comes to teaching mathematics because the subject matter is constantly changing and different teaching methods are required for various fields of study. As a result, one of the administration's main responsibilities is to help teachers improve their instructional techniques in line with the curriculum.

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