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Impact of Mathematics Teacher's Competency on Achievement of Primary School Students

Haleema Begum [1]Prof. Dr. Muhammad Yousuf Sharjeel [2]

1. PhD Scholar, Hamdard University & District Education Officer, Killa Abdullah, Balochistan, Pakistan
2. Professor, Faculty of Social Sciences and Education, Department of Education-SZABIST, Karachi, Sindh, Pakistan

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Corresponding Author
yousufsharjeel@hotmail.com

ABSTRACT

The present study focused on the effect of Mathematics teachers' competency on the performance of students in the context of Baluchistan province of Pakistan. The study was set in the background of selected cities of Baluchistan. Policies and parameter were critically analyzed in order to develop strategies and better solutions to this problem. A sample of N = 280 (143 male and 137 female students) were interviewed and observed in their classrooms to find how they felt towards the subject. Head teachers were also interviewed in selected schools in sampled cities of Baluchistan. Review of literature helped draw the hypotheses. The tests of hypotheses were done through SPSS V 22. Correlation and t-tests were conducted to measure the difference of opinions among male and female students of primary mathematics in the province. The study concludes that effective teachers of primary Mathematics are the only solution to retain students' in primary classes in the province through training and workshops for these teachers. Teacher's encouragement and hard work are likely to lead to more motivated students and encourage parents to send the primary students to school on regular basis

Introduction

Primary Mathematics teaching has always been a major concern for the stakeholders of educational management in Baluchistan province. Teacher competency is a major aspect of all primary schools across the province. Qualification, experience and exposure to professional teaching of mathematics are what the current study is focused on. Teaching of mathematics is a competency-

based skill of teachers in primary schools in Baluchistan. This skill is often scarce in the context of small towns of Baluchistan. A stronger teacher competency in primary mathematics is associated with stronger motivation to attend classrooms by students. Mathematics is supposed to inculcate a higher sense of motivation among parents, teachers and students alike as this subject is considered most pivotal to raise educational literacy and mastery over other content areas. Darling-Hammond (1999)has elaborated the significance of teaching Mathematics through a strategic alignment in schools. This study guided the present study in the context of primary educational institutions.

Teacher competency in Mathematics is a factor that is also considered as essential as the competency in other subjects. Hiring of subject specialist in Mathematics has always been a difficult task for the local and provincial authorities in Baluchistan specifically in areas that are remote and fall in the suburban locations of Baluchistan. The investigator also found that primary mathematics teachers' professional competency has directly been linked with students' dropout from schools too. Mathematics teachers are usually considered strict with respect to student discipline and their performance, appear like perfectionist and invariably expect excellent performance from all students in mathematics. This scenario has also created a fear of being incompetent in many students at primary level.

Shah (1995) states that primary teachers have the most significant national responsibility of training the youth and nurturing their conceptual frameworks. He is of the opinion that teaching skills while planning a lesson is to be considered at the first place as the teacher will affect the learners' mindsets. The study was expected to understand the effect of primary Mathematics teachers' academic skills on the performance of students in Mathematics. It was also the objective to study the role of parents and head teachers in the context of primary Mathematics teachers' competency and skills in Baluchistan. The researcher had planned to analyze how school policies help primary students of Mathematics in the province of Baluchistan to do well in academics. Knowing the factors that impact primary mathematics teacher's performance in real classrooms and comprehending the effect of number of weekly mathematics periods on the performance of primary mathematics students in Baluchistan were also the key objectives of the study.

The study is restricted to the selected cities of Baluchistan province only. The data collected through this study is also restricted to cities in Baluchistan so it must not be generalized beyond the scope of the study. Sample size generated through the study was also limited in that the population of the study was too large and it was not possible to invite all the samples for the study. The accessible sample was limited to the selected male and female students only. The study was also limited as the abundant reviews of literature were not available in the context of the study. Parental involvement was low as they were unwilling to participate in the study due to their traditional and conventional practices.

The researcher finds that the research in this direction is justified because this issue can bring positive change in the minds of policy makers, teachers, parents and students towards Mathematics education in the province of Baluchistan. The other justification is that no other study was known to the investigator that pertained to this direction. The study would serve to be an efficient tool towards persuading parents to send their children to regular school and prevent early dropouts. The necessity of this magnitude of researcher also bred from the fact that teacher's attitude towards teaching of Mathematics as a profession is a key to successful orientation of school learning. The research explores the belief of primary Mathematics teachers' professional needs, students' difficulties and administrative challenges.

Literature Review

Mathematics as a science has a consistent structure. Each square of the structure is connected to the next one by hole free thinking, all rely on an establishment of some settled upon definitions and essential suggestions. For a long time, societies and social orders have perceived the significance of science. It is a language that portrays thoughts and relations drawn from our condition. Being a study of examples, the subject empowers us to make the imperceptible noticeable and subsequently take care of issues that would somehow or another be unimaginable. Arithmetic is an apparatus of science and innovation, through computational guides as well as by empowering researchers to investigate ideas with glorified models before attempting them in reality. Halai (2001) elaborates the role of teachers of Mathematics in Pakistan. The study attempts to achieve the efficiencies of arithmetic instructors in primary schools and gives understanding on how teacher's perspective on the capabilities connotes on the grounds that the essential stages are considered as a fundamental phase of open guidance.

Fullan (2001) is of the opinion that capability relies on the investigation of the expert job given to an individual and a hypothetical definition of expert obligation. Competency proclamation portrays result from the execution of expertly linked-capacities or those information's, abilities, and dispositions over to basic to the creation of those capacities. Mathematical capability can be seen as a conditional indicator of expert viability, and subject to consistent approval techniques. Mathematics teacher's capabilities are determined and made open before teaching in a specified direction. (Fullan 2001)). Exploration of Mathematical skills of primary school teachers on education process has been controlled by social effect on both students' leaning capacity and instructor's skills.

Anderson (1991) emphasized the strategies to increase teacher effectiveness in schools along with the competency to deliver pedagogic instructions in a formal school situation. His concepts are equally supported by Dunkin (1997). The study has also consistently highlighted the fundamentals of educational planning. Research on Mathematics educator's competency has gained ground in two unique stages, reflecting information accessibility and developing observational

methodologies. Beginning examinations depends on cross-sectional information gathered at the dimension of schools or even school regions. This methodology associated by and large school test scores to total proportions of instruct (Fullan & Watson 1999).

Howie (2002) demonstrated that most explicit proportions of Mathematics instructor's competency including involvement and training minimally affected learner's accomplishment. In spite of that, certain proportions of Mathematics educator quality (i.e., the normal execution of individual instructors) differed essentially crosswise over instructors. Halai (1998) in her local study on Mathematics talks about the mentor, mentee, and Mathematics through the lens of professional development and enhancement of Mathematics teachers in Pakistan. The methodology investigates the job of current training contributions with respect to teaching of Mathematics. For instance, school change or assignment to a top-notch Mathematics instructor in students' results. In a perfect world, this skill is very difficult to come by. A wide range of mathematical pedagogy is expected from teachers in mathematics. Along with the school and instructor's contributions, one expects information about every learner's given capacity (Howie & Plomp, 2005).It is also believed in the study that a teacher of Mathematics needs to realize several things prior to expecting the students in school to do well in mathematics classes. One such expectation is that all students understand the contents and techniques equally well.

Châu (1996) discussed the quality of instructional frameworks in a Mathematics classroom. The research signifies various developmental modes of students' responses in formal learning situations in Mathematics. Similarly, Mathematics teachers in the primary classes in Killa Abdullah need to display a continuous rigor and motivation in professional context. They need to realize the fact that primary students' core competency in Mathematics cannot be improvised neither can it be expedited in a short span of time due to several factors. It is expected of them to display methods that have been utilized in the teaching of Mathematics to reduce potential weaker tendencies by merging surreptitious factors that may influence Mathematical learning. In the contemporaneous esteem included plan, accomplishment scores in Mathematics are a component of the present school and family contributions.

Then again, the esteem included additions approach models gains in accomplishment scores as an element of the present school and family inputs including additionally fixed impacts to control past data. Kanu (1996) agrees with Medley (1982) that a school teacher's efficacy is directly affected by professional as well as social factors including how the teachers is perceived by the colleagues and the society, he is part of. Similarly, Mullis, Martin, Beaton, Gonzalez, Kelly & Smith, (2009)) are one of the most unmistakable investigations to appraise Mathematics educator's impacts from board information. The investigation utilizes longitudinal information on individual.

Halai (1998) discussed the role of mentor, the mentee and the process of learning Mathematics. Mathematics instructor's aptitude and competency are observed to be an extraordinary impact on Mathematics students' accomplishment in the review of experts in pedagogy. This applies in the context of this research with respect to Killa Abdullah in the Balochistan province of Pakistan. However; watched educator capabilities like understanding and training answer just a little offer of the inconsistencies in Mathematics educator's quality. Additionally, they locate that the vast majority of the fluctuation in Mathematics instructor quality was inside schools and not crosswise over organizations—a sign that high-performing educators were not conveying in few schools.

Raudenbush, Eamsukkawat, Di-Ibor, Kamali, and Taoklam (2008) look at how inconsistencies in Mathematics educator's quality influenced learners' accomplishment in a medium size region school. They found extensive inconsistencies in esteem included proportions of educator execution. Adler (2001) has significantly raised issues in mathematics classrooms in the study undertaken in the same context. The study stresses that teachers' competence and academic experience are two major components of teaching school students' Mathematical skills and other related competencies.

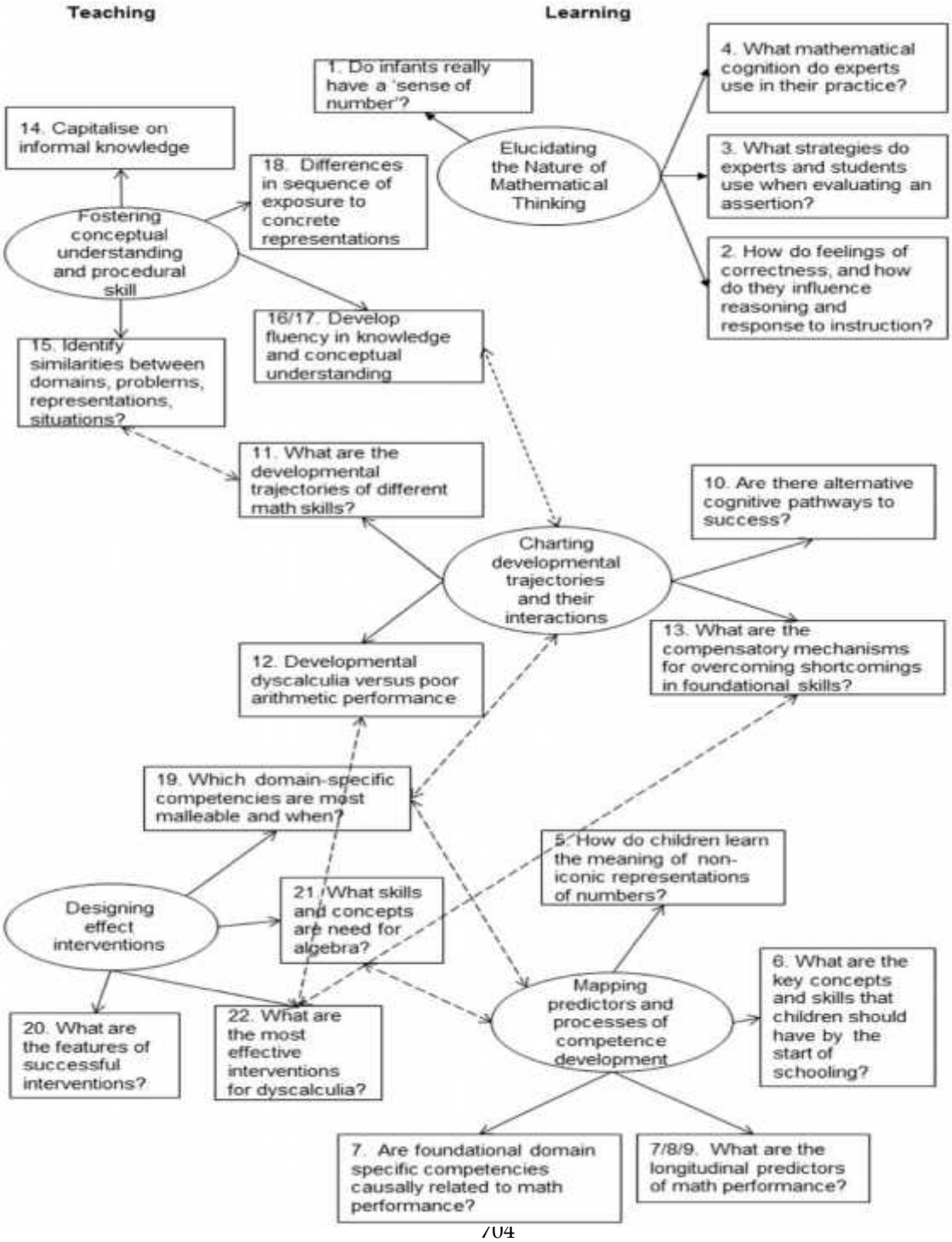
Cleghorn, Mtetwa, Dube, and Munesti (1998) are supported by Fraser (2000). Thy state that that classroom language useis essential for a teacher of Mathematics in a multilingual setting specifically. This theory is upheld by Gorgorio and Planas (2001) who also assert that teaching Mathematics in multilingual classrooms needs professional care and skills not the academic competency alone. Researchers find that key school standards and of Mathematics instructors are preferable indicators of educator in global context. Sander & Horn (2006) investigate how Mathematics' instructor capabilities and in-administration impacted learner's accomplishment. Their investigation discovered little impacts of involvement and instructive foundation on educator execution. Likewise, they find that a Mathematics instructor's major academic bent (SAT or ACT score) is insignificant to their classroom execution.

Researchers in Mathematics also find genuinely comparable parameter estimations for an assortment of significant worth included models for basic Mathematical skills in formal teaching and learning. They found that Mathematics educator's experience, instruction, and licensure test scores affect the accomplishment of the students. These impacts are basically enormous for math; however the impacts are littler in perusing. Sanders and Horn (2006) watch a little impact of instructor licensure test scores on Mathematics students' accomplishment. He quantifies that esteem-based evaluation increases scores as a regressor. Consequently, the performance of both the students and teachers increases.

Researchers in Mathematics teaching argue that classrooms also play a pivotal role in maintaining the performance of students' interest in the subject. Early learners enjoy a classroom setting that facilitates their concepts and Mathematical

skills. Learning environment is an essential aspect of teaching mathematics according to the study without majorly affecting accomplishment scores in the subject. Experts in Mathematics take a gander at educator quality and accomplishment in State funded schools of Chicago.

Figure 1: Conceptual Framework (Adapted from Hill, Ball, & Shilling, 2008)



They connected additions score strategy with controls for effective performance in Mathematics. The outcomes looked for solid impacts of educators on learner's accomplishment. However; regular proportions of Mathematics instructor's capabilities like involvement, training and accreditation type have little impact on classroom results of Mathematics students. Past research has discovered a connection between Mathematics instructor's viability and learner's accomplishment. This work attempts to distinguish the abilities of Mathematics instructors in primary educational institute also to distinguish the huge degree of skills for the arithmetic educators. Hart (1981) advocates the significance of teaching and learning ratio and proportion. The study has also mentioned the role of teachers in teaching Mathematics in primary and middle classes. The work has cited valuable examples from experiences of renowned teachers of Mathematics.

Material and Methods

A survey is carried out in order to understand the behavior, attitude, and concepts of a sample driven from a population in order to make generalization as precisely as possible. This methodology uses quantitative design of research based on an assumption that the sample characteristics represent the population parameter if all conditions of the sampling procedures matched the behavior of the target population. The survey carried out in the study also assumed that primary school Mathematics students' performance was directly affected by the teacher's attitude, subject competency, qualification and experiences while engaged in the process of teaching the contents of primary Mathematics. The effect of teacher's competency in Mathematics was compared with the performance of students in real classroom situations. For this study, researcher employed random sampling procedures from various towns of Quetta, Zob, Qallat, Lasbella, Loralaee and other adjoining areas of the province of Baluchistan. Both male and female primary Mathematics students participated in the study. The researcher made all possible efforts to ensure that the students were not exposed to any bias.

Study Hypotheses

Hypothesis 1

There is no significant difference in the opinion of male and female Mathematics students in primary school about teaching standards and consequent performance.

Table 1
Inferential Statistics of Male and Female Primary Mathematics Students

Independent Samples Test		
	Levene's Test for Equality of Variances	**t-test for Equality of Means**

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Teacher's knowledge of course difficulty.	Equal variances assumed	.000	.983	.388	278	.698	.05574	.14351	-.22676	.33824
	Equal variances not assumed			.388	277.674	.698	.05574	.14348	-.22671	.33819

Table 1 tests the hypothesis that there is no significant difference in the opinions of male and female primary students of Mathematics in Baluchistan regarding teaching standards and subsequent performance in mathematics in primary classes. In this context, the F-value reads 0.000 with a significance of 0.862 and the corresponding t-value of 0.367. The test is insignificant as we observe that the two-tailed significance at 0.05 level of significance is > type I error > 0.05. The upper and lower confidence interval values are not non-zero values. We conclude that there is no significant difference between the opinions of male and female primary students of Mathematics in Baluchistan regarding teaching standards and subsequent performance in mathematics in primary classes.

Hypothesis 2

There is no significant relationship between primary students' perception of their Mathematics teacher's effectiveness on the basis of challenging mathematical contents, valued mathematical skill, enhanced mathematical interest and practical mathematical approach in Balochistan.

Table 2
Correlations between Mathematical concepts, skills, interest and approach

Correlations

		Challenging Mathematical Concepts	Valued Mathematical Skills	Enhanced Mathematical Interest	Practical Mathematical Approach
Challenging Mathematical Concepts	Pearson Correlation	1	.330**	-.071	.371**
	Sig. (2-tailed)		.000	.241	.000
	N	273	273	273	273
Valued Mathematical Skills	Pearson Correlation	.330**	1	.035	.462**
	Sig. (2-tailed)	.000		.569	.000
	N	273	273	273	273
Enhanced Mathematical Interest	Pearson Correlation	-.071	.035	1	.275**
	Sig. (2-tailed)	.241	.569		.000
	N	273	273	273	273
Practical Mathematical Approach	Pearson Correlation	.371**	.462**	.275**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	273	273	273	273

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2illustrates that the four variables challenging mathematical contents, valued mathematical skill, enhanced mathematical interest and practical mathematical approach are significantly correlated in the perception of primary school Mathematics students in Balochistan. A sample of n= 273 male and female students perceive this relationship with 95% confidence interval on a two-tailed probability distribution with 0.05 level of significance.

Findings of the Study

In primary level Mathematics, it is very important to make a child understand the use of addition and subtraction in real life situations. For this, in-class teaching is not enough. But the children must be taken to markets to buy and sell, so they learn the idea in a clearer and better way. A skilled Maths teacher will quickly subtract with daily life. This type of "out of the box" thinking or style can not only be acquired, but improves through professional workshops and development courses.

The quality of an effective primary Mathematics teacher is not how much knowledge he/she has, but how he/she transmits the concepts in fresh minds. The basic Mathematical skills not only help children being confident in Maths, but in their middle or high schools, it becomes easy for them to cope up with their technical subjects like science, physics, chemistry, economics, business studies etc. No subject is complete without Mathematical interference. Once the fear of Maths is gone from a primary school child's mind, he/she becomes more confident in the class and seems satisfied during their learning period.

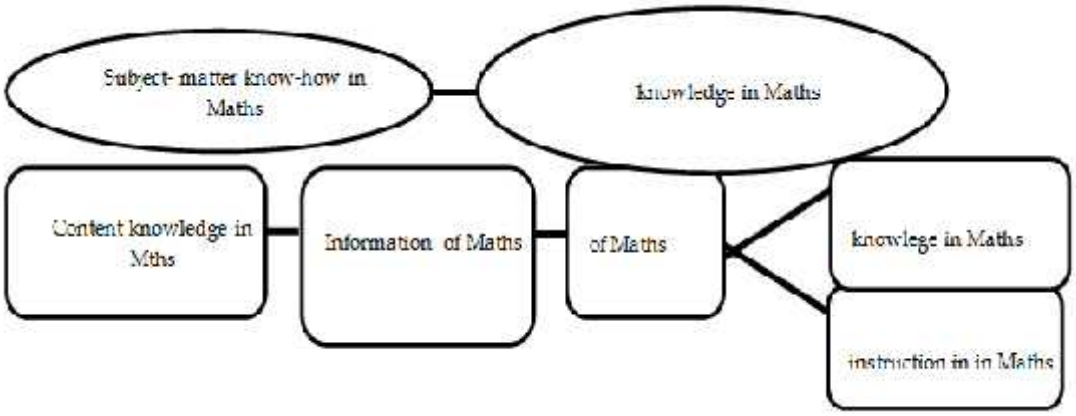
Fortunately, Pakistani public institutes have made this compulsory for an individual to have at least B. Ed degree before entering into teaching profession. But if you survey the private institutes, you will find that almost all the primary Mathematics staff is untrained and belongs to non-teaching backgrounds. This has produced a huge gap in our education system. The output is not what is expected out of designed primary Mathematics curriculum as it is being implemented by untrained people. The government of Baluchistan is taking measures to overcome this gap. In 2009, by USAID program, special institutes were established where primary teachers could be groomed and developed professionally. There was a special arrangement for the teachers of primary mathematics. Moreover, the need of trained primary mathematics professionals is not yet fulfilled. We have to monitor and provide platforms to all teachers who were appointed as primary Mathematics teachers in public schools to learn effective and new methodologies to conduct their lessons in primary Mathematics class.

For this, we need to inculcate I.T in our primary schools where it will become easier for a primary Mathematics teacher to deliver concepts among students. The world is changing so fast and every new technique is appearing as a challenge. We

have to provide our primary teachers of Mathematics with hands on activities which can make lessons more interesting and effective. We have to develop a primary Mathematics teacher who should be open to learn and quick to acquire new technology to train students. Interaction with the world is an effective way to get the knowledge about new teaching methodologies in primary Mathematics across the province of Baluchistan.

Fuhrman (1991) suggests that every child learning Mathematics in primary schools must be respected for his own skill sets in learning a subject as difficult as Mathematics. This also applies in the province of Baluchistan as a similar entity. In most cases, there are challenging students as well. Some children are slow learners whereas some are extraordinary and quick to grasp concepts. It's a huge challenge for primary Mathematics teachers to cater this in class. If a primary mathematics teacher is trained and qualified, he/she can easily handle such students. The skilled primary Mathematics teacher first identifies the strength and weakness of students and divides them in groups as per their capabilities. This not only helps to teach them in small groups, but it helps teacher to assign a group in charge who helps other peers to complete the given task. That group leader should always be the quick learner. Teacher should motivate other members of group to move forward and take the charge of the group. Some Mathematics teacher use competent students as an inspiration for rest of the class to motivate others to be like them.

Recommended Model for Mathematics Teaching



Conclusion

The study concludes that teachers of primary Mathematics must be taught and trained to deliver the contents of their syllabus in active classrooms. For achieving this target, there should be specific Mathematics teacher training programs in the province of Baluchistan. Baluchistan has not received its adequate share of educational budgets in the last three decades in general and in the last six decades in particular.

The public primary schools in the province of Baluchistan must make mandatory requirement of professional educational degrees such as specialized B. Ed in teaching of primary Mathematics. This professionally-accredited degree in Mathematics for teacher training programs will certainly have a positive impact on the primary educational institutions in Baluchistan. There are so many benefits regarding this professional degree program for developing the competency of primary school teachers of Mathematics.

Many primary Mathematics students and teachers learn at school & out of school as well. Some of the primary students find Mathematics difficult because they are unable to relate Mathematics in their real life. One important question also arises how important are Mathematics skills at an early age? The early age creates a basic foundation for everything a child learns in the future. Experience and learning that takes place in the first few years of a child's life influences his development.

We should work upon the courses for removing the fear of Mathematics due to which primary students of Mathematics avoid Mathematics. The concepts which Mathematics teachers use in daily life fails to relate Mathematics in practical sense. It is a matter of opportunities and if a child is not getting enough support from family members at home, learning of Mathematics is likely to have adverse consequences. In fact, the repugnance towards Mathematics is inherited by a child through parents and may be this is the main reason of not performing well in the subject. Since primary child is not encountering any Mathematics at home, he is not developing those skills although he may be good at Maths.

Most of us look at Mathematics as a subject that requires calculations. Therefore, the fear of memorizing these formulas has a negative impact on primary child's mind. Teachers of mathematics are found incompetent professionally to find any relationship between the numbers used and learned in class and real-life competency to deal with numbers. Since from the very beginning, teachers in primary Mathematics classes in Baluchistan have been using short exercises to avoid assessments of papers, they use a repeated solved exercise of Mathematic. These repeated exercises make Mathematics lessons boring, difficult, and dry to do well in the subject.

All students' brain works in a different way. When they sit in a classroom together, they also fear peer pressure. For example, the problem solved by the teacher on the board seems difficult for one child, but everyone else is convinced with the problem and its solution so the child will think that there's something wrong with him not the class. The fear of asking the basic rules for multiplication & division also holds back the questioning of the student.

A good primary mathematics teacher always reads the face expression and tries to solve the problem stepwise including basic steps as well so the child should not feel pressure of being left out or the odd one out in the class. Abadzi, Crouch, Echegaray, Pasco, and Sampe, (2005) elaborate this professional harmony to teach

basic skill acquisition in the subject. This problem can also be solved by giving extra classes, or worksheets that will improve child's basic concepts. The primary students, when look into Maths problems do not solve the problem by assuming values or collecting data. The ability is rare in classroom. The student's mind works in isolation so if they have no prior knowledge or ability to solve the problem, they will not understand anything.

Primary school Mathematics competency is a major issue in the province of Baluchistan. It is a helpless condition to see that such a large province of our country, such as Baluchistan is facing so many problems regarding the teaching of Mathematics at the primary level in the school laying such a low base for comprehending and acquiring the concept of Math that the later years prove futile for developing the Mathematical skills of the future generations in Baluchistan. Thus this extinguishes the hidden logical abilities to go undiscovered like the hidden treasures which could have brought forth great Mathematicians in Baluchistan and could have added to the economists and planners of the future.

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