

Supporting Slow Learners' in Learning Mathematics at Primary School Level

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Abstract

Many students' feel difficulties in learning mathematical concepts and lag behind in their progress as compared to their fellow learners. Their accommodation with regular peers remains always a challenge for the educators and professionals of the field. Experts of the field consider inclusive education as a multi-cog strategy where children with and without special needs belonging to diverse societal groups and marginalized assemblages participate together in learning activities in the same programs. The main objective of this study was to identify problems faced by slow learners in learning Mathematics and identify effective teaching strategies for teaching mathematics to slow learners in inclusive class room at primary school level. The nature of this study was descriptive based on a self report survey, and the sample of the study was 122 teachers selected randomly from 11 primary inclusive schools in district Lahore. The self-developed instrument was consisted on two components; students' mathematics problems and teaching strategies. The results of the study revealed that students face difficulty in understanding the concept of 'place value' and they remained unable to apply mathematical concepts in daily life for the sake of 'solving problems'. Short term memory of learners emerged as a major difficulty faced by the educators in teaching mathematics, so they often use short duration work sessions' strategy with achievable goals and use pictorial cues rarely. Teachers' experience of teaching to divers learners contributed towards the use of proper teaching strategies. Teachers are expected to keep an eye on slow learners as well as on other students with special needs. Teacher educators are supposed to emphasize on development of pre-service training programs enabling future teachers to face the divers learning challenges especially in the subject of mathematics.

Keywords: Inclusive education, slow learners, Mathematics learning, learning difficulties, teaching strategies.

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Introduction

Teaching is a challenging and demanding profession because of many reasons; a teacher is expected to give the maximum outcome of students and has to face a variety of students based on their demographics and different intellectual abilities. The task for a teacher is actually to ensure that students are learning efficiently at their own pace and their diverse needs have been met.

Teachers are familiar with below average students, bottom intelligent students and are also termed as slow learners. World over nations those have already make up their minds to act co-operatively with a common objective "Education for all". Pakistan is also a passionate member of the inclusive education move and the constitution of Islamic Republic of Pakistan 1973 declares that all students have equal right of liberty in communication, excellence schooling or education and right of entry in a harmless and vigorous learning environment.

When the issue comes to slow learners, Vygotsky's Zone of Proximal Development Theory (1978) becomes very relevant. Slow learners' own achievement is usually depressing and they need help from other people. In cooperative environment working and interacting with more capable people, for example in classroom interaction with the Math's teacher, they get an opportunity of developing inherent abilities through exploration of their potentials and intelligence (Berk & Winsler, 1995; Reddy & Ramar, 2006). In inclusive education learners can learn every skill with special educational needs in regular educational sites (United Nations, 2003). The Dakar Framework for Action states that Inclusive education is usually or exactly related to normal contribution of students with characterized such as exceptional learning requirements (UNESCO, 2000).

Inclusive philosophy describes that all school children's are appreciated and welcomed by teachers in a school with all weaknesses and strengths. Ballard (2004) and Lindsay (2003) convey that inclusion admits all children via appreciating and discussing them through care, respect and admiration. It does not mean that a child with a disability cannot move to other settings. It is possible for a child to continue in the separated location for some amounts of the day and arrive in universal education location for other specific phase eras. Gianfranco (1997), Peters (2003) and Skrtic (2003) advocates inclusive learning environment as a special structure of wide-ranging educational institute with diverse supports for example, co-operative communication, teacher's ownership, actual use of expressive specific educational strategies and measures for effectiveness evaluation. Inclusive school provides generous chance to students with special needs and abilities to live together and work in the similar environment. In the subject of

mathematics, many students' performance has observed slow and usually get deprived from many classroom instructional privileges because in class such students are slow in their cognitive processes. Inclusive education is a multi-component strategy or, perhaps, a mega-strategy and it occurs where children have and have not special needs and they are paid special services together in similar educational settings.

In Pakistani context there is hardly any specific exploration regarding specific teaching strategies to teach mathematics to slow learners at primary school level. This study attempted to identify the problems faced by mathematics learners that cause the poor academic performance of the slow learners in the subject of Mathematics. Secondly teaching strategies to support such students who are considered as slow learners were explored to bridge the gap between teaching and learning mathematics.

Review of Literature

Every child has some permanent ability level that describes the best he or she can possibly do (Booth and Ainscow, 2002). Using these presumed differences as a basis, children are labeled as above average, average, below average or slow learners. Martinez (2000) articulated that for special students, teachers and educationists use the terms gifted or handicapped. Khan (2008) expressed that the term slow learning is used for those students who have learning problems but they look like normal students. They want to revise mathematics, but absence of learning capacity, they do not pick up quickly. Sebba and Ainscow (2001) claimed that slow learners are those children who are of limited intelligence. Marsh (2014) explained that slow learner is neither rationally underdeveloped nor is on the lower steps of intellect measure and slow learner is not an analytic classification. Wong, Omar and Mak (2004) communicated that at primary school level the subject of mathematics is puzzled for slow learners, but it is not terrible. Students who are supposed to be slow learners have not learning disability. According to Mukunthan (2013) slow learners are ordinary school children but they are not attentive to learning under traditionally acknowledged structure of education. A slow learner wants extra interval, more and additionally repetition, and normally extra means from instructors to be successful. Typically they are late in reasoning skills which makes new concepts difficult to teach.

The National Council of Teachers of Mathematics (NCTM) established moralities that expresses the objectives for all school children's arithmetic success (NCTM, 1991, 1995, 2000). These morals contain five general math objectives for kids: to acquire mathematics values, turn out to be self-assured in their talent to prepare math, problem solvers, communicate scientifically and learn to be motivated mathematically (Hanich, Jordan, Dick, & Kaplan, 2001). Furthermore, mathematics has extraordinary and

everyday uses, numerous actual normal life circumstances or troubles. Mathematics consequently is an important subject in inclusive and general schools. Deboys and Pitt (2000) proposed that four mathematical operations; Addition, Subtractions, Multiplications and Division should be introduced in primary school level. Addition starts from grade one based on consuming substances and numbers. It should not be beyond ten in class one. Formerly this theory develops as addition of two numbers, without use of carry. Sums not greater than 100 should start from grade two. Adding two or three numbers should be introduced in grade three. Addition of two and three numbers, sum not greater than 1000, with carrying forward from ten's place should be in class four. Adding two and three figures, not more than four characters, with from hundred's place should be taught in grade five.

Mathematics is an important and necessary subject in every general and inclusive school system. Intellectual abilities are significant for success in mathematics and other subject those are learnt by students in schools (Muhammad, 2002; Shaffer, 2002). Wong, Omer and Mak (2004) discriminate that students in Brunei preschools have a variety of mathematics complications and according to Ministry of Education in 1998 mathematics subject students' problems may multiply through application of the national education reforms for example inclusive education (Ministry of Education, 2006). Teachers means inclusive education in schools in a very difficult environment which affects their work in one method or alternative. Geary (2004) and Shulman (2001) take dyslexia as a difficulty in understanding the letters, symbols and shapes produced, by the brain's being unable to perceive the difference between some letters and shapes. Primary school girls and boys who have faced difficulties with calculation and artfulness seems to be dyslexic and behaves like slow learners. It is not predictable because of the incapability to use alpha numeric signs or symbols and keep in the mind.

Sometimes small number of girls and boys in primary school level may have a temporary trouble or short term memory (STM) difficulties. Remembering of quantity details may be a difficulty (Thames & Ball, 2010). There are further problems like during lesson slow learners have a short attention duration, absence of attentiveness, and non-existence of presentation, the students find it challenging to stay on responsibility therefore these problems are related to mathematics subject (Ball & Forzani, 2009). These are general problems those are faced by slow learners in inclusive class rooms at primary school level.

The students faced difficulties in the subject of mathematics and they have particularly difficulties with place value, calculating sums and understanding using basic four processes (Telecsa, Slaton, & Stevens, 2001). Montague (2005) argues that students have complications with spatial awareness and may not have chances to perform with ambiguity that called puzzle, chunks (blokes) and further more they may have difficulty with organizing materials. It belongs to short term memory difficulty. Vandivier and Vandivier (2002) explained that slow learners can't use mathematics in real life locations. But slow learners can use the four processes or operations while purchasing things from a shop or market place, don't recognize shapes in the environment. Slow learners cannot apply basics concepts in real life situation. According to Michael, Dittus and Epstein (2007) slow learners have difficulty in following instructions and become shambolic when face to more than one lessons at a time.

In other words, educator's requirement to be acquainted through themes those are problematic for primary school child and demonstration ways that aimed at instruction and exact gratified impression and awareness (Ball, Lubienski, & Mewborn, 2015). The categories to be helpful to understand student's mental level are known as, knowledge of curriculum, content, and instructional strategies (Grimmett & MacKinnon, 2000).

Instructors and teachers have tried to the best of their capability within the available resources (time, money or fiscal, and experts) to apply inclusive education. Ball, Thames and Phelps (2008) said that there are used some strategies for slow learners in mathematics inclusive class, inspire the use of graphic signs and to help remembrance. Use number rhymes, poems and melodies, make available the students with tactics for recalling facts and evidence such as twosomes, near pairs, perform guesstimate capacities and abilities, calculator may be used skill fully, continuous effort in constructing digit processes involuntary and finishing by entertaining. Fun games such as table scurries, poems and different pieces of music are useful in inclusive class room at primary school level in mathematic subject for slow learners (Bateman, 2002).

Teachers use some flexible strategies for mathematics subject in inclusive classroom that can be successful to get their objectives. They may deliver tinier classroom and household tasks with strong and clear recompenses and compensations for remaining of mission, like computer usage, games and entertaining period (Ball & Forzani, 2009).

Teachers should provide to the point and small instruction, repetition normally, arranged for short task session which can be course of attainable goals. It is essential for teachers that they should encourage the slow learners to become attentive to trouble or difficulty. It is a major strategy that teacher should attempt to use the target in remaining of task it is teachers' duty that they use observations competently achievements should be notes (Ball et al, 2009; Bell, 1999; Peters, 2003; Thames & Ball, 2010).

Teachers' use flexible complication where dissimilar thinkable responses can facilitate the advancement and positive attitude toward the solution of problem. Telecsan, Slaton and Stevens (2001) advocated those strategies which are helpful to teach slow learners in inclusive classroom. They say that the obstinate repetition of thoughts and concept learned but it is different by expenditure of sports, funny sports event and games. Use of information or communication techniques Wright (2005) focused on real life difficulties and problems relevant to slow learners' experience. Teachers makes learning entertaining by using humorous names. Some strategies are suggested by Booth and Ainscow (2002) that jigsaw method of learning is a good strategy of learning as well as block puzzles is major learning and teaching strategy and tan grams can help students in struggling areas, it becomes the cause of maintain reliable group designs in classroom.

Montague (2005) said that with the help of visual cues it provides the knowledge about direction and trend the graphs and counter or table top. Teachers should be provided oral cues related to the student's particular location. It is teachers' responsibility to captivate student's attention which is happening around his scenario (Farooq, 2016). According to some Vandivier and Vandivier (2002) articulated that teacher should use real life objects, items like tangible things and coins in play positions and discuss what are the ways and patterns to spend the pocket money and teachers should provide chances to grip and handle cash in a real shop or school shop. Lindsay (2003) and Muhammad (2002) explained that the mathematics teaching strategies for slow learners are: use little task, pure and clear instructions, directions or symbolic and pictorial signs (cues) and some pictures of copybooks on the chalkboard and on a card.

Shulman (2002) identified some strategies which can help slow learner students; additional care, math online tutors, additional time, teacher should not force students that they perform on time outside ability. Hughes (1999) and Hanich et al. (2001) expressed for creating fun atmosphere during the class time and provided this opportunity to slow learners also. Use new learning techniques, teachers can provide math games and activities. Giangreco (2002) claims that teacher should establish a cooperative plan, and develop a supportive atmosphere for learners. Teacher should encourage students to ask the questions, and he should reply them quickly.

Statement of the Problem

In Pakistan, Mathematics is a core subject in which many students frequently attain poorly. Unfortunately the mathematics understanding was not an easy job for many students especially for slow learners in an inclusive classrooms at primary school level. At primary school level the lower order thinking starts and the world has a new reflection for children. Maximum mathematics teachers have not fulfilled the needs of slow learners in inclusive mathematics classrooms at primary school level. Therefore the understanding of the mathematical concepts is important for enhanced practical life. So the main emphasis of this study was to identify slow learners' problems in learning mathematics and intervention strategies to teach them at primary school level.

Objectives of the Study

The objectives of the study were to:

1. identify problems faced by slow learners in learning mathematics in inclusive classroom at primary school level.
2. find out teaching strategies to effectively teach mathematics to slow learners in inclusive class room at primary school level.

Research Questions

The study answered the following questions:

1. What are the problems that slow learners face in learning mathematics in inclusive classroom at primary school level?
2. What are the important strategies to teach mathematics to slow learners in inclusive class room at primary school level?

Significance of the Study

This research will have scholarly significance because it struggled to comprehend the existing evidence data base about slow learners' problems in learning mathematics and intervention strategies to teach mathematics in inclusive classroom at primary school level. Without the clear understanding of this complex phenomenon the educators will remain unable to provide help to the students. This study will be helpful to provide an instructional guideline for parents and teachers to address the slow learners problems in learning mathematics. This study will be valuable for curriculum developers, policy makers and school management authorities to design curriculum, to provide pedagogical support and sense about teaching materials according to inclusive mathematics classroom respectively.

Method and Procedure

This quantitative study was descriptive in its nature and a self report survey was conducted.

Population and Sampling

The population of the study was teachers of 40 inclusive schools of district Lahore. In this research simple random sampling technique was used, and 11 inclusive schools were selected randomly. From selected schools 122 primary school teachers were selected randomly and were available at that time of survey.

Instrumentation

The instrument was developed in the light of literature review based on five point Likert scale type statements. Questionnaire was best instrument for data collection because it was the prearranged and well-organized way of assembly information (Gay, Mills, & Airasian, 2009). Therefore, quantitative research strategy adopted to quantify the views of the respondents and all respondents were surveyed for getting their opinions. The items or questions were related to problems faced by slow learners in learning mathematics and teaching strategies to teach mathematics to slow learners in inclusive classroom at primary school level. The questionnaire consisted of two components with 43 items. Out of 43 items only 16 items (1 to 16) were related to problems faced by slow learners in learning mathematics and only 27 items (17 to 43) were related to teaching strategies to teach mathematics to slow learners. As Farooq (2013) explained that before field administration of the instrument, it must be piloted, enriched and proved, to check the reliability of the instrument. For this purpose forty teachers were selected randomly from 11 inclusive schools. The instrument was reliable as the Cronbach Alpha value was found as $\alpha = .907$ that indicates good reliability level of the instrument.

Results of the study

Data were analyzed by applying different statistical measures and the details are as:

Table 1*Problems Faced by Slow Learners in Learning Mathematics (N=122)*

Problems	% of problems	Mean	S.D
Place value	49.18	4.81	.413
Counting Numbers	65.57	4.78	.538
Addition	52.45	4.65	.497
Multiplications	47.54	4.62	.550
Subtraction	47.52	4.60	.540
Division	48.36	4.52	.501
Concentrate during lecture	43.44	4.50	.846
Short duration to be attentive.	81.96	4.49	.502
Reversed shapes	36.88	4.48	.518
Shapes in the environment	69.67	4.45	.562
Organizing materials	81.96	4.40	.555
Using concept in another setting	65.57	4.21	.763
Mathematics in real situations	29.51	4.13	.704
More instruction at a time	27.04	4.02	.787
Printed words	33.32	4.02	.828
Reproduced words	31.96	3.98	.833
Daily life problems	31.96	3.61	1.071

Students have faced difficulty in learning place value ($M= 4.81$), because the ability of picking up the concept of mathematics in slow learners was unhurried. Rarely students are unable to apply mathematical concepts in daily life problems ($M=3.61$), according to literature teachers involve students in different activities there for students have not faced difficulty in applying mathematical concepts in daily life problems. There are many other problems such as problems faced in the arithmetic operations, organization of materials and faced in application of mathematical concepts in daily life (Table 1).

Table 2
Strategies to Teach Mathematics to Slow Learners (N=122)

Strategies	% of strategies	Mean	S.D
Short work session with achievable goal	36.9	4.91	.340
Learning fun by using funny things	12.3	4.79	.534
Short period instruction	39.4	4.72	.502
Shorter tasks with clear rewards	59.0	4.67	.807
Visual clues to aid memory	41.0	4.62	.660
Noting student's achievements	54.0	4.60	.757
Number songs	74.6	4.54	.500
Number rhymes	66.4	4.53	.578
Awareness of Difficulty	59.8	4.52	.671
Encouraging students to achieve target	45.9	4.52	.730
Calculations with easy figures	92.6	4.51	.549
Organization pattern	30.3	4.45	.516
Visual cues on charts	45.9	4.45	.516
Visual cues on table top	63.9	4.39	.650
Seating position in group work	45.9	4.38	.875
Drawing student's attention what is happening	63.9	4.20	.738
Real objects	60.9	4.16	.872
Pocket money	79.7	4.15	.789
Coins	53.3	4.13	.680
Visual presentation of material.	84.4	3.95	.443
Picking out the problem	72.1	3.54	.815
Relevant information	57.4	3.54	1.046
Starting activities with clear instructions	18.9	3.52	.874
Using cue sheets	21.1	3.50	1.054
Copybook on the blackboard	15.6	3.48	.774
Picture of a copybook on cards	17.2	3.46	1.179
Using pictorial cues	7.4	3.23	1.059

Short term memory difficulty is a major difficulty so teachers often use short work sessions with achievable goals ($M=4.91$) and teachers always keep the period of instruction short ($M=4.72$) therefore slow learners can't pick up the concept rapidly teachers use pictorial cues rarely ($M=3.23$) because in their point of view the instructional problems are not existing. Students always learn mathematics with funny and honorable names ($M=4.79$) using by the teacher because students motivate by the name of different ideal characters. Teachers also use some other strategies for teaching mathematics effectively as, using number songs, rhymes, visuals, patterns and group work starting from very simple to complex level concepts (Table 2).

Table 3*Effect of Gender on Teachers' Views about Slow Learners Mathematics Problems*

Variable	Gender	N	Mean	S.D	t	df	Sig.
Problems	Male	45	73.42	5.952	8.719	110.586	.000
	Female	77	62.60	7.662			
	Total	122	136.02	13.614			

Comparison of male and female teachers' views about problems faced by slow learners shows that there is a significant difference in mean scores of males ($M=73.42$, $SD = 5.952$) and females ($M =62.60$, $SD =7.662$) teachers ($t= 8.719$; $p= .000$) at .05 level of significance (Table 3). It can be concluded that male and female teachers perceive that boys and girls slow learners face different problems while learning mathematics.

Table 4*Effect of Gender on Teachers' Views about Mathematics Teaching Strategies*

Variable	Gender	N	Mean	S.D	t	df	Sig.
Strategies	Male	45	112.18	5.096	8.880	117.110	.000
	Female	77	99.36	10.799			
	Total	122	211.54	15.895			

Table 4 shows that there is a statistical significant difference in mean scores for male ($M= 112.18$, $SD = 5.096$) and female ($M =99.36$, $SD =10.799$) teachers ($t= 8.880$; $p= .000$) at .05 level of significance for views about teaching strategies. It can be concluded that male and female mathematics teachers use different teaching strategies while teaching mathematics to slow learners and male teachers are more in the favor of listed strategies than the female teachers.

Conclusion and Discussion

There is a diverse range of problems faced by slow learners in learning mathematical concepts at primary school level. The major areas of problems are learning basic arithmetic operations and the place values. Proper utilization of mathematical concepts in daily life events is also a problem. Teachers cannot use all strategies in mathematics inclusive classroom at every time because sometimes slow learners take an interest in some easy concepts and without using any strategy by teachers, they picked up the concept quickly, commonly slow learners know same like normal students. Teachers use pictorial cues rarely because in their point of view the instructional problems were not existing. Students face difficulty to place value and they were able to apply mathematical concepts in daily life problems. In the opinion of teachers boys and girls slow learners face different sort of problems and consequently teachers use different strategies.

Teachers' play their role in using appropriate teaching strategies in inclusive mathematics classroom at primary school level. Students usually face difficulty in learning concept of place value, because the ability of pick up the concept of mathematics in slow learners is skimpy.

Students are unable to apply mathematical concepts in daily life problems. Deboys and Pitt (2000) explained that when teachers involve students in different activities, then students do not face difficulty in applying mathematical concepts in daily life problems. Vandivier and Vandivier (2002) explains that slow learners use mathematics in real life situations and they can use the concept when they purchase things from a shop or market place. According to Ball and Forzani (2009) short term memory difficulty is a major difficulty in slow learners. In a study, Montague (2005) says that teachers often use short work sessions with achievable goals and Ball, Lubienski and Mewborn (2015) expressed that teachers always keep the period of instruction short. Murat and Ozreberoglu (2015) said that slow learners can't pick up the concept rapidly and teachers use pictorial cues because in their point of view the instructional problems do not exist. Michael, Dittus and Epstein (2007) are of the view that students learn mathematics with funny and honorable names. Wahab and Hamzeh (2014) found that teachers' experience was important to use teaching strategies in inclusive mathematics classroom at primary school level because it was very sensitive level of teaching and learning, if teachers have some experience of teaching then they use more appropriate strategies.

Recommendations

Teachers should keep an eye on slow learners as well as on students with special needs. A trained teacher can better understand the problems of the slow learners and lessen those problems by using better teaching strategies. School administration should arrange and provide important materials like different audio and video aides to teachers which helped the slow learners to learn knotty concepts in mathematics.

It is important to mention that teachers should encourage and motivate the slow learners by giving rewards and other incentives. They should not be demotivated by calling them with inappropriate titles as; lazy, nil and idle. Teachers should provide a fair chance to slow learners of asking questions again and again and seeking help from them.

Teacher educators should be emphasized on development of pre and in-service training courses. Need based short training sessions should be organized for teachers and care givers of such type of struggling students. Mathematics teachers should be made aware of the challenges and the supporting strategies to help slow learners. The traditional

assessment techniques also need to be revisited for such type of learners to keep them in the system.

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