

Challenges Faced by Teachers in Teaching Mathematics to Students with Hearing Impairment

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ABSTRACT

The prime objective of this study was to explore the challenges faced by teachers in teaching mathematics to students with hearing impairment. The study was descriptive in nature. All the teachers, junior special education teacher (JSET) and senior special education teacher (SSET) and the psychologists that working in HI schools or centers of Multan districts were constitute the population for this study. Simple random sampling was used to select the representative sample for this study. Self-developed research tool was utilized for the collection of quantitative data. Validity of the research tool was ensured by sharing the research tool with the experts of the field and reliability was confirm before to send it for final data collection. Descriptive and inferential statistics were used to analyzing the collected data, with the help of the Statistical Package for Social Sciences (SPSS) (26.0). Major challenges faced by the teacher's teaching mathematics to children with hearing impairment included (i) Communication barriers, (ii) Basic mathematical concepts, (iii) Pedagogical challenges, (iv) Administrative issues and (v) Lack of support by parents. It is recommended that educational policy makers may devise policies to conduct trainings and refresher courses for the capacity building of teachers to improve their pedagogy skills for the effective delivery of contents in the subject of Mathematics for the children with hearing impairment.

KEYWORDS

Teaching Mathematics, Student Hearing Impairment, SPSS, Junior Special Education, Senior Special Education

JOURNAL INFO

HISTORY: Received: August 17, 2022

Accepted: September 25, 2022

Published: September 30, 2022

INTRODUCTION

Mathematics is an esthetic field of study that synchronized two worlds, one is within our mind and the other world is our environment or nature. The dependency of mathematics is on protocols or rules that govern this synchronization and these protocols must be taught before. For the sake of motivation, the protocols of mathematics are able to express these things in the mathematics language (National Research Council, 1998).

Teaching mathematics is very important for teachers, instructors and learners. Teaching mathematics is difficult task. Complexes of mathematics avert the learners from adoring the world of numbers and symbols in mathematics and this complexity is subjected by usually growing children but more by children who are deaf and hearing impaired (Falsetti, 2005).

According to Kluwin and Moores (1989), due to lack of concentration on mathematics, hearing impaired student's subject difficulties in mathematics and opportunities for incidental learning also compromised. However, it is not easy task for deaf children to do mathematics tasks and math problems. Special Children has weak imaginary visual ability for sketching concepts in their minds. They face huge difficulty in learning tables of basic mathematics, its concepts, general computations and word problems with higher math.

According to Individual with disabilities Education act (IDEA), 'hearing impairment that is so severe that the child is impaired in processing linguistic information through hearing with or without amplification that adversely affect a child's educational performance. Hearing impairment is an enclosed disability and hearing is main factor in perceiving of speech and language development. So, speech and language have huge impact on communication and hearing of hearing-impaired students. However, deaf and hearing-impaired students have very poor and weak background of mathematics. They have poor writing skills of mathematics that creates huge hindrances for teachers and in teaching process (Nunes & Moreno, 1998)

Special educationist faced lot of problems in teaching mathematics of hearing-impaired students. These problems include communication barriers, lack of parent involvement, incompleteness of mathematical curriculum in given time span and difficulty in explaining of basic mathematical concepts within limited resources. In Pakistan, National Institute of special education was recognized to provide training and preparation of tutors who were in-service in different schools of special education. On the other hand, curriculum of special education was decided which were more similar to general education department in addition to some auditory training & speech development program (Khan, 1998).



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It was reported by a researcher named Khatoon who reported that only 2% to 5% special children were satisfied with curriculum. These concerns were reported with the families who have special children with hearing disabilities. It was reported by Kazmi (2007) that the concerns about curriculum of special education children, found to be more theoretical rather than practical (Kazmi, 2007).

Sign language is good substitution of oral learning approach. As a matter of fact, Pakistan Sign Language (PSL) is not standardized at national level, it varies from place to place and from region to region. It was revealed by Khatoon, the tutors and teachers are not capable of handling special children through PSL. These facts are disclosed by 72% of deaf people and 57% of parents of these special persons. She also reported that 88% teachers never use finger spelling & 90% tutors certainly not use speech in the schools (Khatoon, 2003).

In Pakistan, Insufficient policies and implementations of these policies, lack of resources, teachers with insufficient mathematical background and poor mathematical knowledge of sign language create a lot of challenges in teaching process. In Punjab, there is lack of special education teachers and moreover each teacher has to handle number of classes at the same time that creates lot of problems for teachers. In most of the institutes, our teachers are over burdened with students and other official responsibilities (Bushra & Rukhsana, 2014). A lot of work has been done to sort the problems of students with hearing impairment. But for teachers, a lot needs to be done. And this study will specifically be dealing with the problems that teachers are facing in teaching the students with HI.

Teaching mathematics is a difficult task and have greater importance for the facilitators and learners. Teaching of mathematics is not an informal job. Hurdles in teaching mathematics inhibit the teachers to properly teach the hearing-impaired students at a quality level. In past, there is lot of research on deaf students learning problems of mathematics but not more focus on teaching challenges which is most probably faced by the special education teachers. The most important challenge that usually faced by the mathematics teacher of hearing impairment is communication barrier. Special education teachers faced a variety of challenges such as lack of teaching faculty, deficiency of resources, inadequate A.V Aids, weak base of special students in mathematics, extra burden of official responsibilities, poor support from parents, poor policies and no proper implication of these policies, zero interest of special students in mathematics.

LITERATURE REVIEW

Definition of Mathematics

“All children should be taught Mathematics because it is a very important and necessary life skill that cannot be done without (Burger (Editor) 2009:11)”.

Mathematics is an abstract language that permits human beings to consider near the record, and interconnecting the concepts about the connection and component of quantity (Lerner and Johns, 2009, p. 478). According to Sidhu (1995) Mathematics is the science of number and space. Mathematics is also denoting to the skill of logical reasoning. Mathematics is the knowledge of degree, numbers and quantity.

Coffey (2011) says, statistics refers to minimum skills of mathematics that a person uses on a daily basis, for example, to calculate the cost and change of a transaction, basic percentage, average or concern weight. Gough (2001) argues that “Mathematics is the use of primary and external Mathematics, perhaps including its use in everyday situations at home, during leisure time, and in non-technical situations”.

According to Fletcher (2006), Mathematics is a vast field that includes, amongst other things, algebra, geometry, arithmetic, calculus and trigonometry. However, Geary et al. (2000) define arithmetic as adding and subtracting one-digit numbers. Askew, Rhodes, Brown, William and Johnson (1997) view arithmetic as the potential to method, talk and understand numerical facts in a spread of settings. On this examine the issue of mathematics will be known as the issue that cripples a child in fixing mathematical problem.

Myth of Mathematics

There is a myth that mathematics is a universal problem. The difficulty associated with pitiable mathematics overall performance is not always most effective practiced in Pakistan however it is also a prevalent difficulty. Instructors of India, America, England, etc. are also confronted the same situation of negative arithmetic performance (Ebermeier, 1983).

There are some factors which attributed to the poor mathematical performance such as:

1. Teaching Style (whole class teaching)
2. Knowledge associated with mathematics, are failed to use in a good way.
3. Language hurdles
4. Deficiency of flexibility and opinions
5. Worth of teacher-student dealings

As the mathematics is a tough subject and coaching the entire lesson at a similar period is not a convenient for all students. Because students have different caliber and those students who have understand the lecture fast not equal to students who doesn't have enough capacity to understand the concepts at that same time in a classroom. So, whole class teaching is not beneficial for all types of students (Brophy and Good, 1986).

Aim and Scope of Mathematics

Mathematics is an essential portion of human believes and reasoning, and central to challenges at appreciative the sphere and ourselves. Mathematics offers an active approach of constructing intellectual science and boosts rational thought and intellectual care. In addition, mathematical understanding shows a critical role in accepting the subjects of further school contents such as science, social studies, and even music and art (Steen, 2005).

Firstly, the following questions are arising: Why does mathematics embrace such a significant and distinctive place amongst other subjects? How much the importance of mathematics in the whole school syllabus? In what sense mathematics should be considered as an essential subject in global curriculum?

- ✓ Mathematics has a transversal nature. Generally, if we see the history of curriculum in Greek, the two substantial skills of mathematics (geometry and algebra) out of seven as well as in primitive eras. This ancient part funds the belief that mathematics has delivered the intellectual science mandatory for further branches of science.
- ✓ Mathematical learning is a critical element of characters living more active lives as fruitful, anxious and meditative residents. Mathematical learning is engaged to comprise of elementary computational abilities, quantitative thinking, spatial ability etc.
- ✓ Mathematics is functional in several arenas and sciences, i.e., mathematical conceptions and measures are used to solve difficulties in science, engineering, economics. (For example, the kind of complex numbers is a condition to study several
- ✓ concepts in electronics.) For obtaining the mathematical learning and solving the mathematical problems and difficulties, there is need of refined mathematical concepts and methods.
- ✓ Mathematics is a part of our human traditional practice, and we have a duty to progress that tradition (Kilpatrick, 2007).

Secondly, as mathematics deals introductory understanding and talents for other school subjects, such as sciences, art, economy, etc. In some curricula, mathematics acts as an instrumental subject to presented unconventionally to care the study of other school subjects and combined courses of mathematics and further arenas are presented.

Thirdly, it serves as the associated subject to other subjects of school curriculum of each country reflects the number of hours (proportion of hours) and/or courses allotted to mathematics. There is also need to bring together the relationship between quantitative analysis to qualitative description of school mathematics (Steen, 2005).

Importance of Mathematics

According to the Professional Standards for Teaching Mathematics, as stated by Van de Walle (2007), teachers need to make the transition from teachers who focus on learning maths. It is imperative that the coaching of mathematics is grounded on location. For example, children can comprehend well if they are educated math by consuming things from their place, for example, counting draws, or books and toothpick sticks.

Willis (1998) agreed the opinion that mathematics has many potentials for improvement if educated in the setting in which it happens. For example, the teacher has 11 chips pack and she gives Mahira 4 packs - how many chips packs do she have left? Definitely, teaching mathematics to children by using arithmetic theories and their practice, using space-based difficulties, can sort it much easier for them to understand and narrate the topic to their location.

Learning of Mathematics

The means in which way students pick up mathematics impacts in what way they apprehend its theories, practices, and ideologies. Many researchers have discussed that to encourage education with thoughtful means, the educators of mathematics essentially deliberate the chores, conditions of problem-solving, and different techniques used to exemplify mathematical concepts. Mathematical techniques raise knowledge at numerous levels—such as, the knowledge of specifics, processes, and ideas. Techniques can also deliver tangible models of intangible concepts, or they can support students to handle and reflect about thoughts, when go through with difficult questions, however the mathematics becomes accessible and further intensely agreed (Cobb, 1999).

Educational techniques of mathematics can be customary, technical, or public. The utmost educational techniques are customary, that comprise of somatic things or manipulative (e.g., squares), techniques of visualization (e.g., function diagrams), and writing tasks (e.g., making a table of values through paper and pencil). Technological techniques could cover the education sector in a diverse way, for example calculators (i.e., algebraic and arithmetic) and computers (e.g., calculation and multiple-representation software). A third type of educational technique is public technique in which small-group discussions done among students that collaborate with each other to share and encounter their point of view. Because the dependence of the type of knowledge that is estimated, the above three tools can be used autonomously or independently (Paul, 1999)

TYPES OF SPECIAL CHILDREN

Under the Act of IDEA 2004, the special children categorized by the 11 disabilities explained below as:

1. **Auditory Impairment (Ai):** An impairment that is related to the sense of hearing which badly affects the educational performance of any child. Hearing affects at numerous levels with fluctuating degrees of decibels at any age of a person.

2. **Autism (AU):** AU is a disability that puts effect on their verbal and non-verbal communication and social dealings of any person. The sensory imbalances create the hurdles in their daily routine activities. Repetitive actions of autism child have great effect on their academic performance also. They are not friendly with the environmental changes and have effect on their sensory procedures.
3. **Deaf-Blindness (DB):** DB is a disorder in which both senses i.e., vision and hearing are affected. This type of impairment causes a disturbance in communication and developmental problems which leads to adversely affect their educational performance.
4. **Emotional Disturbance (ED):** It is a condition that adversely affects a child's educational performance through intellectual, behavioral, social features. There is badly affect on the relationships with their teachers, peers or with the society.
5. **Learning Disability (LD):** LD is a disorder of restricted intellectual disability that restricts the person's everyday life activities. It is a condition of poor ability to think, write, speak, listen or spoken or for mathematical calculations of any person.
6. **Intellectual Disability (ID):** ID is a condition that adversely affects the educational performance of the child through which sub-average general intellectual functioning, existing parallel with deficits in adaptive behavior and established during the developmental period.
7. **Multiple Impairments (MI):** There is a group of associated impairments such as the disturbances in psychomotor skills, communication, self-care skills, cognition and emotional or social development of any person that badly effects on the educational performance.
8. **Orthopedic Impairment (OI):** OI is an impairment that adversely affects the educational performance of the child through the severe orthopedic impairment caused by disease, a congenital difference, and impairments from other causes.
9. **Speech Impairment (SI):** An impairment that adversely affects the educational performance of the child through the communication disorder such as a voice impairment, language impairment, impaired articulation, or stuttering.
10. **Traumatic Brain Injury (TBI):** It is also called the psychosocial impairment that adversely affects the educational performance of a child. It is basically an injury of brain that results the partial functional disability by applying the external physical force on brain. Traumatic brain injury does not spread over to congenital or progressive brain injuries or by birth trauma.
11. **Visual Impairment (VI):** VI is an impairment of vision that adversely affects the educational performance of a child. Partial sight and blindness both are included in VI.

HEARING IMPAIRMENT AND DEAF CHILDREN

"Hearing impairment occurs when there's a problem with or damage to one or more parts of the ear"

Hearing impaired is the broad term that contains both the hard of hearing (partially hearing) and deaf. The two terms arise from the newer diagnostic and testing method are the deaf and hard of hearing. With the help of auditory training and wearing the hearing aids gain lot of benefits by the hearing-impaired person and this would be empowering them to procure speech and language naturally. As in the case of damage in the auditory channel whose sense of hearing is completely lost are called deaf people. Though such peoples' hearing wisdom are reduced and non-functional, with the passage of time in the presence of hearing aids in their life determinations (Ross, 1972).

As both the terms deaf and hard of hearing (Partially deaf) lies in a single term such as of hearing impairment. That hearing loss which occurs in the pre-lingual period or later with no sufficient severity restricts the growth and development of spoken language called hard of hearing. Such type of impairment is not so much severe as compared to deaf category. Deaf students have severe condition for understanding of mathematical problems and reading skills as compared to hard of hearing students. Proper diagnosis is required for proper classification and acknowledgment for proper possibilities for hearing impaired students (Bryan, 1975).

PROBLEMS OF HEARING IMPAIRMENT

As pointed out earlier, hearing impairment is a challenging state. So, it is assured by a hearing-impaired child or person that I have some problems. These problems of collection range from language difficulty, social and emotional problems, difficulty in thinking, to problems of academic achievement.

1. Difficulty of language:

Due to severe hearing loss, the natural ability of verbal language hinders the development of affected person. For cognitive development, perception is the main key process and it affected on the development of language skills due to defect in hearing organ of the deaf person. Today researchers are starting to differentiate the correlation of two senses such as hearing and speaking because in the past there was a common thought that deaf person means they completely deaf and dumb, it means he/she cannot hear/talk (hearing and speaking) (Bakare, 1979).

2. Social and emotional problems:

For social interaction and to become an effective member of a discussion or project group within the classroom, hearing impaired students observed by their hearing peers good enough or not (Northcott, 1973). Because of poor language development of HI child, socially they faced lot of annoying problems as compared to their hearing peers of same age. That's why they show a high degree of emotional instability and in mostly cases their uncertain liaison with others when they use sign language (Obikeze' & Ofojebe, 2000).

3. Thinking and academic achievement:

Due to poor auditory development in HI children, there is lot shortcoming of intellectual development as compared to hearing children. If the child's hearing level not improved than there is loss of academic targets due to lack of intense and abstract logic (Okeke, 2001). So, it could be saying that intellectual performance is affected by the language disabilities due to deafness. It should be indirectly affected the interpersonal communication and interaction such as cognitive abilities.

LEARNING STYLES OF HICS

Special education teacher goal has always been to specialize the students who are deaf or hearing impaired, disabilities that affect their hearing and auditory processing. HI teachers always know that students with different degrees of hearing loss justify a quality education, and these students are usually very strong in cognitive manner. However, they may learn in a different way from other students because they do not have the same liaison to language, or to captivating in impressions from the world around them. In today's world, HI teachers realize that there are so many different options available for the learning and education of HI students. They believe that the two most important questions to ask when figuring out how to educate these students are:

1. **Learning Styles:** The first question really has to do with defining a student's learning style, their best and easiest way of embracing new information, concepts, and skills. For instance, HI teacher has always been an auditory learner. When they hear something, they should be remembering it! However, this is rarely true for hard of hearing students.
2. **Visual Learning:** Most of the HI teachers have worked with students of visual learners. This means that as what they could see to what they are thinking so they really adapt new good thoughts. Visual learners valued as of working with pictures and graphic/images planners. These visuals become helpful for deaf students to establish their opinions and show themselves by lacking they depend on sound. For example, when HI teachers help deaf students attain new vocabulary, they use graphic planners to help them make relations between words with similar and also opposite meanings.
3. **Tactile Learning:** HI teachers has also observed that tactile learners learn best by means of their features such as hands and bodies obviously between deaf or hard of hearing students. In fact, Pakistan Sign Language (PSL), is a very tangible communication modality. Not only is signing done with the hands, but for expression of distinction and tone it frequently drives through with a great deal of body language. Many of the students of HI teachers has worked with like to touch objects as a way of discovering them, and they can use their bodies to turn what they figure out from texts they read.
4. **Interpersonal Learning:** Some of HI students have also been interpersonal learners that who learn best in link with the other students. Because deaf/hearing impaired students are quite talented of establishing significant contacts with others. By attaining benefits from giving leadership roles in a learning community, these students learn best in companies and small groups.
5. **Educational Programming:** HI teachers would be good observer that different educational options of learning styles are suggested for HI students. This matter depends on significantly on the question of what supports students require. Educational options vary depending on geography and economic resources. However, HI teachers know of several general structures that many students and families look for the betterment of HI students.

TEACHING METHODS OF HICS

It is usually hard to normal the hearing impaired but when they are mainstreamed, HI students required interpreters of sign language in the classroom as well as auxiliary means support. Deafness is a serious sensory deprivation that will definitely pose a problem for the teacher in teaching the HI. It is distinguished to impede the troubled growth of any person usually and particularly in their academic achievement. It initiates that there are hostile effects on academic achievement due to hearing impairment but the degree of hearing loss has influenced by the degree of such hostile effects (Alade & Abosi, 1991). Therefore, the hearing impaired required suitable methods for the effective teaching and learning that may perhaps ease the attainment of semantic as well as societal and passionate regulation. The following methods are comprised of:

1. **Auditory method:** This method includes recognizing sounds by hearing impaired children for the teaching. It highlights the growth of listening abilities. With the endowment of some type of hearing aids for amplification in a condition whereby the hearing impaired is frequently showing both the sound and language in their environment.

2. **The oral method:** Signs and movements are not applicable for this method. Lip reading, speech or auditory training are used for teaching of this method. This method stressed to supporting the HI to attain communication skills and de-emphasizing signs & gestures is compulsory. It is fundamental in the education of HI. For the management of HI students, special educators also put focus for the progress of meaningful communication during the early ages.
3. **Rochester method:** Reading and writing are the main focused for Rochester method. Air techniques are used by the oral method for finger spelling or writing.
4. **Neo-Oralism:** For early to change teenager that are passive into being active, technique of communication specifically expressive communication is used in this method. Like Rochester method kinds use of finger spelling. So, if the young deaf child complete control over finger spelling and the practice of language experts becomes easy, like that of the hard-of-hearing child.

5. Simultaneous total communication method

Oral communication audition, finger spelling, signs, gestures, dramatization reading, pencil and pen writing and drawing type of means the sense modalities are used in this method. To educating the hearing-impaired children, Idowu (2004) writing explains that what the teacher does? Followings explain it clearly.

1. The deaf children learned by visually. It is important for HI to what they can see and not what the imaginary to hear. So, the teacher should use of the white/black board, images, cards and diagrams etc.
2. To builds and endures interest in the lesson, there should be using of concrete objects
3. Over-learning concept is very imperative while working with the deaf children. There is a range of techniques in which one idea or thought offered in a means of more than one logic of modality.
4. Every subject on the time - table could provide an opportunity for teaching language, or some form of communication skills.
5. He added that teachers should pursue co-operation of the home of the child and confirm that he/she is recognized, loved and fortified by his/her parents /guardians.

TEACHING PROFESSIONAL QUALIFICATION IN SIGN LANGUAGE

Formal teaching qualifications, experience, creativity, student communication and practice in school should have a profound outcome on academic routine (Johnson, 2000). Many educators believe that children with disabilities who are impaired are less likely to be useful as they are still exposed to many cultures and therefore find it tough to provision themselves. Due to the shortage of qualified teachers "full communication" could not be applicable as several teachers are not competent with the right understanding, skills and education which means that their self-esteem will be near to the ground and donate to a deficiency in motivation which is why they are competent (Passey, 2013).

Student performance is influenced by the type of teachers they teach, so the teacher is very important to the student's learning life. Odden & Picus (2011) argues that there is an uncommon relationship amongst the worth of teaching and the level of student results, which means any technique that enhances teacher excellence must therefore improve student results. Solomon and Podgursky (2001) argue that testing focuses on teachers' skills and knowledge that provide motivation for improvement and internal rewards for professional improvement.

According to Owino (2011), mathematics teacher organizations promote collaboration among mathematics teachers particularly those who teach students with a hearing problem in mathematics that should be established in centers, schools or districts. Collecting and discovering new concepts by the teachers in coaching the topic to their students in appropriate schools through such dealings.

Curriculum development is hampered by the ever-present level of teacher commitment. Teachers are under stress by the shortage of teaching services or a deficiency of proper planning, time and the qualifications or knowledge of sign language show a very significant role in student performance particularly with hearing impaired students. In various circumstances, the recruitment of new teachers producing a positive practice is an important part of their transformation. In order to convey trustworthy Education to students with hearing impairments, it's very important that teachers need definite update courses to retain with the current practice of Special Needs Education (James, 2007).

Literacy skills such as speaking, listening, reading and writing are the associated skills that must be used for completely understanding the mathematics by any children. It is challenging for deaf children to compete with their hearing peers in a mainstream school and this creates a huge gap between spoken and signed language. Such as all the deaf children did not communicate by using the sign language and this situation clears the differences that helps the teachers for making the maths lesson become more accessible (Scherer, 1999).

STRATEGIES FOR TEACHING MATHEMATICS

By using various techniques and teaching aids, the student may be taught numeric and quantitative skills very easily (Mercer & Pullen, 2013). Some of these techniques have been discussed in details by the followings:

1. **Use of Manipulates:** In teaching mathematics, various types of different objects should be used such as beads and buttons. In a transparent plastic cup, the student dropping the beads in it and counting these beads. They basically learn that how many beads represents the numbers.
2. **Use Visuals:** Teachers should be used drawings or charts and flash cards in support of teaching. The process of computation may be defined to support the process.
3. **Tactile Presentations:** The concepts of greater or smaller, long and short may be taught by using paper strips of different lengths. Similarly, tracing a number on the student's back of hand may also be included in this style.
4. **Color Cues:** In teaching process, teachers should be used marking pens and colored board markers or chalks. Teachers may also have grabbed the attention of students by using various colored highlighters to process signs such as +, -, ÷, × and clue words ("less than", "times").
5. **Use display Charts:** Teachers may be used different charts to explain the various concepts to students with HI. They may be taught the concepts of geometry by using charts.
6. **Use Abacus:** To facilitate the students in calculation process, the teachers may also make se of an Abacus. It may help in teaching basic concepts of mathematics such as addition, subtraction, multiplication and division.

SUPPORTING TIPS FOR DEAF LEARNERS IN MATHEMATICS CLASS

For assisting deaf learners in your maths classroom, following are some tips:

1. If likely starts from an early age with maths language problems, however, the children's understanding can become deeply rooted. Inquiry the children a mathematics-based question every day by including it into their things: "how many books in your bag?" or "are you going to share those books with your friends?"
2. Ask from deaf students a maths question before & after the maths lesson. Questioning done with target language and repetition answering it with them. This will give them extra revelation to the language of maths. You could provide word map concerning a procedure to the vocabulary that the children can mention. As they gain confidence question them to answer queries more independently.
3. The children taught to underline the important numbers and words they will want to use in word problems, so they can recall what they want to do.
4. The use of visuals becomes more compulsory because deaf children can't depend on what they hear. Deaf children may emphasis on existing things for example; using fingers, counters, and blocks that is a bit extensive than hearing children.
5. Deaf children wish to select their own style to solve problems just like the other children. There are a number of techniques you can use: number line, column methods, drawing counters, dots. Always take a white board and a board pen to hand so that they can practice.
6. Sometimes slower speed required for deaf children. Due to their opposite language levels, they need more time to solve the problem or to think about it more clearly. You can give more time to deaf children to solve the problem or answer the questions. You must ask the question from deaf child and come back for a couple of minute later for an answer.
7. It's imperative that it is difficult for some deaf children to solve a problem but it's too much easier for hearing children. A several ways to help the deaf children and some of the tips are given below:
 - a) Sanctioning the deaf children to defined their reply in any type as they can. For example, they should be draw or mark every step of their answer or their technique.
 - b) If the structures of a sentence differently to spoken English but they want to give details in Pakistan Sign Language (PSL) order, then allow them to do it.
 - c) It may allow them to explain their deeds in their own writing and provide them a series of word in which they choose by their own choice.
 - d) Support them to write down what they want to use a scaffold, for example Colorful Semantics.

In the end, it's imperative to keep in mind that deaf children are all different because of their diverse admittance to language, different hearing levels different and language needs. Above mentioned tips should be used for developing the language of mathematics for assisting the deaf children but also work with these children for helping in choosing the best one for them (Brun, 2018).

RESEARCH METHODOLOGY

Research Design: The study was descriptive and data was quantitative in nature.

Research Population: All the teachers, psychologists and the Heads/Principals of schools and centers of Multan, Khanewal, Vehari and Lodhran districts of Multan Division constitute the population of the study.

Research Sample: The junior special education teacher (JSET) and senior special education teacher (SSET) and the psychologists that working in HI schools or centers of Multan districts are included in sample of the study.

Research Tool: After the literature review, the researcher developed a questionnaire, for the collection of quantitative data, questionnaire was developed by the researcher.

Data Collection: The questionnaires were personally administered to the participants of the study. Similarly, the same questionnaire was also administered through web-based application to the participants who were unavailable in person.

Data Analysis & Interpretation

For analyzing of the collected data, the Statistical Package for Social Sciences (SPSS) was used. The descriptive statistics was used to analyze the data.

Table.1. Frequency distribution of the gender, job nature, teaching designation and the teaching experience of the respondents

Category	Frequency	Percent
Gender		
Female	10	21.7
Male	36	78.3
Job Nature		
Contract	22	47.8
Permanent	24	52.2
Designation		
JSET	24	52.2
SSET	18	39.1
Psychologists	4	8.7
Experience		
0-5 Years	25	54.3
6-10 Years	18	39.1
11-15 Years	3	6.5
Total		

Table.2. Challenges Faced by Teachers in Teaching Mathematics to Students with Hearing Impairment

Sr.#	Statements	SA	A	U	DA	SDA	M	SD
1	Extra office work during lesson time.	29	14	3	0	0	4.57	0.62
2	You have enjoyed sufficient resources for teaching practice of mathematical class	23	20	3	0	0	4.43	0.62
3	You teach large number of HI students in mathematics class.	19	24	2	0	1	4.30	0.76
4	You perform extra/irrelevant school duties.	18	23	1	3	1	4.17	0.93
5	At a time, you teach more than one class.	12	22	8	4	0	3.91	0.89
6	You face shortage of classrooms for HI students.	11	20	11	4	0	3.83	0.90
7	You face large student absentees in HI class of mathematics.	15	21	8	1	1	4.04	0.89
8	Your job descriptions of your duties are clear.	16	25	4	0	1	4.20	0.78
9	School management consistently maintain discipline in HI students.	12	24	7	0	3	3.91	1.01
10	You have enough capability to teach HI students that are allotted to you.	16	20	4	4	2	3.96	1.09

Table.3. Independent Sample t-test: Comparison of opinion of the female and male respondents for challenge of communication barriers that faced by teachers in teaching mathematics to students with hearing impairment

Gender	N	Mean	SD	df	t	Sig.
Female	36	44.33	4.20	44	-1.053	0.298
Male	10	45.80	2.35	26.71	-1.437	

*P>.05 Level of Significance

Table shows that the mean and the standard deviation for the female is ($M= 44.33$, $S.D=4.20$) and the mean and standard deviation for the male is ($M= 45.80$, $S.D=2.35$). Results shows that the t-value is -1.053 and the significant value is 0.298 which is greater than the .05. It is concluded that there is no significant difference between the opinion of the respondents on the basis of female and male regarding the challenge of communication barriers that faced by teachers in teaching mathematics to students with hearing impairment.

Table.4. Independent Sample t-test: Comparison of opinion of the contract and permanent respondents for challenge of communication barriers that faced by teachers in teaching mathematics to students with hearing impairment

Job Nature	N	Mean	SD	df	t	Sig.
Contract	22	44.14	4.00	44	-0.856	.396
Permanent	24	45.13	3.82	43.220	-0.855	

* $P < .05$ Level of Significance

Table shows that the mean and the standard deviation for the female is ($M= 44.14$, $S.D= 4.00$) and the mean and standard deviation for the male is ($M= 45.13$, $S.D= 3.82$). Results shows that the t-value is -0.856 and the significant value is .396 which is greater than the .05. It is concluded that there is no significant difference between the opinion of the respondents on the basis of contract and permanent regarding the challenge of communication barriers that faced by teachers in teaching mathematics to students with hearing impairment.

Table.5. One-Way ANOVA: Comparison of opinion of respondents on the basis of teaching designation regarding the challenges of communication barriers that faced by teachers in teaching mathematics to students with hearing impairment

Teaching Designation	Sun of Squares	df	Mean Square	F	Sig.
Between Groups	5.10	2	2.55	.161	.85
Within Groups	679.33	43	15.80		
Total	684.44	45			

* $P < .05$ Level of Significance

There was no statistically significant difference between group means as determined by One-Way ANOVA ($F(2, 43) = .161$, $P > 0.05$). This shows that there is no significant difference in the opinion of the respondents on the basis of teaching designation regarding the challenges of communication barriers that faced by teachers in teaching mathematics to students with hearing impairment.

Table.6. One-Way ANOVA: Comparison of opinion of respondents on the basis of teaching experience regarding the challenges of communication barriers that faced by teachers in teaching mathematics to students with hearing impairment

Teaching Experience	Sun of Squares	df	Mean Square	F	Sig.
Between Groups	107.43	2	53.72	4.003	.03
Within Groups	577.00	43	13.42		
Total	684.44	45			

* $P < .05$ Level of Significance

There was statistically significant difference between group means as determined by One-Way ANOVA ($F(2, 43) = 4.003$, $P < 0.05$). This shows that there is significant difference in the opinion of the respondents on the basis of teaching experience regarding the challenges of communication barriers that faced by teachers in teaching mathematics to students with hearing impairment.

FINDINGS

General findings are based on the descriptive analysis of all the items of the mathematics difficulty questionnaire administered to the participants of the study. Major findings include;

1. The results of the study revealed that teachers of HIC in teaching mathematics faced the multiple challenges such as (i) Communication Barriers, (ii) Basic Mathematical Concepts, (iii) Pedagogical Challenges, (iv) Administrative Issues, (v) Lack of Support by Parents.
2. Study also depicted those challenges in teaching mathematics of HIC restricts the teachers in some limited boundaries. Their teaching scope restricts due to these challenges.
3. The results of descriptive analysis depicted that Communication barriers have great impact on teaching mathematics to HIC. A lot of hurdles faced in PSL during communication in the class.

4. The results of descriptive analysis also reveal that in teaching mathematics to HIC, the basic mathematical concepts also play a major role. If the HIC have no knowledge about the previous mathematical concepts that the teaching process of mathematics continue not smoothly.
5. The results also reveal that pedagogy have great importance in teaching process of the subject of mathematics to HIC. Teachers of mathematics faced various pedagogical challenges in their teaching career.
6. The results show that administration of any institute is the backbone of teaching process. Administration issues create a lot of challenges for teachers in teaching mathematics to children with hearing impairment.
7. The results depicted that parental support for the good teaching process is very important. If the teacher's/parent's relationship is not good, then lot of challenges are faced by the teachers of mathematics to children with hearing impairment.

DISCUSSION

The fourth objective was to define and understand the administrative issues that encountered in the teaching practice of mathematics to children with hearing impairment. For this, the researcher framed the research question. He reveals that the administration has great impact in teaching process. Mathematics class of HICs required a proper time and attention to successfully complete the process of teaching mathematics. But lack of man power in our institutions, teachers complete their administrative tasks also with the teaching. Extra office work and duties are performed that are irrelevant to mathematics teachers. Teachers faced shortage of classrooms, large student absentees and even at a time teaching the more than one class that create the challenges for mathematics teachers of HICs (Brun, 2018).

CONCLUSIONS

The study pointed at exploring the challenges that faced by teachers in teaching mathematics to students with hearing impairment. This study has descriptive nature and quantitative technique was accepted to bring together the data from the mathematics teachers of HICs. The review of literature reveals that the teachers faced the lots of challenges in teaching mathematics to students with hearing impairment. Challenges includes the (i) Communication barriers, (ii) Basic mathematical concepts, (iii) Pedagogical challenges, (iv) Administrative issues and (v) Lack of support by parents. The study depicted that communication barriers have greater impact on the mathematical teaching process because if teachers fail to communicate with the students properly then how they deliver their lecture/ mathematical concepts to the students of HI. The study suggests that pedagogy has greater impact on teaching process of mathematics and weaker pedagogy have a huge challenge for mathematics teachers of HICs. Administrative issues and parental support also create hindrances for mathematics teachers of HI. All these challenges restrict the teachers of mathematics to conquer their teaching tasks successfully.

While making gender, experience, nature of job and designation-based comparison, the findings of the study depicted a significant difference in basic mathematical concepts of permanent and contractual respondent for teaching of mathematics to students with hearing impairment ($P=0.021<0.05$). Similarly, the findings of the study depicted a significant difference in basic mathematical concepts among Junior Special Education Teacher (JSET), Senior Special Education Teacher (SSET) and psychologists respondent for teaching of mathematics to students with hearing impairment ($P=0.042<0.05$). Moreover, the findings of the study depicted a significant difference in lack of support by parents among Junior Special Education Teacher (JSET), Senior Special Education Teacher (SSET) and psychologists respondent for teaching of mathematics to students with hearing impairment ($P=0.007<0.05$). Hence, the findings of the study depicted a significant difference in communication barriers among the teaching experience of 0-5 years, teaching experience of 6-10 years and teaching experience of 11-15 years of respondent for teaching mathematics to students with hearing impairment ($P=0.03<0.05$).

RECOMMENDATIONS

1. The findings of this study revealed that content knowledge in the teaching practice is major hurdle for the teachers in the subject of Mathematics at primary level are instructional. In view of the issues in the contents of subject of Mathematics, curriculum experts may devise curriculum that may be compatible with the level of learning of students.
2. Similarly, the study suggests that pedagogy has greater impact on teaching process of mathematics and weaker pedagogy have a huge challenge for mathematics teachers of HICs. These findings suggest that educational policy makers may devise policies to conduct trainings and refresher courses for the capacity building of teachers to improve their pedagogy for the effective delivery of contents.

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