

AN EXPLORATION OF AVAILABLE PROVISIONS FOR LEARNING OF GEOMETRICAL CONCEPTS AT ELEMENTARY LEVEL

Hina Noor^{*1}, Tanzila Nabeel², Imran Nazir^{*3}, Kokab Nosheen⁴

¹Assistant Professor, Department of Special Education, Allama Iqbal Open University, Islamabad;

²Ex-Professor, Dean Faculty of Education, Allama Iqbal Open University, Islamabad;

^{*3}PhD Scholar, Department of Special Education, Allama Iqbal Open University, Islamabad;

⁴M.Phil Scholar, Department of Special Education, Allama Iqbal Open University, Islamabad

¹hina.noor@aiou.edu.pk; ²hina.noor@aiou.edu.pk; ^{*3}imran.nazir2008@gmail.com;

⁴kokabnosheen@ymail.com

Corresponding Author: *

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ABSTRACT

The descriptive study was carried out to explore the current provisions available to the teachers and students with visual impairment (VI) for learning complex concepts of geometry at elementary level. The population of the study comprised of VI students studying at elementary level and their parents. Research tools were observational checklist to observe the learning environment and semi structured interview guide for parents. After pilot testing, tools were administered for data collection. The quantitative data was tabulated and interpreted whereas repeated themes of the qualitative data was discussed. Results of the study showed that numerous problems were faced by teachers and VI students studying at elementary level. In most of the centers of special education, children with different special needs sit together in a class. Required tactile material and geometry apparatus was not available for students and teachers. Opportunities for in-service training to fresh up the content knowledge and pedagogical techniques were scarce. Class size was manageable but due to lack of instructional material, geometry concepts were not taught properly. Students were not provided with audio aids of notes in soft form. Software were not introduced in the schools and, if available, teachers were not trained to operate these.

Keywords: teaching, learning, mathematical concepts, elementary, visual impairment, class room environment.

INTRODUCTION

The Individuals with Disabilities Act (IDEA) officially defines the category of visual impairment as “An impairment in vision that, even with correction, adversely affects a child’s educational performance. The term includes partial sight and blindness” (Tan, Chong, Darlow, & Dai, 2015). Visual impairment covers both total blindness and low vision. Some of the people who are visually impaired born with difficulties with vision, they are by birth blind and some have late cling blindness. Keeping in view this background low vision and blind persons have different groups, they are an extremely heterogeneous groups. Research about teaching/learning geometry to blind students is a mixed area spread between disability studies (here visual impairment) and

mathematical educational studies (Klingenberg, 2012).

Low vision students are taught as those of their sighted peers. Handouts and notes could be provided to these students for teaching. These students use A3 or A4 enlargement prints for reading (Archambault, 2009). In some cases, adjustments or extra-large font is required for this purpose (Tanti et al. 2007). Second category totally blind students are not able to read these large print material. They need some assistance in reading and writing material. They need more attention than the low vision students. After all, both student required proper attention of the teacher during lesson and during exams as well. But unfortunately in our special school setting, there is no assistance

provided to these special needs students as they require. During the lesson, visually disabled children need more attention to cope with their need. If a student is low vision he requires large print material and totally blind student requires audio aids such as computer with talking software JAWS or audio recorder to listen and to note down the lecture. "Students must have specialized services, books and materials in appropriate media (including braille), as well as specialized equipment and technology to assure equal access to the core and specialized curricula, and to enable them to most effectively compete with their peers in school and ultimately in society" (AFB, 2015). Geometry is a subject area of Mathematics which has importance for the visually impaired children in special schools and it requires the interest of child and teacher's knowledge, skills and teaching methods to tackle a special need child. More precisely it requires content knowledge of subject area and using of instruments related to Geometry for a visually impaired. Content knowledge of teachers is essential for every subject including geometry, one of the most practical topics to daily life, yet, which is usually a neglected topic in the curriculum (Aslan-Tutak & Adams, 2015). Some of the general approaches to teaching geometry to the blind are:

1. Tactile as in Braille and other raised representations. Tactile features are used to read characters with fingers and it depends on the medium that is used (Prescher, Nadig, & Weber, 2010).
2. Audio aids that read equations to the student with tools to help in the reading process.
3. Tonal representations of graphs.
4. Haptic or forced feedback devices that represent shapes of objects and curves.

Haptic or touch sense has significant place in the life of a blind people because they are deprived of visual sense (Heller, McCarthy, & Clark, 2005; Van Scoy, Kawai, Darrah, & Rash, 2001). It is secondary source of a visually impaired even in sighted persons in life, sighted persons use it to grasp things and blind people utilize this sense for recognition of shape and space of things (Van Scoy et al., 2001). Learning Geometry is biggest obstacle for the visually impaired children. It needs highly haptic skills and read or write tactile graphs and geometric shapes. Visually impaired children's strongest haptic medium is Braille. (Christensen &

ApS, 2000) described that Braille code is important medium for visually impaired children but information technology has pivotal role for learning with best suitable way. Having access to the computer with special utilities for visually impaired children opens the door for learning Geometry and also other advance features for study. Reading and writing from print books is totally change from Braille versions to read and write (Karshmer & Bledsoe, 2002). (Mason, 2014) recommended that assistive technology is the best way to convey knowledge but teacher may be aware of these technologies. Researchers described that teaching aids and resources may be assistive for better learning of visually impaired children, textbooks, calculators, graphing and drawing aids and computers are some assistive aids that are helpful for teaching and learning of Geometry (Ngubane-Mokiwa, 2013).

Geometry is the development of spatial concept such as the concept of shape and size, perception of two and three dimensional shapes. Spatial sense is essential part of Geometry (Clements, 2004; Marsh, Golledge, & Battersby, 2007). A variety of methods teachers use for developing spatial concepts in Geometry (Blume, Galindo, & Walcott, 2007; N. J. Boakes, 2009). It is not impossible for the teacher to develop these spatial concepts, teacher can give extra time to teach these shape concepts. Vianna & Barbosa (2006) conducted a research on the activities of the students and concluded that there is no huge problem to develop the concepts of Geometrical figures, if teachers properly develop the concept of line and distance with the help of drawing different shapes on paper and also use suitable tools, then there is no way that a visually impaired student cannot learn Geometry. Bayram (2014) cited in his research that RNIB found out these challenges for visually impaired children first, visually impaired students have little or less observation than the sighted children, they miss knowledge that a sighted child can get from observation, second visually impaired children learn slow than sighted children, it is not because of ability, it is due to gain knowledge to use touch sense and sight is another blessing because of which they can see illustration of graphs, tables and geometric figures. Sighted children can also note down lectures and can see figures drawn in books but visually impaired children deprived all of these. Bayram, Corlu, Aydin, Ortaçtepe,

&Alapala(2015)suggested that during teaching graph teacher should create confidence and develop their own hands with teaching material for visually impaired children.Sahin&Yorek (2009) reported in their study that visually impaired students were comfortable in using Braille for notes taking during class, but they need more time for deeply understanding topic. They also pointed out that being visually impaired doesn't mean that they are not capable of doing work like sighted children. Whilst it is essential that students have a good cognition of geometrical facts, if they are to acquire their spatial thinking and geometrical intuition, a collection of approaches are advantageous, for example, some contents can be introduced informally, others developed deductively or found through exploration (Jones, 2002).

Sighted students use vision for drawing, but it remains difficult for visually impaired student. Klingenberg(2007) emphasis that: "On a perceptual level, the tactile checking of a drawing during its execution is far less efficient than the visual checking of the sighted". Spungin& Ferrell(2007) described in a paper that: "Instruction to develop listening skills is important to students with visual impairments as a foundation for aural learning and reading, as well as for mobility clues, social conversation, and interpretation of a variety of auditory signals received from the environment. Klingenberg(2012) observed that if the students are provided with suitable environment, appropriate listening guidance and proper objects recognition than there is no way that they cannot learn Geometry. Listening becomes particularly important in the secondary grades, when reading assignments increase dramatically in length". Sahin&Yorek(2009) reported that due to traditional classroom environment it has made more harder and problematic for the visually impaired children to understand the subject but it is not impossible that a visually impaired child had full environment and cannot aware about subject. It is a challenge for a teacher that how to develop Kinesthetic sense. They are not aware about that how listening skill can be developed about Geometry. If they want to develop these senses in students but due to non-availability of geometrical instruments, they become limited to teach Geometry. Nathan &Petrosino(2003) observed

about teacher's knowledge and pedagogical skills, he said that: "Teachers with high levels of subject matter knowledge also have high pedagogical content knowledge, not all teachers with high subject matter knowledge necessarily have high pedagogical content knowledge." Moreover, he said that "Expert teaching is a complex phenomenon comprised of expertise in multiple domains, including curriculum subject matter, student behavior and development and pedagogy. Kohanova (2010) viewed that students at secondary level do not have calculation problems but they may have other challenges like, knowledge about complete Braille notation of Geometry. Students are expected to learn Geometry. People who are well known about mathematics can know difficulties very well and the people are little known about mathematics assume that it technical subject that can be learned with little effort and those who are expert in mathematics can realize subject's technical notation would create insuperable barriers for blind persons but in fact Mathematics is a subject that blind persons can approach it with some effort and it is very easy for adopting blind people rather than other subjects (Jackson, 2002; Sierpinska, 2003). Colson, Egger, Heaston, Thompson, &Zwald(2004) conducted a survey of the current state of visually impaired students in elementary classes of Mathematics. Teachers were asked about the facilities they were provided, teaching tools for mathematics and other concerns. The results of this survey revealed that teachers confronted perpetual difficulties in providing materials and equipment for Geometry and support material for visually impaired students and hardly some students were involving in more advanced mathematics and concluded that it is critical that teachers of students with visual impairments have resources and supports to do their jobs effectively. One resource is the students' mathematics textbooks in braille. However, less than half the participants frequently or almost always used the students' textbooks as a model. Equipment use is crucial for Geometry achievement of visually impaired students during the lecture Students use different materials to have a deeper perceptive of Geometry, to appraise their own knowing, and seeking contiguous support when they need to. Most important material that visually impaired children may use are those from which they can take visual concept and/or voice

support. Bayram(2014) conducted an exploratory research to analyze the challenges of visually impaired children in learning Mathematics. He experienced that various teaching materials are necessary for better understanding of mathematics for visually impaired students. The most useful materials are those in which students can get voice support or visual component. Besides this, the way of teaching Geometry and teacher's behavior also matter with teaching of Geometry. Most beneficial instruments that are using for Mathematics are Braille code, JAWS(Job Access with Speech), Textbooks, audio recorder besides this assistive technology like CCTV cameras and other internet resources like audio lessons.

Visually challenged children are likely to learn mathematics achievement comparing with their non-disabled peers if they are well educated properly for their needs (Malasig & Zhang, 2016). Visually impaired students face many problems in daily life to learn. It is very hard to build geometrical concepts for students with visually impaired. One of the most difficult challenges has been teaching concepts involving three-dimensional objects. 3-D problems are found in all levels of mathematics (Susan, 2015). It comprises different shapes, lines and angles that overlaps and students become confuse to solve problems and to make diagrams. Sahin&Yorek (2009) indicated that it is not necessary that the visually impaired students are not capable of learning certain activities in the regular classroom setting. Blind students have full rights to gain knowledge and seek more about Geometry with their sighted peers. Every feature of mathematics can impart to the difficulties that visually impaired students confront in learning this subject. Some of which are the same for sighted people, but not to the same state (Ernest, 2007; Tanti, 2007). Visually impaired students learn in the same way as sighted students but some modifications and adaptations are required to teach them(Tanti, 2007). After adaptations and modifications, students can give better result than the sighted students. Geometry is an important area of Mathematics so it cannot be set aside (Barbosa, 2006). Students with visual impairment cannot develop cognitive structure and their visual perceptions. (Kumar, Ramasamy&Stefanich, 2001; Sahin&Yorek, 2009) reported that visually impaired students have cognitive abilities with same range as sighted students. Visually impaired

students are the learners who learn through tactile and kinesthetic sense so they require to touch to learn the content (Şahin&Yörek, 2009; Gozde., 2014).

Jones (2000) foundthat children with visual impairment face barriers in education particularly in the field of Mathematics. They are not able to get quality education. There are some issues in specials education schools related to teachers and students in teaching and learning mathematical and Geometrical concepts. Change in curriculum, non-availability of instructional material (Braille books, Audio aids, Tonal aids and Geometrical instructional material), Pedagogical skills (Teaching methods) and other issues with respect to the subject Geometry. Teachers are expected to teach geometry when they are likely to have done little geometry themselves since they were in elementary school, and possible little even then. To explore the current teaching learning environment and class room practices for students with visual impairment, the study was carried out with the following objectives:

OBJECTIVES OF THE STUDY

The specific objectives of this study were:

1. To explore the problems faced by visually impaired students in studying geometrical concepts.
2. To find out the problems, teachers face in teaching the geometrical concepts to the students with visually impaired students.
3. To analyze the current class room environment and practices during teaching of geometry to the students with visually impaired students.
- 4.

METHDOLOGY

The study was descriptive in its nature. Qualitative and quantitative paradigms were used to analyze responses of the respondents. Structured interviews and observational check list were developed to analyze challenges in teaching learning of mathematics and geometry faced by the teachers and visually impaired students at elementary level.

Population

Population of the study comprised of:

- i. Visually impaired students including totally blind and partially blind or low vision

students studying at elementary level in Bahawalpur.

- ii. Teachers teaching geometry/maths subject to visually impaired persons in Bahawalpur.
- iii. Parents of the visually impaired students in Bahawalpur.

Sample and Sampling Technique

Convenient sampling technique was used to get the data from the sample of observations of 15 classrooms visited twice. Observations of two periods of classes (duration: 30 minutes each) taught by the teachers and 20 parents of visually impaired students in Bahawalpur district of Punjab.

Research Instruments

Following tools were developed:

1. Geometry Classroom Observation Check List:

An observation list was developed to observe the classroom activities. It was developed to explore the teachers' and students' activities and behavior during the class. The list included the following categories:

- a) Physical Environment
- b) Teacher's Attitude
- c) Teaching Methodology
- d) Use of Equipment

2. Interview Guide

The interview was designed for the parents of the visually impaired students to explore the problems of their visually impaired children it consisted on 3 questions about the problems of visually impaired children.

Validation of the Instruments

Each tool was validated on the opinions of experts and seniors, focusing on objectives defined for the study. The committee comprising Senior Special

Education Teachers(S.S.E.T), Junior Special Education Teacher (J.S.E.T), Headmasters/Headmistress of special education schools and centers, DEO's (District Education Officers), visually impaired students at elementary level and parents of visually impaired students, evaluated the items of observation checklist and semi-structured interview questions content and construct validity. The committee suggested several alterations in the wording of some items. The changes suggested by the committee were incorporated into the observation checklist.

Data collection and Data Analysis

Observational check list was administered in the classroom to observe the teacher's knowledge and students' activities during class. For observational check list researcher visited the 15 classrooms during the period of mathematics. Duration of each observation was 30 minutes and data was collected from each class in a school twice to observe the activities of teachers and students.

For interviews, researcher got the contact numbers of 20 randomly selected parents and took their interviews. In some areas the researcher personally met the parents to find out the problems of their children. They were explained the processes on Skype, phone and meetings whichever the mode was convenient and took their interviews.

On the basis of the categorized and coded quantitative data computed using SPSS 16, following statistics were used for the analysis of data:

- Frequency and percentage of the geometry classroom observation list to quantify observations.
- Qualitative analysis of interview of the parents

RESULTS

I: ANALYSIS OF OBSERVATIONAL DATA

Table 1

Teacher’s Demonstration with Different needs of Students

Statement	Response Category	Frequency	Percent
Teacher is demonstrating the lesson where different special needs students made sit together in a class(all or some categories VIC/HIC/PHC/MRC)	No	10	33.3
	Yes	20	66.7

Table 1 indicates that 66.7 percent of teachers were demonstrating the lesson where different special needs students made sit together in a class, whereas 33.3 percent teachers were demonstrating the lesson in the class where there were only visually impaired students.

Table 2

General Atmosphere

Statement	Response Category	Frequency	Percent
General atmosphere of the class is pleasant.	No	3	10
	Yes	27	90

Table 2 indicates that 90 percent of the general atmosphere was pleasant and 10 percent of general atmosphere was not pleasant.

Table 3

Arrangement of Light

Statement	Response Category	Frequency	Percent
Light is properly arranged (windows and doors)	No	3	10
	Yes	27	90

Table 3 indicates that in 90 percent of the school’s light was properly arranged and 10 percent of the schools had not proper lightening.

Table 4

Class Decoration

Statement	Response Category	Frequency	Percent
Class is decorated with charts and other materials.	No	16	53.3
	Yes	14	46.7

Table 4. indicates that 53.3 percent of the classes were not even decorated with charts and other material and 46.7 percent of the classes were not even decorated with charts and other material.

Table 5

Seating Arrangement

Statement	Response Category	Frequency	Percent
Seating arrangements of the classroom encourage Student-teacher interaction.	No	16	53.3
	Yes	14	46.7

Table 5 indicates that 53.3 percent of seating arrangement was not encouraging student- teacher interaction and 46.7 percent of seating arrangement was encouraging student- teacher interaction.

Table 6 Teacher’s Lesson Plan

Statement	Response Category	Frequency	Percent
Teacher has an organized lesson plan	No	20	66.7
	Yes	10	33.3

Table 6 indicates that 66.7 percent of teachers were not even demonstrating the lesson with lesson plan whereas 33.3 percent teachers prepared a lesson plan and were teaching according to it.

Table 7

Teacher’s Action to introduce concept

Statement	Response Category	Frequency	Percent
Teacher uses an exploratory activity to introduce the concept and use lecture method.	No	14	46.7
	Yes	16	53.3

Table 7 indicates that 53.3 percent of teachers were using exploratory activity to introduce the topic and 46.7 percent were not even using exploratory method.

Table 8

Students Involvement in Teacher’s Demonstration

Statement	Response Category	Frequency	Percent
Teacher makes small group of students and demonstrates lesson in individual groups.	No	3	10
	Yes	2	90

Table 8 indicates that 90 percent of teachers were demonstrating the lesson in a small group of students and 10 percent were not even demonstrating the lesson in a small group of students in individual groups.

Table 9

Questions about Geometry Topic

Statement	Response Category	Frequency	Percent
Teacher allow students to raise questions/queries on the topics.	No	23	76.7
	Yes	7	23.3

Table 9 indicates that 76.7 percent of the teachers did not allow students to raise questions on the topic. And 23.3 teachers allowed students to raise questions on the topic.

Table 10

Teacher’s Movement to Engage Students

Statement	Response Category	Frequency	Percent
Teacher moves around the room to keep everyone engaged and on track.	No	21	70
	Ye	9	30

Table 10 indicates that 70 percent of teachers were not moving around the room to keep everyone engage in work and only 30 percent teachers moved around the class to keep every student engaged and keep on track.

Table 11
 Students Problems after Lesson

Statement	Response Category	Frequency	Percent
After delivering the lesson, teacher attends students' problems independently.	No	14	46.7
	Yes	16	53.3

Table 11 indicates that 53.3 percent of teachers were attending students' problems after delivering the lesson and only 46.7 percent of teachers were not attending students problems after delivering the lesson.

Table 12
 Encouragement of Students to Explain process

Statement	Response Category	Frequency	Percent
Students are encouraged to explain the process used to reach a solution.	No	6	20
	Yes	24	80

Table 12 indicates that 80 percent of students were encouraged by the teachers to explain the process to reach a solution and 20 percent students were not encouraged by the teachers to explain the Geometry process.

Table 13
 Encouragement of Students to Explore Solution

Statement	Response Category	Frequency	Percent
Students are encouraged to explore solutions on their own.	No	6	20
	Yes	24	80

Table 13 indicates that 80 percent of students were encouraged by the teachers to explore solutions on their own and 20 percent students were not encouraged by the teachers to explore the Geometry process their own.

Table 14
 Students' Individual Problems

Statement	Response Category	Frequency	Percent
Teacher attends students' problems individually.	No	16	53.3
	Yes	14	46.7

Table 14 indicates that 53.3 percent of teachers were not even attending students' problems individually and 46.7 percent of teachers were attending students' problems individually.

Table 15
 Availability of assistant Teacher

Statement	Response Category	Frequency	Percent
Assistant teacher is present in the class	No	27	90
	Yes	3	10

Table 15 indicates that about 90 percent of the teachers not even had an assistant teacher in the class and 10 percent of the teachers had an assistant teacher in the class.

Table 16
 Use of Appropriate Tools

Statement	Response Category	Frequency	Percent
Students select tools that are appropriate.	No	20	66.7
	Yes	10	33.3

Table 16 indicates that about 66.7 percent of students were not even selecting appropriate tools and 33.3 percent students were selecting appropriate Geometry tools.

Table 17
 Use of Tactile Material for teaching Geometry

Statement	Response Category	Frequency	Percent
Teacher is using tactile material for teaching Geometry to VIC.	No	21	70
	Yes	9	30

Table 17 indicates that 70 percent of teachers were not even using tactile material for teaching Geometry and 30 percent teachers were using tactile material for teaching Geometry.

Table 18
 Use of Braille Slate for Geometry

Statement	Response Category	Frequency	Percent
Students are using Braille slate for Geometry.	No	4	13.3
	Yes	26	86.7

Table 18 indicates that 86.7 percent of students were using braille slate for Geometry lessons and 13.3 percent students were not using braille slate for Geometry lessons.

Table 19
 Use of Calculators

Statement	Response Category	Frequency	Percent
Students are using calculators	No	21	70
	Yes	9	30

Table 19 indicates that 70 percent of students were not even using calculators and 30 percent students were using calculators for Geometry task.

Table 20
 Use of Embossed Charts and Thread

Statement	Response Category	Frequency	Percent
Students are using embossed charts and thread for making graphs.	No	21	70
	Yes	9	30

Table 20 indicates that 70 percent of students were not even using embossed charts and thread for making graphs and 30 percent students were using embossed charts and thread for making graphs in Geometry task.

II: ANALYSIS OF PARENTS INTERVIEW

Semi structured interview questions of the parents was developed for qualitative research and 20 parents of visually impaired students were randomly selected as a sample of research. They

were interviewed about the challenges of studying their visually impaired children. The responses obtained from parents against each question is provided in the following table.

Table 21
 Analysis of Parents Interview

Item No.	Question's Theme	Summary of Parental Responses
1.	Information about subjects studying their child	<ul style="list-style-type: none"> Out of 20, 11 of the parents of visually children only know English, Urdu, Math and Islamiyat. 5 parents were totally illiterate and did not know what their child is studying even know about the Braille Only 4 parents had knowledge about the Braille books and the subjects their children were studying.

2.	Challenges to educate their visually impaired child	<ul style="list-style-type: none"> • Geometry instruments are not easily available. • Most of the Geometry material are expensive. • They are not even known about the use of these instruments without guidelines • They teach their children at home but he/she is not interested in learning • They guide their child with print books but braille books are too old to cover the syllabus. • They cannot help their child in studies, they are either illiterate or educated, and education is not enough. • None of them knew Braille. • Pick and drop at school is an issue. • Conveyance provide by school is not on the regular basis. • Spectacles are not easily available • Hand held magnifiers are not easily available.
3.	What do you perceive or expect from your visually impaired child after he/she completes the studies	<p>All parents said that their children will get suitable job will become independent in the society.</p> <p>Only few parents said about their female children that they will not give permission to do job them just want that their children become aware about basic education.</p>

DISCUSSION

Successful Geometry teaching depends on the teacher’s skills, knowledge and awareness about latest advancement in subject. Unless the teacher is well trained, have expertise of teaching this specific subject to children with visual impairment, would not be able to cope with job. It is necessary to analyze the challenges teacher face in teaching Geometry, so that while developing curriculum and formulating policies, their issues can be addressed. This study has explored the existing methodologies teachers are using to teaching Geometry. The circumstances in which they work and the challenges they face.

On the basis of the analysis of data, it was found that in some classes students of different special needs were made sit together in a class. It was difficult for the teachers to cope with diversity of special needs in a class. This was one reason teachers cannot deliver geometric concepts to visually impaired students appropriately. However, general atmosphere of the classes was pleasant and well light. However only a few classes were decorated with charts and other material. The seating arrangements of the classrooms do not encourage frequent student-teacher interaction. Most of the teachers were not used to prepare lesson plans. Most of the teachers were delivering

lessons through lecture method to introduce the topics. Most of the teachers did not make small groups of students to demonstrate lesson and the whole class was getting the demonstration together. Due to this individual differences were not addressed by the teacher. Moreover, most of the teachers do not allow students to raise questions /queries. Most of the teachers do not move around the class to interact with students. They just deliver the lesson staying in front of the students. Students have to rely on their sense of hearing for the introduction of the topics and other details. None of the teachers / classes had assistant teacher.

It was encouraging to see that most of the teachers were attending students’ problems independently after delivering the lesson and most of the students were encouraged by the teachers to explore process and solutions their own. Students were not provided with Braille books, tactile material and necessary equipment for learning the concepts of Geometry.

The findings of parents’ interviews were:

- Parents of the visually impaired children were well aware about the subjects which were being studied by their visually impaired children.
- The Parents were aware about the material their child needs to study Geometry. But
 - a. They could not afford to buy.

b. Embossed material is not easily available in the market.

- Parents cannot help their VIC in studies because they did not know the use of Braille. Some parents could manage to get the services of their school teacher for tuition. But most were deprived of it.

CONCLUSIONS

Personal observations show that in special education institutions in Bahawalpur teachers do not teach Geometry with proper instructional material and do not use geometry instruments. Different challenges were faced by teachers and visually impaired students for teaching learning of Geometry at elementary level. Students were not facilitated by assistive technology like computers, audio aids, recording devices or any other equipment that cope with the need of students or that fulfill the requirements of the subjects. Only Braille books were provided for reading and braille frame, braille papers and charts for writing. Geometry is a subject that is more practical than reading and writing. So it requires more practical work. And blind children require equipment to do practical work.

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