

## **Learning Modalities of Elementary Grade Students with Hearing Impairment**

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### **Abstract**

*The contemporary study was descriptive in nature and by method it was exploratory. It is primarily conducted to unfold diverse learning modalities of students with hearing impairment (SHI) at elementary grades level. The objectives of the study were to investigate (a) diverse learning modalities of the hearing-impaired students (b) learning modalities of hearing-impaired students from different socioeconomic status (c) learning modalities and difference in their age group (d) learning modalities and difference in their hearing loss (e) school wise difference in learning styles (f) grade-wise difference among learning modalities. For qualitative data, twelve teachers and administrators were interviewed in the first phase and in the second phase, quantitative data was collected through a questionnaire from 220 students with hearing impairment, enrolled in elementary grades in different special education schools of Lahore. Researchers collected data through convenient sampling. 220 students (male & female) were selected as a sample from seven schools of hearing-impaired children. The research tool were semi-structured interviews and a five-level Likert scale, both tools were constructed by the researchers that covered the following learning modalities, visual, aural, reading/writing & kinesthetic /tactile. For data collection from students, the researchers also took help from sign language interpreters for effective results. The researchers started this research with the vision that the results shall significantly help the academic instructors not only at the school level but also at higher education. Cronbach Alpha of the tool was .873. One Way ANOVA was used to find out the mean difference. The major finding was that visual and kinesthetic/tactile learning modalities for executing teaching and learning processes were practiced in all schools for the teaching and learning processes and socioeconomic status was not reflecting any key concern in determining the learning modalities.*

**Keywords:** Learning Modalities, Students with Hearing Impairment, Elementary Level, Diverse

### **Introduction**

Learning is a natural multidimensional process of every individual. That initiates from observations imitations and acquisition of knowledge. Then the acquired knowledge transforms in maturity of learning. The personal experiences of the learner play important role in leading new dimensions of learning and maturity. The notion that each individual is carrying his/her way to look deep into the situations, learn through maintaining focus, develop understanding and relate the previously achieved milestone into a new situation. Accomplishments in such processes keep the learners on track with great motivation and confidence. It is the most efficient way for anyone to express and share his preferences for learning and response. The way one perceives and interacts with life experiences is the way of learning.

Experience of learning of one person may vary with other person's learning experience in the same situation. For the enhancement or depreciation of learning, contextual conditions are imperative. Context plays an important role in this regard (Din, M: 2001). This interaction of experiences and surroundings carve out the way for future learning. If one student prefers to learn through lectures or auditory experiences, the other may like to learn through hands-on experiences. Such choices make one person's style which is called learning modality. Sometimes learning is intentional and sometimes

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unintentional. Teachers should have the expertise to analyze and locate the learning needs and modalities of each learner and develop their plan of action in teaching for maintaining the individual progress of each learner.

According to the research findings of Felder, R., Brent, R. (2005) learning modality or style is distinguished through relatively stable indicators. Cognitive, affective, and psychological behaviors serve to indicate how learners observe, interrelate, and respond to the learning surroundings. Some students learn better with write-ups and abstraction, others feel comfortable with facts and observations, some prefer introspection some learn under active learning conditions, some prefer verbal explanation and others prefer visual presentation. Any of the learning styles is neither preferable nor inferior to another; it is simply different with different qualities, weaknesses, and strengths.

As stated by Kasoma (2014) those students who are with diversified learning needs, either exceptionally remarkable or at below-average level, should not be considered under handicapping conditions. The professionals must consider that these kids are with distinct disability characteristics. Whereas, according to the researcher the kids who are with handicapping conditions are just the disadvantaged who are facing problems to be socially included in their respective societies. The slogans and phrases used to represent our young generation as a productive and future generation, are not keys to the solution rather we focus on the quality of academic services to meet the global challenges by including all children as future productive members of the society. Once the collaborative and conscious efforts of the professionals start to bring all children in one stream without discrimination, and with an understanding of individual differences, the social challenges would be solved. Consequently, our deliberated efforts to uplift the quality of teaching and learning approaches will produce a high quality of learners and finally the productive social agents.

Marc Marschark (2015) reported that the pupils with hearing disabilities are part of our society and must be taken as diverse performers. He also stressed that every instructor either at beginner level or routine experienced teacher should realize that distinct learning modalities and personality characteristics of individual such as pupils who are at different levels of hearing loss are like us; it is just a matter of distribution determined by Nature about individual diversity in all human beings. Furthermore, he shared that teaching children who have assortment within their disability which is followed by the levels of loss, indeed a great challenge. Additionally, that challenge is not only for the teachers but also the students who have different levels of loss struggle more than general education learners' circumstances. Nonetheless of their ages and learning contexts, teachers should focus on their learning modalities. He also compared that the learners who have the problem of hearing loss but have some capacity of hearing can perform almost at the capacity of those peers who have no loss. In this regard the teachers' professional strength and instructional approach count.

Piaget's speculations relate learning to developmental stages. According to him and his followers learning happens orderly. Everyone can learn according to his/her capacity. So, the opportunities provided should be different and according to the educational level of a learner (Huitt, W., & Hummel, J.: 2003). Effective learning can only happen if the learning modalities are kept in mind while planning instruction for effective and efficient execution. Unfortunately, in Pakistan's education programs this area has not get importance yet. Now it is needed to explore learning modalities of students for better educational and transitional outcomes. Similar critical problems in learning conditions are also faced by the students with hearing impairment (SHI). Here in Pakistan, the academic experts do not go the extra mile for the investigation of SHIs' learning strengths and issues. The key demographic variables of SHI like, type of hearing loss, gender, socioeconomic status, age, cultural factors, and type of education are also important components in determining the learning preferences of students. The Gardner theory on multiple intelligences gives new dimensions to teachers in teaching diverse students in their preferred learning styles. Teachers should plan more student-centered activities and engage students in their preferred learning style-based instruction for effective acquisition of learning (Willingham, 2005). Similarly, Kasoma, (2014) concluded that if we see the relationship of MI theory and learning style we come to know;

- No two people have the same intellectual style
- No two people have identical learning styles.
- No two people have the same directional level/capacity to learn and reflect.

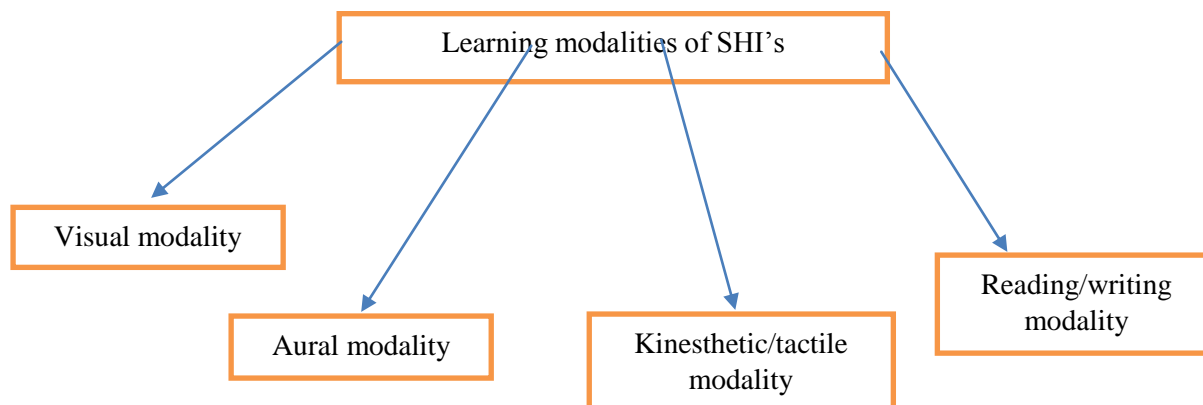
- Learning styles could be modified through training and learning experiences. It is not fixed.
- Learning styles are different in intensity, quantity, and quality.

Students with deafness and hard-of-hearing conditions possess several learning preferences (different from each other), intensities of their aptitude, and audible ranges. SHI also observe and learn through different manners; some may lip-read, others can use a hearing aid, use sign language or learn through finger spellings. Teacher should be familiar with certain common considerations, for different communicating ways e.g. (a), Oral and aural, (b) auditory, (c) verbal, (d) cued speech, (e) total communication, and (f) bi-lingual way.

According to Trigwell Kierkegaard (1999) 'instruction begins when a teacher takes initiative to learn from learners by placing themselves at their place to understand what the student learns and the ways the student understand it.' It is a natural distribution of characteristics that every individual has diverse intensities for getting inspirational experiences and enthusiasm. Moreover, distinct criteria following learner's learning requirements, teaching and learning approaches, dissimilar reactions to particular surroundings of class room and instructional practices, should be of keen concern for a teacher. Felder, R. & Brent, R. (2005) stated that the instructor can better meet the diverse learning needs of all students if he thoroughly understands the diversity. An instructional goal for a teacher should be to equip students with associated skills with every learning style category.

The study of the present situation focuses on performances of students with hearing impairment in academic achievements, low motivation, and feeble participation in the classroom which is closely associated with their learning modalities. Based on the above discussion, the researchers were interested in identifying different and preferred learning modalities of students with hearing impairment at the elementary level in Lahore. The objectives of the study were to discover different and preferred learning modalities of the students with hearing impairment (SHI) by finding out the mean difference among (a) learning modalities of students with hearing impairment (SHI) concerning socio-economic status (b) learning modalities of students with hearing impairment (SHI) and the difference in their age group (c) learning modalities of students with hearing impairment (SHI) and difference in their hearing loss (d) learning modalities of students with hearing impairment (SHI) and the difference in their schools (e) learning modalities of students with hearing impairment (SHI) and the difference in their grades among elementary level grades in schools for hearing impairment from Lahore.

In Pakistan, there is a dire need to training the professional educator in discovering the requirements and modalities of learning not only for the students without any disability but also for the students with any disability. In the case of SHIs' due to lack of professional competency and communication gap, this area is lagging in the education sector. Similar loiter is seen in special education where teachers do not bother to dig out and investigate the needs of the learners because they are with the predetermined thinking that these kids (SHIs') do not engage in proper formal learning up to the knowledge level and the educators reduce the curriculum for their comfort and ease. SHIs' are not provided with the opportunity for getting engaged in high-level learning competencies and experiences. At the school level, the academic professionals think that due to hearing loss these kids are also unable to learn higher learning competency skills. Consequently, the syllabus, teaching methods, supporting aids, all are kept at the same lower level as the abilities and learning are underestimated for those students. To the transitional planning because if the SHIs' are assessed against learning preferences their future can be more directional and better transition can be planned. The SHI can develop a realistic approach towards their potentials and can deal with problem situations and predict and face novel challenges. Teachers get the right direction to teach, assess and engage their students in remedial programs at schools and also guide the parents for doing same practices with their kids at home, to get long-term benefits. But in actual it doesn't happen in Pakistani public and private schools, consequently, it becomes the reason that the quality of basic education is poor and the product is not fulfilling the criteria for higher education. The SHI's face much difficulty in self-writing and creative-writing activities. At the school level for developing reading skills among SHI's prerequisites (Pre-reading skills) are also in limited and rare practice or not in practice. The researchers as teachers were also evident for higher-level reading issues from the text while they are teaching SHI's in the classroom at a higher education level. The following figure is showcasing the distribution of learning modalities into each category (Figure: 1.1);



**Fig. 1.1**

The researchers also followed the figure for the establishment of statements under each category for the construction of the tool for their research.

**Methodology**

**Research design**

A mixed research design was used for this study. The researchers first review the literature and generated four themes for developing an interview guide. The themes of the interview guide were concerning visual, aural, reading/writing & kinesthetic /tactile learning modalities. Each theme is divided into subtheme and related questions. After developing an interview guide, it was validated by three experts from the University of Management and technology and two experts from the University of the Punjab. After validation, an interview guide was evaluated through pilot testing. Some questions were found overlapped so the researchers excluded those questions statements from the interview guide. The purposive sampling technique was used for mixed-method research. Addresses and contacts of special schools were found online for contact as due to COVID 19 schools were not open daily and the staff was also not available on site. So, it was necessary to take an appointment through email and phone calls. The sample size for qualitative research was 12 school teachers and principals. After contacting them, the purpose of the study was shared with them and it was also told that they were ethically allowed to quit interview any time if they feel uncomfortable. They were also ensured that their names will not be revealed anywhere in that research. After collecting all interviews, researchers then transcribe all the interview responses into written form not only for data interpretation but also for the development of the questionnaire with the help of participants' answers. The questionnaire was already validated because all statements were structured through current authentic resources.

In the quantitative part, a research tool was used which was constructed by the researchers based on qualitative responses and that focused on visual, aural, reading/writing & kinesthetic /tactile learning modalities (fig.1.1). For taking expert opinion on the structure of the statement, it was shared with five experts from the field. The criteria of their selection were their teaching experience in relevant filed for 5years and above and must be masters in special needs education. The tool measured the responses against five options on a scale e.g., strongly agree, agree, neutral, disagree, and strongly disagree.

A pilot test was applied on 44 pupils and it was observed that the reliability count was 0.873. For the phase of pilot testing, the researchers engaged a sign language interpreter for two weeks. Out of 44 SHIs' only four SHIs' were inquired against 37 statements, each day to maintain the quality of response.

**Population of study**

All students of learning Modalities of elementary grade of different public and private schools for SHIs' in Lahore were the population of the study.

**Sample**

After the protocol of reliability check sample was conveniently selected from different public and private schools for SHIs' in Lahore. The reason to opt for convenient sampling was that due to covid not all students were attending school regularly.

**Data analysis**

The themes for qualitative analysis are shared in the figure below (Fig. 1.2). Concerning the below-mentioned themes and related questions, the researchers interpreted, analyzed, and summarized the major findings. For the quantitative analysis, the tool was evaluated for its reliability and the Cronbach Alpha of the tool was .873. One Way ANOVA was used to find out the mean difference. All data was analyzed against the demographic components of SHIs', schools, gender, grades, hearing loss, age, socioeconomic status, were included.

**Qualitative theme table 1.1**

Themes	Questions
Visual modality	1- How visual modality is beneficial for SHI's? 2- Which activities you choose for visual modality? 3- Do you face any challenges to teach with the help of visual modality? 4- What do you prefer for new teaching styles and methods while teaching SHI's? 5- Do you experience that visual modality is helpful for your students to enhance study skills?
Aural modality	6- Do you experience that aural modality help SHI's to improve their sensory experiences? 7- Which activities you choose for aural modality? 8- Can you elaborate on the aural learning modalities? 9- Do you experience that this modality is helpful for SHI's in academic activities? 10- Do you face any problems or challenges while using this modality in the classroom?
Kinesthetic/tactile modality	11- How Kinesthetic/tactile modalities beneficial for SHI's? 12- Do SHI's face problems or struggle for learning Kinesthetic/tactile modality? 13- Which learning activities you use during teaching through Kinesthetic/tactile modality? 14- Is this modality is difficult as compare to other modalities?
Reading/writing modality	1- Which activities you choose for reading/writing modality? 2- How reading/writing modality is helpful for SHI's? 3- How do you build reading/writing skills in SHI's? 4- Any unique teaching style or technique you use to incorporate in classrooms for SHI's?

**Interpretation table 1.2**

Respondents	Responses
Visual modality Respondents 1,2,3,4,5,7,8,9,12	Seventy-five percent (75%) of respondents were practicing visual modality during most of the academic hours but they used to adopt this modality for knowledge level skills. They were shared that they showed the written text to their students and the students revise the text until they learn it by heart. In other words, teachers practiced visual modality for rote memory and rarely experience it to incorporate with other learning ways.
Visual modality Respondents 6,10,11	Only twenty-five percent (25%) respondents were revealed that they used to incorporate different strategies along with visual modality while teaching different subjects
Aural modality Respondents 10,11	Just two respondents, only 16% from the same school were told that they take benefit from aural mode not only for developing speech and language but also for the improvement of reading skills. During aural mode, they manage to use cued speech and also follow the procedure of cued speech for teaching new vocabulary with comprehension.
Aural modality Respondents 1,2,3,4,5,6,7,8,9,12	Most of the respondents shared that they use aural mode not up till primary grades. They were also reluctant due to large groups in one classroom and also consider the listening ability of SHI's underestimated. Teachers also said that aural mode can't help much because SHI's have hearing loss and if they are unable to listen properly consequently, they are unable to speak or perform any verbal activity.
Kinesthetic/tactile modality	All respondents were in practice to follow Kinesthetic/tactile modality for enhancing self-grooming skills and confidence among their learners while engaging them in sports activities. However, the SHI's enrolled in those schools

were performing at a distinguished level among others at the provincial level.

Reading/writing  
modality  
Respondents

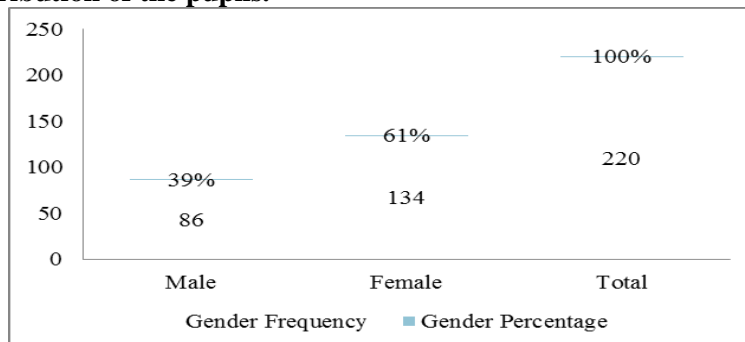
The ratio of respondents was the same as was on visual modality. The teachers used to engage their students in learning by seeing the limited portion of the content and consequently the students learn it by heart. At the time of exams/evaluation, SHI's are just able to reproduce/rewrite what they have seen. Teachers think that text comprehension and using vocabulary in contextual meaning is near to impossible for these students that's why they make it "easy to learn/reproduce" for them instead of focusing on comprehension. One of the major excuses of the teachers was that due to hearing loss comprehension and contextual meanings of the words were not possible to teach. Even they communicate the same statement to the parents and ask them to engage their kids with hearing loss by other means.

**Quantitative analysis**

**School wise sample distribution**

Schools	Frequency	Percent
Valid		
Govt School for Deaf Boys Gulberg II Lhr.	38	17.3
National Education Center Lhr.	34	15.5
Govt.Deaf & Defective Hearing Model High School Lhr.	28	12.7
Govt. Central High School for Deaf Lhr	49	22.3
Inayat Foundation Lhr	9	4.1
Hamza Foundation Lhr	36	16.4
LSLS Lhr	25	11.4
<b>Total</b>	<b>219</b>	<b>99.5</b>
Missing	1	.5
<b>Total</b>	<b>220</b>	<b>100%</b>

**Gender-wise Distribution of the pupils.**



Gender wise distribution of students

**Socio-Economic Status of the pupils**

Socio Economic Status	Frequency	Percent
High	1	0%
Lower Middle	34	15%
Middle	109	50%
Poor	75	34%
<b>Total</b>	<b>220</b>	<b>100%</b>

Socio-Economic wise Distribution of Students

**Grade wise Distribution of Students**

Grade	Frequency	%
<b>4</b>	<b>5</b>	<b>2%</b>
<b>5</b>	<b>3</b>	<b>1%</b>
<b>6</b>	<b>71</b>	<b>32%</b>
<b>7</b>	<b>64</b>	<b>29%</b>
<b>8</b>	<b>76</b>	<b>35%</b>
<b>9</b>	<b>1</b>	<b>0%</b>
<b>Total</b>	<b>220</b>	<b>100%</b>

**Hearing Loss wise Distribution of Students**

Type of Hearing Loss	Frequency	
Missing	38	17%
Deaf	150	68%
Hard of Hearing	32	15%
<b>Total</b>	<b>220</b>	<b>100%</b>

**Cronbach's alpha value shows the Reliability statistics of the tool**

Cronbach's Alpha	N of Items
.873	44

**ANOVA test between Visual learning and Age**

		Sum of Squares	df	Mean Square	F	Sig.
Age data groups * Visual learning	Between Groups (Combined)	59289.43	4	14822.36	1.672	0.157
	Within Groups	1905447	215	8862.544		
	Total	1964736	219			

One way ANOVA was used and it was found that there was no significant difference between visual learning and age.

**ANOVA test between Visual learning and Grade**

		Sum of Squares	df	Mean Square	F	Sig.
Grade * Visual learning	Between Groups (Combined)	9.751	4	2.438	2.656	.034
	Within Groups	197.358	215	.918		
	Total	207.109	219			

One way ANOVA was used and it was found that there was no significant difference between visual learning and grade.

**ANOVA test between Visual learning and School**

		Sum of Squares	df	Mean Square	F	Sig.
School * Visual learning	Between Groups (Combined)	100.401	4	25.100	6.973	.000
	Within Groups	770.284	214	3.599		
	Total	870.685	218			

One way ANOVA was used and it was found that there was a significant difference between visual learning and school.

**ANOVA test between Visual learning and Socio-Economic Status**

		Sum of Squares	df	Mean Square	F	Sig.
Socio-Economic Status * Visual learning	Between Groups (Combined)	.855	4	.214	1.400	.809
	Within Groups	113.865	213	.535		
	Total	114.720	217			

One way ANOVA was used and it was found that there was no significant difference between visual learning style and Socio-Economic Status.

**ANOVA test between Visual Modality and Type of Hearing Loss**

		Sum of Squares	df	Mean Square	F	Sig.
Type of Hearing Loss * Visual learning	Between Groups (Combined)	1.411	4	.353	.647	.630
	Within Groups	117.298	215	.546		
	Total					

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<b>Total</b>	118.709	219
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One way ANOVA was used and it was found that there was no significant difference between visual learning and type of hearing loss.

**ANOVA test between auditory learning and Age**

			Sum of Squares	df	Mean Square	F	Sig.
<b>Age data groups</b> <b>Auditory learning</b>	<b>Between Groups</b>	<b>(Combined)</b>	57280.817	5	11456.163	1.315	0.259
	<b>Within Groups</b>		1864399.815	214	8712.149		
	<b>Total</b>		1921680.632	219			

One way ANOVA was used and it was found that there was no significant difference between auditory learning and age.

**ANOVA test between auditory learning and Grade**

			Sum of Squares	df	Mean Square	F	Sig.
<b>Grade * Auditory learning</b>	<b>Between Groups</b>	<b>(Combined)</b>	7.076	5	1.415	1.514	.187
	<b>Within Groups</b>		200.033	214	.935		
	<b>Total</b>		207.109	219			

One way ANOVA was used and it was found that that there was no significant difference between auditory learning and grade.

**ANOVA test between auditory learning and School**

			Sum of Squares	df	Mean Square	F	Sig.
<b>School * Auditory learning</b>	<b>Between Groups</b>	<b>(Combined)</b>	11.978	5	2.396	.594	.704
	<b>Within Groups</b>		858.707	213	4.031		
	<b>Total</b>		870.685	218			

One way ANOVA was used and it was found that there was no significant difference in school-wise auditory learning.

**ANOVA test between auditory learning and Socio-Economic Status**

			Sum of Squares	df	Mean Square	F	Sig.
<b>Socio-Economic Status * Auditory learning</b>	<b>Between Groups</b>	<b>(Combined)</b>	1.984	5	.397	3.746	.590
	<b>Within Groups</b>		112.736	212	.532		
	<b>Total</b>		114.720	217			

One way ANOVA was used and it was found that there was an insignificant difference between auditory learning and socioeconomic status.

**ANOVA test between auditory learning and Type of Hearing Loss**

			Sum of Squares	df	Mean Square	F	Sig.
<b>Type of Hearing Loss * Auditory learning style</b>	<b>Between Groups</b>	<b>(Combined)</b>	7.738	5	1.548	2.984	.013
	<b>Within Groups</b>		110.971	214	.519		
	<b>Total</b>		118.709	219			

One way ANOVA was used and it was found that there was no significant difference between auditory learning and type of hearing loss.



**ANOVA test between Kinesthetic/Tactile learning and Age**

			Sum of Squares	df	Mean Square	F	Sig.
<b>Age data groups * Kinesthetic/Tactile learning</b>	<b>Between Groups</b>	<b>(Combined)</b>	45759.6	4	11439.9	1.311	0.267
	<b>Within Groups</b>		1875921.031	215	8725.214		
	<b>Total</b>		1921680.632	219			

One way ANOVA was used and it was found that there was no significant difference between kinesthetic/tactile learning and age.

**ANOVA test between Kinesthetic/Tactile learning and Grade**

			Sum of Squares	df	Mean Square	F	Sig.
<b>Grade Kinesthetic/Tactile learning</b>	<b>Between Groups</b>	<b>(Combined)</b>	4.303	4	1.076	1.14	0.338
	<b>Within Groups</b>		202.806	215	0.943		
	<b>Total</b>		207.109	219			

One way ANOVA was used and it was found that there was no significant difference between kinesthetic/tactile learning and grade.

**ANOVA test between Kinesthetic/Tactile learning and School**

			Sum of Squares	df	Mean Square	F	Sig.
<b>School Kinesthetic/Tactile learning</b>	<b>Between Groups</b>	<b>(Combined)</b>	24.771	4	6.193	6.567	.000
	<b>Within Groups</b>		845.914	214	3.953		
	<b>Total</b>		870.685	218			

One way ANOVA was used and it was found that there was a significant difference between kinesthetic/tactile learning style and school.

**ANOVA test between Kinesthetic/Tactile learning and Socio-Economic Status**

			Sum of Squares	df	Mean Square	F	Sig.
<b>Socio-Economic Status * Kinesthetic/Tactile learning</b>	<b>Between Groups</b>	<b>(Combined)</b>	2.433	4	0.608	5.154	0.00
	<b>Within Groups</b>		112.287	213	0.527		
	<b>Total</b>		114.72	217			

One way ANOVA was used and it was found that there was a significant difference between kinesthetic/tactile learning modalities and socioeconomic status.

**ANOVA test between Kinesthetic/Tactile learning and type of hearing loss**

			Sum of Squares	df	Mean Square	F	Sig.
<b>Type of Hearing Loss * Kinesthetic/Tactile learning</b>	<b>Between Groups</b>	<b>(Combined)</b>	4.831	4	1.208	2.28	0.062
	<b>Within Groups</b>		113.878	215	0.53		
	<b>Total</b>		118.709	219			

One way ANOVA was used to determine significant difference between kinesthetic/tactile learning and type of hearing loss and there was found no significant difference between them.

**ANOVA test between learning through reading and writing and Age**

				Sum of Squares	df	Mean Square	F	Sig.
<b>Age groups * Reading and Writing learning</b>	<b>Between Groups</b>	<b>(Combined)</b>		45759.6	4	11439.9	1.311	0.267
	<b>Within Groups</b>			1875921.031	215	8725.214		
	<b>Total</b>			1921680.632	219			

One way ANOVA was used to determine significant difference between learning through reading and writing and age and there was no significant difference between them.

**ANOVA test between learning through reading and writing and Grade**

				Sum of Squares	df	Mean Square	F	Sig.
<b>Grade * Reading and Writing learning</b>	<b>Between Groups</b>	<b>(Combined)</b>		9.151	5	1.830	1.979	.083
	<b>Within Groups</b>			197.958	214	.925		
	<b>Total</b>			207.109	219			

One-way ANOVA was used to determine the significant difference between learning through reading and writing and grade and there was no significant difference between these two.

**ANOVA test between learning through reading and writing and School**

				Sum of Squares	df	Mean Square	F	Sig.
<b>School * Reading and Writing learning</b>	<b>Between Groups</b>	<b>(Combined)</b>		98.455	5	19.691	5.431	.000
	<b>Within Groups</b>			772.230	213	3.625		
	<b>Total</b>			870.685	218			

One way ANOVA was used to determine significant difference between learning through reading and writing and school and there was no significant difference between reading and writing learning mode and school.

**ANOVA test between learning through reading and writing and Socio-Economic Status**

				Sum of Squares	df	Mean Square	F	Sig.
<b>Socio-Economic Status * Reading and Writing learning</b>	<b>Between Groups</b>	<b>(Combined)</b>		7.126	5	1.425	2.808	2.08
	<b>Within Groups</b>			107.595	212	.508		
	<b>Total</b>			114.720	217			

One way ANOVA was used to determine significant difference between learning through reading and writing and socioeconomic status and it was found that the difference was insignificant.

**ANOVA test between learning through reading and writing and Type of Hearing Loss**

				Sum of Squares	df	Mean Square	F	Sig.
<b>Type of Hearing Loss * Reading and Writing learning</b>	<b>Between Groups</b>	<b>(Combined)</b>		4.943	5	.989	1.860	.103
	<b>Within Groups</b>			113.766	214	.532		
	<b>Total</b>			118.709	219			

One-way ANOVA was used to determine significant differences between learning through reading and writing and type of hearing loss. The result shows an insignificant difference between them.

### **Discussion and Conclusions**

Based on the research findings the researchers reached amazing conclusions. Concerning the above fact-based figures and findings it was found that SHIs' also have diversity in their learning modalities while comparing their demographics. As a common practice, the visual and kinesthetic/tactile learning modalities for executing teaching and learning processes were practiced at the schools of the hearing impaired in Lahore.

The impact of demographic variable 'socioeconomic' showed a significant difference with kinesthetic /tactile learning at elementary students with hearing impairment, as there was not found a significant difference. It was also concluded that learning modalities of SHI and age group were not significantly different, and learning modalities of SHI and hearing loss were not significantly different. Similarly, learning modalities of SHI and grade levels were not significantly different. Whereas, there found a significant difference between reading/writing mode of learning and other demographics. Kinesthetic/tactile learning modalities and socioeconomic status were also found significantly different.

The above-mentioned report when compared with already collected data from the teachers then it was reflected that the teachers were not teaching according to the learning preferences of SHI's in a useful manner to improve study skills and they also do not bother to develop and improve reading and writing skills by considering them cognitively sound. The teachers were not giving importance to the aural mode and not using it with the incorporation of other modalities; which can be known as multisensory teaching and learning processes for the improvement of the reading and writing skills and other study skills. The teachers reported the parents of SHI's for not bothering the aural mode and were also not guiding and encouraging them for using multiple modes for practicing.

Only one school in Lahore reported that they used to follow speech and language therapy in routine and their teachers were trained for using aural mode and cued speech/using visuals for developing/improving reading, writing skills among their elementary grade level students.

### **Recommendations**

#### **Recommendations for Hearing Impaired Students**

The SHI should be provided with the freedom to share their preferred learning modalities, while inquired about. They should also put in their energies for in-depth study to reform the subjects, methods, and the professions that go with their learning modalities.

#### **Recommendations for the Researchers & Teachers**

After concluding the results, it is suggested that the teachers' role in their respective classes is just like a researcher. Consequently, they must examine the association of instruction styles and the learning modalities of the students. Researches should be conducted national level. Teachers, by utilizing their all-competent capacities, should try to match their instructional styles with the learning modalities of the SHI and should try to employ all those approaches which would be easy for the learners.

They should also try to seek the learning modalities of SHI and find out the strategies, which can give benefit to both parties.

#### **Recommendations for the School administrators**

The school administrators should conduct seminars and awareness campaigns about the importance of learning modalities identification followed by the academic benefits for SHI. They should also arrange training programs on teaching strategies for teachers. In Pakistan, school management should invest finances and their efforts to facilitate teachers to plan and execute their lessons according to preferred learning modalities.

### **References**

- Baldwin, L., & Sabry, K. (2003). Learning styles for interactive learning systems. *Innovations in Education and Teaching International*, 40(4), 325-340.
- Bamiou, D.-E., Campbell, N., & Sirimanna, T. (2006). Management of auditory processing disorders. *Audiological Medicine*, 4(1), 46-56.
- Biggs, J., & Tang, C. (2011). *Teaching for quality learning at university*. McGraw-Hill International.
- Boud, D. (2012). *Developing student autonomy in learning*: Routledge.
- Cavanagh, M. (2011). Students' experiences of active engagement through cooperative learning activities in lectures. *Active Learning in Higher Education*, 12(1), 23-33.
- Chamberlain, C., & Mayberry, R. I. (2000). Theorizing about the relation between American Sign Language and reading. *Language acquisition by eye*, 221-259.

- Coffield, F., Moseley, D., Hall, E., & Ecclestone, K. (2004). Should we be using learning styles?: What research has to say to practice.
- Corbett, A. C. (2007). Learning asymmetries and the discovery of entrepreneurial opportunities. *Journal of Business Venturing*, 22(1), 97-118.
- Dawn, T., Harkin, J., & Turner, G. (2013). *Teaching young adults: a handbook for teachers in post-compulsory education*: Routledge.
- Dunn, R., Beaudry, J. S., & Klavas, A. (2002). Survey of research on learning styles. *California Journal of Science Education*, 2(2), 75-98.
- Dunn, R. S., & Griggs, S. A. (2000). *Practical approaches to using learning styles in higher education*: Greenwood Publishing Group.
- Entwistle, N. J. (2013). *Styles of learning and teaching: An integrated outline of educational psychology for students, teachers and lecturers*: Routledge.
- Farmer, L. S. (1999). *Cooperative learning activities in the library media center*: Libraries Unlimited.
- Felder, R. M., & Brent, R. (2001). Effective strategies for cooperative learning. *Journal of Cooperation & Collaboration in College Teaching*, 10(2), 69-75.
- Fitzpatrick, D. (2008). *Effects of Auditory Training on Speech Recognition for Persons Within Binaural Sensorineural Hearing Loss*: ProQuest.
- Fullan, M. (2007). *The new meaning of educational change*: Routledge.
- Fuller, M. (2009). *Improving disabled students' learning: experiences and outcomes*: Routledge.
- Goldstein, E. (2013). *Sensation and perception*: Cengage Learning.
- Hargreaves, A. (2000). Four ages of professionalism and professional learning. *Teachers and teaching: theory and practice*, 6(2), 151-182.
- Jambor, E., & Elliott, M. (2005). Self-esteem and coping strategies among deaf students. *Journal of Deaf Studies and Deaf Education*, 10(1), 63-81.
- Kasoma, C. (2014). *Educational services for children with special educational needs in Zambia: a human development and capability approach*. Sweden
- Kolb, A. Y., & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of management learning & education*, 4(2), 193-212.
- Macías-Guarasa, J., Montero, J. M., San-Segundo, R., Araujo, Á., & Nieto-Taladriz, O. (2006). A project-based learning approach to design electronic systems curricula. *Education, IEEE Transactions on*, 49(3), 389-397.
- Marschark, M. & Knoors, H. (2015). Educating deaf learners in the 21st century: What we know and what we need to know. In H. Knoors & M. Marschark (Eds.), *Educating deaf learners: Creating a global evidence base* (pp. 617-647). New York, NY: Oxford University Press.
- Merrill, M. D. (2002). First-principles of instruction. *Educational technology research and development*, 50(3), 43-59.
- Muir, L. J., & Richardson, I. E. (2005). Perception of sign language and its application to visual communications for deaf people. *Journal of Deaf Studies and Deaf Education*, 10(4), 390-401.
- Musselman, C. (2000). How do children who can't hear learn to read an alphabetic script? A review of the literature on reading and deafness. *Journal of Deaf Studies and Deaf Education*, 5(1), 9-31.
- O'Connor, T. (1997). Using learning styles to adapt technology for higher education. Retrieved April 17, 2006.
- Olson, A. D. (2010). *Auditory training at home for adult hearing aid users*.
- Organization, W. H. (2007). *International Classification of Functioning, Disability, and Health: Children & Youth Version: ICF-CY*: World Health Organization.
- Pallarito, K. (2010). Teach patients who hear "well enough" the real cost of neglecting hearing loss. *The Hearing Journal*, 63(8), 19-20.
- Popescu, E. (2009). Diagnosing students' learning style in an educational hypermedia system. *Cognitive and Emotional Processes in Web-based Education: Integrating Human Factors and Personalization*, *Advances in Web-Based Learning Book Series*, IGI Global, 187-208.
- Reis, S. M., & McCoach, D. B. (2002). Underachievement in gifted and talented students with special needs. *Exceptionality*, 10(2), 113-125.

- Riding, R., & Cheema, I. (1991). Cognitive styles—an overview and integration. *Educational psychology*, 11(3-4), 193-215.
- Riding, R., & Rayner, S. (2013). *Cognitive styles and learning strategies: Understanding style differences in learning and behavior*: Routledge.
- Rodda, M., & Grove, C. (2013). *Language, cognition, and deafness*: Psychology Press.
- Šabatová, J. (2008). *Learning Styles in ELT*. Master Thesis. Faculty of Education. Masaryk University Brno.
- Slavin, R. E., & Davis, N. (2006). *Educational psychology: Theory and practice*.
- Stracke, E. (2007). A road to understanding: A qualitative study into why learners drop out of a blended language learning (BLL) environment. *ReCALL*, 19(01), 57-78.
- Thomas, J. R., Nelson, J. K., & Silverman, S. J. (2011). *Research methods in physical activity: Human Kinetics*.
- Willingham, D. T. (2005). Do visual, auditory, and kinesthetic learners need visual, auditory, and kinesthetic instruction. *American Educator*, 29(2), 31-35.
- Wilson, A., & Scanlon, J. (2011). *Language knowledge for primary teachers*: Routledge.
- Wlodkowski, R. J. (2011). *Enhancing adult motivation to learn: A comprehensive guide for teaching all adults*: John Wiley & Sons.
- Wolpert, D. M., Ghahramani, Z., & Flanagan, J. R. (2001). Perspectives and problems in motor learning. *Trends in cognitive sciences*, 5(11), 487-494.
- Wormeli, R. (2001). *Meet me in the middle: Becoming an accomplished middle-level teacher*: Stenhouse Publishers.