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RESEARCH PAPER

Effect of Information and Communication Technology for the Development of Urdu Reading Skills of Students with Hearing Impairment

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ABSTRACT

Education is the fundamental right of every person in the society and Students with Hearing Impairment (SWHI) is also a part of our society. Hearing impaired students face various problems in their academics especially in reading text. The purpose of this study was to assess the effectiveness of Information and Communication Technology (ICT) to develop Urdu reading skills of hearing impaired students in view of "Zone of Proximal Development" framework. True-experimental (pre-test post-test control group design) of quantitative research paradigms was used to conduct this study. A sample of 30 SWHI was selected by the researcher from two schools of special education department Govt. of Punjab and divided into two equal groups through simple random sampling technique. Content was taken from Urdu text book of grade 3 and video clips of this content were made through ICT and taught to the experimental group as treatment whereas control group was taught through traditional method. A self-made instrument in the form of Urdu reading test was developed by the researcher and applied as pretest & posttest to establish the baseline of Urdu reading skills of SWHI. Data was analyzed through Statistical Package for Social Sciences (SPSS) and parametric statistics were used to compare the results of both groups. Recommendations were made on the basis of findings and conclusions for the better improvement of Urdu reading skills for the SWHI by the usage of ICT.

KEYWORDS Hearing Impaired Students, Information and Communication Technology, Urdu Reading Skills

Introduction

Education is the key to ending gender inequality, reducing poverty, creating a sustainable planet, preventing unnecessary deaths and diseases, and promoting peace. As per Al-Shuaibi (2014) that education is the basic tool for future success and for the many opportunities in our lives as well as it paves the way for us to make a good career. It shines our mind, empowers our beliefs, and strengthens our character and behavior towards others. As per report published by UNICEF (2022) that a child's right to education comprises the right to learn and education is an essential human right. Around the world, children miss out on education and learning for a variety of reasons; without quality education, children face many obstacles. Nelson Mandela said "Education is the most powerful weapon which you can use to change the world", one of the most important investments we can make that is education and this is actually true that it is not only for the United States, but for other nations around the world (Duncan, 2013). Deaf community is also a major part of this world. As per report World Health Organization (WHO, 2023) that more than 5% of the world's population or 430 million people need rehabilitation to

cope with their hearing impairment including 432 million adults and 34 million children. Currently there are 1.5 million people with hearing loss worldwide and this number may increase to 2.5 million in 2050 and 700 million people will need hearing rehabilitation at that time. It is also noted that in developing countries, hearing impaired children are receiving school education rarely. As per Hassanzadeh & Nikkhoo (2019) that reading literacy is one of the essential abilities acquired by students at school; therefore, it is necessary to be assessed regularly in all students, especially deaf ones and deaf children perform poorly in word reading, so it is expected that their reading comprehension skills will also be poor. Literacy as a (reading and writing) skill among children with hearing impairment is too as they are unable to use their language smoothly (Bano & Hameed, 2007). According to Marschark et al. (2009) that reading achievements among deaf students typically lags significantly behind hearing peers, a situation that has changed little despite decades of research. Various researches (Zabala-Vargas et al., 2019; Freire, 2005 and Roig-Vila & Mengual-Andres, 2014) suggested that the ICT play a vital role to enhance the reading abilities of the students.

Literature Review

The United Nations Millennium Development Goals (MDGs, 2000) of providing universal primary education for all and ending gender inequality have spurred many nations and many governmental organizations to work to substantially increase educational attainment. But the task is not as easy as it seems, and many countries are failing to meet the goals that were set in 2000 and were to be achieved by 2015. SDGs (2015) also emphasize in goal 4 that delivering quality education to all is essential to building a peaceful and wealthy world. Education gives people the knowledge and skills they need to stay healthy, get jobs and develop tolerance. As per article 28 and 29 of Convention on the Rights of the Child (UNCRC), 1989 that education is the fundamental right of every child as per their needs. It should be free and fair, with equal access for girls and boys. The delivery of a free suitable public education built on the distinctive requirements of the child is at the core of the Individuals with Disabilities Education Act (IDEA, 1975). As per to UNCRC (1989), the education is also the fundamental right of the deaf persons. Studying of the deaf students is much more difficult than ordinary students in the world. Deaf students face much kind of challenges regarding getting education to fulfil their educational needs. El-Zraigat (2010) specifies that the students who are deaf and hard of hearing lack adequate reading skills in general (see Ibrahm, Yahia & Smadi, 2012). There are some major researches (Bano, 2007, Zahida (2011) have been done in Pakistan on reading and writing for SWHI to find out baselines and to enhance their reading and writing skills. Paul (2001) said that children with hearing impairment face problems in phonological development of language and this deficiency affect their reading abilities (see Bano, 2007).

The persons with hearing impairment can possibility to compensatory strategies to comprehend a message when grammar and vocabulary skills are limited (Haider, 2012). The students with deafness have problems in reading Urdu text as compare to English text because of the Urdu text is so complicated for them due to its synthesis. Urdu alphabets are more than the English alphabets and it is too difficult to create a new word and sentence with the help of spellings especially for deaf students. Urdu is the national language of Pakistan and it is as important for deaf students as it is for ordinary people, but it is more difficult for deaf students to understand Urdu than ordinary people. Good reading ability leads towards the better outcomes of the students. With the development of Urdu reading skills, the SWHI can improve their education especially in Pakistan zone. As per Paul, Wang and Williams (2013) that the addition to identifying reading challenges among students with hearing loss, it is important for teachers to know the essential components

of reading including phonics, phonemic awareness vocabulary, fluency, and reading comprehension.

Hearing impaired individuals can face with such significant problems in school achievement and social life. One of the areas where individuals need special education due to these needs is technology. Technology is perceived as products with higher quality scientific knowledge and techniques with its present connotation. Along with the rapid development of information technologies, the gaps in the areas where the classical method used for the training of the handicapped are insufficient are filled. In this way, students with disabilities can be educated in a more comfortable way (Baglama et al., 2018). Children live in a digital age where exchange of much information occurs through ICT (Brodin, 2010). According to UNESCO (2000) that ICT may have a role to play in disseminating and sharing special forms of education. According to UNESCO (2023) states in a report that when teachers are digitally literate and trained to use ICT, such methods can lead to higher thinking skills, students to be creative in expressing their understanding and can provide individualized options, better preparing students to deal with ongoing technological change in society and the workplace. UNESCO takes a holistic and comprehensive approach to promoting ICT in education. Maduabuchi (2007) stated that ICT facilitates the teaching and learning process by providing access to a wide range of information sources and a wide variety of subjects. With ICT in education, a learner-centered approach is encouraged because students can access and learn from these technologies at their own pace, thus promoting learner autonomy. Many studies regarding ICT demanded that the usage of ICT in teaching and learning increases education and provides extra teaching and learning helps for the teachers and learners (Salehi & Salehi, 2012; Yunus, Salehi & Chenzi, 2012; Young, 2003).

As per Allen, Letteri, Choi, & Dang (2014) that Paul, Wang, and Williams (2013) developed Qualitative Similarity Hypothesis in order for children to become good readers, they need to understand, from an early age, English language and literacy fundamentals and skills, such as phonological processing, phonemic awareness, decoding, and print conventions. It should be noted, however, that there is a debate as to whether it is necessary for children with severe to profound hearing loss to acquire and learn certain fundamental skills of a sound phonology (phonological awareness, phonemic awareness, and phonics) as a part of the reading process, due to the fact that these children have limited access to auditory information (Allen et al., 2014).

In order to improve the Urdu reading of deaf children, this study has been carried out keeping in view the parameters of Zone of Proximal Development (ZPD) framework which was presented by Vygotsky (1978). The zone of proximal development, it is also known as the zone of potential development refers to the range of skills that an individual can perform with expert guidance, but cannot yet perform independently (Cherry, 2019). ZPD is a moving target by giving children tasks that they cannot easily do on their own and providing the guidance they need to complete them, teachers can gradually advance the learning process (Eun, 2017).

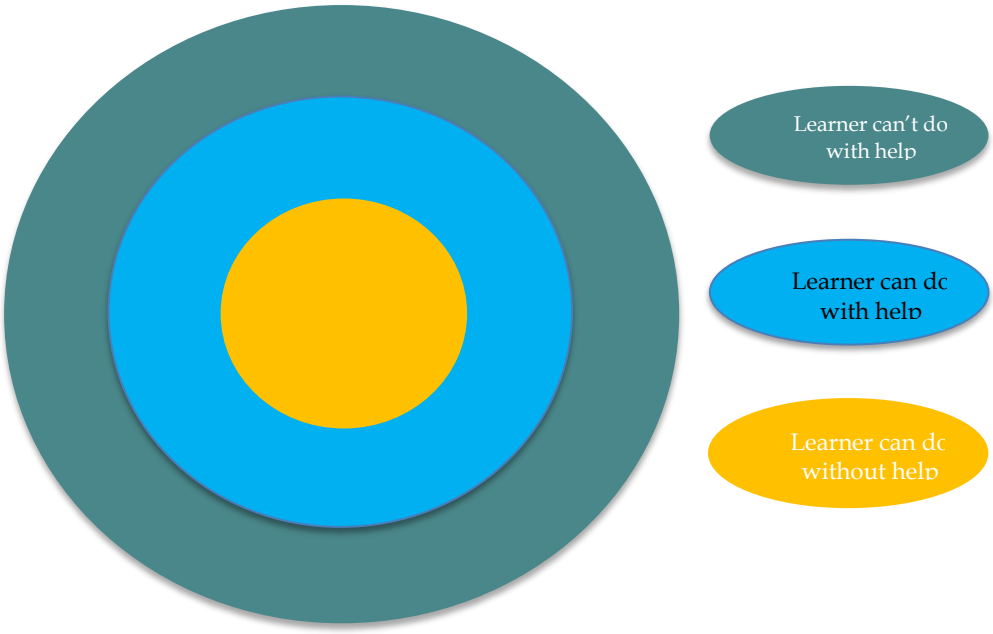

Figure: Zone of Proximal Development (ZPD) Framework

The National Policy for Persons with Disabilities (2002) was a very virtuous step taken by the Govt. of Pakistani in which education was also taken into consideration along with other sectors for the disabled and after that the National Plan of Action (2006) stated that it was affirmed that all the laws of the National Policy for Persons with Disabilities should be implemented which were set to be achieved by 2025. After that, increasing the number of special education in the province of Punjab and creating an institution at each tehsil level was the link of this policy. In Pakistan, especially in the province of Punjab, the Ministry of Special Education has laid great emphasis on the education and training of disabled students. According Special Education Department Govt. Punjab (2022), currently 300 institutions are working for the education of disabled persons in Punjab, of which the number of institutions for hearing impaired students is 221 including special education centers, schools, colleges, training colleges and vocational training centers where 21332 students are enrolled and getting education.

Research Hypotheses

Considering the objectives of this research, the following hypotheses were made:

H_1 There is a positive effect of ICT on developing Urdu reading skills among students with hearing impairment.

H_1 There is a significance difference between the results of pretest and posttest of students with hearing impairment.

H_0 There is no positive effect of ICT to develop Urdu reading skills among students with hearing impairment.

H_0 There is no significance difference between the results of pretest and posttest of students with hearing impairment.

Material and Methods

Type of Research and Research Design

This study was conducted on quantitative research paradigms. Pretest-posttest control group design of true experimental research was used to conduct this study.

Population of the Study

Population of this study was comprised to SWHI of class 3, who were studying in Government special education centers and schools of Punjab province thus; this papulation was targeted to Lahore city due to availability of required sample size for this study.

Sample and Sampling Technique

Sample of the study was selected through simple random sampling technique (odd and even numbers) from two schools Govt. Central High School for Hearing Impaired (Girls) and Govt. Secondary School for Hearing Impaired (Boys) Gulberg II, Lahore of Special Education Department Govt. of Punjab which was comprised on 30 SWHI. Due to required sample size, this place was allocated for the experiment of this study. The total number of SWHI of grade 3 were 42 from A,B & C sections and 30 SWHI were separated on the basis of homogeneity and randomly divided into two equal groups.

Instrument of the Study

A self-made instrument was made by the researcher with 80 items from Urdu text book of class 3 and administered as Urdu reading test to both groups (control and experimental) as pretest and posttest to establish the base line of Urdu reading abilities of SWHI. Instrument was validated by field experts and piloted to SWHI of class 3 who were studying in the Govt. special education centers and schools to check the validity and reliability of the test. The Cronbach's Alpha value of the pilot test was noted α=.94 through SPSS and the total number of respondents were (N=104). Some changes were made as instructions given by field experts.

Pretest Administration

After finalized the instrument, pretest was administered to control and experimental groups to measure the baseline of Urdu reading skills of SWHI. The researcher expressed some necessary written instructions to the students of both groups about the conduction of reading test.

Treatment/Intervention

Then treatment was given to the experimental group and taught the content from various chapters of Urdu text book of grade 3 through ICT based videos clips as per requirement of ZPD framework to know the effect of ICT on developing Urdu reading skills of SWHI whereas control group was taught by the class teacher through traditional method. Every lesson was planned lesson, contained 35 minutes, and delivered through multimedia projector. The video clips based on ICT and the combination of real text book content, captions and interpretation in sign language. At the end of lesson, worksheets were distributed to the students on which the students were tested to find out how far the students have learned the lesson and sometimes peer tutoring was also conducted from the children on the board related to the lessons taught and if needed, a video was also replay again on next day.

Timeline of Treatment

The duration of this research was comprised on 8 weeks. The school schedule of Urdu period of class 3 was followed for time and day allocation. According to the time table, the period of Urdu subject was 5 days in a week and each period was containing 35 minutes per day.

Posttest Administration

The duration of this research was comprised on 8 weeks. The school schedule of Urdu period of class 3 was followed for time and day allocation. According to the time table, the period of Urdu subject was 5 days in a week and each period was containing 35 minutes per day.

Results and Discussion

Data Analysis

The results of pretest and posttest of both groups were compared to find out the difference in achievement in Urdu reading skills of SWHI before and after treatment. As per data of this study was of interval level of measurement, so that parametric tests were used to see the significance difference. Independent sample t-test and paired sample t-test were used through SPSS to see the significant difference between the variables. Effect size was also measured by applying Cohen's *d* formula to check the relationship or difference between the variables/groups. Bhandari (2020) stated that effect size guides us that how much significant relationship between variables or the difference between groups exists. Cohen (1988, 1992) proposed that $d = 0.2$ be deliberated a "small" effect size, 0.5 considered a "medium" effect size and 0.8 will be a "large" effect size (see McLeod, 2019).

Table 1
Frequency Distribution of Demographics of Control and Experimental Groups

Variables	Labels	Control Group		Experimental Group	
		f	%	f	%
Gender	Male	8	53	8	53
	Female	7	47	7	47
Age	9 years	15	100	15	100
Degree of Hearing Loss	Profound	15	100	15	100
Class Level	3rd	15	100	15	100
School Name	Govt. Central High School for Hearing Impaired (Girls)	6	40	6	40
	Govt. Secondary School for Hearing Impaired (Boys)	9	60	9	60

Table 1 shows that majority (53%) of the subjects was male and (47%) of the respondents was female in both groups. All (100%) respondents of both groups were same age group (9 years) and same degree of hearing loss (Profound). As well majority (60%) of the respondents was belonging to Govt. Secondary School for Hearing Impaired (Boys) and remaining (40%) were from Govt. Central High School for Hearing Impaired (Girls).

Table 2
Comparison of Urdu Reading Skills of Control and Experimental Groups Based on Pre-Test

	Control Group		Experiment Group				
Variable	M	SD	M	SD	t(28)	p	Cohen's d
Pre-test	27.27	3.91	27.00	5.76	.148	.88	.05

Table 2 shows the comparison among scores of Urdu reading skills of two groups on the basis of pre-test. This table indicates that control group exhibited higher scores on pre-test (M=27.27, SD=7.67) as compare to experimental group which revealed (M=27.00, SD= 5.76) and t(28)=.108, p>.05. The value of Cohen's d is noted .05 (<.20) which indicates small effect size. So, there is no statistical significance difference is noted among the Urdu reading skills of control group and experimental group of SWHI on the basis of pre-test results.

Table 3
Comparison of Urdu Reading Skills of Control and Experimental Groups Based on Post-test

	Control Group		Experiment Group				
Variable	*M*	*SD*	*M*	*SD*	*t*(28)	*p*	Cohen's *d*
Pre-test	28.00	8.39	54.93	9.29	-8.33	.00	3.04

Table 3 shows the comparison among the scores of Urdu reading skills of two groups (control and experimental) on the basis of post-test results. This table indicates that control group exhibited lower scores on post-test (M=28.00, SD=8.39) as compare to experimental group which revealed (M=54.93, SD= 9.29) and t(28)=8.33, p<.05. The value of Cohen's d=3.04 which indicates large effect size. So, there is a statistical significance difference is noted among the Urdu reading skills of control and experimental groups of SWHI on the basis of post-test results.

Findings

1. Majority (53.3%) of the data set consisted on male students and remaining (46.7%) consisted on female SWHI.

2. It is find out that control group exhibited higher scores on pre-test (M=27.27, SD=7.67) as compare to experimental group which revealed (M=27.00, SD= 5.76) and t(28)=.108, p>.05. The value of Cohen's d is noted .05 which indicates small effect size. So, there is no statistical significance difference among the Urdu reading skills of control group and experimental group of SWHI on the basis of pre-test results.

3. The control group exhibited lower scores on post-test (M=28.00, SD=8.39) as compare to experimental group which revealed (M=54.93, SD= 9.29) and t(28)=8.33, p<.05. The value of Cohen's d=3.04 which indicates large effect size. So, there is a statistical significance difference among the Urdu reading skills of control and experimental groups of SWHI on the basis of post-test results.

Discussion

The major objective of this study was to assess the effectiveness of ICT for the development of Urdu reading skills of SWHI. This study was designed to check the effect of ICT for the development of Urdu reading abilities through ZPD framework. The results of this study are similar to other studies which are conducted earlier for enhancing reading skills of SWHI (Bano, 2007; Parveen, 2011; Allen et al., 2014; Paul et al., 2013; Zabala-Vargas et al., 2019; Freire, 2005 and Roig-Vila & Mengual-Andres, 2014). The results of both groups were almost same on the basis of pretest regarding Urdu reading skills of SWHI and there was no significance difference. However, when the posttest of both groups was conducted after the treatment, the results of the experimental group were very surprised and incredible for us. There was a significance difference among the results of experimental and control group. Therefore, this research has proven that ICT has a significant impact on the learning of deaf students, especially on their Urdu reading skills.

Conclusion

The focus of this research is on what role ICT can play in enhancing the reading ability of deaf students in Urdu. The ZPD framework has been used to conduct this research to assess effectiveness of ICT on developing Urdu reading skill of SWHI. A valid and reliable Urdu reading test was developed and administered to measure their Urdu reading skills. A set of ICT based videos was made to increase the Urdu reading skills of hearing impaired students. When the Urdu reading scores of the two groups (control & experiment) were compared on the basis of the pre-test, it was revealed that there was no significance difference in their scores and Cohen's *d* stated that there was small effect size. After the treatment, when the scores of the two groups were again compared on the basis of posttest, it was observed that the score of the experimental group was significantly better than that of the control group. However statistical significance difference was noted among scores of control and experimental groups about Urdu reading skills on the basis of posttest as well as Cohen's *d* stated large effect size indicating that ICT has a significant effect on developing Urdu reading skills of SWH of grade 3. Results of about Urdu reading skills of SWHI effectively increased through the use of ICT based video clips.

Recommendations

Considering the ZPD framework, ICT-based video clips were used to improve Urdu reading skills of deaf students and based on the findings/conclusions; the following recommendations were made by the researcher:

1. Fundamental reforms should be made by the government to teach SWHI through ICT.

2. The government should organize pre-service and in-service ICT trainings for teachers to improve reading skills of children with hearing impairment.

3. Teachers should teach to hearing impaired children through video clips using information and communication technology rather than traditional method.

4. Govt. should prepare video clips of all syllabuses to improve reading skills of hearing impaired students.

5. Govt. should arrange meetings, workshops and seminars on ICT with the collaboration of ICT staff/department to enhance the reading abilities of SWHI.

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