ORIGINAL ARTICLE

Assessing the Impact of Pakistan Early Learning System (PELS) Urdu Alphabet Learning in Children with Hearing Impairment Using Computer Assisted Web Based Program

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Author Contribution

[1]*Conception, Synthesis and Planning of the research, Review the Study*
[2]*Analysis and discussion, Data collection*

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ABSTRACT

Objective: The objective of this study is to assess impact of PELS i.e., culturally appropriate computer-assisted learning program, using web-based programme for Urdu alphabets in children with hearing impairment.

Study Design: Randomized Control Trial.

Place and Duration: Special education schools and centers of Islamabad and Rawalpindi from September 2015 to December 2016.

Methodology: Fifteen students with hearing impairment, between age ranges of 5 to 8 years were selected randomly from special education schools of Rawalpindi and Islamabad. In the study design, the pretest comprised of domains including Urdu alphabets matching, matching to pictures, matching to sign language, sequencing and sorting odd ones out. These children were subsequently divided into three groups having 5 students each. There was a total of three conditions in this study. In the first condition, Group 1 was taught using traditional teaching method's (TTM) for Urdu alphabet learning. In second, Group 2 was taught using computer-assisted learning (CAL) i.e. Pakistan early learning system (PELS a newly created web-based programme). In third and last condition, Group 3 was taught using both traditional teaching methods and Pakistan Early Learning System for six weeks. A post-test was then conducted to test the effectiveness of the programme for learning Urdu alphabets by analyzing the results of pre and post-tests.

Results: The significant value of group 1 (TTM) for Urdu alphabet learning was 0.854, which was not significant. For group 2 (PELS), it was 0.004, which was significant. Whereas for group 3 (TTM + PEL), the value came out to be significant (i.e., 0.003).

Conclusion: It is concluded that the results of PELS for teaching Urdu alphabets in children with hearing impairment either alone or along with TTM were significant providing meaningful evidence that computer-assisted learning is advantageous.

Keywords: Computer-assisted learning (CAL), Visually impaired, Hearing Impairment

Introduction

Disability is a reality for many and has farfetched implications for those in developing countries. As such the impact on the quality of life of persons with disabilities and people around him/ her is exacerbated due to society's

inability to cope with the demands of disability. There appears to be a gap between a person's capabilities and environmental demands especially in countries, which are more poverty striken.[1] According to WHO, 15% of world population is having some sort of disability[2] which according to the Global status of a report on disability and development 2015, by United Nations is reported to be 19%.[3] Hindrance to the education of persons with disabilities results not from inherent in competencies but from the physical and community's attitudinal demands of the environment formulated politically. As per disability and
economic report by United Nations, people with disability are employed on the considerably lower rate and 200 million disabled people worldwide are living below poverty line.[4]

According to National health policy 2002, only 2.49% population is disabled out of which 7.40% is hearing impaired. Hearing loss seems to be more prevalent in rural settings in Pakistan; 7.9% in a general population setting according to Elahi et al.[5] Children who have siblings with hearing impairment were also more likely to have an undiagnosed hearing loss as discovered by Z:jkzouk et al.[6] According to the researchers, the prevalence of hearing impairment among such children with hearing impaired siblings was 24.8% compared to 7.7% among all children screened.

Computer-assisted learning is a far more effective technique for concept building in children with hearing impairment and has been proven by researches globally.[7,8] The use of technology not only facilitates students in the learning process itself, but when designed culturally appropriate, it can also develop abilities in reading or writing in their own contexts and values by generating interest.[9] In Pakistan, the strategies used in teaching hearing children with impairments are outdated. Special schools are unable to facilitate deaf children to their maximum potential and to meet the challenges of hearing in society.[4] In theory, though computer education is part of the syllabus in schools for Hearing Impairment, yet computers are not used as a medium of instruction for HI children.

Therefore, the aim of this study was to find the significance of teaching strategy in which computer is used as a medium of instruction compared to traditional teaching methods. For that purpose, a computer-based learning programme called Pakistan Early Learning System (PELS) for HI children was developed based on HI syllabus and sign language.

Methodology

A randomized control trial was carried out in which a group of 15 children aged 5- 8 years with congenital hearing impairment were selected randomly. Children who had already attended preschool were excluded from the group. Pretest of Urdu alphabet learning along with sign language was designed with five responses from each category, for example, matching the picture to picture, matching the picture to alphabet/ figure/ Urdu haroof, matching alphabet to sign language, sorting odd ones out, missing letters and sequencing were tested. All these children were subsequently divided into three groups randomly and tested for six weeks.

Group 1	instructed through TTM
Group 2	instructed through CAL (PELS)
Group 3	Instructed through TTM + PELS

By the end of this duration, a post-test was conducted and results of pre- and post-test were compared for all three groups.

PROCEDURE: PELS is a web-based programme, which is approachable and can be searched on web-based search engines. The programme is grounded in curriculum and sign language that is currently being taught in most of special education setups catering for children with hearing impairment in early learning years. Characteristics of PELS for English Alphabet learning are as follows:

Domain	Description of lessons	Activities
Urdu	• Recognition of alphabet. • Pictures of words starting from specific alphabet. • Picture of sign language for alphabet. • Video clip showing sign language for the alphabet	• Matching Alphabet to alphabet • Matching alphabet to picture • Matching alphabet to sign-language • Sorting out odd ones • Missing letters • Sequencing

PROTOCOL: Following sequence was carried out for teaching and testing the students for the study.

No of Students	Domain	Time	Days	Breakup of lessons	Breakup of activities	Total duration of Intervention
15	Urdu	45 min/day	5 days/ wk	One lesson/ day (Mon-Thurs)	Activity once a week (Friday)	6 weeks

Results

Pre- and post tests were carried out before and after interventions, data was and collected and analyzed on SPSS. Results were compiled as follows.

The result shows that Urdu pretest score for group 1, which was taught through traditional teaching method, is 5.800 with standard deviation ± 2.280. The post-test score is 6.00 with standard deviation ± 1.224 and p value is 0.854, which makes this method insignificant. For a group which was taught through PELS pretest score is 4.200 and the standard deviation is ± 2.387. The post-test score is 17.2000 with standard deviation ± 6.058 and p-value is 0.004 showing that result of PELS is significant. Similarly, group 3 which was taught using both TTM and PELS the pre-test scores are 4.2000 with a standard deviation of ± 1.095.The post-test result is 19.4000 with a standard deviation of ± 4.827 with .003 p-value. This shows that this method is significant as well.

Domain	No. of Participants in each Group	Group	Pretest Mean±SD	Posttest Mean±SD	P-value
Urdu	5	1 (TTM)	5.8000 ±2.280	6.0000 ±1.224	.854
	5	2 (PELS)	4.2000 ± 2.387	17.2000 ± 6.058	.004
	5	3 (TTM + PELS)	4.2000 ± 1.095	19.4000 ± 4.827	.003

Discussion

Most studies carried out in various parts of the world show significant results when children with hearing impairment are taught with computer-assisted learning. This study has also proved that PELS, which is a computer-assisted learning programme is based on the curriculum of early learning of children with hearing impairment, with culturally appropriate pictures has positive results.

A study carried out in Austria 2009 by Game and Bulenth with pre schoolers with hearing impairment was helpful in developing articulation and memorizing concepts. Computer-assisted learning makes the teaching process interesting and children achieve their academic goals in comparatively a shorter duration.[10]

A study was conducted in 2000 by Ted and Candyce focusing on how helpful computer technology is in teaching-learning process of children with special needs in this digital age.[11] Likewise, this study has also proved that PELS has played a highly significant role and children with special needs can achieve their goals within a shorter period of time. A study conducted in 2014 by Apiluck and Kasetart in Thailand illustrates the attitude of Thai deaf children towards the verbal aspect of language, which was statistically significant and young children showed more willingness towards spoken language after use of the technologically driven interventional program.

Thus, computer-based learning not only enhances the learning capabilities of children especially who have compromised abilities but also saves time taken by teaching-learning activities by making the learning process more interesting. Learning spellings and phonics is another difficult task to learn for children with hearing impairment but a study conducted in 2014 by Azhan and Naean, published in the International Journal on Islamic journal in computer science and technology.

According to this study computer-based programme was designed to teach Quran to HI children by using different colors along with numbers and results were highly significant. The model was validated through prototype development.[12]

Conclusion

The current study confirms that the students taught with computer-assisted learning have significant results and validates that computers should be used as a medium of the teaching process. More computer-based software and programmes should be formalized depending on the syllabus being taught to all age groups and gradually becoming complex in higher grades. Web-based programmes are more advantageous than desktop-based programmes as constant changes and additions can be made in the prior technique. In all outreach special education school's government has already taken initiatives of providing internet facility and computers,

therefore, to launch computer-based instruction mode is easy and can play a vital role in concept building of HI children. Moreover, spellings, creative writing skills, syntax formation, mathematical skills can be taught more efficiently and effectively. Computer-based education makes educational process more interesting and saves time. Teachers should be trained to teach educational software. Software like PELS is cultural based and locally designed in the native language, whereas those adopted from foreign countries are not culturally appropriate.

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