DIGITAL EMBODIMENT OF ADAPTED VERSION OF THE PICTURE EXCHANGE COMMUNICATION SYSTEM (PECS) FOR AUTISTIC CHILDREN IN PAKISTAN

Farah Rahman[1], Almas Ikram Kayani [2], Muhammad Hanif [3]

[1]Researcher, Department of Education, Faculty of Social Sciences,
[2]Associate Professor, Department of Education, Faculty of Social Sciences,
[3]Assistant Professor/Chairman, Department of Statistics, Faculty of Social Sciences,
[1-3]Pir Mehr Ali Shah Arid Agriculture University Rawalpindi,
PAKISTAN.

[1] farahrahman76@gmail.com, [2] almaskiani@uaar.edu.pk

ABSTRACT

In 1984 Lori Frost and Dr. Andrew Bondy developed PECS. PECS basically aids autistic people in developing verbal language; moreover, it reduces grumpiness and anomalous behaviors which results in increased socialization. By implementing the heuristic framework, the researcher adapted pictures which were traditionally sensitive for Pakistan within the PECS. The current experimental research aimed to utilize digital advancements for implementing the adapted version of PECS for autistic children in Pakistan to facilitate their communication and personification in the world. An experimental study on a sample of 5 autistic children was conducted for the digital embodiment of adapted PECS. The sample of the research study comprised of one experimental group. Convenience sampling technique was administered in order to make the precise and accurate results. A paired t-test on sample and digital adapted PECS showed significant results. Statistical package for social sciences (SPSS Version, 22.0) for data analysis. As the study was experimental, so the main objective of the study was to highlight the effectiveness and implementation of digital embodiment of adapted pictures within the PECS. This study has produced a well adapted digitally embodied PECS, suitable for implementation for Pakistani Autistic Children. Results of this study confirmed that digital embodiment of adapted PECS enhanced the perceptual and sensory skills of the autistic children. The high level of correct identification percentage of adapted PECS through ipad, depicts that no response percentage was lesser in digitally adapted PECS as compared to the adapted PECS on hard copy.

Keywords: PECS, adapted, digital, embodiment, autistic, mobile

INTRODUCTION

By the data analysis of this study PECS affectivity as an intervention tool has been confirmed for autistic children and as well as other disabilities. This tool leads to improvement in the functional communication of autistic children who are poor at interacting with other people. Through this program the autistic child is encouraged to take responsibility for communication; the approach can be less threatening because the child is not expected to converse verbally (Tincani & Devis, 2011).

Psychologists, speech therapists special educationists now give weight to AAC approach to deal with their communication problems (Frea, Arnold, & Vitimberga, 2001).In the field of research, the AAC approach has a wider impact and this it has stressed on the improvement in communication skills of persons having severe deficits in communication. The main aim of this approach is to make interaction easy by different ways that add-on or conventional change methods used for communication. Its methods and strategies may differ to a great extent; it includes the total communication method, use of different symbols, mobile apps and

ISSN: 2223-9944, e ISSN: 2223-9553

other devices through which speech can be generated. PECS is the most widely and regularly used AAC techniques and methods. In PECS different images on the cards, related to the different categories are used to develop functional communication. Several Pictures of different things from different categories might be used to develop from compound and multifaceted statements ((Frea, Arnold, & Vittimberga, 2001).

Usually, its images have been used after printing the images of different things on the paper, then simply plastic coating to save it. In adding together, particularly designed devices used for AAC approach, that has controlled the soft and hardware, have provided a substitute rather than for using paper. In the last few years, AAC based PECS software has significantly been used. Along with the large PECS book of hundreds of vocabulary cards, it is difficult for individuals to handle them all together and it becomes an obstacle between communications. The invention of the iPad as assistive technology in 2010 made the revolutionary changes in the accessibility and to facilitate the autistic children. The persons with autistic characteristics have been predominantly utilizing this assistive device (iPad) and other Android-based tablet computers. Significantly a number of applications and devices have been introduced for them (Bondy & Frost, 2001). A number of researches have been conducted to highlight the importance of assistive devices.

OBJECTIVES OF PRESENT STUDY

The current research aimed to highlight the effectiveness and implementation of digital embodiment of adapted pictures within the PECS. This study has produced a well-adapted digitally embodied PECS, suitable for implementation of Pakistani Autistic Children. The objectives of the study were:

1. To highlight the effectiveness of digital embodiment of adapted pictures within the PECS.
2. Implementation of digital based adapted pictures within the PECS for Pakistani children.

The following hypothesis was formulated for the study:

The autistic children's group results showed that no response percentage was lesser in digitally adapted PECS as compared to the adapted PECS on the hard copy.

MATERIAL AND METHODS

Study Design

Experimental research design was deployed.

Sampling Technique

The Adapted PECS was digitally embodied through an experimental study on autistic children. Convenience sampling is a non-probability sampling technique and as the name depicts it gathers sample data in accordance to ease of access and availability within the approved time of research. Primary data comprising of sample of 5 autistic children was drawn through the convenience sampling from private special education institute of Rawalpindi. Pictures of Adapted PECS were shown to autistic children on mobile and tablets. Data collected through digital embodiment (Mobiles and Tablets) was compared to data collected by hard copy (Papers).

Sample statistics were used to regulate the population parameters. A sample of 5 autistic children of 5-10 years of age from private special education school was drawn for research.

ISSN: 2223-9944, e ISSN: 2223-9553

The participants of the research study were allocated to one experimental group. Sample details are as:

i. 5 autistic children of 5-10 years of age
ii. Researcher herself

Data Collection Instrument

i. Three thousand nine hundred and nine (3909) picture cards of the adapted PECS in the digital form (soft form).
ii. Self developed checklist for the marking of responses of autistic children by the committee members.

Data Analysis Procedure

For the interpretation of the results coding of variables is highly important in quantitative research. Using Microsoft Excel software, the questions, and their responses, sound errors were enter and coded in the computer.

RESULTS AND FINDINGS

Measure of central tendency (mean) and a sample paired t-test on simple and digital adapted PECS were conducted to identify the difference between the responses of autistic children on digital embodiment of Adapted PECS and the hard copy of adapted PECS. The mean response for a hard copy of adapted PECS was entirely different from the mean response for a digital embodiment of Adapted PECS.

Table 1 shows paired samples statistics of Digital embodiment and hard copy of Adapted PECS. The mean response for a hard copy of Adapted was entirely different from the mean response for a digital embodiment of Adapted PECS (difference of 0.27); there was also a difference in the standard deviations of responses for digital embodiment and hard copy of Adapted PECS. The standard error of the mean for a hard copy of Adapted PECS was greater than that of digital embodiment data. For mean the coding for correct recognition is 1 and 2 for wrong recognition. The mean correct recognition for a hard copy of Adapted PECS is 1.48 and for a digital embodiment of Adapted PECS its 1.05 (nearer to 1). (See Table 1).

Table 1. Paired Samples Statistics of Digital embodiment and hard copy of Adapted PECS

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	**Hard Copy of Adapted PECS**	1.48	43	.15016	.02290
	Digital Embodiment of Adapted PECS.	1.05	43	.09894	.01509

The correlation was 0.324 and significant at 5% level of significance ($p < .05$). Although the correlation was positive but quite low as values above 0.5 are considered as high correlation in table 2.

Table 2. Paired Samples Correlations of Digital Embodiment and hard copy of Adapted PECS

		N	Correlation	Sig.
Pair 1	**Hard Copy of Adapted PECS & Digital Embodiment of Adapted PECS**	43	.324	.003

ISSN: 2223-9944, e ISSN: 2223-9553

PROCEDURE

After a thorough examination, the Heuristic framework was applied for the adaptation of identified pictures which are not culturally appropriate within the PECS. Adaptation committee adapted all those pictures which are culturally sensitive and not appropriate according to the cultural norms and added new pictures which were in accordance to the culture of Pakistan.

DISCUSSION

According to the results that, digital embodiment of adapted PECS identified in a greater percentage of correct picture perception (in other words no response or wrong response percentage was lesser in digitally adapted PECS as compared to the adapted PECS on hard copy). The paired mean response for a hard copy of Adapted was entirely different from the mean response for a digital embodiment of Adapted PECS (difference of 0.27); there was also a difference in the standard deviations of responses for digital embodiment and hard copy of Adapted PECS. The standard error of the mean for a hard copy of Adapted PECS was greater than that of digital embodiment data. For mean the coding for correct recognition is 1 and 2 for wrong recognition. The mean correct recognition for a hard copy of Adapted PECS is 1.48 and for a digital embodiment of Adapted PECS its 1.05 (nearer to 1). So the digital embodiment of adapted PECS resulted in a greater percentage of correct picture perception. The basic purpose of administering the paired t-test was to check whether the means of correct responses on hard copy and by digital embodiment were the same or not. For mean the coding for correct recognition is 1 and 2 for wrong recognition. The difference in means of correct recognition for a hard copy of Adapted PECS and for a digital embodiment of Adapted PECS is 0.42 which is not equal to zero. So there was a significant average difference in means of correct recognition for a hard copy of Adapted PECS and for a digital embodiment of Adapted PECS ($t_{42} = 7.28$, $p<0.05$).

CONCLUSION

This study indicates that PECS ^{PAK} is an effective tool, suitable for the culture of Pakistan, practical and can be time efficient if fully digitally embodied (or its application to be developed for Android).

The digital embodiment of adapted PECS enhanced the perceptual and sensory skills of the autistic children. Through digital embodiment, advanced PECS can be implemented easily on autistic children and in turn it enhances their interaction environment and enables them to socialize in this era of globalization.

RECOMMENDATIONS

On the basis of the results and findings, the following recommendations are proposed:

1. There is a lack of planning to use technology in special educational institutions. A plan must be developed for this purpose indicating needs, funds, maintenance, and staff development requirement.
2. The emphasis should give on the digital technology; computer assisted instructions or learning, drill, and accessories in special education institutions.
3. Special training program of ICT based education should be organized for the teachers, teaching special needs kids.

ISSN: 2223-9944, e ISSN: 2223-9553

4. Parents both educated and uneducated should be trained to teach their child through IT technology as a part of their home based management plan for their special needs children.
5. Current autism curricula need to be revised in the light of global ICT based education plan for such children.

REFRENCES

[1]. American Psychiatric Association, (2000). Diagnostic and Statistical Manual of Mental Disorders. 4th ed., text rev. Washington, DC.

[2]. Barrera, M. J., and F. G. Castro, (2006). A Heuristic Framework for the Cultural Adaptation of Interventions. *Clinical Psychology: Science and Practice, 13*, p. 311-316.

[3]. Bernal. G., J. Bonilla, and C. Bellido, (1995). Ecological Validity and Cultural Sensitivity for Outcome Research: Issues for Cultural Adaptation and Development of Psychological Treatments with Hispanics. *Journal of Abnormal Child Psychology, 23*, p. 67-82.

[4]. Bondy, A. and L. Frost, (2001). The Picture Exchange Communication System. *Behavior Modification. 25*, p. 725-744.

[5]. Domenech, R. M. and E. Weiling, (2004). *Developing Culturally Appropriate, Evidence-based Treatments for Interventions with Ethnic Minority Populations*. In: M. Rastogin and E. Weiling (eds.), Voices of color: First person accounts of ethnic minority therapists. Thousand Oaks, CA: Sage. p. 313-333.

[6]. Eigsti, I., A. B. DeMarchena, J. M. Schuh, and E. Kelley, (2011). Language Acquisition in Autism Spectrum Disorders: A Developmental Review. *Research in Autism Spectrum Disorders, 5*, p. 681-691.

[7]. Frea, W. D., C. L. Arnold and G. L.Vittimberga, (2001). A Demonstration of the Effects of Augmentative Communication on the Extreme Aggressive Behavior of a Child with Autism within an Integrated Preschool Setting. *Journal of Positive Behavior Intervention, 3,* p. 194-198.

[8]. Frost. L. and A. Bondy, (2002). *The Picture Exchange Communication System (PECS) Training Manual.* New York, Pyramid Educational Products Inc.

[9]. Kumpfer, K. L., R. Alvarado, P. Smith, and N. Bellamy, (2002). Cultural Sensitivity and Adaptation in Family-Based Preventions. *Prevention Science, 3*, p. 241-246.

[10]. Lovass, O. L., C. D. Newsom, and C. Hickman, (1987). Self Stimulatory Behaviour and Perceptual Reinforcement. *J. Appl. Behav. Anal., 20*, p. 45-68.

[11]. Resnikow, K., R. Soler, R. L. Braithwait, J. S. Ahluwalia, and J. Butler, (2000). Cultural Sensitivity in Substance abuse Prevention. *Journal of Community Psychology, 28*, p. 271-290.

[12]. Tager, F. H., L. Edelson, and R. Luyster, (2011). *Language and Communication in Autism Spectrum Disorders. In D. Amaral, G. Dawson, and D. Geschwind (Eds.), Autism Spectrum Disorders*. New York: Oxford University. p. 172-185.

[13]. Whaley, A. L. and K. E. Davis. 2007. Cultural Competence and Evidence-Based Practice in Mental Health Services: A Complementary Perspective. American Psychologist, 62(6): p. 563-574.

ISSN: 2223-9944, e ISSN: 2223-9553