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Application of Heuristic Model, A Culturally Sensitive Adaptation of The Picture Exchange Communication System (PECS) For Autistic Children in Pakistan

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Abstract
The present study was conducted for the adaptation of picture exchange communication system (PECS) through the application of Heuristic Model, and the translation of word list of PECS into Urdu. Study was completed into two phases. In first phase, adaptation was done, after the reviews and information gathered through the responses of the pilot and pretesting of the original (PECS) on the sample through convenience sampling (pilot-testing) as the name illustrates, it collects sample data as per the ease of access within the appropriate time (Velozo & Delespaul,2024). Designing daily-life research combining experience sampling method with parallel data. *(*Kennedy, 2013) and simple random sampling for (pre-testing data). In the second phase, word list of PECS (adapted version) was translated into Urdu, according to the guidelines for adaptation and translation suggested by (Farooq & Munawar, (2024). Translation, cross-cultural adaptation and validation of the Quebec back pain disability scale to Urdu language. Foundation University Journal of Rehabilitation Sciences, Barerra & Castro, 2006) Heuristic model's committee approach. Sample comprised of 5autistic children for pilot and 100 normal children for pre-testing of the original (PECS) and 20 committee members. Four committees were made with five members in each i.e. adaptation, translation, back translation, and adjudicators committee. Over all mean responses of autistic children for original PECS in pilot testing was 54.16 and of normal children in pre-testing was 42.81. Similarly, responses of adaptation committee show total 2332 out of 3909 pictures were recommended to be adapted. Overall mean was 54.23. Significant (p) value is less than 0.05, so the ANOVA and Linear model considerably fit for the data. The committee identified almost equal average number of pictures (pilot and pre-testing) which were not or wrongly identified by autistic and normal children, Culture.

Keywords: PECS, adaptation, heuristic framework, intervention, augmentative approach

Introduction

This distinctiveness provides the assurance of the huge cultural fit for the adaptation process (Pawar, 2024). Survey of Cultural Awareness in Language Models: Text and Beyond). Community-based alteration is a promising discipline that boost the efficiency of evidence-based interventions (Jensen, (2024). Community-Based Group Psychoeducation for Informal Caregivers of

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Individuals with Mental Illness: A Single-Arm Pilot Study of Feasibility and Preliminary Effectiveness. Research on Social Work Practice.). Different methods and procedures have been projected to tailor the tools according to a specific community need in an analytical way (Spriggs, Rotman, & Trauth, 2024). Functional analysis of web-based GIS tools for environmental justice assessment of transportation projects. Transportation Research Part D: Transport and Environment, 128), has stated the meaning of cultural adaptation is to modify the tool/system or program according to the norms and values of a specific culture (Rane, Mallick, Kaya, & Rane, (2024). Artificial general intelligence in industry 4.0, 5.0, and society 5.0: Applications, opportunities, challenges, and future direction. Future Research Opportunities for Artificial Intelligence in Industry 4.0 and, 5, 2.). In the adaptations according to a specific cultural, ethnicity, protocol of the program should be kept in mind, by addressing the central ethics, attitude, norms, and many other prominent features of the group, their ideas and their living style (Sánchez Osorio, (2024). The intercultural competence of sixth grade English students in a public pilot educative institution in bilingualism located in Pereira, Colombia.). The societal capability is the most excellent practice highlighting for medical management with minimal cross-fertilization (Bartolomucci, Trasciani, & Gerli (2024). Social and Technological Innovation: Cross-Fertilization Needed. In Improving Technology Through Ethics (pp. 93-105). Cham: Springer Nature Switzerland.).

It is necessary that for the adaptation of the particular instrument, one individual must consider the translation of one language to another language for completing the target language, which is necessary to use with the new version (Cruchinho, López-Franco, Capela's, Almeida, Bennett, Miranda da Silva & Gaspar, (2024). Translation, Cross-Cultural Adaptation, and Validation of Measurement Instruments: A Practical Guideline for Novice Researchers. *Journal of Multidisciplinary Healthcare*, 2701-2728.). So there is the appropriate conversion has the requirement of balanced linguistic treatment, scientific information along with the contextual and cultural framework (Roberts, M., Anderson, J., Delgado, W., Johnson, R., & Spencer, L. (2024). Extending contextual length and world knowledge generalization in large language models.). Moreover, in this area the research provides the suggestion as the bilinguals and the individual translators should be beckoned for the adaptation of the substance into the latest verbal communication (Thomson, C. (2024). *To share or not to share... That is the question. A hermeneutic review of student's experiences of Guidance Counsellors use of self-disclosure* (Doctoral dissertation, Research Space@ Auckland).).

Though, the particular translator be having initial consideration as the perfect fit for the finalization of the transformation procedure (De Jong, H. J. (2023). *Translation as Self-Transformation: Scrutinizing the Process of Religious Conversion Through Translation* (Doctoral dissertation, Université d'Ottawa/University of Ottawa).), the existence of the two translators who are bilinguals is endorsed for the completion of the process, hereby the minimization of threat of psychological, language, societal and together hypothetical and sensible thoughtful biases (Marchiori, W. M. (2023). English as a Lingua Franca in the European Union.). Various recommendations related to the translation put their focal point on the value provided by the translators (Correia, R. C. (2024). Can Portuguese language policy keep up? Balancing the sociolinguistic tightrope

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and the rise of ELF. *Focus on ELT Journal*, *6*(3), 50-75.). The argument with the purpose of translation that must have proficiency in dual languages of attention and must be acquainted by the culture which directly connected to language belongs of each group (Sun, Y., & Lan, G. (2024). Translingual practices in Chinese as a second language writing: Variations across language proficiency levels. *Language Teaching Research*, 13621688241299906.) highlighted that the persons who do translations should have fluency in their source language of the technique or the tool and must be national of the intended language (Bordet, G. (2024). Corpora, Translation, and Teaching of Languages for Specific Purposes. In *The Routledge Handbook of Corpus Translation Studies* (pp. 383-400). Routledge.).

Diagnostic & Statistical Manual of Mental Disorders (DSM-5, 2013) defines Autism as characterized by tenacious insufficiencies in societal emotional mutuality, deficits in -nonverbal expressive actions (including gestures) were used to maintain social dealings-, understanding, in addition to deficits in establishing, maintaining, and accepting social relations (Cerroni, Salatiello, Albano, & Nocerino, (2023). Perspective Chapter: "The Knowing How to Regulate Oneself"–Transversal Competence between Parenting Skills, Biological Determination, Deficits in Primary or Secondary Disorders, and the Role of Specific Rehabilitation in Developmental Age. In *Autism Spectrum Disorders-Recent Advances and New Perspectives*. Intech Open.).

Picture exchange communication system (PECS) is a well-known, effective intervention system (El Arbaoui, El Hari, & Saidi, (2024). Enhancing Communication for People with Autism Through the Design of a Context-aware Mobile Application for PECS. *Journal of ICT Standardization*, *12*(3), 243-270.). It is a kind of alternative and augmentative communication (AAC) approach designed by pyramid educational consultants, and it is mostly used to develop functional skills in autistics (Lutfianti, Ataqi, Asmiati,Putri, Puspitasari, , Widya, & Jazilatusyifa,(2023). The Application of Augmentative Alternative Communication (AAC) Through Picture Exchange Communication System (PECS) Media to Improve Communication Skills of Children with Autism: The Application of Augmentative Alternative Communication (AAC) Through Picture Exchange Communication System (PECS) Media to Improve Communication Skills of Children with Autism. *Educational Insights*, *1*(2), 97-105.). It has been used for many children, from 2 to 16 years age group children, who show communication, cognition, other bodily impairments (Lutfianti,Ataqi, Asmiati, Putri,Puspitasari, idya, Jazilatusyifa, (2023). The Application of Augmentative Alternative Communication (AAC) Through Picture Exchange Communication System (PECS) Media to Improve Communication Skills of Children with Autism: The Application of Augmentative Alternative Communication (AAC) Through Picture Exchange Communication System (PECS) Media to Improve Communication Skills of Children with Autism. *Educational Insights*, *1*(2), 97-105.). In PECS different images on the cards, related to the different categories are used to develop functional communication. For example, an individual may show an image of food to indicate that he/she is hungry. Several pictures of different things from different categories might be used to develop from compound and multifaceted statements (Kumar, Rego, Rao, Nada, Kabiri, Dilip Kumar, & Kurkuri (2024). Understanding the interfacial science of nature-inspired materials for versatile applications. *Surfaces and Interfaces*, 104181.).

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Due to the different and remarkable characteristics of participants, other researches tailored its procedures. (Al-Zahrani (2024). The impact of generative AI tools on researchers and research: Implications for academia in higher education. Innovations in Education and Teaching International, 61(5), 1029-1043.) verified that the addition of names of different pictures in Braille language, allowed a visually impaired person to answer or reply to pictures correctly. (Guzman-Orth, Steinberg & Albee, (2023). English learners who are blind or visually impaired: A participatory design approach to enhancing fairness and validity for language testing accommodations. *Language Testing*, *40*(4), 933-959.) customized this tool for visually impaired persons and the touch method for embossed words on each picture card of PECS is being used. Students have trained to exercise this tool with their peers for requesting, good wishes and response to demand. (Zhu, & Yang, (2024). Research on immersive interaction design based on visual and tactile feature analysis of visually impaired children. Heliyon, 10(1).) states that additionally utilization of PECS with this main aim to develop skills to communicate with peer, so some researches extended its protocol for the purpose of further studies to teach the creative abilities. (Malik, Khan, & Hussain, (2023). How is ChatGPT transforming academia? Examining its impact on teaching, research, assessment, and learning. Examining its impact on teaching, research, assessment, and learning (April 9, (2023). found in experimental research on PECS training method that its procedures require more modifications in some phases of it, to improve the target behavior of some participants (Forbes, Travers, & Vickers Johnson, (2024). A systematic review of acquisition and mastery of skills taught using the Picture Exchange Communication System. Augmentative and Alternative Communication, 40(2), 100-114.).

The tailored version of PECS with an autistic child who has hearing impairment also. (Amanah, & de Oliveira, (2023). Picture Exchange Communication System (PECS) implementation program for children with autism spectrum disorder. Codas, 35(4) On the whole, results established the increase practical interaction skills. It has been discussed through the above-mentioned past studies that, PECS has been needed to be modified and adapted if the participants did not obtain the required skills or in other words did not fulfills the cultural and learning needs (Kody's, Perry, & McFee, (2022). Picture Exchange Communication System® (PECS®) use in a community setting: A preliminary investigation. Journal of Developmental and Physical Disabilities, 34(5) On the other hand, the findings of the above-mentioned researches suggested the need for adaptation and the effectiveness of PECS and the usage of one prompter, continuously time delay and oral prompts as well (Almutairi. (2023). The effectiveness of the Picture Exchange Communication System (PECS) in treating echolalia in autistic children. Migration Letters, 20(S10), 779-787.).

Methods

As the research required pilot testing and pre-testing of PECS, so experimental research design was deployed.

Phase 1. Adaptation of original PECS

In this phase, cultural adaptations of the original PECS were the main focus. In

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pilot testing, five autistic children were participated as respondents; they were diagnosed according to the DSM-V criteria by the rehabilitation team of National Institute of Rehabilitation Medicine (NIRM) Islamabad. Pilot testing was conducted with the sample of 5 autistic children. After pilot testing of original PECS on 5 autistics, it has been (original version) shown to the 100 normal children of 5-10 years of age from primary section of two model colleges for boys and girls Islamabad, selected through simple random sampling (50 girls & 50 boys from each model school). The reviews and information gathered and the responses of the pilot testing and 100 normal children was integrated to make preliminary changes in the original PECS intervention. After an extensive literature search, a heuristic model for the society based alteration of intervention was used.

For this purpose, the researcher made a PECS implementer team (consisted of two senior teachers, two special educationists, and one speech therapist) who had the understanding of the PECS program and autism as well. A self-developed checklist with the options of correct recognition, wrong recognition/no response was used by the PECS implementer team to collect the responses of the children. This procedure took two months and on daily basis two hours. The researcher considered as a person who is developing this program. Also check the recommended replacements through the considerable remarks for the protection of this intrusion tool.

For the cultural adaptation of PECS, an “adaptation committee” (consisted of one psychologist, one speech-language pathologist, two special educationists, and one educationist) was made, these team members were bilinguals and had an understanding of the autistic children and PECS program and culturally aware. The main task of the adaptation committee was to observe the cultural relevancy of the PECS content, to identify the disparities and suggest the modifications, and mark the changes required in the content and maintain its protocol. Adaptation committee members have marked their responses on the self-developed checklist with the options of (Change/replace, delete, repeated item and correct). A total of eight committee meetings consisting of 4 -6 hours each were conducted.

During the course of these meetings, all the adaptations were thoroughly reviewed. Alteration leads to the substitution and alternate, modifications plus deletion of some objects. Then team again asked to maintain the adaptation, its sense, and complexity of pictures maximum related to the actual tool. Direct comprehensive and thorough conversation meetings were completed to recognize and highlight the equally surface and deep construction changes of pictures within the PECS.

Phase 2. Translation of the word list of PECS into Urdu

As the translated version of PECS word list is not available so the second phase involved the manifold onward transformation of the word list of PECS into the national language of Pakistan that is Urdu. Barrera & Castro (2006) defined the following guiding principles to carry out the translation into Urdu.

In the initial part the word list of PECS was translated into the national language of Pakistan that is Urdu. Original English version list of words of PECS was given to the translation committee of five members for the purpose of translation (researcher herself, one Ph.D. student of psychology, one M. A English literature,

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one M.A Urdu literature, and one speech-language pathologist) and they all were considered as bilinguals and they have finalized the procedure through four consultations, three and half hour for each consultation. They were asked to translate the word list of adapted PECS individually into Urdu and also maintain the sense of the translated part close as much as possible to the actual content.
The next step of translation involved the committee of five adjudicators (supervisor, two educationist and two psychologist) all were decisively analyzing all the translated material and choose mainly the appropriate and contiguous translation into Urdu of the word list of the PECS. A team of adjudicators has finalized the procedure through the six consultative meetings, spend approximately three and a half hours for each consultation.
This Urdu translated measure was again given to a back translation committee of five bilinguals (two M.A Urdu and two M.Phil in English literature and one MSc in Psychology) to translate this Urdu list into English again that is technically called the back translation. The back translation team were not included in the translation committee, they have completed the process through four consultations, three and half hour for each consultation.
Then again adjudicators committee of five (supervisor, two educationist and two psychologist) and researcher were meticulously and carefully evaluated the word list of PECS. The team critically does the scrutiny of back translation; the main purpose is to check whether the translation of the actual tool was sufficient or not. Finally, the adjudicators committee critically does the scrutiny after translation and back translation. The committee has decided to add or change the pictures after considering the results of pre-testing with further related to society and its norms. And at last, scrutiny was completed by the translation committee, back translation committee and adjudicators committee and the word list of PECS was finalized.

Sample

A sample of 125was drawn for research. The participants of the research study were allocated to three experimental groups' namely pilot testing, pre-testing, and Cultural adaptation of PECS. Sample comprised of (5) autistic children for pilot testing of original PECS and (100) normal children for pre-testing of original PECS and (20) committee members for the adaptation of pictures within the PECS and translation of the word list of the PECS.

Instrument

Three thousand nine hundred and nine (3909) picture cards of the original PECS with 43 categories were used for this study (Frost & Bondy, 2012). Over all mean responses of autistics in pilot testing for original PECS was incorporated in the adaptation process (McKleroy et al., 2006). As the overall weighted mean of no response and incorrect response of autistic children on original PECS was 54.14. Main protocol of the PECS were remains the same (Card, Solomon, & Cunningham, 2011; Mckleroy et al., 2006). Overall mean responses of respondents during pre-testing (original PECS) on 100 normal children was 42.81(wrong recognition by normal children). An organized alteration of PECS was conducted through a heuristic model designed for the modifications based on the cultural norms and values (Castro, Barrera, &Holleran, 2010). Overall mean responses of adaptation committee was 54.23.Self-developed check list

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with the options of correct recognition, wrong recognition/no response was used similarly one list for normal children with the options of correct recognition, wrong recognition/no response and another self-developed checklist for committee members, with the options of change/replace, delete, repeated item and correct was used. Complete PECS list of words in English for translation into Urdu, it includes the total 43 categories.

Procedure

After a thorough examination, the heuristic framework was applied as a culturally based intervention for the adaptation of identified pictures within the PECS, to ensure their suitability for autistic children in Pakistan. Both boys and girls studying in the model schools of Islamabad were approached through simple random sampling along with the convenience sampling was administered. In the initial stage information was gathered and it was aimed to pre-test the original instrument (PECS-pictures) on the sample of five autistic children and 100 normal children to assess the problems regarding identification and cultural relevancy in the original pictures. In the next step preliminary adaptation changes was assimilated after the identification of culturally inappropriate pictures and Heuristic framework for the adaptation of pictures within the PECS, and translation of the word list of PECS was applied to ensure their suitability for autistic children in Pakistan.

Results

Measures of Central Tendency (Mean) and percentage analysis were conducted to identify the pictures of PECS which were culturally sensitive. Mean response of 5 autistic children, 100 normal children and 20 committee members regarding 43 categories of PECS were calculated. The results depicted that on average committee members identified the same number of pictures of PECS for adaptation which was incorrect or not recognized by autistic children (See Table 1).

Table 1: *Overall mean response of autistic children for original PECS (N=5)*

Pilot Testing Autistic Children (N=05)			
No of Items Mean (No response	Overall weighted (correct +No response	Percentage & wrong response)	Percentage (Incorrect response)
3909 (43- 54.16 Categories)	40%	60%	

Table 1 shows the overall weighted mean response of autistic children for forty-three categories of original PECS (N=5). The overall weighted mean of no response and incorrect response of autistic children on original PECS was 54.16, and overall mean was 60 approximately, showing the urgent need to adapt PECS. So autistic children of Pakistan can fully recognize it and use it for communication.

Table 2: *Overall mean response of respondents during pre-testing (original PECS)*

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Mean Response	Pre-Testing-Normal Children (N=100)	# of Items
	Correct Wrong	
Total	2051 1858	3909
Overall Mean	Pre-testing (Wrong Reconition byNormal Children 42.81	43 Categories of PECS

Table 2 illustrates the overall mean response during pre-testing of original PECS. As per table total 1858 out of 3909 pictures of original PECS were wrong recognized by normal children of Pakistan. Overall mean was 42.81 in pre-testing (wrong recognition, normal children).

Table 3: *Overall mean responses of adaptation committee members (original PECS)*

Mean Response	**Adaptation Committee Members (N=5)**				**# of items**
	Delete	**Correct**	**Replace**	**Repetit**	
Total	603	1577	926	803	3909
Overall Mean	Committee Changes (Delete + Replace + Repetition)		54.23		43 Categories of PECS

Table 3, indicates the overall mean response of adaptation committee members for original PECS. As per table total, 2332 out of 3909 pictures of original PECS were recommended to be adapted. Overall mean was 54.23 (delete, replace and repeated item).

As the significance value (p) is less than 0.05 in Table 4 so the regression model significantly good fit for the data. Moreover, it also depicts that all 3 groups (Pilot-testing, Pre-testing and Committee) showed the different average number of pictures which need to be adapted. To check which average differs, an overall average of respondents of the study for 43 categories of PECS was calculated which depicts that Committee identified an almost equal average number of pictures which were not or wrongly identified by autistic children and normal children (See table4).

Table 4: *ANOVA and Linear Model Summary*

	Sum of Squares	**DF**	**Mean Square**	**F**	**Sig.**	**R**	**R Square**
Regression	78090.130	2	39045.065	286.6	.000[b]	.9	
on				98		67	
Residual	5447.544	40	136.189			a	.935
Total	83537.674	42					

R-value (0.967) shows a high degree of correlation and R^2 show that 93.5% of total deviation in Committee results can be expounded by the responses of

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autistic and normal children (See table 4).

Translation Committee	Adjudicator Committee	Back Translation Committee	Adjudicator Committee
Total words 3909 translation into Urdu 100% translation into Urdu	Selected Correct translation into Urdu 3809 words 97.44 % correct translation	Total words 3909 translation Into English 100% translation into English	Selected Correct translation into English 3905 words 99.89% of correct translation

Table 5: *Percentage analysis translation committees (adapted PECS)*

Table 5 depicts that translation committee translated total 3909 words list into Urdu, and adjudicators committee selected the correct translation of 3809 words, 97.44% and back translation committee translated the total 3909 words into English and again adjudicators committee selected the best back translated content into English that is 3905 words, 99.89% and review the complete list of 3909 and finalize it accordingly.

Discussion

The main aim of the current study was the adaptation according to the culture of Pakistan and the translation of word list of PECS into the national language of Pakistan, Urdu and the outcome measure for the children of Pakistan. These objectives were achieved through the conduction of steps defined by Barrera and Castro (2006) with various phases of their own. Orderly and organized tailoring was conducted through a heuristic model designed for the community-based modification (Castro, Barrera, & Holleran, 2010). Their wide-ranging alteration model suggests the stages. The probable ethnically incompatible basics in the PECS, be recognized in the initial step of "Information collection". Verbal communication, religious conviction, and society willingness measured same as a probable variance. This thing should be kept into the mind that the society and ethnicity-based alterations of pictures within the PECS, must be followed by the recommended strategy and procedure (Frost & Bondy, 2012). PECS intrusion plus the outcomes were interpreted into our national language, Urdu. The recommended group review initial version of the PECS to classify inadequacies of change (Barrera & Castro, 2006). Basic parts of the PECS were not changed (Card, Solomon, & Cunningham, 2011; Mckleroy et al., 2006). At this point, our main concern was, that changes must be incorporated where required. Interview, focus group discussions with the stakeholders of special education, committee members, teaching staff and participants is too completed.

Feedback collected in the pilot testing is utilized in the next stage of "alteration modification" for the purpose of made changes in the original altered edition (McKleroy et al., 2006). These all stages as joined together elaborated the quantitative data for making the valid decisions related to the intervention

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adaptation. The stages include the gathering of all the relevant information, making the essential preliminary adaptation design, making the essential preliminary testing, making all refinement of the adaptation and making the trial for the final implication of the cultural adaptation. According to Christy Wallis, Director Operations Pyramid Educational Consultants, 2016, pictures of PECS images has been adapted into the following cultures: English, French, Greek, Italian, Japanese, Spanish, Brazilian, Portuguese, German, and Korean.

Alteration procedure of pre-testing was finished in the initial phase of this study. It begins with the pilot testing of the real instrument (PECS) on the sample of five autistic children and pretesting of the original version on a relatively large sample of 100 normal children. The results of this phase give the experimental proof for adaptation and translation of PECS according to Pakistani autistic population.

Consequently, the consultation was taken from the twenty (20) member's adaptation team in the current study for adaptation of pictures within the PECS and translation of the word list of PECS. Team for adaptation, were comprised of five (5) members, they all are bilingual and had an understanding of the autistic children and PECS program and culturally aware. A total of eight committee meetings consisting of 4-6 hours each were conducted.

Committee for translation was comprised of five members for the purpose of translation. In the first part in ward transformation of the PECS's English original word list into the national language of Pakistan, which is Urdu was done. In the second step of translation, the team approach of five judges were analyzed the translated material and choose the appropriate translation into Urdu. These Urdu translated measure was again given to a back translation team of five bilingual experts to translate this Urdu list into English again. Team members of back translation and researcher were meticulously and carefully evaluated the word list of PECS (Castro, Barrera, & Holleran, 2010).

Then again adjudicators committee of five were meticulously and carefully evaluated the wordlist of PECS and critically does the scrutiny of back translation, to check whether the translation of the actual tool was accurate or not. Sample reply option designed for many pictures be also changed and tailored and the unfamiliar names of pictures in all categories were changed with the ordinary and general names. Significantly, with the intention of the translation of word list, the entire latest translated words into the national language that is Urdu all along through the responses of sample be chosen plus incorporated the changes(Castro, Barrera, & Holleran, 2010). Earlier than giving the final touch to the altered pictures within the PECS and the translated word list of PECS for the field testing, the slight changes to be done. Both clinical and statistical methods were implemented for the purpose of alteration and modification in the current study. The researcher found that foods items, occasions, people and character categories had shown the high score for alteration which has taken place through the gathered information (Georgas et al., 2008).

So, it has been concluded that these findings and analysis confirms that the current study is considered as the first step; it is not the end, so reviews regarding its community-based relevancy and psychometric potential are highly suggested (Georgas et al., 2008). In another word it's the pioneer effort in this region to provide this tool with adaptation to rehabilitate the autistic population.

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Limitations &Future Recommendations

The convenience sampling technique was applied and the range of the research study limited to the Government and private normal and special education institutions of Islamabad and Rawalpindi (Twin cities of Pakistan). Current study found 2332 pictures of PECS were culturally sensitive and adapted accordingly and word list of PECS was translated into Urdu. At last, in this study autistic children were included so it is recommended that adapted PECS is a best tool for autistic children specially to develop functional communication.

On the basis of the results and findings, it has recommended that PECS, in recognition of its effectiveness and easy applicability, shall be introduced to the special education institutions of Pakistan where it can be used as an intervention program for all children with communication difficulties. As $PECS^{PAK}$ is suitable for the Pakistani culture and it improves the communication abilities of autistic children, so it should be used as a teaching tool. In order to make practical utilization, teachers and professionals will have to master a variety of powerful tools, redesign their lesson plans, and solve the logical problems of how to teach a class of students having special needs, specifically autistic children. Parents, teachers, audiologists, psychologists, occupational and vocational therapists and teachers should all work as a team in order to develop the functional communication skills in autistic children.

Implications

This research study has been undertaken to apprehend the adaptation of picture exchange communication system (PECS) for the autistic children of Pakistan. PECS images have already adapted in ten cultures and now, eleventh time the pictures of PECS images have been adapted, and word list translated into Urdu language for Pakistan according to the norms of Muslim culture and south Asian environment, and same methodology was followed for the contextualization and localization of the pictures within the PECS in this study, as followed by other countries.

Conclusion

The paradigm of adaptation of pictures within the PECS and translation of wordlist into Urdu is value learning because it is a significant variable that leads to numerous constructive results at work. As the current study attempted to adapt the pictures within the PECS and translate the wordlist into Urdu (adapted version), which is an extensively used instrument to develop functional communication skills in autistic children. There are many pictures which were not identified within the PECS regarding cultural appropriateness, difficulty level and comprehensibility in multiple categories of original PECS. It is found out that adaptation committee adapted a greater number of pictures as compared to those which were identified by normal children in pre-testing phase, because adaptation committee adapted those pictures which were repeated or blur in PECS, either correctly or incorrectly recognized by normal children in the pre-testing phase, and adaptation committee added 2332 new pictures out of 3909 pictures which were in accordance to the culture of Pakistan. With the help of translation committee and the back translation committee, and adjudicators committee, the adapted list of PECS was translated into Urdu Language.

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