Promoting Android Application as an Intervention Strategy for Toilet Training to the children with Autism Spectrum Disorder.

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Abstract

Learning happens through various means and modes. One such mode is Android application to teach the utmost important basic activity of daily living skill to be learned by the children with Special needs in order to manage themselves as independently as possible in their basic routines. The present study focused on teaching toileting skill to the children with Autism by using mobile application which gives both audio and visual inputs as instructions to perform the skill in step by step manner. Pre and posttest control group design was used for this study and results revealed that there was a significant difference in the achievement of the Toileting skill between Experimental and Control group indicating that the Android application is more effective in achieving the toileting skill compared to the traditional picture flash card method.

Key Words: Android App, Toilet Training, Autism Spectrum Disorder.

1.0 Introduction:

Learning skills to perform activities of daily living by the children with autism and other neurodevelopmental disorders is indispensible to lead an independent life through special education services. Special education refers to specially designed instructions which meet the unique needs of an exceptional child by using special materials, teaching techniques and providing necessary facilities. Also it is essentially meant to develop confidence and competent among children with special needs with different teaching leering strategies to enhance the skill development. Skilling in Toileting is one of the utmost important basic activities of daily living to be learned by the children with special needs. Perhaps the parents, those who have children with physical, intellectual, or developmental disabilities can appreciate the toilet-training process as a way to follow and celebrate a child's overall growth (Healthy children.org>toilet training children with special needs). Children with Autism usually face difficulties in performing toileting skill and need prompts or complete support even at basic level like indicating toileting or identifying the toilet to the higher level skill of washing after toileting. This daily routine task to be taught by the parents in the natural setting and at natural call time by applying suitable teaching strategies. Training toileting activity to the children with autism is depends upon the learning styles of the individuals. And since these children are visual and auditory learners and teaching trough mobile and tabs with available apps may be feasible teaching strategy. However technology plays a vital role in training not only the academic skills but also to teach functional skills like food preparation (Devid 2010) , purchasing skills in grocery store (Devid & Morgan 2008), augmentative communication skills (Cronin 2006) and toilet training through video modeling technique (Clara Yun Qi et al. 2014) as teaching strategies. One such another platform for teaching basic activities of daily living including toilet training could be digital app though android mobile phones and tablets. The apps are of relevance to cases of physical as well as mental disabilities, namely hearing impairment, visual impairment, autism and speech articulation disorders (Jalal Ismaili & El Houcine Ouazzani Ibrahimi, 2016). Many apps available for training and learning of various skills by differently abled like LetMeTalk: Free AAC Talker, Speech Assistant, Autism Therapy with MITA, JABTalk etc., (https://www.educatorstechnology.com/2018/05/9-good-android-apps-for-students-with.html)

2.0 Review of Literatures:

The world of technology enhances the skills among the individuals irrespective of gender and qualification. Both teachers and parents of children with special needs are interested in using mobile technology for teaching and learning purpose as they are comfortable to use at any place. The present study using the app KAVI-pts a customized mobile app to teach various concepts to the children with special needs as it is flexible to insert pictures and sounds as visual and auditory instructions to the children with autism as they are visual and auditory leaners. The mothers of the children with special needs feel comfortable in using mobile apps in training their wards as visual reminders. David (2010) studied on the effect of computer-based video instruction to teach life skills and he found that role of CBVI as a tool for reviewing previous levels of performance. Toni (2010) studied on comparison of Picture and video prompts to teach daily living skill to individuals with Autism and he found that the video prompting was considerably more effective than picture prompting. David and Morgan (2008) conducted a study to evaluate the effect of multimedia computer-based instruction (CBI) program to teach grocery store purchasing skills to three high school students with intellectual disabilities. A multiple baseline design across participants was used to measure the computer performance mastery and grocery store probes to evaluate the CBI. After introduction of CBI all participants increased correct purchasing skills. Delivering Instruction is a crucial part of the training program which depends upon the style of the learners. Cronin (2006) conducted a study on Computer-Based video Instruction to teach the use of Augmentative and alternative communication Devices for ordering at Fast-food restaurants, and he supported his result that CBVI is one solution for providing instruction in a simulated environment when community-based instruction is limited. Most of the studies have been conducted using digital media in teaching domestic skills, arithmetic skill, and literacy skills but not on personal skills like brushing, bathing, dressing, toileting. The main focus of teaching toileting skill to the students of Autism spectrum disorder is to make them as independent as possible in that particular skill. There are enough studies have been conducted on toileting skill training by using other techniques and strategies but not using digital android application. Considering the importance of the digital media in teaching personal skill of toilet training, the investigator made an attempt in the present study to fill the gap.

2.0 NEED & SIGNIFICANCE OF THE STUDY

The purpose of the present study is to find the effect of android application (Kavi-PTS) in promoting toileting skills among students with Autism Spectrum Disorder. It was proved in research studies that the digital media is successful in teaching different skills and to enhance desirable behaviors of students with Autism Spectrum Disorder and other disabilities. The ultimate aim of education is to lead towards personal adequacy, social competence and economic independence. Therefore training in toileting skills is important to include the children with autism in the mainstreaming society. Also to reduce the burden of the care takers and enable the child as an independent being in the basic important every day's routine task so that he/she can focus on functional and literacy skills.

3.0 STATEMENT OF THE PROBLEM

The present study aims to find the effect of android application Kavi-Pts (picture to Speech) for training toilet skill among the students of Autism Spectrum Disorder.

4.0 OBJECTIVES OF THE STUDY

- To find out the effect of android application Kavi-Pts (picture to Speech) for toileting skill achievement among experimental group.
- To find the effect of traditional method using picture flash cards for toileting skill among control group.
- To compare achievement scores on Toileting skills between experimental group and control group.

5.0 HYPOTHESES

- There is a significant difference between pre and post-test mean scores on toileting skill achievement among experimental group.
- There is a significant difference between pre and post mean scores on toileting skill among control group.
- There is a significant difference between post-test of experimental group and control group on toileting skill.

6.0 RESEARCH METHODOLOGY

The present study on "Promoting Android Application as an Intervention Strategy for Toilet Training to the Children with Autism was conducted in the context of training toileting skills using android phone and tab for digital pictures with recorded sound in order to find the effect of digital app (KAVI-PTS) on achieving toileting skill among the students with ASD of age group 7-10 years who are attending primary-I class. For conducting the present study, experimental method of pre-test post-test control group design was used. The sample for the present study consists of 10 students with moderate Autism, within the age group of 7 to 10 years studying in primary-I level attending to the special school in Pondicherry. A group of available students with moderate

Autism spectrum disorder within the age group 7-10 years were assessed in Toileting skills. A check list was prepared by the researcher for assessing the current functioning level in Toileting skill. Based upon the performance level on underpinning skills , 10 students who have scored in the range 80-90% were included in the study. The 10 students were allotted in matched groups to establish homogeneity among the experimental and the control group. Each group contains 5 subjects. The matched group subjects were allotted in the score range of 80-82%, 83-85%, 86-87%, 88-90% and 91-93% as acquired by them in accordance to the pre-requisite check list. In the present study, the researcher has administered self-prepared checklists validated by 15 special educators and senior professional in special education.

7.0 DATA ANALYSIS & INTERPRETATION

Data collected during intervention have been tabulated and the mean, SD, Wilcoxon Signed Rank Test and Kolmogrov-Smirnov Tests were used for analysis. The details of analysis and interpretation of results are discussed below.

Table: 1 Comparison of Pre-Test Mean Scores of Experimental and Control group:

Group	N	Mean	SD	Mean Diff	Kolmogorov-Smirnov test "Z"-value	Level of significance
E-Pre	5	31.80	10.159	1.80	0.550	NS
C-Pre	5	30.80	6.760		0.700	

The above table presents the results from Kolmogorov-Smirnov test of normal that the p values of Experimental pre test p= 0.923, Control pre test p = 0.711, Experimental post test p = .997 and Control post test p = .809, the p values of Kolmogorov-Smirnov test is greater than 0.05 which states that the data follow a normal distribution. Hence, we can use the parametric test for further analysis.

It is evident from the table 1, Pre –test mean score of Experimental Group is 31.80 (SD=10.159) and Pre –test mean score of Control Group is 30.80 (SD= 6.760) which shows that there is no difference between pretest mean scores of Experimental and Control Group who received training in the Toileting skills. "Kolmogrov Smironov test was used to find out whether this difference in the mean scores is statistically significant or not. The obtained 'Z' value is 0.550 and 0.700 which indicates that there is no significant difference between Pre-Test mean scores of Experimental and Control group. Hence there exists homogeneity between the groups.

Achievement of Experimental Group on Toileting skills
Table 2: Comparison of Pre and Post Test Mean Scores of Experimental Group (Kavi-PTS)

Group	N	Mean	SD	Mean Diff	"t" Value	df	Sig. (2-tailed)
E Pre-Test	5	31.80	10.159	-4.40	-3.641 p<0.05	4	0.022
E Post-Test	5	36.20	10.159				

Table 2 shows that there is an increased difference in pre and post-test mean scores of Experimental group who received training in Toileting skill through android app (Kavi-PTS). The Pre-test mean scores 31.80 (SD=10.159) and Post-test mean score is 36.20 (SD=10.159) and difference in mean score is -4.40. Paired t-test was used to find out whether there is any significant difference between pre and post-test mean scores of Experimental group. The obtained t value (t) of -3.641, the degrees of freedom which is 4, and the statistical significance (2-tailed p-value) of the paired t-test which is 0.022 . As the p-value is less than 0.05 (i.e., p<.05), it can be concluded that there is a statistically significant difference between two variable scores. Hence it is significant at p < 0.05 level which indicates that the intervention through android app (Kavi-PTS) has positive effect on achievement of Toileting skills among the students with ASD. Thus the hypothesis "There will be a significant improvement between pre and post test scores on Toileting skill achievement among experimental group" is accepted.

Achievement of Control group on Toileting Skills:

Table 3: Comparison of Pre and Post-Test Mean Scores of Control Group:

Group	N	Mean	SD	Mean Difference	"t" Value	df	Sig. (2-tailed)
C Pre-Test	5	30.80	6.760	-2.40	-4.000 p<0.05	4	.016
C Post-Test	5	33.20	6.611				

From the above table 3, pre and post-test mean scores of Control group are 30.80 (SD=6.760) and 33.20 (SD=6.611) and the mean difference is 2.40. This indicates that there is a difference in the Pre and Post -test mean scores of Control group who received intervention in Toileting skills through traditional method (picture flash card method). The obtained t-value (t) of -4.000, the degrees of freedom which is 4, and the statistical significance (2-tailed p-value) of the paired t-test which is .016. As the p-value is less than 0.05 (i.e., p<.05), which indicates that there is a positive effect of traditional method of using picture flash cards in the performance of toileting skill among the subjects of control group. Hence the hypothesis "There will be a significant improvement in pre and post-test mean scores on Toileting skills among control group" is accepted.

Comparison on the achievement of Toiling skills among experimental and control group:

Table 4: Comparison of Post-test Mean Scores of Experimental and Control group:

group	N	Mean	SD	Mean Diff	Kolmogrov Smirnov test "Z"-value	Level of significance
E-post	5	36.20	10.159	3.00	0.400	0.05
C-post	5	33.20	6.611		0.639	

The above table-4 shows the post test-mean scores of toileting skill of students with moderate ASD in experimental group and control group. The post-test mean scores of both the groups are (10.159) and (6.611) respectively and difference in mean scores is 3.00. Kolmogrov-Smirnov test was used to find out whether the difference in these mean scores is statistically significant or not. It can be seen from the table that the p values of Experimental posttest p = 0.997 and Control posttest p = 0.809, the p values of Kolmogorov-Smirnov test is greater than 0.05 which states that the data follow a normal distribution. As it is evident from the above table the obtained Z value is 0.400 and 0.639 which is significant at p < 0.05 levels which indicates that the subjects in the experimental group (through Kavi-PTS) have shown higher achievement in Toileting skill than control group (through traditional method of Pictures). Hence the hypothesis "There will be a significant difference between post-test mean scores of experimental and control group on achievement of Toileting skills is accepted.

Subjects with Autism Spectrum Disorder have the ability to learn the activity with android app technique of Kavi-PTS. This has slight positive way to perform the activity with motivation of attracted colorful digital pictures and achieved more score in toileting skill among the Students of ASD than the control group who learned the skill through picture flash cards.

Table 5: Comparison of session-wise means scores of Experimental group and Control Group.

Group	Pre-test	5th	10th	15th	Post-Test
Exp	31.80	33.00	33.40	36.00	36.20
Ctr	30.80	32.00	32.80	33.20	33.20

Table 5 shows the mean scores of both the Experimental group and Control group at different intervals. It is observed that there is a gradual progress in both the groups and the Pre-test mean scores of the subjects in both the groups are 31.80 and 3.80. It is evident from the above table that each session shows the performance of experimental group is slightly more than the performance of control group. The reason for such difference may be that the digital pictures are more attracted with recorded mother's voice as it is more familiar voice to the child.

8.0 LIMITATIONS OF THE STUDY

- The period for collecting the data was short. As we are dealing with students with ASD, they require more time to get accustomed to new things, as far as this intervention results are concerned they showed significant improvement on achieving Toileting skills. However more better and reliable results can be obtained if the study is conducted for a longer period of time.
- It is little difficult for the mothers to operate the android phone/tab in the toilet as if it might fallen in the toilet commode or in the bucket of water while operating it.
- Discharging battery power of the android phone or tab is one of the limitations while training the skill.
- Limited Water supply for few households was one of the limitations in the study.
- Interest in playing games cause for diverting them while learning toileting skill.

9.0 DIRECTION FOR FUTURE RESEARCH

On the basis of findings obtained in the present study a few research questions are apparent. The following suggestions for future research are:

- Studies in the area of teaching skills in various domains like personal, social, academics, occupational using Android apps technique among students with Autism Spectrum Disorder and other disability are very limited. So there is need to conduct more research in these areas using available android apps.
- The present study revealed that, android app (KAVI-PTS) is effective in learning toileting skill. So using this kind of customized applications, the other functional skills can be trained to various categories of children with special needs.
- The present study was conducted on students with moderate ASD of the age group 7 to 10 years old who are attending to primary-I class. Further studies need to be conducted in persons with different age group with different severity levels of ASD to find out whether it produces similar effects. The findings of the study will have direct implications to teachers, parents in selecting strategies for teaching personal skills.

10.0 CONCLUSION

The present study has revealed that the android app (KAVI-PTS) is effective technique as instructional strategy in training Toileting skill to the students with ASD. It is reported by the mothers that during the intervention, all the subjects of both the groups except one or two were enthusiastic to perform the skill. The subjects in experimental group were more enthusiastic since they were receiving training through multi sensorial methods through digital app. This helps in sustaining the motivation of the subjects of experimental group throughout the learning sessions. This in turn resulted in better achievement by the subjects from the same group.

It was reported that the children were focusing and operating when mother keeps the phone in the hand for listening to the audio with picture by scrolling the pictures. Mothers reported that the children were able to initiate and imitate the task to perform by seeing pictures like removing and wearing the pant/panties, pouring water into the toilet, showing gestures to wash the bottom etc.,

It is clear from the study that the students with Autism Spectrum Disorder could learn the skills in better way by using digital android application

The result of the study further support that teaching toileting skill using android app (Kavi-PTS) was effective teaching strategy as in a better way of expressing by the children with ASD through performance of various tasks involved the skill. A variety of personal skills can be taught by using this kind of digital apps as they are factors of attraction and motivation.

The findings of the study have implications for innovative way of teaching personal skills through this method. A variety of pictures according to the child's level and choice with male or female voice recordings can be uploaded with different sub groups. Further the same procedure can be applicable to other categories of disabilities like intellectual disability, learning disability for promoting different functional skills like cooking, washing, and functional academics like time concept, money concept and broad variety of social skills by using this kind of customized apps.

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