

USING VISUAL PROMPT APPROACH IN PARENTAL INTERVENTION TO IMPROVE THE TOILETING SKILLS OF CHILDREN WITH AUTISM SPECTRUM DISORDER

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Abstract

Past studies in autism have shown that individuals with Autism Spectrum Disorder (ASD) exhibit impairments in their toileting skills due to their cognitive skills. Hence, a 10-month intervention programme was developed to help ASD children aged 3 to 5 years old to master toileting skills. This multiple baseline design study sets out to examine the effectiveness of a parental intervention. Moreover, a visual prompt approach was used in the intervention and it helps to enhance the child's processing ability. Quantitative data collection (frequency recording forms) were used to record the number of occurrences on the targeted behaviours on their toileting skills which then converted to percentage correct to find out the mastery criterion level of the children. The findings showed that five children with ASD had successfully satisfied (80% above) most of the performance criteria on the toileting skills that had been taught to them by their parents. In contrast, the whole performance criteria on the toileting skills were only mastered well by one of the subjects. This finding has proven that early intervention on toileting skills based on parents and learning tools (busy bags) may help motivate learning among children with ASD.

Keywords

Autism, visual prompt, multiple baselines, parent-training, toilet-training, toileting skills

Using Visual Prompt Approach in Parental Intervention to Improve the Toileting skills of Children with Autism Spectrum Disorder

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Abstract

Past studies in autism have shown that individuals with Autism Spectrum Disorder (ASD) exhibit impairments in their toileting skills due to their cognitive skills. Hence, a 10-month intervention programme was developed to help ASD children aged 3 to 5 years old to master toileting skills. This multiple baseline design study sets out to examine the effectiveness of a parental intervention. Moreover, a visual prompt approach was used in the intervention and it helps to enhance the child's processing ability. Quantitative data collection (frequency recording forms) were used to record the number of occurrences on the targeted behaviours on their toileting skills which then converted to percentage correct to find out the mastery criterion level of the children. The findings showed that five children with ASD had successfully satisfied (80% above) most of the performance criteria on the toileting skills that had been taught to them by their parents. In contrast, the whole performance criteria on the toileting skills were only mastered well by one of the subjects. This finding has proven that early intervention on toileting skills based on parents and learning tools (busy bags) may help motivate learning among children with ASD.

This research focuses on the intervention programme using a visual prompt approach implemented by parents at home on their children with ASD. A child who has been diagnosed with having a disability that negatively affects their school performance is served by special education and laws that uphold their right to appropriate public education (Doorlag & Lewis, 2011). This includes those with Autism Spectrum Disorder.

Autism Spectrum Disorder

Autism Spectrum Disorder, or also known as ASD, is a lifelong developmental disability and this can give an impact on the understanding of individuals with this disorder. This includes an impact on what they see, hear and sense. It was identified by

Kanner in 1943 (as cited in Anderson, Birkin, Seymour & Moore, 2006) when he '...categorised a group of children whom he described as displaying social aloofness, an indifference to others, and repetitive stereotyped play' (p.11).

Up until April 2014, Thien (2014) mentioned that according to the Developmental Paediatric Services or previously known as Child Development Centre (CDC), Brunei Darussalam has 445 registered autistic patients where 353 of them are males (refer Table 1). CDC stated that every week they recorded one new case of autism among children aged two and above. There is a higher prevalence among males as stated by Alberta Learning in Canada (2003). In 2018, Brunei Darussalam has recorded 4303 registered autistic patients.

The World Health Organization (2017) stated that worldwide, it was estimated that 1 in 160 children has an autism spectrum disorder (ASD) and the occurrence of ASD appears to be increasing globally. A total of 445 registered autistic patients under the Developmental Paediatric Services, Brunei Darussalam, was reported. Among them, 353 were males and 92 were females.

Furthermore, although there are different types of ASD mentioned or identified, the individuals with ASD need help and support from their family especially their parents.

Parental Involvement

Parents' participation is vital for a child's success, and if the parents are not involved in their child's development programme, the probability of success is much lower. The child may be learning better and would probably use the skills they learned more quickly if their parents are involved in the development and implementation of interventions, as the intervention procedures are more likely to be used across contexts and people (Fielder, Simpson, & Clark, 2005).

Due to the mandates of the Individuals with Disabilities Education Act (IDEA, 2004), parental involvement was seen as a hallmark in special education and this requires parents to participate in evaluating their child's educational and transitional goals actively. Furthermore, parents are given more authority and legal rights especially in participating as full members of the Individualized Education Programme (IEP) of their child. Thence, this study focused on the gap in parental involvement especially in Brunei Darussalam and their involvement in

teaching, guiding, as well as facilitating their child with ASD particularly in toilet-training.

Problem Statement

Little research (most of the research study was not published) has been conducted in Brunei especially in toileting skills of children with ASD regarding the use of visual prompts implemented by parents at home. In addition, not much has been done on parent-training programmes that teach parents how to do an intervention using this approach to help improving their child's toileting skills. Drysdale, Lee, Anderson, and Moore (2014) mentioned that current methods used to teach toileting skills to individuals with a developmental disability are based on Rapid Toilet Training (RTT) by Azrin and Foxx (1971) and Response Restriction method (RR). There has been little research conducted on this method for children with ASD.

Autism and Toilet-Training

Toilet-training is commonly delayed in ASD (Yip, Powers & Kuo, 2013) and this was shown in Dalrymple and Ruble (1992) study where 22% (among 100) of the children did not show full success in toileting. To date, toilet-training individuals with ASD has been a priority amongst researchers (Duffy, 2015) because it is difficult due to the length of time needed and the effort to teach children with ASD (Duffy, 2015; Keen, Branningan & Cuskelly, 2007). Paterson (2015) mentioned that children that have been diagnosed with autism might find it difficult to understand what is being asked of them as these children have problems with social communication, social interaction, and imagination. Some children with autism may also be hyper- or hypo-sensitive to sensory stimuli and the

smell of cleaning and personal hygiene, or even bright lighting and fan noises can be distracting, distressing or unbearable. Paterson (2015) added that these children might have ‘...reduced awareness of their body signals and struggle with balance’ (p.18), hence they may feel unsafe or afraid to sit on the toilet. These children also have problems with processing sensory information which can reduce the likelihood of the child to exhibit what are usually considered to be signs of readiness to use the toilet either with or without assistance (Paterson, 2015).

Therefore, this research study aimed to help in improving the toileting skills of children with ASD using a visual prompt approach and busy bags as a tool that suits the context of Brunei, as different cultures will have different toileting skills. Based on previous research on toileting skills of children with ASD, this research study used multiple baseline designs to investigate the effectiveness of the intervention using VPA in toileting skills.

Method

Participants

In this study, 5 children with ASD (age range = 3 to 5 years old) and their parents (parent-child dyads) participated. Children with ASD were recruited through non-governmental organisations after the parents filled in an inclusion criteria form. The inclusion criteria for all participants were that parents were having difficulties in teaching their child toileting skills and they have no obstacle to implement the approach at home as well as being able to take part in the intervention sessions for seven months.

Meanwhile, the inclusion criteria for the children included being diagnosed with ASD, aged between 3 to 5 years old, attended an Early Development Programme, able to listen to their parents’ instructions, able to take part in the intervention sessions for 10 to 15 minutes per session for seven months and able to go to the toilet with assistance.

Materials

This study used busy bags as a tool, and these bags contained five different materials which included the ‘yes/no box’, a poster, a matching game, a flashcard fan, and an ice-cream stick colour match. These materials contained pictures and text on the steps of toileting, dressing and personal hygiene skills. This study used the ‘Visual Task-Analysis’ in developing the materials in the busy bags. Step-by-step support was provided to facilitate the independence of the children in the completion of tasks. These tasks can be more complex, consisting of several sequential steps (Meadan, Ostrosky, Triplett, Michna & Fetting, 2011, pp.32-33).

Procedure

The ethical approval was granted by the researcher’s university and the non-governmental organisation where the research was conducted. The inclusion screening form was sent to the respective parents. Once the participants were identified by the researcher, a consent form was sent to them and participants who were the parents of ASD children in the selected organisation were notified regarding the parent-training programme. Five sessions in the parent-training programme were conducted with the parents, and parent-training evaluation was

given in the last session of the training programme. Once the training programme finished, the parents implemented the intervention at home on their ASD children. The intervention programme lasted for around ten months in which one month was spent for baseline, seven months for the intervention phase and another two months for the retention phase. During this time, the parents used the tools from the busy bag and a frequency recording form for data collection. In summary, these parents were made aware of the objectives and the nature of the research study.

Intervention Programme

The intervention consisted of three phases; 2 to 3 sessions of baseline, 5 sessions of the intervention phase, and 3 sessions of retention phase.

Baseline

In this stage, the intervention has not been implemented, and the duration was based on each participants' behaviour in performing the toileting skills; two sessions for Child A, B and C, and three sessions altogether for Child D and E. No instructions were given during this stage as parents helped their child in performing the skills before the implementation of the intervention. Parents observed their child in a 'natural observation' and filled in the frequency recording form to record the number of occurrences of the targeted behaviour performed by their children.

In addition, according to Tawney and Gast (1984), the data collected during the baseline must show an acceptable level and trend stability (p.227) before implementing the intervention. In this current study, the data

collected during the baseline exhibit stability in the level and trend after two or three sessions for each child. Hence, the researcher advised the parents to implement the intervention after two or three sessions. In relation to that, in this current study, two to three baselines were recorded, and the baselines represented responses of five different participants and responses of eight different behaviours of the same participant.

Intervention phase

After baseline, the implementation of VPA took place at home by the parents. This phase lasted for seven months (28 weeks) with five sessions and each session took 10-15 minutes. Parents filled in the frequency recording form throughout the intervention period. Once the parents have implemented the intervention on their child for each sub-domain of the intervention, their children were required to do activities using the busy bag and toileting skills (either with the help or support from the parents). Parents filled in the data collection material for five sessions during the intervention phase. In addition, there were three main activities for this intervention programme; (1) parents gave out inputs using a busy bag, (2) parents demonstrated their toileting skills (targeted behaviours), (3) children used the busy bag and performed toileting skills (with the help of their parents if necessary).

Retention phase

During this phase, parents stopped using the intervention programme, and they taught their children without using the busy bag (tool). After two weeks of not using the intervention programme, parents filled in the frequency recording form for three weeks,

with one session per week. This was to record the number of occurrences of the targeted behaviour performed by their children without the use of the approach and tools.

Table 1. Total number of trials per session.

Children	No. of trials per session
Child A	5
Child B	6
Child C	6
Child D	15
Child E	11

Table 1. shows the total number of trials per session for each child during the intervention programme.

Results

The quantitative data for multiple baseline design was analysed using graphs. As stated by Price (2012), the researcher that has been using this type of research will typically analyse their data using graphs and make judgements from the graphs to see whether the dependent variable was affected by the independent variable based on latency, trend, and level.

In this study, a correct of 80% was adapted as the mastery criterion level on all targeted behaviours in toileting skills. The targeted behaviours were evaluated once a week for 2 to 3 weeks for the baseline, sessions 1, 2, 3, 4 and 5 for five weeks during the intervention phase, and once a week for three weeks for the retention phase.

The quantitative results were explained in tables and graphs. The graphs showed the percentage correct of the targeted behaviours during baseline, during the intervention, and

retention phase. The x-axis showed the number of sessions in which the behaviours were recorded or evaluated. Meanwhile, the table also shows the percentage correct on the targeted behaviours and the minus sign (-) means the children were not being recorded or evaluated for the particular session of the intervention. Their children were required to do activities using the busy bag and using their toileting skills (either with the help or support from the parents). Parents filled in the data collection materials for five sessions during the intervention phase.

Toileting skills

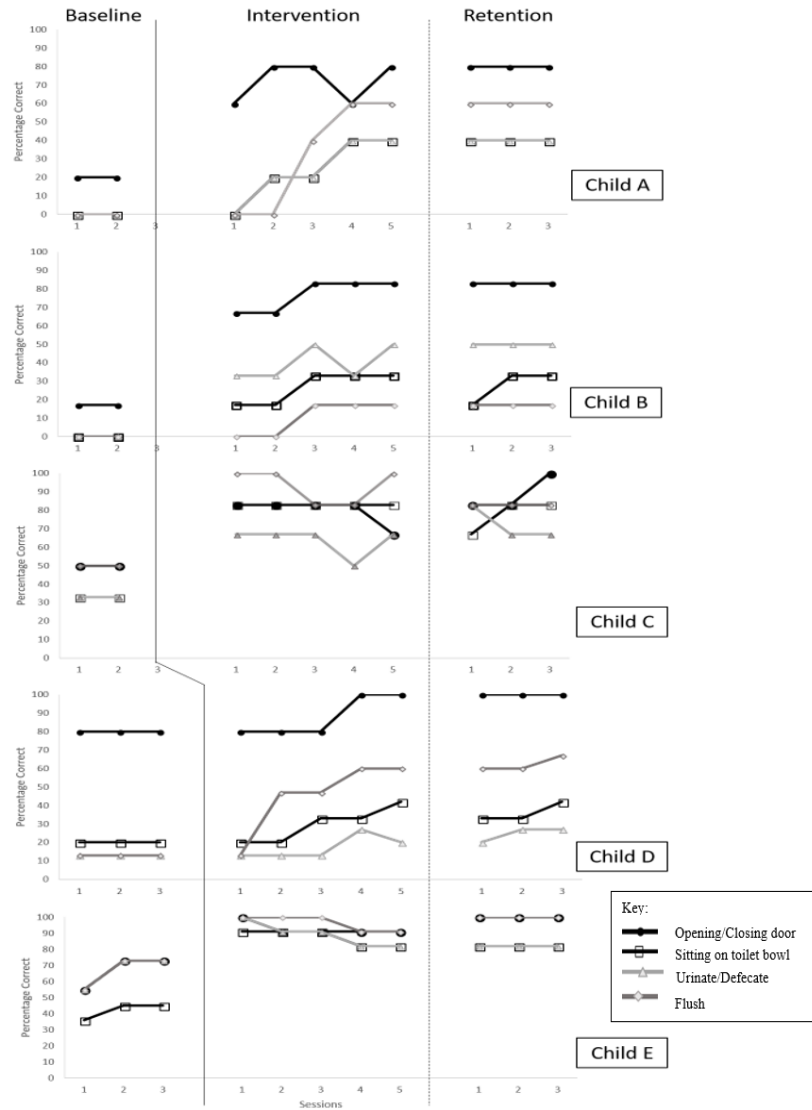
Based on the research findings, the baseline and intervention scores for each child were different. As seen in Figure 1, the percentage correct value of the targeted behaviours for 4 performance criteria during baseline for Child A was around 0% to 20% correct and that of Child B was around 0% to 17%.

Meanwhile, the percentage correct value for Child C was 33% to 50%, Child D with 13% to 80% and around 36% to 73% for Child E. This shows that each child scored different percentage correct values during baseline and that Child A, as well as Child B, were considered to have not yet attained the basic skills on toileting.

This is based on their percentage correct on opening and closing the toilet door, sitting on the toilet bowl appropriately, urinating or defecating in the toilet bowl appropriately, or flushing during the baseline phase.

After the intervention using VPA was implemented, all the children managed to show an improvement especially in the performance criteria of opening and closing

Figure 1. The Graphs on Percentage Correct of the Targeted Behaviours on Toileting



the toilet door. Child A scored a range of 60% to 80% for the performance criteria of opening and closing the door for all five sessions and reached the mastery criterion level of 80% during sessions 2, 3 and 5 over 5 trials per session. The percentage correct was retained during the retention phase by scoring 80% correct for three sessions. In addition, child A scored 20% to 40% correct for performance criteria of sitting on the toilet bowl appropriately and urinated or defecated in the toilet bowl appropriately during the intervention phase. The percentage correct

was retained during the retention phase by a score of 40% correct. For the last performance criteria, which is flushing the toilet, this child showed an improvement in performing the performance criteria during session 3 and was able to score 40% to 60% correct as well as retain the percentage correct of 60% during the retention phase.

Child B scored a range of 67% to 83% correct for performance criteria of opening and closing the door for all five sessions and reached the mastery criterion level of 80%

correct during sessions 4 and 5 over 6 trials per session. This child also managed to retain the percentage correct during the retention phase by scoring 83% correct for three sessions. For the performance criteria of sitting on the toilet bowl appropriately, Child B scored 17% to 33% correct during the intervention phase. Even though Child B was not able to reach the mastery criterion level of 80% correct, this child still managed to show an improvement in the percentage correct compared to the baseline score of 0% for the third performance criteria.

This is because this child scored 33% during sessions 1, 2 and 4, and 50% correct during sessions 3 and 5. For this performance criteria, this child managed to retain the score of 50% correct for all three sessions during the retention phase. Meanwhile, for the last performance criteria, which is flushing the toilet, Child B also showed an improvement in performing the performance criteria especially during sessions 3 to 5 and was able to score 17% correct. This child was also able to retain the percentage correct during the retention phase by scoring 17% correct for all three sessions.

On the other hand, Child C scored 83% correct during sessions 1, 2, 3, and 4, and 67% during session 5 for performance criteria of opening and closing the door. This child reached the mastery criterion level of 80% correct, and a score of 83% correct was reached during sessions 1 and 2, whereas 100% correct during session 3 was scored for the retention phase. For the second performance criteria, Child C scored 83% correct during the intervention phase and retained the percentage correct during the retention phase by scoring 67% during session 1 and 83% correct during sessions 2

and 3. This child also reached the mastery criterion level of 80% correct for this performance criteria. Meanwhile, for the third performance criteria (urinating or defecating in the toilet bowl appropriately), Child C scored 67% to 50% correct and for this particular performance criteria, this child was not able to reach the mastery criterion level but was able to retain the percentage correct during the retention phase by scoring 83% correct during the first session and 67% correct during sessions 2 and 3.

Based on Figure 1, this child scored a higher percentage correct for the last performance criteria compared to the others by scoring 100% to 83% correct. This child was able to reach the mastery criterion level and also managed to retain the percentage correct during the retention phase by scoring 83% correct. Child C showed consistency in performing the selected performance criteria and based on results in Table 2, the PND score of this child was 100% for all performance criteria. This shows that the intervention using VPA was very effective for this child. Child D managed to retain the percentage correct for the first performance criteria (opening and closing the door) during the intervention and retention phase by scoring 80% to 100% correct. Child D was able to demonstrate mastery in this particular toileting routine. For performance criteria of sitting on the toilet bowl appropriately, Child D was able to score 20% to 42% correct.

Even though Child D was not able to reach the mastery criterion level of 80% correct for this performance criteria, this child still managed to show a slight improvement in the percentage of correct behaviours. This child also showed a slight improvement for the third performance criteria (urinating or

defecating in the toilet bowl appropriately) by scoring 27% correct.

Meanwhile, for the last performance criteria of flushing the toilet, Child D showed an improvement in performing the performance criteria with 47% to 60% correct. This child was also able to retain the percentage correct during the retention phase by scoring 60% to 67% correct for all three sessions. This intervention was considered as effective on this child with a PND score of 80% for the fourth performance criteria (flush), and minimal effect on the first, second and third performance criteria with a PND score of 60% to 40% respectively.

Table 2. Percentage of Non-Overlapping Data of each child on each performance criteria (Toileting).

Performance criteria	Child	PND (%)
1. Opening and closing the toilet door	Child A	100
	Child B	100
	Child C	100
	Child D	40
	Child E	100
2. Sitting on the toilet bowl appropriately	Child A	80
	Child B	100
	Child C	100
	Child D	60
	Child E	100
3. Urinating or defecating in the toilet bowl appropriately	Child A	80
	Child B	100
	Child C	100
	Child D	40
	Child E	100
4. Flushing	Child A	60
	Child B	60
	Child C	100
	Child D	80
	Child E	100

Lastly, Child E scored 100% correct for the performance criteria of opening and closing the door and reached the mastery criterion level of 80% correct. For the second performance criteria, Child E scored 91% to 82% correct during the intervention phase and was able to retain the percentage correct during the retention phase by scoring 82% correct. Meanwhile, for the third performance criteria (urinating or defecating in the toilet bowl appropriately), Child E managed to score 100% to 82% correct. Similar with the previous performance criteria, this child was able to reach the mastery criterion level and was also able to retain the percentage correct during the retention phase by scoring 82% correct for all the three sessions. This child scored 100% correct for the last performance criteria and managed to retain the percentage correct during the retention phase by scoring 100% for all three sessions. Child E showed consistency in performing the selected performance criteria, and this can be seen from the PND score (refer to Table 2) of this child, whereby 100% was scored for all performance criteria. This shows that the intervention was very effective for this child.

Discussion

Overall, the results findings have successfully proven the effects of an intervention in which parents applied a visual prompt approach on the toileting skills of their children with ASD. In addition, the research findings were able to show an improvement in the children based on the percentage correct on the targeted behaviours in the toileting skills compared to their baseline score. The children were also able to retain the mastery skills during the retention phase (5 weeks after the intervention phase).

The children were able to increase the number of percentages correct compared to their baseline scores, and some of them reached the mastery criterion level of 80% correct. They also managed to retain the percentage correct during the retention phase which shows that the intervention was effective on them.

Additionally, there was a diversity in the levels of the toileting skill achievement for each child during the same intervention period. The findings showed that the low percentage correct achieved by Child A, B, C and D in certain performance criteria on the toileting skills was most likely due to the time period (e.g. five sessions) of the intervention which was still insufficient for the children. According to their parents, the decrease in the percentage correct in certain performance criteria during certain sessions was mainly because their children were having mood swings or a meltdown during that session. Some of the children wanted to play around but were forced to open and close the door by themselves, and hence, the children's emotions were disturbed. This resulted in an intense response to the overwhelming situation (Ryan, 2010) which led to a meltdown in the children.

Moreover, with the success of this visual prompt approach intervention in improving the toileting skills of the children with ASD, this study has shown a significant impact on the learning of the toileting skills. This research study also suggested that the development of the children was not limited to the help of their teachers and therapists only, but their parents helped these children to improve better in their toileting skills using a proper approach and tools.

The research study also contributes to a parental intervention approach or parental involvement and, therefore, makes an important contribution to the reinforcement of the involvement of parents in their child's learning. In addition, the current study also showed that a visual prompt approach could be used and implemented by the parents at home. Hence, the use of this approach under ABA was not restricted to teachers or educators only. It was also mentioned by Cohen (1998) that children with ASD prefer to use pictures and that they are visual learners rather than auditory or hearing learners.

Finally, this study does not mean to generalise on the toileting skills, but rather to review the effects of early intervention on the toileting skills using a visual prompt approach and the parental intervention, as well as the help of busy bags as a tool for children with ASD. In conclusion, a successful intervention does not rely solely on the intervention programme plan provided, but also on the use of learning aids (busy bags) as well as the role played by parents which catalyses its effectiveness.

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