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The Effectiveness of Discrete Trial Training in Teaching Writing

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ABSTRACT

The main objective of this case study was to enable the child to write their name independently. The intervention was implemented on child X using Discrete Trial Training (DTT), a structured teaching technique grounded in the principles of ABA. Initially child X' behavior was observed for 10 days in a natural environment to establish a baseline, followed by structured 10 individual sessions, targeting writing skills. Tasks were taught using visual, verbal and physical prompts with systematic fading to promote independence. After the intervention, a 10-day post-intervention observation period was conducted to assess the maintenance and generalization of acquired writing skill. Continuous data collection was conducted to monitor and evaluate progress. The baseline of pre-intervention was 26%, during intervention rose to 67% and after post-intervention behavior score was observed at 76%. The result of this study proved that with consistent and systematic use of DTT intervention which is an ABA technique successfully helped a child to write their name without any assistance. Moreover, findings suggest that ABA based techniques specifically DTT interventions are helpful for improvement of fine motor skills such as writing task for those children who can't write due to developmental delay.

Keywords: *discrete trial training, developmental delay, learning disability, case study, writing skills*

INTRODUCTION

Applied Behavior Analysis (ABA) is a scientifically based approach to understanding and improving socially significant behavior, grounded on the principles of learning theories. ABA is commonly applied to support individuals with developmental delays, learning disabilities and behavioral challenges influenced by environmental factors as well as to improve communication skills and other areas of social skills. ABA interventions target behaviors with different types of reinforcements: positive reinforcement to strengthen a behavior and a negative reinforcement to reduce a negative behavior, implemented systematically.

Discrete Trial Training (DTT) is a structured teaching method used in ABA. This method involves breaking down complex tasks into smaller, manageable tasks, using positive reinforcements to encourage behavior. DTT trial has 4 component instruction, response, consequence and intertrial response. In this case study DTT intervention was applied to teach a child to teach to write his name who could read and perform orally but was unable to write even his name. With the help of Discrete Trial Training (DTT) method, the child was taught to write his name without any assistance. In developmental years, name writing plays an important role in a child's life. Being able to write their own name fosters a child's fine motor skills and provides a sense of identity and autonomy. Therefore, with careful and systematic strategic intervention using ABA, discrete trial training conduct on a child to learn writing their name. DTT effectiveness lies in

its structured approach, which allows for repeated practise, immediate feedback and ongoing data collection of observe progress and make necessary adjustments. The meta-analysis of 25 studies found that Applied Behavior Analysis based interventions significantly improved communication, adaptive and cognitive skills in children with autism spectrum traits, with greater treatment duration resulting greater adaptive behavior (Collins et al., 2025). There's another study in which trained university students with ABA techniques and later those trained students taught multiple skills to autistic children for non-verbal and verbal communication skills and learning such as writing

(Matos et al., 2025). There's a study to explore the efficacy of discrete trial training and the purpose of s scoping review was twofold: one is to describe the component variations of DTT and the other is to evaluate the general efficacy of DTT in teaching new skills to individuals with learning disabilities Frank-Crawford et al. (2024) study supports the case study of 7 year old boy who was unable to write but with the of DTT intervention the child has started to write.

According to Liqun & King (2024), sight words are a building block for reading but with intellectual disability children often have difficulty so to challenge that difficulty DTT provides effective teaching models to deal with developmental disabilities in restrictive settings. A study conducted to examine the functional relationship between task selection technique and avoidance behavior with autistic children to reduce the task avoidance

(Chung & Yang, 2021). Further one research suggests that DTT effectively integrates with different training, activities and environments (Mitsch &Riggleman, 2020).

Much research suggests that DTT has been widely used within autism intervention to teach basic life and functional skills but with this extensive research has proved that DTT can also be helpful in literacy skills (JEBPS Vol 17-N2, n.d.) Moreover in 2018 another study conducted a comparison between DTT and VBA and study concluded that DTT is more structured and systematic to teach skills (Chan, n.d.)

There's one more study who highlighted the importance of discrete trial training in special education program (Mitsch & Riggleman,2010). There's research who suggests DTT must include in education paradigm because it is structured and effective to. Teaching skills (Tarbox & Najdowski, 2008). A behavorial skills training improved 3 teachers' implementation of discrete trial training, with a significant increase in correct response from 43% to 97% after training (Sarokoff & Sturmey, 2004). DTT is an instructional crucial tool to deal with autistic children, enabling the teaching of new behaviors, discriminations and advanced skills

(Smith, 2001). Much past research consistently supports DTT as a highly systematic and structured intervention. It effectively uses repetition and reinforcements to teach skills and modify behavior. DTT has been widely used and affectively applied as a key intervention for autistic children. However, there is a significant gap in current research the application of DTT on non-diagnosed individuals. Given its proven efficacy in structured learning environment for autism, research should be expanded to investigate DTT as an intervention for non-diagnosed children and those with other intellectual disorders. Hall et al. (2014) conducted a research on whether using DTT to identify learning impairments in boys with Fragile X Syndrome and concluded that DTT can be used to identify learning impairments in boys with FX as well as other low-functioning individuals with developmental disabilities This expansion is important to understand the full scope of DTT's utility beyond its traditional application in autism spectrum disorder.

Case History

A 7-year-old child name X who is an orphan lives in an orphanage, unable to recall anything about his family and past. His orphanage's caregivers informed that he is a shy boy in their orphanage centre. Moreover, his behavior seems to be normal general but there's one issue that X is intellectually behind in his age group. X is enrolled in Pre-Nursery standard due to only he can read and can learn orally but can not write even his name. His teachers have only one problem that they can't promote him to next standard till he starts to write, which they have tried to but couldn't succeed. X's younger classmates often used to make fun of him even X started to say, "I don't know how to write, I can't write". Whenever teacher asked him to write his responses were that he forgot and he can't write. No serious medical condition and psychological issue were mentioned by his caregivers.

As per the medical data which was provided by the orphanage claimed that child is in good health physically but there is no psychological assessment conducted on a child to evaluate his mental health. Also, there is no family history has provided so there is no evidence of his writing challenge or late development of motor skill.

Discrete Trial Training technique of ABA has implemented on him to modify this target behavior and taught him to write his name because for every individual name writing is an integral part of development as name is an identity of an individual and it gives an individual sense of being autonomous.

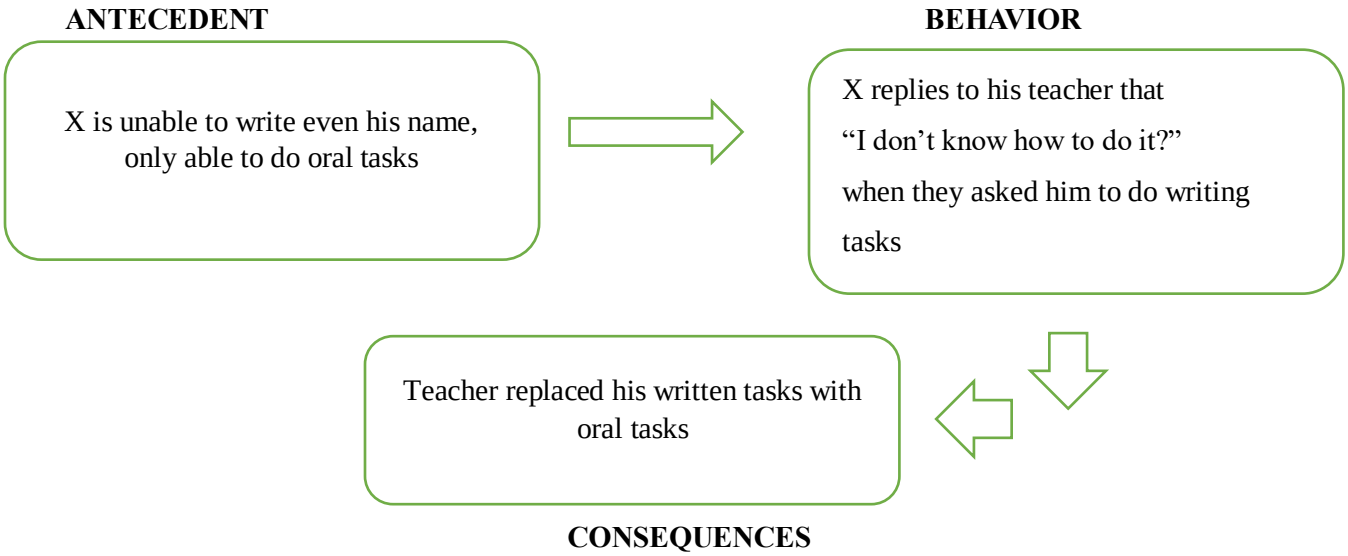
During the DTT intervention X likes to be appreciated and that appreciation whether in the form of verbal or tangible motivates him to follow the instructions more consciously. This case history is evidence that discrete trial training is quite effective if one follows with instructions.

Functional Behavioral Assessment (FBA)

Functional Behavioral Assessment (FBA) results of a 7-year-old boy claims that X is a shy and calm boy. He respects his teachers and classmates, also good in sports. However, he can't write independently even his own name. According to X's teacher he is quite brilliant in oral tasks. He identifies the alphabets but unable to form a word or write also he easily forgets the identity of alphabets. His teacher reported that whenever they assigned him a writing he says, "I don't know how to write it?' sometimes teacher tries to guide him into writing tasks but most of the time they replace writing tasks into oral tasks. As per the observations, due to the lack of reinforcement and guidance from the caregiver X couldn't develop his writing skills. An individual should be able to write their name without any instruction, name writing is an integral part of introduction and if an individual doesn't know how to write their own name, a person may feel embarrassment and may doubt on their other skills.

In this functional behavioral assessment of X antecedent is that he is unable to write, and this antecedent follows to the behavior of his response " I don't know how to do it?' and the consequence is writing tasks replaced with oral tasks.

The Discrete Trial Training technique of ABA was applied on X to modify his behavior of "I don't know how to do it?" and to teach him name writing so he would be able to write his name independently. While applied DTT on X verbal and tangible reinforcement have been used to strengthen his name writing skill. Subsequently, the reinforcement was systematically faded from the intervention.



METHODOLOGY

Design and Sample

In this case study, name writing was taught to a 7-year-old child with developmental delays in fine motor skills using a Discrete Trial Training intervention of ABA.

Material

Functional Behavior Assessment (FBA) is needed when child struggles with their challenging behavior interferes with the ability to learn. FBA assists in understanding the function or purpose of a specific interfering behavior (AFIRM, n.d.)

Alphabet Tracing Book is an educational workbook designed to help young children learn to write the letters of alphabets with a guided help (Big City Readers, 2025).

Procedure

According to the history of a 7-year-old child reinforcement plan has decided which includes verbal reinforcement (Very good, excellent and wow) and physical prompts as reinforcers to give for a child during intervention. Throughout the study ethical considerations were followed. Firstly, permission letter was provided to the Edhi Orphanage Centre that was signed by the head of Student Affairs from the university and took the formal consent from the caregiver of the child who is the supervisor of orphanage centre. The supervisor of orphanage centre provided the medical and family history of a child. Then functional behavioral assessment was conduct for the child X.

Intervention

Then the pre-intervention phase of 10 days started to get baseline data by asking the child X to write his name without any assistance, 5 trials were conducted over 5 seconds. The child's responses were marked as (□) correct and for incorrect responses (□). After collecting the baseline data, the intervention phase also started for 10 days.

In intervention phase, the child was first asked to point to his name, then trace the letters of his name, and then try to write it without any assistance. During the intervention phase, physical prompts were provided to the child for correct responses, and no reinforcement was given for incorrect responses.

After the intervention phase, a post intervention phase was conducted for 10 days. During the post-intervention phase, data was collected without providing reinforcement to the child.

A follow-up was conducted 3 days after the post-intervention to observe the effectiveness of intervention, followed by another follow-up and then after a week later.

In last result was calculated statically. To demonstrate the comparison of Pre-intervention, Intervention, Post-intervention and follow-ups graphs were made.

DTT steps

- **Discriminative Stimulus:** "Point to your name", "Trace the letter of your name"
- **Response:** The child's responses were recorded as "Correct" or "Incorrect".
- **Prompt:** Verbal (Very good, excellent and wow) and physical prompts were used.
- **Stimulus Reinforcers:** Sticky notes, stars drawing on a hand and verbal praise.
- **Inter trial interval:** 5 seconds.

Inclusion & Exclusion Criteria

- To apply ABA intervention on a child, there must be learning difficulties which intervenes in other aspects of child's life.
- Availability of a child for regular sessions for ABA.

Ethical Considerations

Formal consents were taken from the child's caregiver as a child is an orphanage, so the supervisor of an orphanage centre is the caregiver of the child. Confidentiality of a kept protected. Intervention plans were made while keeping in mind child's physical and mental health. No behavior was imposed on child forcefully. Child's progress was being shared with child's caregivers during the intervention. After ending the intervention, made sure that child is not dependent on any reinforcement.

Follow-up sessions were conducted to follow up with the child after the post intervention to observe his behavior.

RESULTS

Descriptive Results

Phases of Intervention	N	Mean	Std. Deviation
Pre-Intervention	10	1.30	.823
Intervention	10	2.70	1.059
Post-Intervention	10	3.80	.919
Total	30	2.60	1.380

Descriptive results proved that mean correct responses increased significantly from 1.30 (pre-intervention) to 2.70 (during intervention) till 3.80 (post-intervention). This recommends the intervention discrete trial training (DTT) of Applied Behavior Analysis for teaching the new behavior or skill. the standard deviation is relatively moderate across phases. Variability peaked SD = 1.059) during intervention phase must be because of initial learning fluctuations. In post-intervention (SD = 0.919) shows slightly more consistency in performance.

Table 1

Table 1 shows the pre-intervention data which helped to get the baseline. Incorrect responses were marked as □ and correct responses were marked as □.

Correct response counted as 1 and incorrect response were counted as 0. To better understand the results, the mean percentage of correct responses for each day of the intervention was calculated.

Days	Trials							
	1	2	3	4	5	Total	Incorrect	Correct
1	□	□	□	□	□	0	100%	0%
2	□	□	□	□	□	0	100%	0%
3	□	□	□	□	□	1	80%	20%
4	□	□	□	□	□	2	60%	40%
5	□	□	□	□	□	2	60%	40%
6	□	□	□	□	□	1	80%	20%
7	□	□	□	□	□	2	60%	40%
8	□	□	□	□	□	2	60%	40%
9	□	□	□	□	□	1	80%	20%
10	□	□	□	□	□	2	60%	40%
						26%		

Table 2

This table clearly depicts the progress of intervention. Verbal prompt shown as (*), while physical prompt shown as (**) in this table. After getting the baseline, intervention has started and showed significant improvement in child X data as baseline was 26% and rose it to 67%.

Days	**Trials**							
	1	**2**	**3**	**4**	**5**	**Total**	**Incorrect**	**Correct**
1	□	□	□	□	□*	1	80%	20%
2	□	□	□*	□	□	1	80%	20%
3	□	□	□*	□	□*	2	60%	40%
4	□*	□**	□	□	□*	3	40%	60%
5	□*	□*	□	□	□*	3	40%	60%
6	□*	□	□**	□	□	4	20%	80%
7	□	□**	□	□	□*	3	40%	60%
8	□	□	□	□	□*	4	20%	80%
9	□*	□	□	□	□	5	0%	100%
10	□	□	□	□	□	5	0%	100%
						67%		
***Verbal Prompt**								
****Physical Prompt**								

Table 3

This table shows the effectiveness of post-intervention and evidently proved that DTT significantly improved the child X's skills. As baseline was 26% and post-intervention was 76% which significantly tells the effectiveness of DTT intervention.

Days	**Trials**							
	1	**2**	**3**	**4**	**5**	**Total**	**Incorrect**	**Correct**
1	□	□	□	□	□	4	20%	80%
2	□	□	□	□	□	5	0%	100%
3	□	□	□	□	□	3	40%	60%
4	□	□	□	□	□	4	20%	80%
5	□	□	□	□	□	2	60%	40%
6	□	□	□	□	□	4	20%	80%
7	□	□	□	□	□	3	20%	80%
8	□	□	□	□	□	5	0%	100%
9	□	□	□	□	□	4	20%	80%

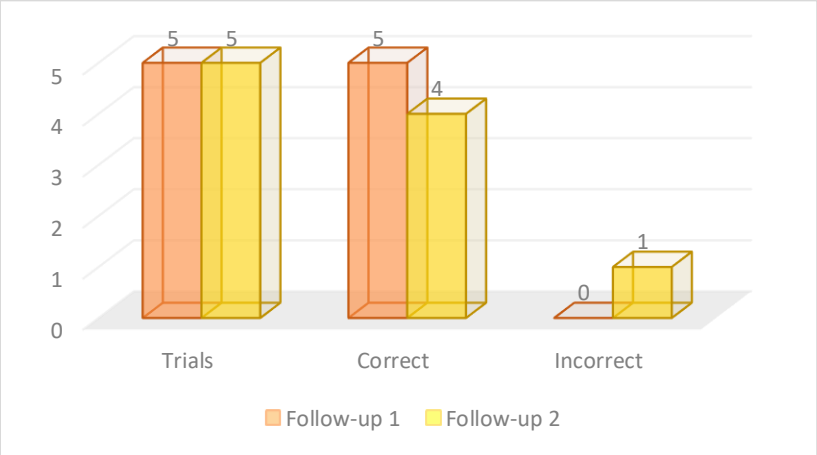
10	☐	☐	☐	☐	☐	4	20%	80%
						76%		

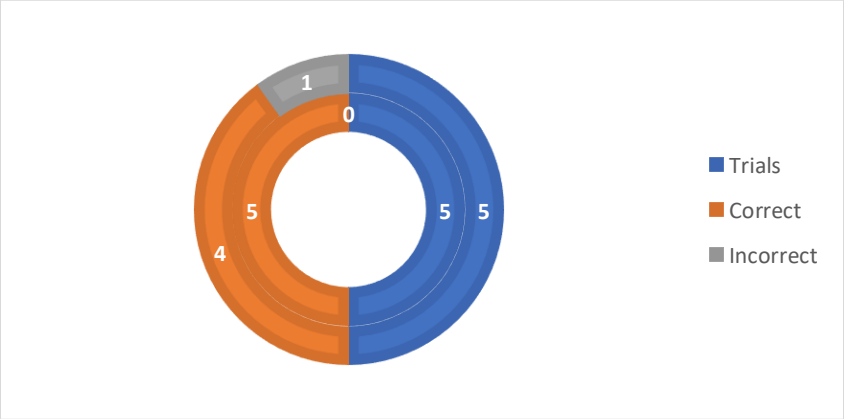
Follow-up

So, after the post intervention there were two follow-ups conducted. First follow-up was conducted after 3 days of post intervention, and second follow-up was conducted after 10 days of first follow-up.

Follow-up	**Trials**	**Correct**	**Incorrect**	**Correct %**
Follow-up 1	5	5	0	100
Follow-up 2	5	4	1	80%

Below graphs demonstrates the difference between follow-up 1 and follow-up 2.





DISCUSSION

This case study aligns with existing literature which focuses on DTT's effectiveness teaching functional skills to address developmental challenges of children (Smith, 2001; Lovas, 1987). This study aimed to highlight the importance of effectiveness of Discrete Trial Training (DTT), a core technique of Applied Behavior Analysis, in teaching name writing skill of a 7-year-old child. Before applying the intervention on a child, the child has demonstrated a significant deficit in this area. Child "X" has shown delayed development in motor skills.

While following the structure of DTT, significant progress was observed in the child's ability to write. With systematic sessions of DTT along reinforcements, the child started to trace the letters of his name. After a few sessions, the child tried to write his name without dots, and in the final intervention sessions, the child was finally able to write his name without any assistance. The intervention was broken into small, manageable steps so child could learn. The child's motivation continuously increased due to the praise received during the intervention, which encouraged him to learn. The baseline of pre-intervention was 26% which rose to 67% due to DTT intervention and post-intervention was 76%. The statistical analysis of the intervention supports the effectiveness of DTT also supported by the study which that per week 3 to 5 mins are enough to teach a child in early literacy years

(*JEBPS Vol 17-N2*, n.d.) The child showed increased compliance and attention during the intervention, suggesting the predictability and clarity of DTT procedures play a sensitive role in reducing anxiety associated with writing.

However, there are a few limitations in this study, such as the fact that it is based on only one child, which limits the generalizability of the findings. Additionally, external factors were also included in this study, such as the medical history of a child, family history and more importantly the need for a psychological assessment to better understanding of his delay development in motor skills as the child is an orphan. These external factors could not be controlled in this case study because child is an orphan.

Furthermore, in the orphanage centre, the behavior of teachers was also observed; they did not pay enough attention to the child, and this behavior could also be a part of child "X" delay development in motor skills.

In conclusion, this study contributed to the enhancement of human motor skills in a 7-year-old child, and a positive outcome was observed: the child started to write his name. Further, there is a significant gap in past literature that DTT has been widely used as an intervention for autism, but there is no significant current research on DTT for non-diagnosed individual and as an intervention for other intellectual disorders though there's a study which evaluates the effectiveness of DTT in children with developmental disabilities, finding positive changes in cognitive, language, behavioral and socio-emotional functioning. Future research should explore implication (Downs et al., 2007). This highlights the gap in literature and requires further research in this area. Future studies should consider larger sample sizes, longer intervention periods and a diverse population to apply discrete trial training intervention effectiveness.

CONCLUSION

According to the study findings, it has been concluded that child learned to write his name without any assistance after the Applied Behavior Analysis intervention. This demonstrates the effectiveness of Discrete Trial Training and proves that it strongly supports in human behavior modification. The structured sessions

of DTT with reinforcements shape behavior and help with generalization in environment. To conclude the study findings, this method really works for teaching the new skill or behavior to an individual.

LIMITATION & RECOMMENDATION

- Psychological assessment of child "X" was needed for better understanding of his cognitive skills and late development of motor skill.
- As "X" is an orphan so his family background such as medical history were missing to understand the cause of developmental delay.
- This study involved only one child which limits the generalisability of the findings. While the results are promising, they may not be applicable to all children with similar challenges.

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