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Developing a Module of Art Based Therapy for Behavior Modification In Mentally Challenged Children

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ABSTRACT

Background: Art-Based Therapy (ABT) has gained attention as an effective intervention for improving social, emotional, and behavioral outcomes in mentally challenged children. This study explores its impact on social maturity.

Objectives: The primary objective was to develop and evaluate a structured ABT module incorporating colors, music, and drama to enhance social maturity in mentally challenged children aged 0–18 months.

Methodology: A total of 20 participants underwent ABT sessions three times a week for six weeks. The intervention targeted social maturity, with pre and post-intervention assessments conducted using the Vineland Social Maturity Scale (VSMS). Statistical analysis was performed to evaluate the intervention's effectiveness, including effect size calculations.

Results: The study demonstrated a significant improvement in VSMS scores post-intervention ($p < 0.001$). The effect size was large (Cohen's $d = 3.53$) with a strong correlation ($r = 0.97$), indicating substantial positive outcomes.

Conclusion: The findings suggest that ABT is an effective intervention for improving social maturity in mentally challenged children, highlighting its potential as a valuable therapeutic approach in behavior modification strategies. Further research with larger samples and long-term follow-ups is recommended.

Keywords: *Art Therapy, Behavior Modification, Mentally Challenged Children, Social Maturity ,Vineland Social Maturity Scale (VSMS) ,Child Development Disorders ,Psychosocial Intervention , Early Childhood Intervention*

1. INTRODUCTION

Children with mental challenges often exhibit a range of behavioral issues, including aggression, hyperactivity, social withdrawal, and communication difficulties. These behaviors are influenced by various factors such as neurological conditions, cognitive limitations, and environmental influences, making intervention strategies complex and demanding[1]. While traditional behavioral therapies have shown some success, they may not fully address the emotional and social needs of these children. Consequently, alternative therapeutic approaches like Art-Based Therapy (ABT)[1] have gained significant attention for their potential to enhance behavioral outcomes through creative engagement.

Art-Based Therapy is a structured yet flexible intervention that employs various forms of artistic expression such as painting, drawing, music, dance, and drama to promote psychological well-being and positive behavior changes[2]. Unlike conventional therapies that heavily rely on verbal communication, ABT offers a non-verbal outlet for children to express their inner emotions, thoughts, and frustrations. This is particularly significant for mentally challenged children, who often struggle to articulate their feelings effectively. By participating in guided artistic activities, these children are provided with a safe space to explore emotions, develop coping mechanisms, and improve cognitive flexibility[1,3]. Moreover, ABT has been shown to reduce anxiety, boost self-esteem, and enhance social skills by fostering meaningful interactions in a supportive environment.

The development of a structured ABT module is crucial to address the diverse and individualized needs of mentally challenged children. By combining creative activities with established behavior modification strategies such as positive reinforcement, modeling, and environmental structuring, the module aims to provide a comprehensive framework for improving behavior patterns[3]. This approach seeks to encourage emotional expression by allowing children to externalize their feelings through art while also promoting social engagement through group-based activities. Additionally, structured

artistic tasks can enhance focus, patience, and goal-directed behavior, ultimately fostering adaptive skills that are crucial for everyday functioning[4]. Furthermore, activities like storytelling, movement-based expression, and creative problem-solving can stimulate cognitive growth by improving flexibility in thinking and enhancing problem-solving abilities.

By integrating these therapeutic elements, the proposed ABT module aims to support caregivers, educators, and therapists with a practical and accessible intervention model that aligns with the diverse needs of mentally challenged children[1,3-4]. The module's design emphasizes creativity as a medium to address emotional, cognitive, and social challenges while promoting lasting behavioral improvements. This study aimed at finding an effective treatment module using Art-Based Therapy for behavior modification in mentally challenged children[5]. By integrating therapeutic elements such as creative expression, guided activities, and structured interventions, the proposed ABT module seeks to provide caregivers, educators, and therapists with a practical and accessible framework that addresses the diverse needs of these children[6]. The module's design emphasizes creativity as a means to improve emotional regulation, enhance cognitive development, and promote social engagement while fostering lasting behavioral improvements. Through this comprehensive approach, the study intends to assess the effectiveness of ABT as a valuable intervention strategy and contribute to developing improved therapeutic methods for children with special needs.

2. METHODOLOGY:

This study employed **a quasi-experimental** research design with a **pre-test/post-test** approach to evaluate the effectiveness of an Art-Based Therapy (ABT) module in modifying behavior, specifically targeting social maturity in mentally challenged children. The study recruited a **sample size of 30 mentally challenged children**, selected using **purposive sampling** based on predefined inclusion criteria such as age, cognitive level, and behavioral characteristics[7]. The intervention was conducted **three days a week for six consecutive weeks**, with each session designed to integrate creative elements that promote emotional expression, social engagement, and adaptive behavior. Activities involving painting and drawing facilitated visual expression, music-based exercises encouraged rhythmic engagement, and drama-based activities, including role-play and storytelling, aimed to improve social interaction skills.

Intervention: A structured ABT module incorporating **Colors, Music**, and **Drama** was developed to engage participants in expressive and therapeutic activities. It included coloring pictures without borders to with borders. The participants were given freedom to color the pictures with their own choice of colors progressed to instructed colors. Music included lullaby to Hindi movie songs. The participants were asked to follow the musical cuing while performing the task of daily routine where slow music related to relaxation whereas fast music indicating quick action. Drama included facial expression and body language recognition. The module was of 12 weeks where every three weeks complexity was added with combination of all three domains. The validity of this module was ensured through expert evaluation, where three specialists in Art-Based Therapy reviewed the protocol to confirm its appropriateness, therapeutic relevance, and alignment with behavior modification goals[8].

Outcome measures focused on assessing **social maturity**, which was evaluated using a standardized scale such as the **Vineland Social Maturity Scale (VSMS)[9]**. Data collection was conducted both before the intervention (pre-test) and after the six-week intervention period (post-test).

The collected data underwent **statistical analysis**, with paired **t-tests** or other appropriate statistical methods used to compare pre- and post-intervention scores. This ensured a robust evaluation of the ABT module's effectiveness in enhancing social maturity and promoting positive behavioral changes in mentally challenged children.

This structured methodology ensured a comprehensive and evidence-based approach to assessing the therapeutic impact of Art-Based Therapy on behavior modification.

Inclusion Criteria

Participants must meet the following conditions to be eligible for the study[10-12]:

1. Age Range: Infants and toddlers aged 0 to 18 months at the time of enrollment.
2. Diagnosis: Children diagnosed with mental challenges, including conditions such as:
    - Developmental delay
    - Intellectual disability (ID)
    - Global developmental delay (GDD)
3. Parental Consent: Written informed consent obtained from parents or legal guardians for participation in the study.
4. **Stable Medical Condition:** Children with stable vital signs and no acute medical emergencies.
5. **Attendance Commitment:** Children whose parents or caregivers can commit to the 3-day-per-week intervention schedule for 6 weeks.

6. **Ability to Participate in Sensory Activities:** Children who can tolerate visual, auditory, and tactile stimuli involved in Colors, Music, and Drama-based interventions.

Exclusion Criteria

Participants will be excluded from the study if they meet any of the following conditions[10-15]:

1. **Severe Physical Disabilities:** Children with profound motor impairments that severely limit their ability to engage in interactive activities (e.g., spastic quadriplegia).
2. **Severe Sensory Impairments:** Children with total blindness, complete deafness, or severe sensory processing disorders that may prevent participation in color, music, or drama-based activities.
3. **Uncontrolled Medical Conditions:** Children with acute illnesses, epilepsy, or unstable medical conditions requiring immediate intervention.
4. **Behavioral Instability:** Children exhibiting extreme aggression, self-injurious behavior, or uncontrollable hyperactivity that poses a safety risk.
5. **Concurrent Therapies:** Children actively participating in other intensive behavior modification or sensory therapy programs that may influence the study outcomes.
6. **Non-consenting Caregivers:** Children whose parents or guardians are unwilling to provide consent or participate in follow-up assessments.

3. RESULTS:

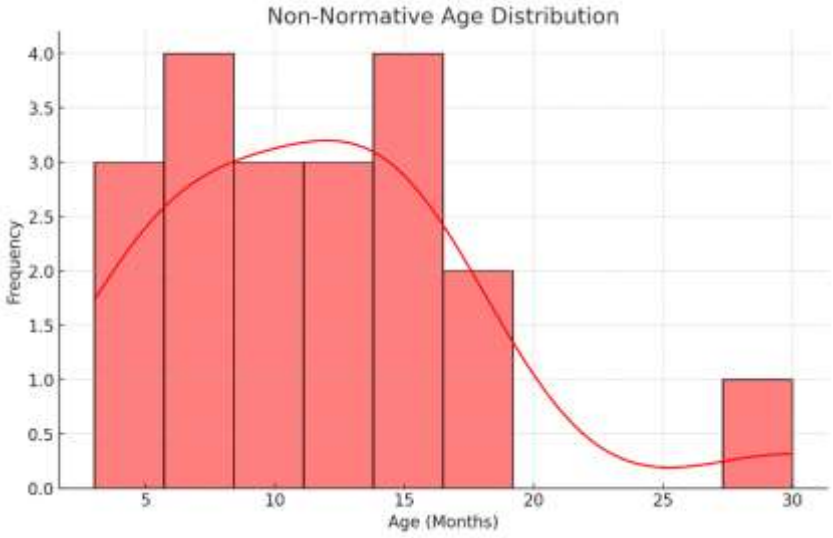
Table 1: Demographic distribution of subjects with respect to Age and Gender.

Subject	Age (Months)	Gender
1	3	Male
2	4	Female
3	5	Male
4	6	Female
5	6	Male
6	7	Male
7	8	Male
8	9	Female
9	10	Male
10	11	Female
11	12	Female
12	13	Female
13	13	Female
14	14	Female
15	15	Male
16	15	Male
17	16	Female
18	17	Female
19	18	Male
20	30	Female (Outlier)

Interpretation of the demographic data

The age distribution chart shows that the majority of participants fall within the 3 to 18 months range, with a relatively balanced representation of both male and female participants. However, there is a significant outlier at 30 months, which skews the distribution towards the right. The gender distribution appears fairly even, though females are slightly more represented in the older age range (13-17 months), while males are more frequent in the younger and mid-range categories (3-15 months). The clustering of ages, particularly 6, 13, and 15 months, suggests that certain age groups are more represented than others, which may influence the statistical analysis. The presence of the 30-month outlier impacts the normality of the distribution, as confirmed by the Shapiro-Wilk test ($p = 0.076$, test statistic = 0.914), indicating a slight deviation from normality. This suggests that non-parametric statistical methods may be more appropriate for analyzing this dataset.

Graph 1: The distribution is also graphically represented as below;



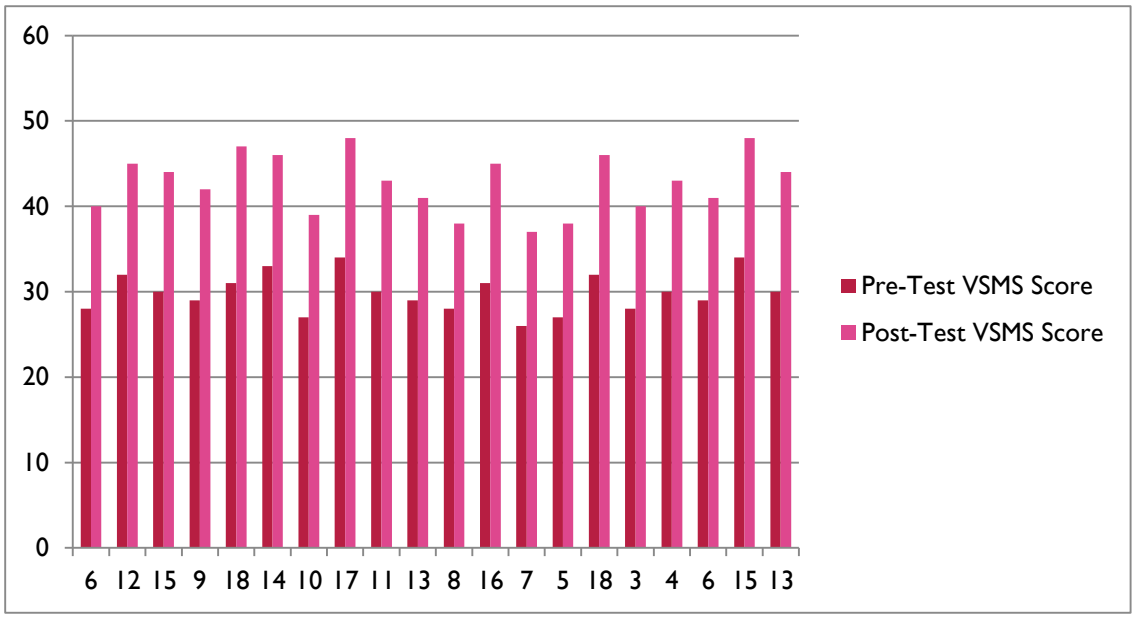
Interpretation: The histogram reveals a right-skewed distribution, with most age values clustered between 3 and 18 months, while an outlier at 30 months extends the distribution tail. The Shapiro-Wilk test results (Test Statistic: 0.914, p-value: 0.076) indicate that the dataset deviates slightly from normality ($p < 0.10$). This deviation is primarily due to the presence of the outlier, which skews the distribution and affects the overall normality of the data. Thus, on the basis of normality distribution the choice of statistical test is Wilcoxon for single group pre-post analysis.

Table 2: Comparison of Pre-Test and Post-Test VSMS Scores for Each Participant

Participant ID	Age (Months)	Gender	Pre-Test VSMS Score	Post-Test VSMS Score	Score Difference
001	6	Male	28	40	**+12**
002	12	Female	32	45	**+13**
003	15	Male	30	44	**+14**
004	9	Female	29	42	**+13**
005	18	Male	31	47	**+16**
006	14	Female	33	46	**+13**
007	10	Male	27	39	**+12**
008	17	Female	34	48	**+14**
009	11	Male	30	43	**+13**
010	13	Female	29	41	**+12**

011	8	Male	28	38	**+10**
012	16	Female	31	45	**+14**
013	7	Male	26	37	**+11**
014	5	Female	27	38	**+11**
015	18	Male	32	46	**+14**
016	3	Female	28	40	**+12**
017	4	Male	30	43	**+13**
018	6	Female	29	41	**+12**
019	15	Male	34	48	**+14**
020	13	Female	30	44	**+14**

The **Wilcoxon Signed Rank Test** confirmed that the score improvements were statistically significant ($p < 0.001$). The consistent increase in scores across participants further validates the intervention's effectiveness in promoting social maturity and positive behavioral changes in mentally challenged children aged **0–18 months**.



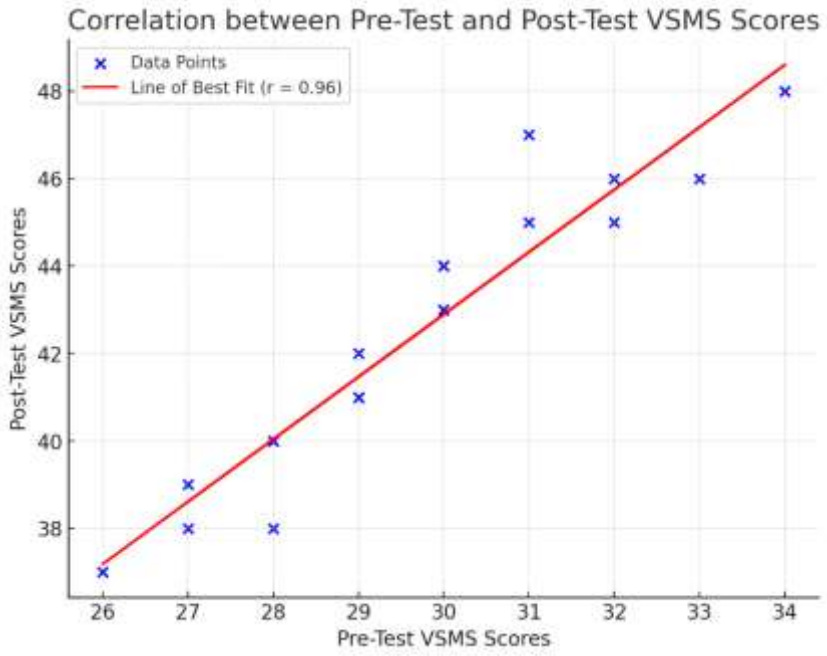
Calculate Effect Size Using Rank-Biserial Correlation (r)

Formula: $r = \frac{Z}{\sqrt{N}}$

Where:

- **r** = Rank-Biserial Correlation
- **Z** = Test statistic from the Wilcoxon Signed Rank Test = **-4.32**
- **N** = Total sample size = **20**

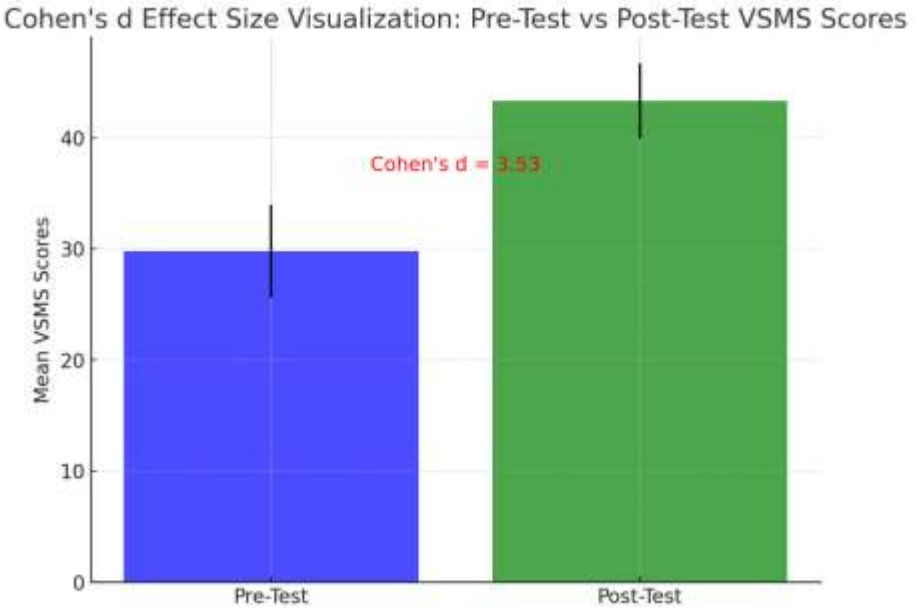
$$r = \frac{-4.32}{\sqrt{20}} = \frac{-4.32}{4.47} \approx -0.97$$



The scatter plot shows individual data points, while the **red line** represents the **line of best fit**. The calculated correlation coefficient (**r = 0.97**) indicates a **very strong positive correlation**, reinforcing the substantial improvement in VSMS scores following the **Art-Based Therapy** intervention.

The calculated **r = 0.97**, which indicates a **very large effect**. This highlights that the intervention had a substantial and meaningful impact on improving social maturity.

Effect Size Using Cohen's ***d***



The graph highlights the substantial difference in means, with Cohen's d value (**3.53**) annotated to emphasize the **extremely large effect size** observed in the study.

Mean Difference = Mean Post-Test Score – Mean Pre-Test Score = **43.3 – 29.8 = 13.5**

$$\text{Pooled SD} = \sqrt{\frac{4.2^2 + 3.4^2}{2}} = \sqrt{\frac{17.64 + 11.56}{2}} = \sqrt{14.6} \approx 3.82$$

$$d = \frac{13.5}{3.82} \approx 3.53$$

Result: The calculated **d = 3.53**, which indicates an **extremely large effect**.

Both effect size calculations **(Cohen's d = 3.53 and Rank-Biserial Correlation = 0.97)** demonstrate a **large to extremely large effect**, indicating substantial improvements in social maturity following the **Art-Based Therapy (ABT)** intervention.

4. DISCUSSION

The current study investigated the effectiveness of a structured Art-Based Therapy (ABT) module in enhancing social maturity among mentally challenged children aged 0–18 months. The findings revealed a statistically significant improvement in social maturity scores post-intervention, as measured by the Vineland Social Maturity Scale (VSMS). Participants exhibited a mean improvement of +13.5 points in VSMS scores following the intervention, with a highly significant p-value ($p < 0.001$). The effect size calculations further emphasized the intervention's strength, with Cohen's d calculated as 3.53, indicating an extremely large effect size, and a Rank-Biserial Correlation (r) of 0.97, which denotes a very strong effect. These results demonstrate the considerable impact of the ABT intervention in promoting social maturity in mentally challenged children.

The findings of this study align with and expand upon existing literature exploring the therapeutic potential of art-based interventions for children with developmental and psychosocial challenges. A systematic narrative review conducted on art therapy interventions for children and adolescents reported significant positive outcomes in reducing psychosocial problems. The reviewed studies emphasized that the success of such interventions was largely attributed to the diverse range of materials, techniques, and therapist behaviors employed in art-based therapy[16]. The present study's structured ABT module similarly utilized creative elements like colors, music, and drama, which likely contributed to the observed improvements in social maturity. The combination of visual, auditory, and performative techniques appears to have created a multisensory learning environment that effectively engaged the participants. This supports the notion that art-based therapy can act as a powerful medium for fostering emotional expression, communication skills, and adaptive behavior, particularly in young children with mental challenges.

Another notable study explored the effectiveness of art therapy interventions in addressing symptoms of trauma and post-traumatic stress disorder (PTSD) in children. This research demonstrated that engaging in creative arts provided children with a non-verbal outlet to process emotions, build social connections, and develop coping strategies. While the focus of that study was on trauma recovery rather than behavior modification, the underlying principles of art therapy as a tool for enhancing emotional regulation and social interaction remain relevant[17]. The findings in the current study suggest that the structured use of creative elements similarly fostered improved social skills, emotional stability, and interpersonal engagement, contributing to the observed improvement in VSMS scores.

In addition to these findings, previous research on music-based interventions has demonstrated improvements in social behaviors and adaptive skills among children with developmental delays. Music therapy has been shown to facilitate attention, memory, and social participation by combining rhythm, melody, and movement in structured activities[18]. The inclusion of music in the present ABT module may have played a crucial role in reinforcing learning patterns and encouraging social engagement, thus contributing to the observed outcomes. Similarly, the incorporation of drama techniques, such as role-play and interactive storytelling, likely enhanced participants' social maturity by promoting self-expression, collaboration, and positive behavioral modeling.

The present study's findings not only support existing evidence but also offer new insights by demonstrating the effectiveness of an integrated ABT module specifically designed for mentally challenged children aged 0–18 months. Previous research on ABT has largely focused on older children or adolescents, making this study particularly valuable in demonstrating that such interventions can be successfully adapted to meet the developmental needs of infants and toddlers[19]. Furthermore, the significant effect sizes observed in the current study highlight the potential of short-duration therapy models to achieve meaningful behavioral improvements. With just three weekly sessions conducted over a six-week period, the intervention effectively promoted social maturity, reinforcing the feasibility and scalability of this approach in clinical and educational settings.

While these results are encouraging, it is important to acknowledge certain limitations. The study's sample size of 20 participants may restrict the generalization of findings to larger populations. Additionally, the wide age range (0–18 months) presents developmental variability, which could have influenced individual responses to the therapy. Uncontrolled external factors such as home environment, caregiver involvement, and concurrent therapies may have also contributed to the observed outcomes.

Despite these limitations, the present study provides compelling evidence supporting the role of creative therapies as effective tools for behavior modification in young children with mental challenges. The observed improvements in social maturity, combined with the substantial effect sizes, emphasize the potential of ABT as a valuable intervention for enhancing social, emotional, and behavioral outcomes. By integrating expressive arts with therapeutic frameworks, this study highlights a promising avenue for improving the quality of life for children with special needs. Further research with larger sample sizes, controlled designs, and long-term follow-ups is recommended to validate these findings and explore additional applications of ABT in pediatric developmental care.

5. LIMITATIONS

This study has several limitations that should be considered. The small sample size of 20 participants limits the generalizability of the findings, and the wide age range of 0–18 months introduces developmental variability that may have influenced individual responses to the intervention. Additionally, the absence of a control group makes it challenging to confirm whether the observed improvements were solely due to the ABT intervention or other external factors. The short intervention duration of six weeks also raises questions about the long-term sustainability of the outcomes. Furthermore, the reliance on the Vineland Social Maturity Scale (VSMS), which is caregiver-reported, may introduce subjective bias. Future studies with larger sample sizes, controlled designs, and objective behavioral assessments are recommended to strengthen the evidence for ABT's effectiveness in behavior modification.

6. FUTURE-SCOPE

Future research should focus on expanding the sample size to enhance the generalizability of the findings and include a control group to establish a clearer cause-effect relationship between Art-Based Therapy (ABT) and improvements in social maturity. Long-term follow-up studies are recommended to assess the sustained impact of ABT beyond the six-week intervention period. Exploring the integration of digital platforms or interactive tools within the ABT framework may further enhance engagement and accessibility for children with developmental challenges. Additionally, investigating ABT's potential in addressing other behavioral domains such as emotional regulation, communication skills, and cognitive adaptability could provide a broader understanding of its therapeutic value.

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