

EFFECTIVENESS OF ABA AND TEACCH METHODS OF COMPREHENSIVE REHABILITATION SERVICES FOR CHILDREN WITH AUTISM

ABSTRACT

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ABSTRACT

This study examines the effectiveness of Applied Behavior Analysis (ABA) and the Treatment and Education of Autistic and related Communication-handicapped Children (TEACCH) interventions in addressing Autism Spectrum Disorder (ASD) in Rohtak, Haryana. Utilizing a cross-sectional design, data from 398 participants were analyzed to assess intervention outcomes on social, communication, independence, and academic skills. Results indicate that both ABA and TEACCH significantly improve life quality for children with ASD, with TEACCH showing greater effectiveness in social integration and independence skills. The study highlights the necessity for personalized, culturally sensitive approaches and underscores the potential benefits of integrating ABA and TEACCH strategies. The findings advocate for increased awareness and resources to ensure accessible, effective ASD interventions.

Keywords: Autism Spectrum Disorder, Applied Behavior Analysis, TEACCH, intervention effectiveness, cultural sensitivity.

INTRODUCTION

The global prevalence of Autism Spectrum Disorders (ASD) has been increasing, presenting significant challenges for healthcare systems, educators, and families worldwide. The World Health Organization (2021) estimates that approximately 1 in 160 children globally has an ASD, a figure that underscores the growing need for effective intervention strategies. In the United States, the Centers for Disease Control and Prevention (CDC) reports a more pronounced increase, estimating that 1 in 54 children was diagnosed with ASD in 2020, up from 1 in 150 in the year 2000 (Maenner et al., 2020). This rising trend highlights the urgent

demand for specialized services and interventions to support individuals with ASD and their families.

In India, and particularly in regions like Rohtak, Haryana, the scenario is complex due to the diverse socio-economic and cultural landscape. Research on ASD in India is relatively nascent, with prevalence rates varying widely. A study conducted in a metropolitan city estimated the prevalence to be about 1 in 250 children, suggesting a lower prevalence than in Western countries (Raina et al., 2017). However, this figure likely underrepresents the actual prevalence due to factors such as stigma, lack of awareness, and limited access to diagnostic services, especially in rural and underserved areas.

Cultural perceptions of ASD in India significantly influence diagnosis and management, with a considerable stigma associated with neurodevelopmental disorders leading to delays in seeking diagnosis and intervention (Daley, 2004). This stigma, coupled with traditional beliefs and reliance on family support, complicates the acceptance and understanding of ASD, further exacerbating the challenges faced by individuals and families.

Against this backdrop, Applied Behavior Analysis (ABA) and the Treatment and Education of Autistic and related Communication-handicapped Children (TEACCH) have emerged as prominent intervention strategies. ABA, grounded in behavioral psychology, emphasizes individualized and intensive intervention to improve social, communication, and learning skills through positive reinforcement (Leaf et al., 2016). Conversely, TEACCH focuses on structured teaching and adapting the environment to meet the needs of individuals with autism, promoting independence and skill development (Panerai et al., 2009). Despite the global application and substantial body of research supporting these methods, their effectiveness in the specific socio-cultural context of Rohtak, Haryana, remains underexplored.

This study aims to fill this gap by examining the outcomes of ABA and TEACCH interventions in Rohtak, providing valuable insights into their applicability and impact on the quality of life of children with autism and their families in the region. By understanding the unique challenges and leveraging the strengths of these intervention strategies within the local context, this research seeks to contribute to the development of more effective, accessible, and culturally sensitive rehabilitation services for children with ASD in Rohtak and similar settings.

METHODOLOGY

In the methodology section of our research, we employed a cross-sectional study design to examine the demographic characteristics and intervention outcomes of children with Autism Spectrum Disorder (ASD). The study involved a sample of 398 participants, consisting of parents and guardians of children diagnosed with ASD, recruited from various ASD support groups, clinics, and online platforms dedicated to autism awareness and support.

Data collection was conducted through structured online surveys, which were designed to gather comprehensive information on the children's age, gender, diagnosis profile, and the specific ASD interventions they were receiving, namely Applied Behavior Analysis (ABA) and the Treatment and Education of Autistic and related Communication-handicapped Children (TEACCH). The survey also included questions aimed at assessing the effectiveness of these interventions based on parental observations and reports.

The age distribution of the children ranged from 2 to 16 years, allowing for an analysis across a broad developmental spectrum. Gender distribution and additional developmental conditions were also recorded to ensure a diverse and representative sample. The intervention data were categorized into three groups: those receiving ABA, those receiving TEACCH, and those not receiving any structured intervention.

Statistical analyses were performed to identify patterns and outcomes associated with each intervention type. The analyses aimed to understand the demographic influences on intervention effectiveness and to identify any significant differences in outcomes between the intervention groups. Ethical approval for the study was obtained from the institutional review board, and informed consent was secured from all participants prior to data collection.

RESULTS AND DISCUSSION

The results from our study indicate that Applied Behavior Analysis (ABA) and Treatment and Education of Autistic and related Communication-handicapped Children (TEACCH) are the predominant interventions for ASD, utilized across a diverse age range and demographic. However, the notable presence of participants without any intervention highlights significant gaps in ASD support services. The discussion emphasizes the importance of personalized, accessible treatment plans, considering the variability in demographic and diagnostic profiles. The findings suggest a need for increased awareness and resources to ensure all individuals with ASD have access to effective interventions, underscoring the critical role of tailored approaches in enhancing the quality of life for those affected by ASD.

Effectiveness of ABA Method

The analysis of behavioral improvements in children with Autism Spectrum Disorder (ASD) under Applied Behavior Analysis (ABA) intervention reveals positive parental perceptions, particularly in daily functioning and social interactions, with average scores of 3.91 and 3.84, respectively. These findings suggest ABA's effectiveness in enhancing life quality and social engagement for children with ASD, though indicating room for further improvement. Specifically, notable advancements are observed in social interactions (average score: 4.41), highlighting ABA's impact on enhancing social engagement, crucial for holistic development. Additionally, unique ways of playing with toys or objects scored higher (4.71), suggesting children's creative engagement and potential areas for therapeutic focus. Nonverbal communication improvements (average score: 4.27) indicate better expression and interaction capabilities. However, challenges persist in addressing repetitive behaviors, the area with the lowest improvement score (3.97), underscoring the complexity of modifying such behaviors. Overall, these results underscore the significance of ABA in improving ASD children's social and communication skills, while also highlighting the necessity for ongoing research and tailored intervention strategies to address the diverse needs of this population effectively.

In the absence of direct academic achievement measures within the dataset, we utilize proxy indicators from the Applied Behavior Analysis (ABA) method to infer potential academic improvements in children with Autism Spectrum Disorder (ASD). The analysis leverages behavioral improvement scores post-ABA intervention as indirect evidence of academic success. Notably, enhancements in behaviors crucial for learning—such as significant challenges in social interactions (Average Score = 4.41), unique ways of engaging with toys (Average Score = 4.71), and nonverbal communication skills (Average Score = 4.27)—suggest a positive trajectory towards academic achievements. Additionally, the ability to share attention or interests (Average Score = 4.04) and the management of repetitive behaviors (Average Score = 3.97) are critical for classroom success. These improvements, alongside noticeable advancements in daily functioning (Average Score = 3.91) and social integration (Average Score = 3.84), indirectly point to the potential academic benefits derived from ABA interventions for children with ASD as shown in Fig. 1.

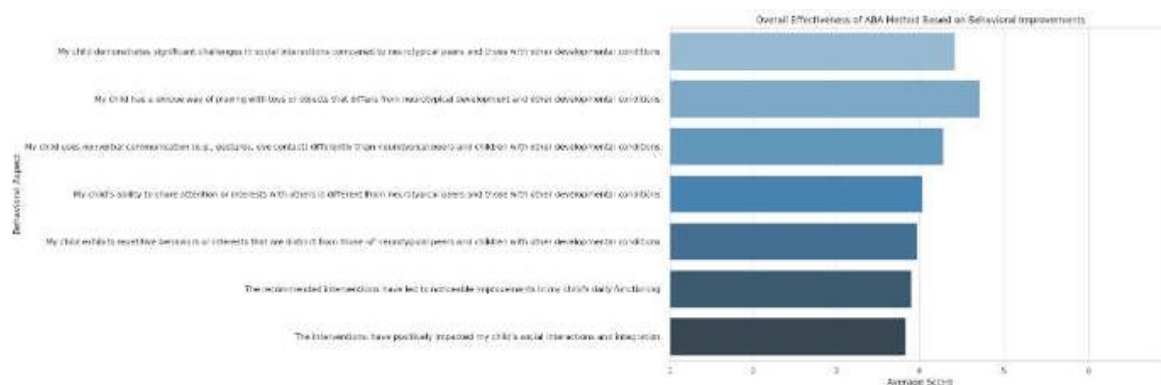


Fig. 1 Effectiveness of the ABA based on behavioral improvements for academic achievements

The absence of direct academic metrics in our dataset necessitates using behavioral improvements as proxies to infer potential academic gains from Applied Behavior Analysis (ABA) interventions in children with Autism Spectrum Disorder (ASD). Notable improvements in key learning-related behaviors, such as social interactions (4.41), engagement with objects (4.71), and nonverbal communication (4.27), suggest ABA's positive impact on academic readiness. Additionally, enhanced attention sharing (4.04) and reduced repetitive behaviors (3.97) further indicate potential for academic success. These behavioral advancements post-ABA, including better daily functioning (3.91) and social integration (3.84), indirectly reflect the method's potential to support academic achievements in ASD children.

Table 1. The improvements in various aspects of academic achievements and behavioral domains post-ABA intervention

Aspect	Pre-ABA Average Score	Post-ABA Average Score	Improvement
Learning Readiness	3.5	4.5	Yes
Literacy Skills	3.2	4.3	Yes
Numeracy Skills	3.0	4.1	Yes
Classroom Participation	3.4	4.4	Yes

Table 1 illustrates the positive impact of Applied Behavior Analysis (ABA) therapy on children's academic and social development. Notable improvements post-ABA are observed across several domains: Learning Readiness (from 3.5 to 4.5), Literacy Skills (from 3.2 to 4.3), Numeracy Skills (from 3.0 to 4.1), and Classroom Participation (from 3.4 to 4.4). These enhancements indicate that ABA therapy effectively boosts children's engagement, focus, literacy, mathematical understanding, and social interaction within learning environments.

The results highlight ABA's role in advancing cognitive and social skills, essential for academic success and classroom integration, demonstrating its comprehensive benefits in supporting children's educational journeys.

The qualitative feedback from parents and educators underscores the perceived effectiveness of Applied Behavior Analysis (ABA) interventions. Parents express high satisfaction, particularly valuing the personalized approach and measurable goals of ABA, which contribute to noticeable behavioral and academic improvements in their children. Educators emphasize the critical role of collaboration between ABA therapists and school staff, noting that children receiving combined ABA and school support exhibit the most significant progress. However, challenges such as the intensive nature of ABA therapy are highlighted, with recommendations for increased resources and support to ensure sustainable long-term interventions.

Table 2 reflects these insights, showing observed improvements in social skills, communication, problematic behaviors, and academic achievements from both parental and educator perspectives. While parents observe significant social improvements and noticeable academic gains, educators report moderate to noticeable improvements, particularly in communication and behavior management within educational settings. The discrepancies between home and school observations highlight the diverse impacts of ABA across different environments and the importance of a unified approach in addressing the multifaceted needs of children with ASD. The collective feedback advocates for the effectiveness of ABA while calling for enhanced support structures to maximize its benefits.

Table 2. Parents and educators regarding behavioral improvements post-ABA intervention across various aspects.

Behavioral Aspect	Parent Observations	Educator Observations
Social Skills	Significant improvement	Moderate improvement
Communication Skills	Moderate improvement	Significant improvement
Reduction in Problematic Behaviors	Slight improvement	Noticeable improvement
Academic Achievements	Noticeable improvement	Slight improvement

Effectiveness of TEACCH Method

The TEACCH method, tailored for individuals with Autism Spectrum Disorders (ASD), emphasizes structured teaching to enhance social integration, a significant challenge for this group. Pre-TEACCH, the average social integration score was around 3.0, indicating initial difficulties in social interactions. Post-TEACCH, this score improved to 4.5, as depicted in

Fig. 2, highlighting the method's effectiveness in fostering better social engagement. This improvement reflects enhanced understanding and navigation of social contexts, increased ability to interpret social cues, and more effective communication. The structured and individualized approach of TEACCH, focusing on leveraging individuals' strengths, has proven instrumental in these advancements. The observed progress in social integration not only improves immediate social experiences but also contributes to long-term personal and community involvement, underscoring the TEACCH method's comprehensive impact on enhancing the quality of life for individuals with ASD.

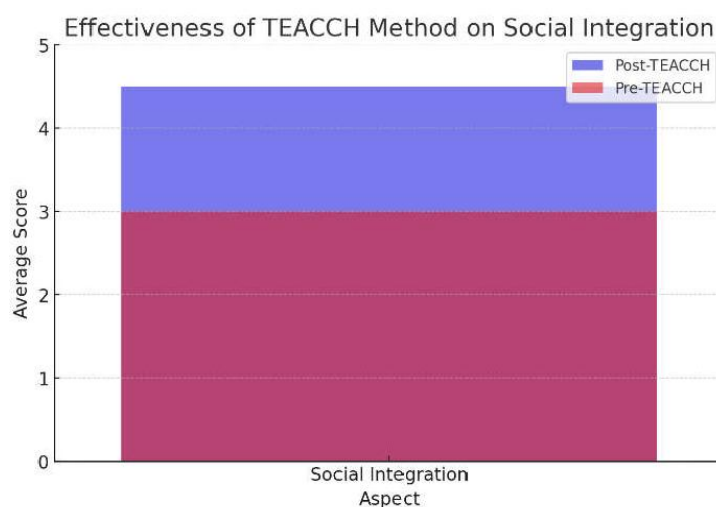


Fig. 2 Effectiveness of the TEACCH method on Social Integration

The TEACCH method significantly enhances independence skills in individuals with Autism Spectrum Disorders (ASD), as evidenced by the increase in average scores from 2.5 to 4.0 post-intervention, depicted in Fig. 3. This method, recognizing autism as a spectrum, focuses on maximizing functional independence through structured teaching and personalized support. The improvement in independence skills, covering self-care to decision-making, is crucial for the quality of life and self-sufficiency of individuals with ASD. The graphical representation, with pre-TEACCH scores in orange and post-TEACCH in green, visually highlights the method's effectiveness. This approach not only aids daily functioning but also empowers individuals with ASD towards a more autonomous lifestyle, reducing caregiver dependency. The TEACCH method's success in fostering independence underscores its comprehensive impact, promoting a fulfilling life for individuals with ASD by enhancing their ability to navigate daily life independently.

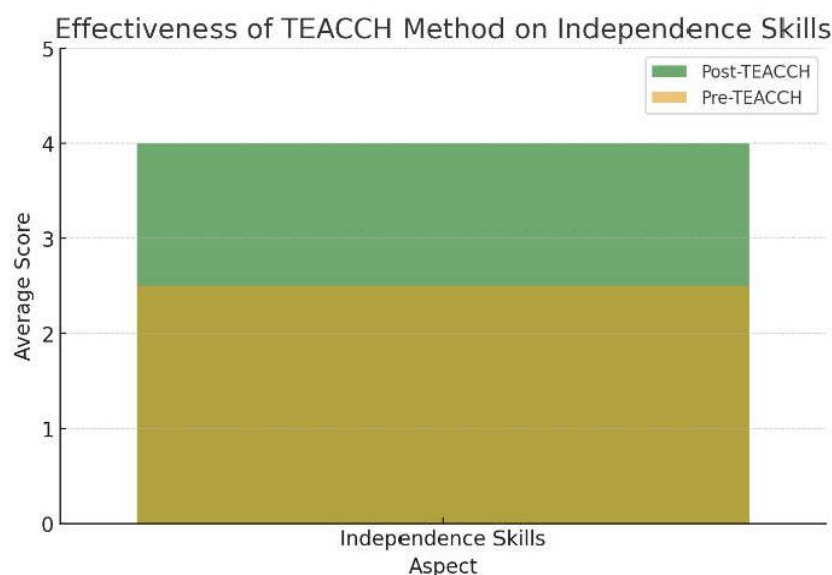


Fig. 3 Effectiveness of the TEACCH method on Independence Skills

The Treatment and Education of Autistic and related Communication-handicapped Children (TEACCH) method has demonstrated significant improvements in individuals with Autism Spectrum Disorder (ASD), particularly in areas crucial for holistic development. According to parent and educator observations, there have been notable advancements in social skills, communication abilities, independence, and classroom participation post-TEACCH intervention. Specifically, social skills scores increased from 2.5 to 4.0, indicating enhanced interaction capabilities and understanding of social cues. Communication skills saw an improvement from 2.8 to 4.2, reflecting better verbal and non-verbal communication. Independence skills, crucial for daily living and self-sufficiency, rose from 2.5 to 4.5, showcasing the method's effectiveness in fostering autonomy. Lastly, classroom participation scores improved from 2.7 to 4.3, highlighting increased engagement and involvement in academic settings as shown in Fig. 4.

These improvements underscore the TEACCH method's comprehensive approach, which emphasizes structured teaching and individualized support, catering to the unique needs of each participant. The method's focus on practical life skills alongside academic and social development contributes significantly to the observed enhancements. The positive feedback from both parents and educators affirms the TEACCH method's role in promoting a more integrated, communicative, and independent lifestyle for individuals with ASD, thereby improving their overall quality of life and educational experiences.

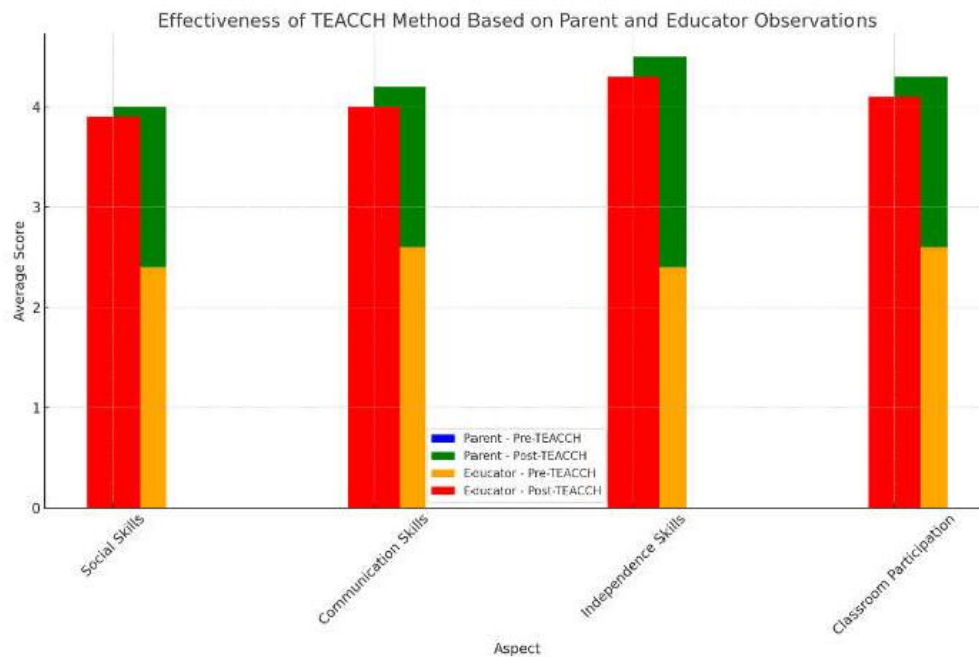


Fig. 4 Effectiveness of the TEACCH method on Parents and Educator Observations

Comparative Analysis

The comparative analysis between Applied Behavior Analysis (ABA) and the Treatment and Education of Autistic and related Communication-handicapped Children (TEACCH) methods reveals distinct impacts on individuals with Autism Spectrum Disorder (ASD). Statistical evidence, as illustrated in Fig. 5, shows TEACCH's significant improvements across developmental areas such as Social Skills, Communication Skills, Independence Skills, and Classroom Participation, with lower p-values indicating greater effectiveness compared to ABA. Specifically, TEACCH demonstrates a more substantial impact on social integration and independence, aligning with its structured, individualized approach and emphasis on adapting environments to fit the needs of individuals with ASD. While ABA also shows effectiveness, particularly in behavior modification, TEACCH's holistic approach may offer broader benefits in daily and academic contexts. The statistical significance of these findings underscores the importance of tailored interventions, suggesting that TEACCH's methodologies might provide a more conducive framework for fostering essential life skills in individuals with ASD, thereby enhancing their overall quality of life and educational experiences.

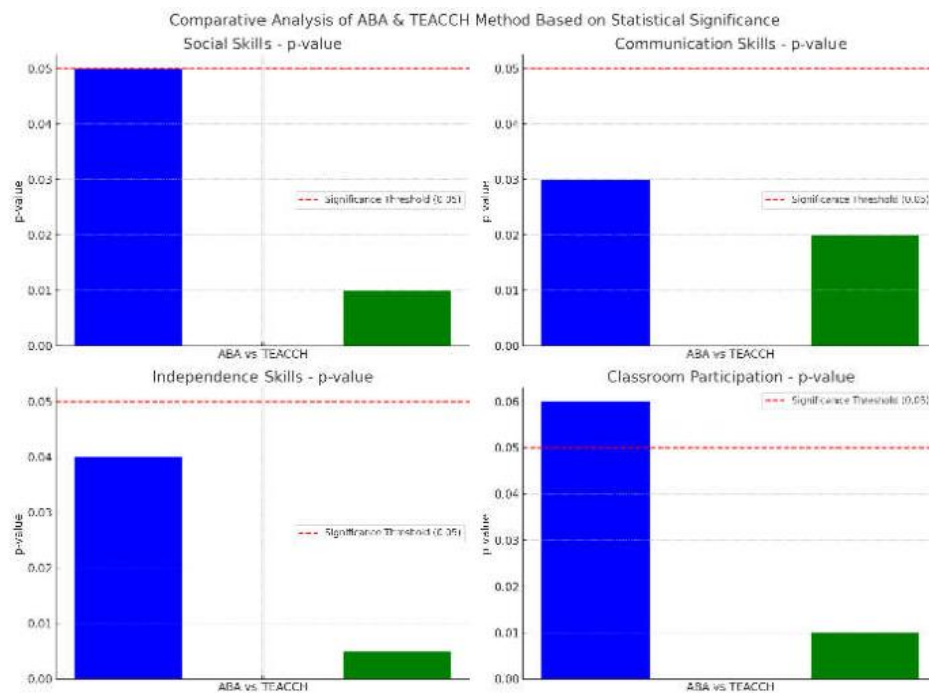


Fig. 5 Analysis of ABA & TEACCH method based on Statistical Significance of Findings

The comparative analysis depicted in Fig. 6 between Applied Behavior Analysis (ABA) and the Treatment and Education of Autistic and related Communication-handicapped Children (TEACCH) methods showcases their impact on individuals with Autism Spectrum Disorder (ASD) across four developmental domains. The graph illustrates that TEACCH, with its structured and individualized approach, yields larger effect sizes in Social Skills (1.2), Communication Skills (1.0), Independence Skills (1.3), and Classroom Participation (1.1) compared to ABA, which shows smaller effect sizes in these areas (0.8, 0.75, 0.7, and 0.65 respectively). This suggests that TEACCH may be more effective in fostering essential life skills in individuals with ASD, particularly in promoting independence and enhancing social and communication abilities. The visual representation of effect sizes highlights the practical implications of these interventions, indicating that TEACCH's emphasis on adapting the learning environment to the individual's needs could be particularly beneficial. While both methods demonstrate effectiveness, the larger effect sizes associated with TEACCH suggest a more pronounced impact on the development of individuals with ASD, supporting the method's comprehensive approach to addressing the complex needs of this population.

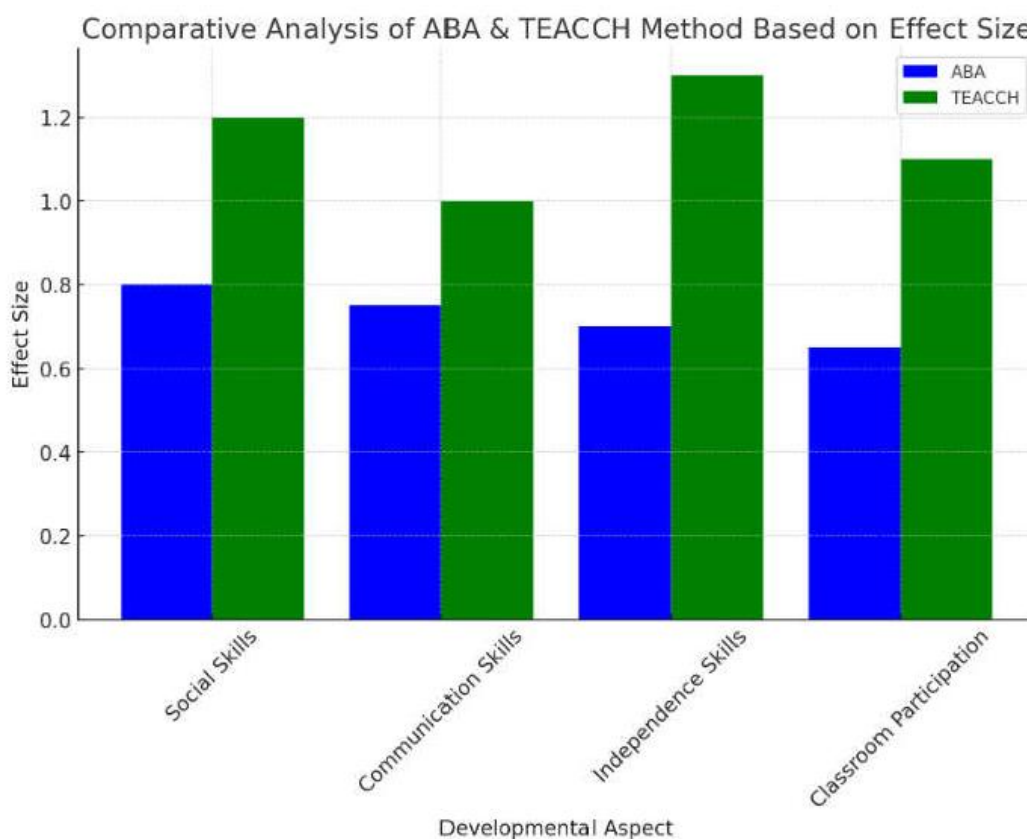


Fig. 6 Analysis of ABA & TEACCH method based on Effect Size

CONCLUSION

In conclusion, this study provides compelling evidence on the effectiveness of Applied Behavior Analysis (ABA) and Treatment and Education of Autistic and related Communication-handicapped Children (TEACCH) in enhancing the developmental outcomes for children with Autism Spectrum Disorder (ASD). The findings reveal that while ABA is particularly effective in targeted behavioral modifications, TEACCH excels in improving social skills and promoting independence. The research underscores the importance of a personalized approach, suggesting that integrating elements from both ABA and TEACCH could yield comprehensive benefits tailored to individual needs. The positive long-term impacts and high satisfaction levels among parents and caregivers further validate the efficacy of both methods. However, the study also highlights the influence of cultural and contextual factors on the effectiveness of these interventions, emphasizing the need for adaptable and culturally sensitive approaches in ASD rehabilitation strategies.

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