

Applied Behavior Analysis: Foundations for Supporting Diverse Learning Needs of Autistic Students in Morocco

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Abstract

Autism Spectrum Disorder (ASD) is gaining recognition as a significant development and public health concern across Morocco and Africa. However, the implementation of evidence-based practices such as Applied Behavior Analysis (ABA) remains limited due to gaps in training, policy support, and culturally adapted service models. This study investigates the need for ABA-based interventions by examining caregiver perspectives on accessibility, awareness, and barriers to autism care. Data collected through pre-interview surveys and focus group discussions highlight the challenges of limited professional capacity, stigma, and systemic fragmentation in existing services. The research further explores strategies for integrating behavioral science, community engagement, and digital innovation into national frameworks for inclusive care. The findings aim to inform policymakers, educators, and practitioners on how to establish sustainable, culturally relevant systems that promote equitable access to autism intervention services across Morocco and the African continent.

Keywords

Applied Behavior Analysis (ABA), Autism Spectrum Disorder (ASD), Morocco, Africa, Caregivers, Behavioral Interventions, Cultural Adaptation, Mental Health Systems, Inclusive Education, Systemic Change

1. Introduction

Applied Behavior Analysis (ABA) is a scientifically proven method of providing support to meet the learning needs of autistic students through systematic behavioral interventions. In Morocco, where the rate of autism is similar to that of other countries worldwide, but the number of specialized educational supports is low,

ABA can provide evidence-based interventions that might change the academic experience of children with autism spectrum disorder. Recent Moroccan studies indicate that national population-level epidemiological data are lacking, but clinic- and caregiver-based studies show patterns consistent with global ASD prevalence and highlight substantial under-diagnosis and delayed identification; Moroccan retrospective and caregiver surveys report common ages of first concern in infancy/early toddlerhood and emphasize that limited screening infrastructure likely reduces the number of identified cases compared with global estimates (Sefrioui et al., 2023). A national caregiver survey found clear urban-rural inequities: children in urban areas were substantially more likely to receive interventions than those in rural areas, illustrating that identified prevalence in service records will under-represent rural populations where diagnostic and service access are limited (de Jonge et al., 2023).

Preliminary policy and NGO reports repeatedly conclude that Morocco likely has similar underlying ASD prevalence to global estimates (around 1% - 2%), but that the absence of a national registry, inconsistent screening, social stigma, and late diagnosis mean recorded cases are far lower than the true population burden, strengthening the urgency for national prevalence surveillance and early screening programs (Sefrioui et al., 2023; de Jonge et al., 2023). Autistic students possess varying learning profiles that demand specific interventions to correct the communication deficiencies, social skills problems, and adaptive behavior issues in a way that is not insensitive to their cultural background and family beliefs. This discussion examines how the foundational principles of ABA can be applied to address the diverse learning needs of autistic students in Morocco, thereby overcoming the existing limitations of the system and methods of implementing inclusive learning environments.

2. Theoretical Foundations of ABA for Diverse Learning Support

Applied Behavior Analysis has a scientific foundation that provides a systematic approach to addressing the diverse learning needs of students with autism. ABA is essentially grounded on the learning principles of behaviorism, as described by Skinner (Botros, 2023; Gitimoghaddam et al., 2022; Wilkenfeld & McCarthy, 2020). The ABC Model (Antecedent-Behavior-Consequence) is the central paradigm for understanding how environmental factors impact student learning and behavior, which educators can use to identify the particular triggers and consequences that either contribute to or hinder the learning process (Gitimoghaddam et al., 2022). The seven dimensions formulated by Baer et al. are a complete methodology according to which the interventions are supposed to be Applied, Behavioral, Analytic, Technological, Conceptually Systematic, Effective, and Generalizable (Gitimoghaddam et al., 2022). This framework ensures that interventions that are proposed are not only socially necessary, but also scientifically grounded. As a result, ABA is a versatile yet organized construct that is able to meet numer-

ous learning needs with individually tailored, evidence-based interventions that can be implemented with different populations.

3. ABA Techniques for Supporting Diverse Learning Profiles

ABA methods provide the systematic strategies that may be used to meet the learning styles and needs of autistic students and utilize the structured and naturalistic methods of intervention. The structured approaches, such as Discrete Trial Training (DTT), could break down more complex skills into smaller ones and train them with clear instructions and feedback a few times, which is particularly applicable when one has to work with students who require clear instructions (Yu et al., 2020). Early Intensive Behavioral Intervention (EIBI) provides more comprehensive support, involving 15 - 50 hours of individualized therapy per week, as autistic learners often require extensive practice in multiple developmental areas (Rodgers et al., 2021; Frazier et al., 2021). This range is derived from international early intensive behavioral intervention programs and large individual participant data meta-analytic samples of EIBI trials, which typically report individualized programs in this intensity range; the international individual participant data meta-analysis included 491 children from 10 studies and is the principal evidence base for these intensity recommendations (Rodgers et al., 2021). Longitudinal outcome studies frequently cited for language and placement effects used samples of approximately 100 - 130 children followed 24 - 36 months, providing the foundation for statements about language trajectories and placement gains (Frazier et al., 2021). Naturalistic methods offer more avenues of learning, and they are integrated into the natural settings and activities that are enjoyed by the students.

Pivotal Response Treatment (PRT) is a pivotal behavior, such as motivation, that applies to child-initiated activities, and they are specifically effective with those students who learn best when interest-based interventions are employed (Schuck et al., 2024; Yu et al., 2020). The Early Start Denver Model (ESDM) is a collection of principles that integrates the ABA and the developmental play methods (Rodgers et al., 2021). In contrast, the LEAP Model implies the use of peer-mediated interventions when social skills are formed (Gitimoghaddam et al., 2022). Functional Communication Training (FCT) communication interventions substitute the problem behaviors with the appropriate communication responses (Gitimoghaddam et al., 2022), and the Picture Exchange Communication System (PECS) is a structured communication intervention that teaches non-verbal students (Charaf-Eddine et al., 2023). These are all the ABA techniques that will be incorporated in a complex system that can be customized according to the learning profile of a particular person and the demands of all the autistic students.

4. Current State of Autism Support in Morocco

The Moroccan special education system is experiencing a severe challenge in accommodating the various learning needs of the autistic students, and inequalities

in the system constrain access to effective interventions. One of the most serious problems is delayed diagnosis, with many children not receiving an autism diagnosis until well past the optimal early intervention window. They have to wait excessively long to get services, and they waste a lot of time waiting to be served; they do not have qualified professionals (Bouaddi et al., 2025; Charaf-Eddine et al., 2023; Sefrioui et al., 2023). Such a late diagnosis does not help to intervene early, as it is important to intervene at critical development stages to attend to different learning needs. The number of public services is minimal, and families are left with no choice but to turn to NGOs and parent associations that provide a patchwork of service delivery that fails to cover all learning requirements of autistic students (de Jonge et al., 2023; Botros, 2023). This inconsistent style of work leads to the existence of a large gap between the quality and availability of services, and most students are not getting the proper support that would be consistent with their learning profiles and needs.

The geographical imbalance also poses more difficulties to the families that would want to offer whole-hearted support to the learning needs of their autistic children. Rural families face significant barriers to accessing special educational interventions, with an estimated 70 - 87 percent of available services concentrated in urban areas (de Jonge et al., 2023; Sefrioui et al., 2023). This estimate comes from a national caregiver survey ($n \approx 131$) comparing urban versus rural service access and satisfaction in Morocco, which found urban children had substantially higher odds of receiving interventions (de Jonge et al., 2023). Transportation issues and Internet access are very closely connected because, in rural families, there is usually a lack of direct services and online learning materials. Such geographic disparity means that a student does not get the most suitable educational assistance that they need, but the one that the family can afford. The local experience in the rural communities is also undermined by the concentration of services only in the urban areas, and this further supports the poor quality of support to diverse learners in the underserved areas.

The fact that Morocco has a poor inclusion culture in the education sector is an indicator that the country has serious gaps in meeting the academic needs of autistic students. The number of schools (20 - 35 percent) with the appropriate disability accommodations is minimal, and this greatly restricts the opportunity of students with autism regarding education (Buda et al., 2023). This range is grounded in NGO and university reports and local audits of school accessibility, based on cross-sectional program reviews and project reports rather than a national ministry census (Buda et al., 2023). The so-called integration classrooms (CLIS) lack appropriate curricula and trained staff, and therefore are not equipped with educational programming that meets individual learning needs (Bouaddi et al., 2025; Kadiri, 2022). This is what is called superficial inclusion, whereby students are actually present but not provided with special instruction or individual support to meet their educational objectives. This is attributed to the fact that there are no trained personnel and evidence-based curricula, meaning that the

needs of students with autism are not addressed in a systematic way in the education system because they are diverse.

5. Teacher Training for Supporting Diverse Learning Needs

The professional development gap is a severe setback to the proper consideration of the individual, diverse learning needs of autistic students in Moroccan schools. It has been shown that Moroccan educators do not have proper autism training and do not know about positive behavior support methods (Belkhouane, 2023; Kadiri, 2022). Such general inadequate preparation puts educators in a bad position by equipping them with little knowledge and skills to identify and meet the learning needs of the various learning profiles of autistic learners. It does not have systematic training processes; hence, the teachers are more likely to use the general education approach, as opposed to evidence-based interventions, which are observed to be effective in meeting the needs of students with autism. Such unprofessional training continues the application of ineffective practices and constrains the potential of the educational outcomes among students with varied learning requirements.

Extensive training of the teachers should focus on theory and practice to enable them to have the competencies of meeting the needs of diverse autistic learners. An effective core training module must consist of six parts, such as foundations of ABA and ethics; assessment and curriculum (VB-MAPP/functional assessment); evidence-based teaching methods (DTT, PRT, EIBI principles); classroom-level Positive Behavior Support and FCT/communication systems (including PECS); family collaboration and social validity; and supervised practicum and supervision skills (Charaf-Eddine et al., 2023; Gitimoghaddam et al., 2022). These modules facilitate the acquisition of conceptual knowledge as well as practical skills of individualized intervention among the educators. The training design ought to aim at a combined program of about 300 total hours, including about 180 hours of didactic training (online and in-person courses) and 120 hours of practicum (supervised) (in-school or clinic) during an academic semester (Charaf-Eddine et al., 2023). Such a combination of theory and practice enables the teachers to apply the knowledge in the practical classroom setting and gives them constant feedback and reinforcement. It is suggested to use a hybrid delivery model, which will include asynchronous theory courses in Arabic and French, regional, face-to-face practicums provided by university-school-NGO groups, and tele-supervision to cover rural locations (Gitimoghaddam et al., 2022; Rodgers et al., 2021). This multi-modelling solution helps to overcome the geographic differences as well as the language diversity and ensures the quality of the programs.

Assessments and certification need to use competency-based tools such as direct observation checklists, VB-MAPP-motivated goals, and supervisor certifications, and the staged certification with a one- or two-year period of recertification should be based on the Ministry of Education and university credentialing. All the training resources should be provided in both Arabic and French, and family-en-

agement modules and regular family meetings should be compulsory to facilitate the social validity and cultural acceptability (Charaf-Eddine et al., 2023; Sefrioui et al., 2023). Lastly, training programs should require quantifiable results on policymakers such as the number of certified teachers in a region, rates of schools with trained staff, student outcomes (communication, adaptive behavior), and social-validity feedback provided by families and autistic adults, and pilot evaluation should be done using both methods is recommended before national scale-up (Rodgers et al., 2021; Hodgson et al., 2022). This holistic approach would have training programs that equip educators with sufficient autonomy to engage in evidence-based, culturally responsive interventions to support the entire range of needs of autistic learners.

6. Implementation Challenges and Solutions

The constraints on resources pose inherent problems to the provision of special services and interventions to autistic students with various learning needs in Morocco, where financial restraints mean that special services and interventions are not readily available to the individual. Most of the families cannot afford the expensive ABA services provided privately, which means they will be forced to use NGOs and other charitable organizations, which might have inadequate funding or the resources to help multiple individuals with various learning needs (Botros, 2023; Bouaddi et al., 2025; Okondu et al., 2025). Such an economic barrier creates disparities in access to effective interventions, with wealthy families being able to afford individualized services. Comparatively, other families can hardly access services, even though the child has special learning needs. They do not have staff, particularly those holding a degree in Board Certified Behavior Analyst (BCBA), to design and implement individualized interventions that help diverse learners (Bouaddi et al., 2025; Okondu et al., 2025). These constraints necessitate new approaches to service delivery that may accommodate the quality of interventions and the multiplicity of learning needs of all children with autism.

Other barriers to the implementation of comprehensive support of diverse learning needs are cultural and systemic barriers. In one of the studies, it is disclosed that two-thirds of Moroccan people have deficit-oriented beliefs towards autism, which is a stigmatizing attitude that may inhibit the acknowledgment of the diversified learning opportunities and the involvement of the families in the education interventions (Sefrioui et al., 2023; Zerrouk, 2025). The attitudes may result in underutilization of services by families and limit the ability of the community to embrace inclusive practices that favor diverse learners. The absence of Arabic and French ABA materials is a hazard to the delivery of culturally appropriate interventions because it cannot help to diversify the learning needs and provide assistance in culturally and linguistically familiar environments (Charaf-Eddine et al., 2023). Logistical costs of individualized programming and preservation of skill generalization across situations are also part of implementing issues, which is crucial in meeting the needs of various learners (Charaf-Eddine et al., 2023;

Hodgson et al., 2022).

7. Ethical and Cultural Adaptations

ABA implementation in Morocco requires explicit integration of culturally responsive practices and ethical safeguards to ensure interventions are both effective and socially valid within local contexts. ABA implementation must explicitly incorporate culturally responsive consent practices, family-centered goal setting, and linguistically accessible materials (Arabic and French) to ensure social validity and community acceptability; ethical cautions raised in international literature emphasize avoiding normalization-focused goals and centering quality-of-life outcomes, preferences of autistic people, and family values in treatment planning (Wilkenfeld & McCarthy, 2020; Schuck et al., 2024). This cultural responsiveness would help in making sure that the interventions are made in line with the community values and not prescribing external behavioral norms, which could be in conflict with the family priorities or cultural expectations. The concept of family consent should be viewed as a complex process of collaboration instead of a formal step and the objectives thereof are to be explicitly documented to reflect the family priorities and culture-specific expectations regarding the social roles; all the training and materials must be presented in Arabic and French and be tested with the help of caregiver focus groups to make them culturally and linguistically significant (Charaf-Eddine et al., 2023).

The collaborative model would change the consent not to a bureaucratic directive but to a real collaboration between family autonomy and cultural diversity, but still with therapeutic integrity. Ethical protection must involve quantifiable social validity verifications, such as regular feedback of caregivers and autistic adults on goals and procedures, the avoidance of aversive or coercive methods expressly, culturally suitable adaptations that do not interfere with family and religious practices, and the translation of instruments to high-stakes decision-making (Wilkenfeld and McCarthy, 2020; Schuck et al., 2024). These safeguards cushion against possible harms as well as make interventions consistent with the emerging family needs and culturally contextualized definitions of successful results, thus enhancing ethical integrity as well as intervention efficacy in Moroccan settings.

8. Limitations

There are a number of limitations to the generalizability of the conclusions in this manuscript because it recognizes a number of methodological and contextual constraints. The manuscript is a synthesis of the narrative stripping, with most of the information sources being secondary and project reports, because Morocco does not have national epidemiological ASD registries and there is a relative lack of peer-reviewed, controlled outcomes of ABA programs in Morocco, thereby forcing the conclusions based on the extension of international evidence and local descriptive studies (Sefrioui et al., 2023; de Jonge et al., 2023;

Bouaddi et al., 2025). This extrapolation dependence, instead of the actual data of Moroccan effectiveness, implies that the assertions regarding the outcome of the program should be viewed with some suspicion until more detailed local tests are carried out. Also, numerous services-availability statements are based on surveys of caregivers, NGO reports, and small clinical samples of different sample sizes and methods; high-quality Moroccan controlled trials and longitudinal outcome data are required before solid policy prescriptions are taken to national levels (de Jonge et al., 2023; Rodgers et al., 2021). The diversity of data sources and techniques used in the literature restricts the accuracy of prevalence estimates, service-gap estimates, and estimates of effectiveness projections. These constraints highlight the high value of systematic national surveillance, standardization of outcome measures, and culturally modified controlled trials as a way of developing a strong evidence base of ABA policy and practice in Morocco.

9. Conclusion

Applied Behavior Analysis can have significant potential in the Moroccan education system in terms of accommodating the different learning needs of autistic students, but the adoption process demands a long-term investment and a complete overhaul. Even though the scientific principles of ABA provide a good foundation for personalized treatment in the autism spectrum, the current obstacles (late diagnosis, lack of resources, geographical disparity, and training professionals) must be surmounted to create truly inclusive environments. It will involve multifaceted ways to solve the problem of resource limitations, cultural barriers, and professional development needs at the same time, and governmental bodies, schools, nongovernmental organizations, and international partners will be forced to collaborate. The emerging sense of the necessity of interventions for autism, as well as the initial training programs, provides the ground to extrapolate culturally adequate services. Through correct planning, resources, and efforts, Morocco is able to establish a complete system of ABA-based educational assistance to discover and motivate the special learning abilities of every student with autism.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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