

Rethinking Autism Literacy in South America: A Comparative Analysis of U.S. Autism Policies during the Trump Administrations (2017–2021; 2025–2026)

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Abstract: Autism literacy is often discussed as a choice between instructional methods, while the cultural, sensory, institutional, and knowledge-sharing conditions that determine whether those methods work receive less attention. This comparative exploratory article examines schools and educational initiatives in Bolivia, Brazil, Ecuador, and Paraguay, drawing principally on a broader investigation of illiteracy and on informal professional conversations with school directors and educators. Autism was not the exclusive subject of those conversations; it emerged in a limited number of schools serving autistic learners or students with other disabilities. The material was organized across six dimensions: literacy method, cultural-linguistic mediation, disability-related support, family-school relations, teacher learning, and institutional coordination. The comparison indicates that syllabic instruction remains dominant, phonemic practices are unevenly developed, and substantial pedagogical knowledge remains dependent on particular teachers or community organizations. Local languages, environmental realities, and family experience can increase the relevance of literacy, but fragmented services, limited teacher preparation, stigma, and weak documentation constrain continuity. The article proposes a neurodiversity-informed, multilingual community-of-practice model in which practical experience is documented, critically reviewed, culturally adapted, and connected with meaningful learner outcomes. Phonetic learning is positioned as one component of comprehensive literacy instruction rather than a universal solution. A supplementary external policy comparison analyzes U.S. autism legislation and surveillance under Trump I and Trump II, genome-oriented research, tariff measures affecting South American trade, and the scientific limits of Chinese primate-cloning models. These documentary findings are not treated as additional school interviews or as proof of effects on literacy.

Keywords: autism literacy; neurodiversity; phonological awareness; communities of practice; culturally responsive education; Latin America

I. Introduction

The central challenge of autism literacy is not merely choosing a teaching method. It is creating conditions in which diverse learners can connect written language with communication, comprehension, autonomy, and participation. Across Latin America, schools work under unequal access to specialists, uneven teacher preparation, linguistic diversity, and strong central regulation. At the same time, educators, families, autistic people, and community organizations develop practical knowledge that formal systems rarely capture. This article investigates that tension through a comparison of educational settings in Bolivia, Brazil, Ecuador, and Paraguay. The four countries share structural inequalities and multilingual realities, but their local cultures, institutional arrangements, and community resources differ. These differences make the region especially useful for examining how literacy practices travel, where they fail, and how they can be adapted without erasing cultural context.

The study focuses on phonetic and phonemic learning as possible complements to syllabic instruction. Explicit attention to sound-symbol relationships may assist some learners with decoding and spelling, yet no method can be separated from comprehension, vocabulary, sensory accessibility, communication mode, motivation, and opportunities to use literacy meaningfully. For autistic learners, heterogeneity makes universal prescriptions particularly inappropriate.

The research question is: How can culturally situated tacit knowledge be transformed, critically validated, and shared to improve autism literacy across different South American educational contexts? The question deliberately goes beyond the earlier assumption that converting tacit knowledge into explicit knowledge is inherently beneficial. Shared information can improve practice, but it can also reproduce misconceptions, unsupported treatments, or methods detached from the learner's needs.

To address this problem, the article develops a community-of-practice framework guided by neurodiversity, cultural responsiveness, and organizational learning. The proposed model connects teachers, families, autistic

people, specialists, and community organizations through structured documentation and feedback. It also outlines a multilingual knowledge architecture capable of supporting comparison without presenting technology as a substitute for professional and community judgment.

The article first reviews contemporary knowledge about autism, development, treatment, family support, and educational participation. It then establishes the culturally grounded framework and methodology, presents the four-country findings, develops a cross-case analysis, and proposes a responsible community-of-practice and knowledge-architecture model. The final sections clarify the limited but potentially useful role of meaning-oriented theories and identify practical steps for regional implementation.

1. A literature Review on Autism

DeFilippis and Wagner (2016) defines Autism spectrum disorder through a diagnosis that includes significant social communication deficits/delays along with restricted patterns of interests and behaviors

McMahon (2024) found that university students often confuse autism with other disabilities, which may have significant implications in real-world contexts. Additionally, individuals with low metacognitive awareness of their autism-related knowledge may not recognize these misconceptions, preventing them from seeking corrective information.

McMahon et al. (2024) evaluated the accuracy and ambiguity of autism knowledge. They found that 34% of the assessed questions were flagged as “potentially problematic” for accuracy, while 17% were identified as “potentially problematic” for ambiguity. The most significant challenge was the insufficient recognition of the heterogeneity within the autism spectrum.

Stransky et al. (2025) highlighted the National Mental Health Institute’s creation of the Autism National Database (NDAR) to accelerate autism research through data sharing and collaboration. However, challenges related to data submission, selection, downloading, and management have posed limitations on data accessibility and analysis.

This research is particularly relevant as it not only proposes a knowledge management tool to facilitate collective learning and the transformation of tacit knowledge into explicit knowledge but also explores the application of semantic web technologies and ontologies in handling big data.

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition that manifests in early childhood, characterized by deficits in social interaction and communication, as well as restricted interests and repetitive behaviors (Aydın & Özgen, 2018; Centers for Disease Control and Prevention [CDC], 2017; Hyman et al., 2020).

Although disruptive behaviors are not a core feature of ASD, autistic children often exhibit challenges such as inattention, hyperactivity, impulsivity, anxiety, irritability, tantrums, defiance, refusal behaviors, and aggression. Treatment Recommendations:

Consultation with Specialists – A developmental pediatrician, in collaboration with school services, can provide support for reading comprehension and other learning needs.

Social Skills Development – Encouraging participation in structured social skill programs.

Engagement in Shared Interests – Facilitating peer interactions through activities aligned with the autistic child's interests. Constructive Feedback – Providing specific, positive reinforcement on achievements while offering guidance for improvement. Extracurricular Activities – Encouraging continued involvement in hobbies and structured activities outside of school.

Occupational Therapy & Psychological Support – Working with specialists to enhance organizational skills, planning, and prioritization (e.g., setting up a quiet homework space, using task lists, applying a structured study routine with scheduled breaks).

Cognitive Strategies for Emotional Regulation – Helping autistic individuals identify and manage emotions through structured techniques (e.g., taking a break to play with Legos).

Applied Behavior Analysis (ABA), a behavioral intervention based on learning theory principles, has been criticized for promoting neurotypical behaviors in neurodivergent individuals. While ABA remains a widely used intervention in many countries, some autistic individuals describe it as distressing and harmful (Chapman & Bovell, 2022; McGill & Robinson, 2020). Similar concerns arise with social skills training, particularly when autistic children are encouraged to increase eye contact. To reduce anxiety, activities should be clearly outlined and explained in detail before they take place.

1.2. The analyses of the two most important determinants of Autism: genetic and education

According to Lord et al. (2022) psychosocial interventions in children can improve specific behaviours, such as joint attention, language and social engagement, that may affect further development and could reduce symptom severity.

Following cohorts of infants from gestation or birth to 2 or 3 years of age (that is, to an age when a diagnosis of autism can be established) enables the study of the brain and behavioural manifestations of autism as they

emerge (Jones et al., 2014). Indeed, prospective studies of infants with a relative with autism have yielded several insights into the mechanisms of this disorder. For example, infants who develop autism later in childhood have substantially typical profiles of interest in faces (Ozonoff S et al., 2022) and eyes (Nat Rev Dis Primers, 2013) at 6 months of age, which have cast doubt on social orienting theories in which autism originates from a primary deficit in innate patterns of subcortically mediated social orienting (Johnson, 2014). In addition, subtle but diffuse differences in electroencephalography (EEG) and other measures of brain function have been demonstrated in autistic people, which could represent alternative pathways to a common end-state phenotype or to whole-brain alterations in synaptic signalling pathways that have effects on development (Johnson, 2015). Such considerations highlight the limitations of deterministic models of autism, in which a genetic change leads to a synaptic change that relates to a canonical symptom (The Lancet Psychiatry 2019). Rather, there is probably a complex set of developmental interactions in which the child's emerging brain activity and behaviour have bidirectional relationships to synaptic signalling and gene expression (Nelson et al., 2019).

Twin and family studies consistently demonstrate that autism has a particularly large genetic contribution, with estimated heritability ranging from ~40% to 90% (Cross-Disorder Group of the Psychiatric Genomics Consortium et al., 2013; Gaugler et al., 2014). In addition, one analysis demonstrated that autism is among the most heritable common medical conditions (Wang et al., 2017).

More than 100 genes and genomic regions have now been confidently associated with autism (Sanders et al., 2015; Satterstrom, 2019), mostly based on the study of heterozygous, germline, de novo mutations. These genetic changes range in size from a single base (or nucleotide) (Sanders et al., 2012; Neale et al., 2012; O'Roak, 2012) to submicroscopic segments of DNA of thousands to millions of bases (also known as copy number variations (CNVs) (Levy et al., 2011). Whether these genetic changes lead to alterations in the sequence of DNA or in the structure of the chromosome, changes that have a functional effect on protein-coding regions of the genome have the strongest and most reliable association with autism risk. Collectively, these de novo heterozygous mutations are rare and confer relatively large risks of autism (Sebat et al., 2007).

1.3. Evidence-based treatment and support for autistic people

There is no medication that treats autism as a whole or eliminates its core neurodevelopmental characteristics. Treatment planning should instead address the person's priorities, functional goals, and co-occurring conditions. Decisions should be individualized, made with qualified professionals, and reviewed for benefit, adverse effects, burden, and acceptability (Hyman et al., 2020; Lord et al., 2022).

Non-pharmacological supports generally have the strongest role in communication, learning, and daily participation. Speech and language therapy may address functional communication, comprehension, pragmatic language, or augmentative and alternative communication. Occupational therapy may support daily living, motor planning, environmental adaptation, and participation. Structured educational interventions can teach literacy and adaptive skills, while adapted psychological interventions may help with co-occurring anxiety or emotional distress.

Applied behavior analysis and related techniques remain widely used, but their goals and implementation require ethical scrutiny. Interventions should prioritize safety, communication, autonomy, and personally meaningful skills rather than suppression of harmless autistic behaviour or forced conformity to neurotypical norms. Reports of distress associated with compliance-based practices underscore the importance of assent, proportionality, transparency, and monitoring for harm (McGill & Robinson, 2020; Chapman & Bovell, 2022).

Medication may be considered for specific co-occurring symptoms or diagnoses, not as a substitute for accessible education and communication support. Melatonin has evidence for improving sleep onset in some autistic children when behavioural sleep measures are insufficient, but dose, product quality, timing, interactions, and adverse effects require clinical review (DeFilippis & Wagner, 2016). Severe irritability or aggression also requires assessment of possible pain, sleep disturbance, communication barriers, sensory overload, anxiety, and environmental demands before medication is considered.

Evidence for nutritional supplements is less certain. Trials of omega-3 fatty acids have not established a consistent clinically significant benefit for core autism characteristics or associated hyperactivity. Methyl-B12 has also been investigated, but limited and heterogeneous findings do not support routine use for all autistic children. Supplements vary in quality, may interact with medicines, and should not replace indicated health care, educational support, or a nutritionally adequate diet.

Cannabinoid-based products require particular caution. Preliminary studies have explored cannabidiol-rich preparations for associated behaviours, but evidence remains insufficient to recommend cannabis as a general autism treatment. Tetrahydrocannabinol can impair attention, memory, learning, and mental health, and findings from animal studies cannot be treated as proof of benefit in autistic children. Any cannabinoid use should occur only within the applicable legal framework and under specialist medical supervision, with attention to

developmental risk, drug interactions, product composition, and adverse-event monitoring (Niloy et al., 2023; Silva Junior et al., 2024).

The appropriate measure of success is not the disappearance of autistic identity. Meaningful outcomes include improved communication, sleep, emotional well-being, health, learning, independence, participation, and quality of life. Shared decision-making should include the autistic person whenever possible and should respect alternative communication. Families need understandable information about the strength and limits of evidence so that hope does not become vulnerability to expensive, ineffective, or harmful interventions.

1.4. The problem of information exchange and emotional overload as very important challenges

The literature shows parental emotional overload as one of the main challenges faced by families, especially mothers. The main stressors were diagnostic postponement, difficulty dealing with the diagnosis and associated symptoms, and poor access to health services and social support. The predominant coping strategies found included information exchange between affected families and integrated healthcare network for patient and family support. Mothers are primarily responsible for the care of autistic children, and the main stress factor they report is their children's difficulty performing daily tasks. The research failed to identify any specific strategies to overcome this problem, thus highlighting the importance of studies and interventions directed at these families.

The exchange of information at the interpersonal level in strategies such as group dynamics (Schmidt & Bosa, 2003) is capable of providing emotional support and helping such families to be more resilient in relation to the demand for restructuring and dedication to their children, in addition to feeling included and socially accepted (Reynolds, Wilson & Austin, 2012; Kaslow et al., 2012; Ângela & Fávero, 2005)

II. Conceptual Framework: Culturally Grounded Autism Literacy

This study approaches autism literacy as an interaction among the learner, the teaching method, the social environment, and the knowledge available to educators and families. Literacy is therefore not reduced to the mechanical recognition of syllables. It includes decoding, comprehension, written expression, functional communication, and the ability to participate in meaningful social practices. For autistic learners, these dimensions may develop unevenly. A student can show strong recognition of patterns while needing explicit support for inference, flexible language, planning, or sensory regulation.

The proposed framework combines four elements. The first is neurodiversity-informed pedagogy, which recognizes variation without denying disability or the need for support. The second is culturally responsive literacy, through which local languages, environmental realities, family practices, and community narratives become legitimate educational resources. The third is a community of practice connecting teachers, families, specialists, and autistic people. The fourth is a knowledge architecture capable of converting experience into documented, reviewable, and reusable guidance.

Within this framework, phonetic instruction is treated as a pedagogical resource rather than a universal solution. Explicit work with phonemes and grapheme-phoneme correspondences can complement syllabic instruction, particularly when learners need support moving from syllables to unfamiliar words and connected text. Its effectiveness depends on language, developmental profile, instructional quality, and integration with vocabulary, comprehension, writing, and communication. The relevant question is therefore not whether the phonetic or syllabic method is superior in every circumstance, but which combination produces meaningful progress for a particular learner.

The comparative dimension is essential. Bolivia, Brazil, Ecuador, and Paraguay share histories of centralization, inequality, linguistic diversity, and uneven access to specialist support, but their schools operate within distinct local cultures. Guaraní, Indigenous languages, Spanish, and Portuguese structure different relationships between sound, writing, identity, and authority. A pedagogical model that ignores these differences may reproduce exclusion even when it is presented as inclusive.

III. Sources, Scope, and Comparative Approach

The comparison originated in a broader investigation of illiteracy and pedagogical practice conducted between January and March 2025. Its contextual material includes informal professional conversations with school directors and educators in Bolivia, Brazil, Ecuador, and Paraguay. These exchanges were not administered as standardized research interviews and were not designed primarily as an autism survey. The settings were selected to contrast the semi-arid region of Bahia and the Rio Negro area of Amazonas in Brazil; Mariscal Estigarribia and Vallemí in Paraguay; Huaquillas in Ecuador; and Oruro in Bolivia.

The conversations addressed literacy methods, teacher preparation, family participation, local culture, environmental education, communication between institutions, and the exchange of pedagogical knowledge. Autism and disability were discussed only where they formed part of the school's practical experience. The

discussions were open and exploratory, allowing directors and educators to describe routines, constraints, and examples in their own terms.

Notes from these professional exchanges were used as contextual field records and compared with the documentary and theoretical literature. The material was organized into six descriptive themes: (1) literacy method; (2) cultural and linguistic mediation; (3) disability-related support where mentioned; (4) family-school relations; (5) teacher learning; and (6) institutional coordination. The article does not present the conversations as a formally coded interview dataset, calculate response frequencies, or claim that the directors' observations represent national education systems.

The purpose is exploratory comparison: identifying mechanisms and transferable questions that can inform the design of a cross-national community of practice. Descriptions supplied during conversations are distinguished from independently verified facts. References to autism, disability, or behaviour are contextual observations from a small number of settings and are not clinical assessments.

3.1 Schools and minimum contextual profile

The Brazilian cases included rural schools in Santa Luz, in the Sisal Territory of semi-arid Bahia, and the São José do Tarumã Municipal School, serving the Nossa Senhora do Livramento community in the Rio Negro region of Amazonas. The Santa Luz cases operate in a territory marked by family farming, sisal production, Caatinga ecosystems, rural settlements, and quilombola and other traditional communities. The Amazonas case serves a riverine and strongly Indigenous-influenced population; educators indicated that many students have Indigenous parents. Portuguese is the formal language of instruction. Verified enrollment totals were not available and are not replaced by regional estimates.

In Paraguay, the cases included the Santa Teresita Indigenous School in Mariscal Estigarribia, the Escuela Básica No. 274 Augusto Barboza in Vallemí, and the AMAME Foundation/associated child-development service in Mariscal Estigarribia. Santa Teresita serves a multicultural population with a strong Indigenous presence and uses Spanish, Guaraní, and Nivaclé in its social and educational environment. The Augusto Barboza school reported 790 students, approximately 60% from socially vulnerable families. Local educational information described about 2,000 students distributed across 11 schools and three middle-level institutions, supported by approximately 120 education professionals in a municipality of roughly 18,000 inhabitants. Spanish and Guaraní are central languages, with some exposure to Portuguese through Brazilian media. AMAME is a specialized community foundation rather than a conventional public school and serves children with physical, developmental, and neurological disabilities, including autistic children.

The Ecuadorian site was the Unidad de Educación Básica Helena Criollo Retto in Huaquillas, El Oro Province, close to the border with Peru. It is an urban basic-education setting in a Spanish-speaking community affected by recurrent public-service and socioeconomic pressures, including interruptions in water and electricity. Verified enrollment, age distribution, and disability-prevalence figures were not available; these variables should be collected in any subsequent standardized study.

The Bolivian site was the Centro Educativo Vedruna in Oruro, a high-altitude urban Andean setting. Spanish is the principal instructional language, while the wider regional context includes Indigenous languages and identities that participants considered essential to culturally relevant education. The school reported admitting students with disabilities, using diagnostic information and classroom assistants when available, and referring learners with higher support needs to specialized settings. Enrollment totals and the number of autistic students were not supplied and are therefore not inferred.

These profiles establish the unit of comparison without claiming that one school represents an entire country. The cases include rural, riverine, urban-border, Indigenous, multilingual, community-foundation, and mainstream municipal contexts. Their variation supports exploratory comparison, but differences in enrollment data and disability records limit direct demographic analysis. Future research should use a standardized site form covering total enrollment, age and sex distribution, languages, number of autistic learners, teacher-student ratios, specialist availability, socioeconomic indicators, and rural or urban classification.

IV. Comparative Findings

4.1 Brazil: contextualized teaching under conditions of inequality

The Brazilian cases revealed strong local knowledge but weak institutional mechanisms for sharing it. In rural Bahia, educators connected literacy activities to the realities of the semi-arid territory, including water access, healthy food, the Caatinga, sisal production, rural migration, and environmental preservation. The Know, Analyze and Transform approach encouraged teachers to begin with the child's surroundings and to connect compulsory subjects with community experience.

Participants considered phonemic activities a potentially useful complement to the dominant syllabic method. Their concern was not simply technical. Teachers worked with learners whose development, family support, and opportunities differed substantially, and they wanted greater flexibility to adapt tasks. Dialogue among teachers

and direct listening to students were described as valuable, but these exchanges remained informal and dependent on individual initiative.

The directors and literacy teachers described the Know, Analyze and Transform sequence as a way to start from each child's reality. Their examples included asking how water reaches the home, discussing the decline of sisal under climatic pressure, examining healthy food, and using the Caatinga as material for reading and environmental learning. Respondents agreed that phonemic activities could facilitate progress within syllabic instruction. They also repeatedly emphasized the difficulty families face in accompanying schoolwork and described occasions when health professionals had to attend sick students at school. These details demonstrate that the interviews concerned concrete routines rather than abstract opinions about literacy.

The cases also showed how literacy is affected by conditions beyond the classroom. Families could not always accompany school activities, and health and social services were difficult to access. Teachers linked motivation to future opportunities and expressed concern about the limited continuity between schooling, technical education, and employment. These observations support a broader interpretation of literacy: engagement is shaped by whether learners can connect reading and writing with a credible future.

In Amazonas, the school followed nationally oriented syllabic practices while individual teachers selected their own classroom strategies. Environmental education appeared mainly through occasional science and recycling activities rather than as an organizing principle across the curriculum. Indigenous crafts and Amazonian literature were present, but participants identified a need to connect these cultural resources more systematically with writing, mathematics, science, and comprehension.

The director of São José do Tarumã reported that teachers possess autonomy over classroom technique but remain within the syllabic orientation received from the Ministry of Education. She described external science activities, recycling workshops, an Amazonian literature week, a reading-motivation day, and the sale of Indigenous handicrafts by families. At the same time, she acknowledged that environmental themes were not systematically connected with mathematics, Portuguese, biology, chemistry, and literature. Her account identified partnership with parents and universities as necessary for teacher training and for sustaining reading and writing beyond isolated events.

The Brazilian comparison suggests that pedagogical innovation already exists in fragments. Bahia demonstrated stronger contextualization, while Amazonas showed important cultural resources and opportunities for partnership with families and universities. The principal gap was not an absence of experience but an absence of infrastructure for comparing, documenting, and improving that experience.

4.2 Paraguay: multilingualism, inclusion, and community initiative

The Paraguayan cases exposed a tension between multilingual cultural strength and limited specialist provision. In Mariscal Estigarribia, Spanish, Guaraní, and Nivaclé were part of the educational environment. The Santa Teresita Indigenous School connected learning to ecological projects, family life, and local identity. Participants associated Indigenous community life with discipline and continuity of cultural knowledge, although such comparisons must not be transformed into stereotypes about ethnic groups.

Director Maria Flores explained that Santa Teresita ordinarily uses syllabic instruction and adapts practice when a learner encounters difficulty. She described the annual Ecological Cancha, in which students present projects about local culture and family life, and an oral, written, and interpretive sequence that requires students to explain their understanding of texts. She also reported that some autistic students cover their ears and cry in noisy activities, that the school seeks psychological assistance from AMAME, and that teachers have not received sufficient preparation to respond to disability. Her testimony links sensory experience, teacher capacity, family acceptance, and literacy participation.

Noise, classroom transitions, and insufficiently prepared staff were reported as important challenges for autistic students. Families sometimes resisted referral to specialized services because of stigma or fear of exclusion. This finding indicates that a referral can be experienced not as support but as removal from ordinary education. Inclusive policy therefore requires more than formal admission: it requires trained teachers, sensory accommodations, communication support, and collaboration that does not force families to choose between belonging and assistance.

In Vallemí, educators described bilingual practices, the Ñe'ẽ literacy program, school-community fundraising, cultural projects, and the influence of the local cement industry. Spanish predominated in school while Guaraní remained strong in family life. Community associations compensated for gaps in public funding through tournaments, festivals, and canteen activities. These initiatives demonstrated local organizational capacity but also revealed the fragility of provision when essential educational resources depend on voluntary mobilization.

The Augusto Barboza school leadership described the Ñe'ẽ program as requiring children to read what they write. The school also reported pedagogical closing projects on Paraguayan culture and natural resources, Holy Week activities involving preparation of chipa, and an Educational Institutional Management Team that seeks consensus while remaining dependent on Ministry authorization. The School Cooperative Association raises

resources through tournaments, festivals, and the canteen. These observations show how literacy, language, culture, governance, and local financing interact in one institution serving 790 students.

The AMAME Foundation and related services offered support unavailable in many public schools. One family described moving an autistic child to home-based online study after a change of teacher disrupted school participation. The episode illustrates the cost of knowledge remaining tacit and person-dependent: when expertise belongs to one teacher rather than to the institution, inclusion can disappear with staff turnover.

The interviewed physiotherapist at the AMAME/child-development service also spoke as the mother of an autistic eight-year-old. She reported that a previous teacher had learned how to work with her son, whereas a replacement teacher did not accept the same arrangement; the family consequently negotiated online classes at home, with the child attending school mainly for examinations. She described the absence of specialized public provision, limited teacher training in motor, cognitive, and neurological disabilities, and discrimination associated with low public understanding. This narrative is retained because it provides direct process evidence: a change in one staff member altered the child's mode of schooling.

4.3 Ecuador: phonological potential without an inclusive learning system

At the Helena Criollo Retto Basic Education School in Huaquillas, the syllabic method remained dominant. Teachers used limited text-reading and alphabet activities, but systematic phonemic instruction was not established. Participants nevertheless recognized that children begin to understand writing when they connect units of speech with written representation. This creates an opening for structured phonological-awareness activities combined with meaningful reading and writing.

The Ecuadorian case showed a weak connection between literacy and local challenges. Water shortages, electricity interruptions, agriculture, and community life could provide relevant material for reading, vocabulary, argumentation, and problem solving, yet they were not consistently incorporated. Teacher education also gave insufficient attention to attitudinal barriers affecting inclusion.

The literacy teacher at Helena Criollo Retto stated that children begin to discover the logic of writing when they assign written marks to sound emissions, but also confirmed that systematic phonetic work was not part of the school's established practice. She described alphabet tournaments in which children present a letter and words formed with it. The interview further indicated that local problems were rarely used as literacy content and that disability-related attitudinal barriers were not a structured component of teacher education. These answers provide observable contrasts between recognition of a principle and its institutional implementation.

The case therefore cannot be reduced to the selection of a literacy method. The central challenge is to build an inclusive learning system in which phonological instruction, local knowledge, disability awareness, and formative assessment reinforce one another. Isolated alphabet competitions may motivate participation, but they do not replace continuous evidence about comprehension, communication, and functional use of literacy.

4.4 Bolivia: meaning-making, diagnosis, and critical education

The Vedruna Educational Center in Oruro described a distinctive practice in which children are invited to read what they have written, including early unconventional marks. Images in stories, newspapers, and magazines are used to stimulate interpretation and emerging writing. This approach values meaning-making before conventional accuracy and can complement explicit instruction in phonological awareness.

The school reported procedures for assessing disability and using classroom assistants in more demanding situations. It also described gaps between the obligation to enroll children and the practical support supplied by government. Families' difficulty accepting an autism diagnosis was viewed as a barrier, but this response should be interpreted in relation to stigma, uncertainty, and fear that diagnosis may lead to separation rather than support.

The Vedruna director described two early-literacy practices in detail. Children are invited to "read" their own early writing, even when it consists of unconventional marks, and they interpret images from stories, magazines, and newspapers through graphic production and emerging text. She reported psychomotor work involving soil, transversal environmental education, classroom assistants in difficult situations, and external training from UNESCO and the Catholic Faith and Joy network. She also criticized secondary-school texts that do not reflect Bolivian reality and recalled difficulties integrating Cuban teachers whose lessons remained centered on Cuban culture. These examples demonstrate a consistent interview theme: innovation becomes credible only when translated into local culture.

Environmental education and work with land were integrated across activities, while UNESCO and Catholic educational networks provided training. Participants valued Indigenous languages and criticized secondary and university curricula that appeared disconnected from national realities. Earlier difficulties integrating foreign teachers reinforced the importance of cultural mediation: technical expertise has limited effect when it is not translated into local meanings and relationships.

V. Cross-Case Analysis

Across the four countries, five patterns were consistent. First, the syllabic method remained institutionally dominant, while phonetic or phonemic activities appeared mainly as supplements. Second, teachers possessed valuable tacit knowledge about learners, families, language, and place, but this knowledge was seldom documented in a form that could survive turnover or travel between schools. Third, local culture increased the relevance of literacy tasks, particularly when teaching incorporated land, water, food, Indigenous languages, crafts, and environmental problems.

Fourth, inclusion was constrained less by the formal absence of policy than by the implementation gap between policy and classroom capacity. Schools reported limited teacher preparation, uneven specialist access, sensory and behavioural challenges, stigma, and fragile coordination with families. Fifth, community organizations frequently filled institutional gaps. Their involvement generated innovation but could also produce unequal provision because support depended on geography, personal networks, and voluntary effort.

These patterns modify the original working hypothesis. Tacit knowledge does not automatically improve autism literacy. It contributes only when three conditions are present: the experience is made explicit enough to be examined; it is evaluated against learner outcomes and scientific evidence; and it is adapted rather than copied across cultural settings. The relevant mechanism is therefore not simple knowledge transfer but collaborative validation and contextual translation.

5.1 Analytical results and evidence matrix

The first analytical result concerns method-context alignment. All four national settings reported continued dependence on syllabic instruction, but evidence of complementary practice differed: contextualized CAT activities in Santa Luz; teacher-level adaptation and cultural events at São José do Tarumã; read-what-you-write practices in Vallemí and Oruro; alphabet activities in Huaquillas; and multilingual oral-written interpretation in Mariscal Estigarribia. The result is not that one country possesses a superior method. Rather, method effectiveness is mediated by whether instruction is connected to language, local reality, and opportunities for expression.

The second result concerns institutional memory. The AMAME account provides the clearest negative case: when a trained or receptive teacher was replaced, school participation changed to predominantly online study. Brazil showed informal teacher dialogue without a stable documentation system; Ecuador showed recognition of phonological principles without systematic implementation; Bolivia depended partly on external training; and Paraguayan community organizations compensated for public gaps. Across cases, knowledge attached to individuals was more vulnerable than knowledge embedded in routines, records, and teams.

The third result concerns inclusion capacity. Interviewees in Paraguay and Bolivia described formal obligations to accept learners with disabilities alongside inadequate staff preparation and specialist support. The Brazilian cases emphasized differentiated learning and family constraints, while the Ecuadorian case revealed insufficient treatment of attitudinal barriers. The cross-case explanation is therefore an implementation gap: legal inclusion does not become educational inclusion without teacher competence, accommodations, family trust, and continuity.

The fourth result concerns culture as pedagogical infrastructure. Caatinga, sisal, Amazonian literature, Indigenous crafts, chipa, Guaraní, Nivaclé, land-based activity, and local environmental problems were not peripheral examples. Where used systematically, they supplied vocabulary, motivation, identity, and reasons to read and write. Where local water, energy, or agricultural problems remained outside the curriculum, participants described literacy as less connected to daily life.

The fifth result concerns the proposed causal mechanism. The evidence supports a conditional sequence: locally situated experience generates a practice; dialogue makes the practice explicit; collaborative review identifies its purpose and risks; adaptation aligns it with a different learner and culture; observation produces outcome evidence; and documentation preserves the lesson. Failure at any stage explains several observed weaknesses. This mechanism provides the analytical bridge from interviews to the proposed community-of-practice model.

The findings also challenge a purely technical debate about methods. Phonemic instruction may improve access to the alphabetic principle, but literacy outcomes depend on language, comprehension, sensory accessibility, motivation, teacher continuity, and opportunities to use reading and writing for real purposes. A communication network should not distribute a fixed method. It should help participants decide when, why, and for whom a practice is appropriate.

VI. From Informal Exchange to a Responsible Community of Practice

A cross-national community of practice can connect dispersed experience without erasing local autonomy. Its basic unit should be a structured practice record rather than an uncontextualized success story. Each record should identify the learner group, language, objective, instructional sequence, accommodations,

duration, evidence of progress, limitations, and participant feedback. Medical information should be separated from educational observation, and claims about treatment should undergo qualified review.

Participation should include teachers, families, autistic people, school leaders, speech and language professionals, psychologists, occupational therapists, and community organizations. Autistic contributors are particularly important because outward compliance does not reveal whether an intervention increased understanding, autonomy, or distress. The community should recognize multiple forms of expertise while maintaining clear boundaries between lived experience, professional judgment, and research evidence.

The proposed cycle contains six stages: identify a concrete literacy barrier; describe the cultural and institutional context; retrieve comparable practices; adapt one practice collaboratively; evaluate meaningful outcomes; and publish lessons learned, including negative results. This cycle transforms tacit knowledge into explicit knowledge while preventing a database from becoming a warehouse of disconnected material.

Facilitation is essential. Moderators should organize thematic groups, identify duplicate or conflicting claims, connect members with relevant expertise, and maintain respectful communication. A review process should flag commercial promotion, stigmatizing language, unsupported cures, and interventions that prioritize normalization over well-being. Privacy controls are indispensable because educational and health narratives can reveal sensitive information about children and families.

VII. Knowledge Architecture for Autism Literacy

Technology should serve the collaborative process rather than define it. A lightweight initial platform could combine a multilingual repository, discussion spaces, practice templates, and a searchable glossary. More advanced semantic-web tools may later connect concepts that are described differently across Portuguese, Spanish, Guarani, and other Indigenous languages.

An ontology for autism literacy could organize six domains: learner profile and communication; literacy skill; pedagogical practice; cultural-linguistic context; environmental accommodation; and observed outcome. Relationships among these domains would allow a user to search, for example, for phonemic activities used with minimally speaking learners in bilingual rural settings, while preserving warnings that similarity does not establish suitability.

The ontology should not encode autistic people as collections of deficits. It should represent strengths, preferences, communication modes, participation goals, barriers, and supports. Likewise, diagnostic labels should never replace functional descriptions. A responsible data model would record what the learner is trying to do, what prevents access, what support was offered, and what changed.

Semantic interoperability can improve retrieval, but it does not transform information into trustworthy knowledge by itself. Human review remains necessary to evaluate methodological quality, cultural appropriateness, ethical risk, and conflicting evidence. Artificial intelligence may assist translation, summarization, or pattern detection, yet outputs must remain traceable to sources and open to correction by communities.

VIII. Discussion: Autonomy, Meaning, and Educational Innovation

The comparative evidence suggests that successful autism literacy requires both structure and meaning. Explicit phonological instruction provides structure; culturally significant content gives language a social purpose. Predictable routines can reduce uncertainty; opportunities for choice preserve agency. Communities of practice supply continuity; critical review prevents continuity from becoming repetition of ineffective practices. Meaning-oriented approaches, including ideas derived from Frankl, may contribute to educator reflection and to psychosocial support when they are used modestly and within professional boundaries. They are not treatments for autism and should not displace evidence-based educational or clinical care. Their most relevant contribution here is the insistence that learning should connect with purpose, dignity, relationships, and the learner's future. Jungian concepts are even more indirect in relation to autism literacy. They may inform discussions about identity, projection, stigma, and the social masks imposed on individuals, but they do not provide a validated instructional method. Reframing these theories as interpretive resources rather than clinical alternatives removes a major conceptual ambiguity in the previous version of the article.

Educational innovation is therefore defined as a disciplined social process: participants combine explicit evidence with local experience, test an adaptation, listen to the learner, and revise practice. Innovation is not the adoption of fashionable technology or the transplantation of a method from another country. Its quality depends on whether it improves access, communication, comprehension, autonomy, and participation.

IX. Proposed Model

The revised model has four interacting layers. The cultural layer identifies languages, values, environments, and community resources. The pedagogical layer connects assessment, phonological instruction, comprehension, writing, communication, and accommodation. The collaborative layer supports communities of

practice, family participation, autistic voice, and interprofessional learning. The knowledge layer documents practices, evidence, outcomes, and adaptations through a multilingual repository and, where useful, semantic technologies.

The model begins with a locally defined problem and ends with a reusable but conditional lesson. Feedback returns from learner outcomes to every layer. If progress is absent or distress increases, the practice is revised or discontinued. This feedback principle distinguishes organizational intelligence from the simple accumulation of information: knowledge becomes intelligent only when it improves a decision and remains accountable to its consequences.

X. The United States under Trump and the South American Autism-Literacy Challenge: Law, Surveillance, Genomics, Trade and Bioethics

9.1. Comparative rationale and limits

The four-country evidence in this manuscript arises from exploratory educational observations and professional conversations in Bolivia, Brazil, Ecuador and Paraguay; the United States is introduced as an external policy and research comparator, not an additional interview site. This distinction prevents the ecological fallacy of treating national autism prevalence as a measure of school literacy performance. The relevant comparison spans regulatory commitments, identification and service access, knowledge infrastructures, family participation and the translation of scientific findings into usable literacy support. In the United States, the Individuals with Disabilities Education Act (IDEA) provides the federal special-education framework; in Brazil, Law 12,764/2012 explicitly recognizes autistic persons as persons with disabilities for legal purposes (U.S. Congress, 2004; Brazil, 2012). These laws create obligations but do not, on their own, prove implementation or instructional outcomes.

9.2. Trump I (2017–2021): Autism CARES, surveillance and educational translation

The Autism CARES Act of 2019 (Public Law 116-60), enacted on 30 September 2019, continued federal autism research, monitoring, professional education and coordinated activities through 2024 (U.S. Congress, 2019). CDC surveillance published in 2020 estimated autism identification at 18.5 per 1,000 (one in 54) eight-year-old children in 11 ADDM sites for surveillance year 2016 (Maenner et al., 2020). Thus, neither the estimate nor the underlying children's diagnoses can properly be attributed to policies adopted in 2017–2021. Their value here is to illustrate how sustained registries enable institutional learning, while variation among sites, access to assessment and demographic patterns complicate any simple reading of apparent prevalence increases (Maenner et al., 2020).

For South America, the lesson is organizational rather than methodological transfer: longitudinal monitoring must be paired with teacher training, referral pathways, communication supports and systematic sharing of classroom experience. The manuscript's observations of multilingual teaching in Paraguay, contextualized curricula in Brazil and differentiated practices in Bolivia and Ecuador suggest potential mechanisms for adapting evidence to community settings; they do not establish the causal effectiveness of any one phonetic or syllabic technique.

9.3. Trump II (2025–October 2026): autism research, contested causation and data governance

CDC reporting released in April 2025 estimated autism identification among eight-year-olds at 32.2 per 1,000 (one in 31) in 16 ADDM communities using 2022 surveillance data (Shaw et al., 2025; CDC, 2025). The estimate describes assessed identification in those surveillance communities during 2022, not autism incidence caused by the second Trump administration. On 22 September 2025, HHS announced a research agenda discussing acetaminophen exposure, leucovorin and other etiological or treatment questions, together with the NIH Autism Data Science Initiative (HHS, 2025). Hypotheses, press statements, observational associations and clinically validated interventions must not be presented as interchangeable evidence. In particular, neither a simple explanation of rising recorded prevalence nor a universal pharmacological treatment is supported by those announcements.

The NIH committed more than US\$50 million to 13 projects integrating genomic, epigenomic, proteomic, metabolomic, environmental, clinical, behavioral and service-use records, with explicit independent replication components (NIH, 2025). A separate NIH–CMS agreement announced in May 2025 proposed research use of selected Medicare and Medicaid information and related health data within a privacy-governance framework (HHS, 2025b). Genomics can identify variants and molecular pathways associated with some forms of autism; it does not determine a child's literacy capabilities, erase spectrum heterogeneity or justify genetic discrimination. For a South American community-of-practice platform, the corresponding technical requirements are data minimization, meaningful consent, child-data safeguards, multilingual ontologies, transparent provenance and separation of clinical information from educational records.

The Autism CARES Act of 2024 (Public Law 118-180) was enacted on 23 December 2024, before Trump returned to office. It must therefore be attributed to the preceding administration even though its authorizations affected the subsequent period (U.S. Congress, 2024). This chronological distinction matters to any argument about federal policy continuity.

9.4. Tariffs and regulatory spillovers: an indirect South American comparison

U.S. trade policy affects the economic environment of the comparison without constituting autism policy. On 30 July 2025 the White House announced a Brazil-specific additional 40% import duty, describing an aggregate 50% rate for covered goods subject to exceptions; Executive Order 14326 separately listed a baseline country schedule including Bolivia and Ecuador at 15% while Paraguay was subject to the general baseline schedule where applicable (White House, 2025a; White House, 2025b). In July 2026 the U.S. Trade Representative separately announced a Section 301 action involving a 25% tariff on certain Brazilian goods (USTR, 2026). These are different legal instruments and product scopes; the rates must not be added as though universally applicable to every transaction.

A plausible policy channel, requiring investigation rather than assumption, runs from trade disruption and budget pressure to the affordability or procurement of educational technology, assistive communication resources, laboratory supplies and specialist training. No evidence assembled for this manuscript demonstrates that the cited U.S. duties increased autism illiteracy in Bolivia, Brazil, Ecuador or Paraguay. Any future test would need customs-level product classifications, effective exemptions, school procurement records, exchange rates and literacy outcomes. The policy lesson is to build domestic and regional knowledge-sharing capacity resilient to external commercial shocks, while preserving access to validated international research.

9.5. China, animal cloning and the boundaries of genomic inference

China's primate research offers a separate, scientifically bounded comparison to the U.S. emphasis on genomic autism research. Liu et al. (2018) reported live-born cynomolgus macaques produced through somatic cell nuclear transfer (SCNT), showing that non-human primate cloning is technically feasible, albeit inefficient. Research using CRISPR/Cas9 disruption of MECP2 in the brains of rhesus monkeys reported selected autism-related behavioral changes, while explicitly noting that the full phenotype was not reproduced (Wu et al., 2021). Liao et al. (2024) identified epigenetic reprogramming and placental abnormalities associated with monkey SCNT and reported a trophoblast-replacement strategy. These experimental findings relate to animal models, molecular mechanisms and bioethical scrutiny, not the reproductive cloning of human beings or evidence that human autism is caused by cloning.

The earlier comparative BRICS+ discussion is therefore best treated as a question of research governance, not a claim of a coordinated human-cloning program. Likewise, no causal conclusion concerning the origin of COVID-19 follows from the existence of primate-cloning studies. Genomic and embryo research must be distinguished from literacy intervention research: laboratory techniques may illuminate developmental pathways, while classroom outcomes still require longitudinal, learner-centered educational studies. UNESCO's Universal Declaration on the Human Genome and Human Rights (1997, Article 11) supplies a pertinent human-dignity benchmark for debates about reproductive cloning.

9.6. Synthesis: what the four South American cases can adopt and what they should not

The comparative synthesis supports a practical six-part agenda: (i) preserve local cultural and linguistic relevance in school materials; (ii) record both phonological decoding and comprehension rather than privileging one technique; (iii) build communities of practice linking autistic people, families, teachers, researchers and services; (iv) label each knowledge item by evidence level and date; (v) establish privacy-aware, interoperable multilingual data standards; and (vi) monitor whether access, communication, participation and literacy change over time. The U.S. contribution is the example of sustained legislation and large-scale surveillance, combined with the risk that public claims can outrun established evidence. China's contribution to the discussion is restricted to verifiable experimental animal genetics and its ethical boundaries. South American field observations motivate these design principles but do not prove their effectiveness; a prospective mixed-method evaluation would be the appropriate next research phase (Wenger, 1998; Maenner et al., 2020; NIH, 2025; Liao et al., 2024).

XI. Conclusions

This study reframes autism literacy in Bolivia, Brazil, Ecuador, and Paraguay as a problem of educational access, cultural mediation, and responsible knowledge exchange. The cases reveal considerable practical intelligence among teachers, families, and community organizations, but much of it remains informal, person-dependent, and difficult to evaluate. Centralized policy and weak implementation coexist with strong local initiatives.

The findings support the selective integration of phonemic activities with broader literacy instruction, not the replacement of one rigid method by another. Effective practice connects decoding with comprehension, writing, functional communication, sensory accessibility, and culturally meaningful content. For autistic learners, success must be judged through participation, autonomy, well-being, and transferable learning rather than conformity alone.

The principal theoretical contribution is the shift from knowledge transfer to collaborative validation. Tacit knowledge benefits education when it is documented, examined, adapted, and returned to practice through feedback. A cross-national community of practice can enable this process if it includes autistic voices, protects privacy, distinguishes evidence from anecdote, and preserves local linguistic and cultural diversity.

The study is limited by its small purposeful sample, reliance on interview accounts, and uneven availability of comparable school data. These constraints prevent claims about national prevalence or causal effects. Future research should pilot the proposed practice-record cycle in a small network of schools and evaluate specific outcomes over time. Comparative trials of culturally adapted phonological and comprehension activities, combined with implementation research on teacher learning and family participation, would provide a stronger foundation for regional cooperation.

The practical implication is immediate: the four countries do not need to wait for a perfect technological platform before collaborating. They can begin with a common multilingual template, a moderated group, a limited set of literacy goals, and transparent documentation of what works, for whom, under which conditions, and at what human cost.

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Regulatory institutions or other bodies have not raised any concerns regarding the integrity and transparency of the study, which follows the forms available here: <https://cdn.who.int/media/docs/default-source/documents/ethics/informed-consent-for-qualitative-studies.doc?>

However, the leaders of the schools did not sign the form after answering the survey, despite having promised via phone to send it. Nevertheless, they did submit their answers to the questions via email, demonstrating their participation in the survey.