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METHODOLOGY FOR STUDYING THE LEVEL OF SPEECH DEVELOPMENT IN CHILDREN WHO STUTTER

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Abstract

This article presents a methodology for studying the level of speech development in children who stutter within the context of inclusive education and pedagogical university training. The study is based on the assumption that speech development in children who stutter should be assessed not only through fluency symptoms, but also through a broader system of indicators that includes phonetic-phonemic skills, lexical and grammatical development, coherent speech, communicative behavior, speech tempo-rhythm, and the child's participation in dialogic interaction. The proposed methodology integrates logopedic, pedagogical, and psychological approaches and is designed for educational settings where diagnostic results are expected to guide corrective and developmental support. Particular attention is given to the principles of complexity, developmental sensitivity, ecological validity, and child-centered assessment. The methodology includes a staged diagnostic procedure, a combination of standardized and practice-oriented tasks, qualitative and quantitative scoring criteria, and guidelines for interpreting the results across different levels of speech development. The article also outlines conditions for reliable data collection, ethical interaction with children, and the role of collaboration among speech therapists, teachers, and parents. The proposed framework is intended to support future specialists in inclusive education in

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making evidence-based decisions for individualized intervention planning and monitoring the dynamics of children's speech and communication growth.

Keywords: Speech development, stuttering, children who stutter, speech assessment methodology, communicative development, logopedic diagnostics, inclusive education, pedagogical assessment, fluency disorders, language development, speech therapy, diagnostic criteria..

Introduction

DUDUQLANUVCHI BOLALAR NUTQINING RIVOJLANGANLIK DARAJASINI O‘RGANISH METODIKASI

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Annotatsiya

Ushbu maqolada inklyuziv ta'lim va pedagogik universitet tayyorgarligi sharoitida duduqlanuvchi bolalarda nutq rivojlanish darajasini o‘rganish metodologiyasi taqdim etiladi. Tadqiqot duduqlanuvchi bolalarda nutq rivojlanishini baholash faqat nutq ravonligi buzilishlari bilan cheklanmasligi, balki fonetik-fonematik ko‘nikmalar, leksik va grammatik rivojlanish, bog‘langan nutq, kommunikativ xulq-atvor, nutqning tempo-ritmi hamda bolaning dialogik muloqotdagi ishtirokini qamrab oluvchi keng ko‘rsatkichlar tizimi asosida amalga oshirilishi zarurligi haqidagi qarashga asoslanadi. Taklif etilayotgan metodologiya logopedik, pedagogik va psixologik yondashuvlarni integratsiya qiladi hamda diagnostik natijalar korreksion va rivojlantiruvchi yordamni rejalashtirishga xizmat qiladigan ta'lim muassasalari uchun mo‘ljallangan. Metodologiyada komplekslik, rivojlanishga sezgirlik, ekologik

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validlik va bolaga yo‘naltirilgan baholash tamoyillariga alohida e’tibor qaratilgan. U bosqichma-bosqich diagnostik jarayon, standartlashtirilgan va amaliy yo‘naltirilgan topshiriqlar uyg‘unligi, sifat va miqdoriy baholash mezonlari hamda nutq rivojlanishining turli darajalarini talqin qilish bo‘yicha ko‘rsatmalarni o‘z ichiga oladi. Shuningdek, maqolada ma’lumotlarni ishonchli yig‘ish shartlari, bolalar bilan etik muloqot tamoyillari hamda logoped, o‘qituvchi va ota-onalar hamkorligining ahamiyati yoritiladi. Taklif etilgan konseptual asos inklyuziv ta’lim sohasida kelajak mutaxassislariga individual korreksion dasturlarni asosli rejalashtirish va bolalarning nutq hamda kommunikativ rivojlanish dinamikasini monitoring qilishda dalillarga asoslangan qarorlar qabul qilishga yordam beradi.

Kalit so‘zlar: nutq rivojlanishi, duduqlanish, duduqlanuvchi bolalar, nutqni baholash metodologiyasi, kommunikativ rivojlanish, logopedik diagnostika, inklyuziv ta’lim, pedagogik baholash, ravonlik buzilishlari, til rivojlanishi, nutq terapiyasi, diagnostik mezonlar.

Introduction

Inclusive education requires pedagogical systems to recognize that speech and language difficulties can become a primary barrier to participation, learning, and social belonging. Among these difficulties, stuttering occupies a special place because it is not limited to articulatory errors or delayed vocabulary; it is a complex disorder of speech fluency that affects the rhythm and continuity of verbal output and can trigger avoidance, anxiety, reduced classroom participation, and impaired peer interaction. In educational contexts, the visible features of stuttering often attract disproportionate attention, while the broader developmental profile of a child’s speech may remain insufficiently examined. For inclusive education specialists, this imbalance is risky: intervention plans built only on symptom frequency may fail to address weaknesses in language structure, narrative organization, pragmatic competence, or the child’s ability to sustain dialogic exchange under cognitive and emotional load. Therefore, a methodology for studying the level of speech development in children who

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stutter must move beyond a narrow fluency lens and operate as a comprehensive diagnostic system.

A second reason for methodological expansion is the heterogeneity of stuttering. Children who stutter vary widely in onset history, severity, linguistic abilities, motor control, emotional reactivity, and environmental support. Some children demonstrate age-appropriate language but struggle with speech timing and anticipatory tension; others show combined profiles in which stuttering coexists with phonological disorder, expressive language delay, or weaknesses in grammatical morphology. In multilingual and sociolinguistically diverse settings, which are common in Central Asia, speech development may unfold across Uzbek, Russian, and other languages used at home and school. Consequently, diagnostic procedures must be flexible enough to capture real communicative functioning in the child's everyday linguistic environment while remaining structured enough to permit reliable comparison across cases and time points.

In inclusive classrooms, assessment is not an isolated clinical event; it is a pedagogical tool that informs instructional adaptation, therapeutic planning, and collaborative support. A well-designed methodology should produce results that are meaningful for teachers and speech-language specialists, not only for researchers. This means the assessment system must identify functional strengths and barriers in situations relevant to schooling: responding to teacher questions, narrating personal experiences, retelling texts, participating in group work, and coping with communicative pressure. It also means that the methodology must be feasible within institutional constraints, using tools and procedures that can be implemented by trained specialists in educational settings, including university-based speech therapy clinics and partner schools.

From a theoretical standpoint, the assessment of speech development in children who stutter should reflect contemporary views on communication as an integrated system. Speech fluency is influenced by motor planning, linguistic formulation, attentional control, and emotional regulation. Communicative competence is realized through pragmatic choices, turn-taking, and the ability to select language resources appropriate to context. Coherent speech requires

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narrative macrostructure, lexical precision, grammatical cohesion, and planning. A methodology grounded in this systemic view is more likely to produce an accurate developmental portrait and to guide interventions that improve participation rather than merely reduce overt stuttering behaviors.

This article therefore aims to articulate a methodology for studying speech development levels in children who stutter that is compatible with inclusive education objectives and pedagogical university training needs. The approach combines multi-domain assessment of language and communication with structured observation of fluency and its situational variability. The methodology proposes staged data collection, clear criteria for scoring and interpretation, and recommendations for ensuring reliability and ethical practice. By emphasizing both quantitative indicators and qualitative profiles, the framework supports individualized planning and progress monitoring, which are central to inclusive education.

Methods

The proposed methodology is organized as a staged diagnostic system that integrates direct testing, structured speech sampling, and contextual observation. Its purpose is to determine the child's level of speech development by assessing language form and content, communicative functioning, and fluency characteristics in tasks that approximate educational communication. The target group is children of preschool and early school age who demonstrate stuttering or stuttering-like disfluencies, with the option to extend the protocol to older children when appropriate. The methodology is suitable for university-based training clinics, inclusive schools, and specialized speech therapy settings, provided that assessors are trained in standardized elicitation, observation, and ethical interaction.

Participant preparation begins with an intake phase that collects developmental history and contextual information. This includes caregiver interview focused on age of onset, variability of stuttering across situations, family history, bilingual language exposure, psychosocial factors, and prior interventions. Teachers may provide information about classroom participation, oral

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responses, peer communication, and triggering contexts such as reading aloud or answering under time pressure. The methodology recommends documenting the child's dominant language(s) and the language of instruction, because speech development indicators should be interpreted within the child's actual linguistic ecology rather than assuming monolingual norms.

Assessment conditions are structured to reduce confounds while preserving ecological validity. A quiet room is used for core tasks, but at least one observation segment occurs in a naturalistic setting or a simulated classroom interaction. Sessions are ideally conducted in two meetings to reduce fatigue and to examine variability. All speech tasks are audio-recorded, and selected tasks are video-recorded to support analysis of secondary behaviors, speech tension, and nonverbal communication. If recording is not possible, detailed real-time transcription and behavior notes are required. Ethical safeguards include child assent, caregiver consent, and the option to pause or stop tasks if distress increases.

The diagnostic content is divided into three integrated blocks. The first block evaluates language development components that are essential for speech maturity. Phonetic-phonemic processing is assessed through sound discrimination tasks, phoneme identification in words, and repetition of minimal pairs where available in the child's language. Articulation is screened through picture naming and repetition to identify co-occurring speech sound disorders that can influence fluency and intelligibility. Lexical development is assessed using expressive naming tasks, semantic categorization, and comprehension checks through following multi-step instructions. Grammatical development is examined through sentence imitation of increasing complexity, morphological completion tasks, and elicited production of target structures relevant to Uzbek or the language of instruction. Coherent speech is assessed through narrative tasks: retelling a short story with visual support, generating a story from a picture sequence, and producing a personal narrative. For each narrative sample, macrostructure is coded by the presence of setting, initiating event, goal, attempt, outcome, and evaluative elements, while microstructure is coded by

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mean length of utterance, grammatical accuracy, lexical diversity, and cohesion devices.

The second block assesses fluency and speech tempo-rhythm through standardized and semi-structured speech samples. The protocol includes spontaneous conversation (at least 10 minutes), picture description (3–5 minutes), narrative retell, and oral reading or repetition depending on literacy level. Disfluencies are classified into stuttering-like disfluencies (sound/syllable repetitions, prolongations, blocks) and other disfluencies (interjections, revisions, phrase repetitions). Severity indicators include frequency per 100 syllables, average duration of the three longest events, and physical concomitants such as facial tension or extraneous movements. Situational variability is examined by comparing samples across different communicative demands: low-pressure conversation, cognitively loaded narrative planning, and performance-like speaking. The methodology recommends documenting speech rate in syllables per minute and noting abrupt accelerations or decelerations, because rate often interacts with stuttering and language formulation.

The third block examines communicative competence and participation. Pragmatic skills are observed through turn-taking, topic maintenance, repair strategies, and responsiveness to interlocutor cues. The child completes role-play tasks that simulate classroom interaction, such as asking for clarification, requesting help, responding to a teacher question, and collaborating with a peer in a problem-solving game. Communication attitudes are assessed using age-appropriate self-report or interviewer-guided prompts about speaking difficulty, avoidance, and preferred communication situations. When self-report is limited, caregiver and teacher rating scales are used to capture avoidance and participation restrictions.

Scoring is implemented through a combined quantitative-qualitative system. Each subdomain produces a standardized score on a three- or four-level rubric describing development as high/age-appropriate, mildly reduced, moderately reduced, or significantly reduced. Quantitative indices are computed for narrative measures, lexical measures, grammatical error rates, and fluency severity metrics. Qualitative profiling summarizes the interaction among

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language formulation, fluency disruptions, and communicative behavior. The overall level of speech development is determined by convergence across subdomains rather than by any single indicator. Reliability is supported through assessor training, use of scoring manuals, double-coding of at least 20% of samples, and periodic calibration meetings within the university clinic team.

Results

Application of the proposed methodology yields a structured profile of speech development in children who stutter, expressed through measurable indices and level-based interpretations. The results are designed to be readable for both clinical and pedagogical decision-making, so each child's output includes domain scores, a narrative description of functional performance, and a synthesized level of speech development. The methodology produces three primary result layers: language development indicators, fluency and tempo-rhythm indicators, and communicative participation indicators. Together, these layers allow the assessor to distinguish whether fluency disruption is the dominant limitation or whether broader language and pragmatic factors contribute substantially to the child's communication difficulties.

In the language development layer, phonetic-phonemic assessment typically differentiates children with isolated fluency disorders from those with co-occurring speech sound vulnerabilities. Children whose phoneme discrimination, sound awareness, and articulation screening are within expected ranges often display clear segmental production but may show reduced stability under increased speaking demand, particularly in multi-syllabic words and syntactically complex utterances. In contrast, a subset of children demonstrate inconsistent production, phonological simplification patterns, or reduced phoneme discrimination, which is reflected in lower scores on repetition and minimal-pair tasks and increased intelligibility fluctuations during spontaneous speech. These results are clinically important because they indicate that intervention should address not only fluency shaping, but also speech sound accuracy and phonological processing.

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Lexical results commonly reveal that vocabulary knowledge is not uniformly impaired in children who stutter, yet lexical retrieval under time pressure may be vulnerable. In naming tasks, many children achieve age-appropriate accuracy but show prolonged response latency, increased use of fillers, or avoidance of specific words that trigger stuttering. Semantic categorization tasks and comprehension of multi-step instructions often show a clearer separation between children with stable receptive language and those with reduced receptive capacity. When receptive indicators are reduced, narrative comprehension and classroom listening demands become risk points for participation. In expressive measures, lexical diversity within story retell and picture-sequence narratives frequently declines as task complexity increases, suggesting that language formulation load can amplify disfluency and reduce content richness.

Grammatical results provide one of the most informative contributions of the methodology because they reveal how morphosyntax interacts with stuttering. Sentence imitation tasks typically show that as syntactic complexity rises, children who stutter may demonstrate increased disfluency frequency, reduced accuracy in morphological markers, or both. In elicited production, some children maintain grammatical correctness but simplify utterance structure to reduce speaking burden, leading to shorter sentences and fewer subordinate constructions. Others produce longer utterances with higher error rates and multiple revisions, indicating instability in planning and monitoring. These patterns help determine whether the child's speech development level is primarily affected by fluency or by broader language system immaturity.

Coherent speech results, derived from narrative macrostructure and microstructure, usually show that narrative organization is sensitive to communicative and cognitive load. In macrostructure coding, many children can establish a setting and describe events but omit goal-oriented elements, causal links, or evaluative components, especially when speaking spontaneously. Microstructure measures often show reduced cohesion markers, increased revisions, and variable mean length of utterance across tasks. Importantly, the methodology captures that narrative weaknesses may not reflect a lack of ideas;

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they may reflect avoidance, time pressure, and interruptions in planning due to disfluency. The combined analysis therefore distinguishes narrative skill deficits from performance constraints imposed by stuttering.

In the fluency layer, the methodology yields a detailed disfluency profile by task and speaking context. Children who stutter commonly exhibit higher rates of stuttering-like disfluencies in performance-demand tasks such as story retell, oral reading, or simulated classroom answering, compared with low-pressure conversation. Severity indices provide a multidimensional summary: frequency per 100 syllables captures how often events occur, duration indices capture persistence and blocking tendencies, and physical concomitant notes capture muscular tension and secondary behaviors. The results also include speech rate estimates, revealing that some children adopt accelerated tempo that destabilizes fluency, while others slow markedly in an effort to control speech, potentially reducing naturalness and communicative confidence.

The communicative participation layer produces results that are directly relevant to inclusive education. Structured observation and role-play tasks typically reveal whether the child can initiate interaction, maintain turns, repair breakdowns, and request clarification. Some children demonstrate adequate pragmatic competence but avoid speaking in front of peers, show minimal initiation, or respond with short answers to reduce risk. Others participate actively but struggle to maintain topic continuity due to disfluency-related interruptions and frequent self-repairs. Attitudinal indicators, when collected through child-friendly prompts and caregiver/teacher ratings, often show that negative speaking expectations correlate with reduced classroom participation even when objective stuttering severity is moderate. These results support a key methodological outcome: severity of disfluency is not a sufficient predictor of participation restriction, and therefore assessment must include psychosocial and pragmatic data.

The synthesis stage of the methodology produces an overall level of speech development by integrating the domain results. A typical high-level profile is characterized by age-appropriate language form and content, coherent narratives with minor microstructure disruptions, and stuttering that increases primarily

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under performance pressure with limited participation restriction. A moderately reduced profile is characterized by vulnerabilities in narrative organization, lexical retrieval under load, or grammatical stability, combined with situationally variable stuttering and emerging avoidance. A significantly reduced profile is characterized by broader language weaknesses, low narrative cohesion, high disfluency frequency and duration across contexts, and marked participation limitations in classroom-like interactions. This level-based result is accompanied by individualized educational implications and a monitoring plan, enabling inclusive education teams to track change over time using the same indicators and comparable speech sampling conditions.

Discussion

The results generated by the proposed methodology support a key conceptual position for inclusive education: stuttering cannot be fully understood or addressed through fluency counts alone, because the child's communicative functioning emerges from the interaction of language development, speech motor control, cognitive load, and psychosocial factors. The methodological profile demonstrates how fluency disruptions can coexist with age-appropriate language or, alternatively, can be embedded within a broader pattern of speech and language immaturity. This distinction matters in educational practice, where the primary goal is participation in learning and social communication rather than the narrow reduction of observable disfluencies.

One of the most informative findings produced by the methodology is the role of task demand in shaping the child's performance. The consistent increase of stuttering-like disfluencies during narrative planning, retelling, and classroom-simulated answering indicates that linguistic formulation load and performance pressure are systematic triggers. This aligns with contemporary views that stuttering is sensitive to planning complexity and communicative stress. For inclusive classrooms, the implication is practical: when children are required to answer rapidly, speak in front of peers, or produce long coherent narratives without support, their fluency and the overall quality of speech output may deteriorate. Therefore, assessment that includes task variation offers direct

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guidance for instructional adaptations, such as allowing extra planning time, providing visual supports, and offering alternative participation formats that preserve learning goals while reducing communicative strain.

The language-layer results also carry critical interpretive value. When lexical retrieval latency increases and revisions cluster around specific phonological or morphosyntactic structures, it suggests that the child is not simply "stuttering," but is negotiating instability in language formulation. In these cases, fluency-based therapy alone may yield limited functional gains unless it is integrated with language development support. Conversely, children with stable language measures but situational stuttering may benefit more from interventions targeting speech motor timing, desensitization, and communication confidence. The methodology's integrated scoring approach therefore serves as a differential planning instrument, helping practitioners select targets with higher educational payoff.

Narrative measures deserve special emphasis in the context of inclusive education. Narrative competence is foundational for academic success because it underlies comprehension, written expression, oral presentations, and social storytelling. The methodology's macrostructure and microstructure coding clarifies whether narrative weaknesses represent limited narrative knowledge or whether the child's narrative is constrained by interruptions, avoidance, and reduced planning continuity caused by disfluency. This distinction is often missed in everyday school observation, where a child's short or fragmented answers may be interpreted as low ability rather than as a coping strategy. By capturing both content structure and delivery dynamics, the methodology reduces the risk of underestimating the child's cognitive and linguistic potential.

The communicative participation layer reinforces another essential point: the relationship between stuttering severity and participation is non-linear. Some children with moderate disfluency display significant avoidance and low classroom engagement, while others with more frequent disfluencies remain socially active and academically participatory. This suggests that assessment must include pragmatic observation and attitude indicators to identify participation barriers early. In inclusive education, these barriers can become

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self-reinforcing: reduced speaking leads to fewer practice opportunities, which can limit vocabulary growth, weaken narrative skills, and intensify anxiety in formal speaking contexts. The methodology provides a mechanism to detect and interrupt this cycle by recommending interventions that combine skill work with participation supports, such as structured peer interactions, gradual exposure to speaking tasks, and teacher-mediated reinforcement of communicative attempts rather than speech perfection.

From a training perspective for pedagogical universities, the methodology functions as a competency-building framework. It teaches future specialists to interpret speech development as a system, to triangulate evidence across tests and observations, and to translate diagnostic results into inclusive instructional recommendations. The staged structure and rubrics also support reliability in student-led clinical practice, where inexperienced assessors may otherwise rely on subjective impressions. By requiring audio-recorded samples and periodic calibration, the methodology promotes evidence-based habits and strengthens the quality of university clinic services.

At the same time, the approach has limitations that should be acknowledged. First, standardized norms for some tasks may be limited across languages and dialects used in local educational contexts. The methodology therefore relies on a combination of criterion-referenced scoring and within-child comparisons across tasks, which may reduce comparability across institutions unless shared scoring manuals and training are implemented. Second, speech sampling is sensitive to rapport, fatigue, and situational anxiety. Although the methodology recommends multi-session assessment, real-world constraints may compress assessment time. In such cases, the reliability of disfluency indices and narrative measures may decrease, and interpretations should be cautious. Third, psychosocial indicators depend on age-appropriate self-report and adult ratings, which can be biased by stigma or limited awareness. This reinforces the need for triangulation and for creating a supportive assessment atmosphere.

Despite these constraints, the methodology offers a robust foundation for inclusive educational planning because it produces actionable information. It identifies which classroom contexts are high risk, which language structures

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increase formulation burden, and which pragmatic skills require scaffolding. The integration of quantitative metrics with qualitative profiles supports both monitoring and individualized intervention design. In inclusive settings, where the objective is to maintain the child's learning trajectory and social belonging, such a comprehensive assessment methodology is not an added luxury but a necessary condition for equitable support.

Conclusion

The methodology described in this article positions the study of speech development in children who stutter as a comprehensive, educationally meaningful diagnostic process rather than a narrow measurement of disfluency frequency. Within inclusive education, the central value of such an approach is that it connects assessment outputs to participation outcomes: the child's ability to learn, interact, and demonstrate competence in classroom communication. By integrating language development indicators, fluency and tempo-rhythm analysis, and communicative participation measures, the methodology offers a structured way to identify not only what is disrupted in speech, but why disruption occurs in specific contexts and how it limits or reshapes communicative behavior.

A major strength of the methodology is its emphasis on task variability and ecological validity. Speech in children who stutter is not stable across conditions; it changes with cognitive load, linguistic complexity, emotional pressure, and social expectations. The staged procedure addresses this variability by eliciting speech samples across conversational, narrative, and classroom-simulated tasks, allowing assessors to map situational triggers and resilience factors. Such mapping is critical for inclusive classrooms because it transforms assessment from a label-producing event into a planning instrument. Teachers and specialists can use the results to implement feasible accommodations such as extended response time, structured speaking turns, visual scaffolds for narratives, and alternative response modalities that preserve academic goals without intensifying communicative strain.

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The methodology also supports differential intervention planning by clarifying the interaction between fluency and language formulation. When language measures are stable and difficulties cluster primarily in performance contexts, intervention priorities may focus on fluency management, desensitization, and confidence-building strategies. When narrative cohesion, grammatical stability, or lexical retrieval under load are reduced, intervention should combine fluency work with targeted language development support. This integrated planning logic is particularly important in inclusive education, where limited support time requires prioritizing goals that yield the greatest functional gains for learning and peer interaction.

Another key contribution is the explicit inclusion of communicative participation and attitude indicators. Participation barriers frequently emerge before academic underachievement becomes visible, especially when avoidance reduces speaking opportunities. By documenting pragmatic behavior, turn-taking, repair strategies, and speaking attitudes through observation, role-play, and adult ratings, the methodology allows early identification of children at risk of withdrawal. This feature strengthens the educational relevance of assessment because it aligns with inclusion as a social and developmental process, not merely a clinical outcome.

For pedagogical universities, the methodology provides a practical framework for training future specialists in evidence-based assessment. The rubrics, recording requirements, and calibration procedures encourage reliability and reflective practice, while the synthesis step models how to translate diagnostic data into individualized recommendations and monitoring plans. This alignment between assessment and action is essential for preparing professionals who can collaborate with teachers and families and who can maintain a child-centered focus in inclusive settings.

Overall, the methodology offers a coherent diagnostic architecture that can be implemented across educational and university-based contexts with appropriate training and adaptation to local linguistic realities. Its core premise is that speech development in children who stutter must be studied as a multidimensional system linked to participation, learning, and well-being. By producing structured

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profiles and level-based interpretations, the methodology strengthens the foundation for individualized support, progress monitoring, and inclusive pedagogical decision-making.

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