
Navigating High-Tech Augmentative and Alternative Communication (AAC) Implementation: Special Education Teachers' Experiences with Barriers and Enablers

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Abstract — This study identified the obstacles and enablers special education teachers encounter when integrating high-tech augmentative and alternative communication (AAC) into classroom practice, focusing on lived experiences that enhance total communication for students with complex communication needs (CCNs). A qualitative phenomenological design guided the inquiry; semi-structured interviews were conducted, transcribed verbatim, and analyzed using Colaizzi's seven-step method, with member checking utilized to ensure the integrity of the findings. The sample consisted of ten U.S. special education teachers active from 2022 to 2025, selected through purposive sampling to represent varied grade levels and diverse urban, suburban, and rural settings. The findings revealed that while instructional successes occurred, they were continually undermined by chaotic logistics and structural gaps, confirming that the primary barrier to success is ecological rather than instructional. Twelve distinct themes emerged: Contextual Transfer, Operational Load, Needs-Based Assessment, Voice Access, Ethical Balance, Reciprocal Network, Systematic Evidence, Autonomous Communication, Teacher Resilience, Inclusion Advocacy, Operational Pedagogy, and Nurturing Behavioral Governance. These themes converged into the meta-theme of C.O.N.V.E.R.S.A.T.I.O.N., representing the continuous, coordinated dialogue required among the multidisciplinary team to sustain the student's voice. To institutionalize this dialogue, the research proposes the 10-Minute T.A.L.K. Protocol (Team Target, Access & Autonomy, Logistics Check, Kudos & Knots). This design intervention features

a strategic time cap intended to mitigate unsustainable burdens and protect teacher resilience. Recommendations include embedding the T.A.L.K. Protocol into district policy and Individualized Education Program (IEP) procedures, enforcing daily readiness checks, securing repair loaners, and shifting professional development toward structural problem-solving.

Keywords: aided language modeling, augmentative and alternative communication; phenomenology; special education; TALK Protocol.

I. INTRODUCTION

On a global perspective, augmentative and alternative communication (AAC) serves as a critical bridge for individuals with complex communication needs (CCNs) to participate fully in educational and social contexts. According to Biggs and Hacker (2021), ecological systems, including policy frameworks, resource allocation, and institutional support, significantly influence AAC outcomes by shaping access and sustainability. In their analysis, Uthoff, Zinkevich, Boenisch, Sachse, Bernasconi, and Ansmann (2021) argue that effective interprofessional collaboration among educators, speech-language pathologists, and families enhances both the quality and continuity of AAC services. In line with these perspectives, this study situated itself within a global effort to refine AAC practices in special education settings and examined the factors influencing AAC implementation fidelity.

AAC encompasses a continuum of strategies distinguished by the required technology level and materials involved (ASHA, n.d.). No-tech AAC relies solely on the user's body (e.g., gestures, facial expressions, pointing, head nodding, sign language, finger spelling, or eye gaze) without external tools. Low/Light-tech AAC systems use non-electronic materials such as picture communication boards, books, cards, written messages, or visual schedules. Medium/Mid-tech AAC includes simple battery-operated devices with fixed displays and recorded messages, offering limited vocabulary. High-tech AAC utilizes advanced electronic devices (e.g., computers, tablets, or dedicated speech-generating devices) with dynamic displays, synthesized speech, word prediction, and connectivity features, providing maximal flexibility and support for complex communication (Wahl & Weiland, 2023). This study focused on high-tech AAC due to its capacity

to offer the most comprehensive communicative options, adaptability to diverse user needs, and alignment with contemporary digital participation trends, despite challenges related to cost and technical support.

At the field level, teacher perspectives on high-tech AAC implementation reveal persistent challenges alongside key enablers. In a study by Lackey, Hyatt, Batorowicz, van Engelen, Li, Pinder, and Davies (2023), special education teachers identified barriers such as limited technology access and insufficient administrative backing. As reported by Alzayer (2024), although teachers valued tablet-based AAC devices for their flexibility, students frequently treated iPads as gaming tools, which undermined communication goals. Consistent with these findings, Leatherman and Wegner (2022) demonstrate that structured collaboration with speech-language pathologists and ongoing professional development can reduce teacher isolation and bolster instructional competence.

Specifically, special education teachers' first-hand experiences provide insight into context-dependent obstacles. Based on research by Pm, Sreekumar, and Philip (2021), service limitations and prevailing societal myths about disability emerged as significant barriers to AAC uptake in inclusive classrooms. As highlighted in Marinduque and Marquez (2025), language differences and behavioral issues within self-contained classrooms further complicate consistent AAC use. These nuanced challenges underscore the need to explore teacher perceptions in environments where institutional supports and student characteristics intersect.

The researcher believes that, despite existing mandates for inclusive communication, gaps remain in translating high-tech AAC frameworks into everyday classroom practice. Most published work spotlights hospitals, preschools, family coaching, or workplace accommodations, leaving K–12 special-education classrooms underexplored, and first-person narratives from teachers themselves are sparse. Drawing from Ramirez and Lynch (2024), the researcher's motivation stemmed from observing uneven patterns of team collaboration that lead to fragmented service delivery. Current findings also fragment around tool emphasis—some studies chase open-source software and AI customization, others document single-day workshops or tightly controlled clinical trials—offering little guidance for district-wide practice. In the researcher's view, educators on the front line hold essential insights that can inform the design of targeted training modules and foster stronger school–community partnerships to bridge policy and practice. By

adopting a phenomenological stance, the study sought to surface those lived experiences and translate granular teacher stories into context-responsive solutions.

Based on the researcher's routine visits as an itinerant service provider, one gap stood out: most classrooms still ran on guesswork when it came to high-tech AAC. Many teachers received little or no hands-on training, so they felt uneasy when asked to set up devices or model the use of these devices. For those needed an AAC system but did not have one, these students with CCNs often lacked access due to insufficient teacher knowledge about AAC and its evaluation and referral process. A further gap appeared in attitudes and myths; some teachers viewed high-tech AAC as a "last resort," and still, many teachers had been fed the wrong notion that AAC was an option only for those who met the cognitive and prerequisite skills. These myths slowed early adoption, limited student practice, and led to device abandonment in the long run. When support from speech-language pathologists or administrators was thin, teachers faced the task alone, leaving barriers in place instead of solutions on the table.

The study generated practical recommendations addressing both systemic and individual-level factors affecting high-tech AAC implementation. Moreover, this qualitative inquiry aimed to inform policy revisions, professional learning initiatives, and resource allocations that collectively advance high-tech AAC implementation in special education.

Theoretical Lens

The current qualitative inquiry into special education teachers' perspectives on the barriers and facilitators to high-tech AAC implementation was guided by the Theoretical Domains Framework (TDF) (Cane, O'Connor, & Michie, 2015). The TDF synthesizes constructs from 33 behavior-change theories into twelve domains that collectively capture the psychological, social, and environmental determinants of professional practice. By mapping teachers' narratives onto these domains, the framework enabled a systematic identification of both inhibitory and promotive factors influencing high-tech AAC implementation in K–12 special education classrooms. Each domain offered a lens for understanding specific drivers of teacher behavior, from individual beliefs and skills to organizational resources and social influences. This structured lens ensured

that subsequent recommendations for training, policy, and resource allocation directly targeted the most impactful determinants of sustained AAC use.

a. Knowledge. The Knowledge domain refers to an individual's awareness of, and understanding about, the behavior in question—in this case, AAC principles, device features, and communication strategies (O'Rourke, Lima, & Jetten, 2021). Within the TDF, knowledge is foundational: without accurate information, behavior change is unlikely to occur. In special education, teachers' grasp of AAC concepts shapes their readiness to adopt and integrate communication tools into instruction. Prior research in healthcare contexts demonstrates that gaps in professional knowledge hinder evidence-based practice (O'Rourke et al., 2021). By analogy, insufficient teacher understanding of AAC impedes effective device selection, customization, and implementation.

In the current study, the Knowledge domain guided the development of interview prompts aimed at uncovering teachers' existing awareness and misconceptions about high-tech AAC. Transcripts were coded for statements reflecting correct or erroneous understandings of device capabilities and functions. Identified knowledge gaps informed the design of targeted professional development modules. Moreover, mapping variations in teacher knowledge allowed the research to recommend differentiated training strategies. Ultimately, this domain anchored the study's efforts to link awareness deficits to specific implementation barriers.

b. Skills. The Skills domain encompasses the practical abilities required to perform the target behavior, including hands-on operation of AAC tools and embedding them in lesson activities (Dyson & Cowdell, 2021). In the TDF, skills reflect both learned competencies and procedural know-how. Evidence from clinical settings shows that limited training reduces fidelity of intervention delivery when practitioners lack procedural skills (Dyson & Cowdell, 2021; Wang, Wu, & Shih, 2021). Translating this to education, teachers who struggle to navigate AAC software menus or program message options may avoid using devices altogether. Consequently, skill deficits represent a critical obstacle to consistent classroom application of high-tech AAC.

For this study, the Skills domain informed both data collection and analysis. Interview questions will probed teachers' self-reported competence with device setup, troubleshooting, and lesson integration. Observations of demonstration sessions (where feasible) supplemented

narrative data, providing concrete examples of skill proficiency or lack thereof. During coding, specific references to technical challenges or successes were categorized under Skills. Findings will then supported recommendations for practice-based training workshops emphasizing hands-on device use.

c. Social/Professional Role and Identity. Social/Professional Role and Identity pertains to individuals' perceptions of their responsibilities and roles in performing the behavior (Wittek, 2022). Within the TDF, alignment between a new practice and one's professional identity enhances engagement and ownership. In dementia care, caregivers who viewed support routines as integral to their role exhibited higher adherence (Wittek, 2022). Similarly, when teachers see AAC support as central to their educator identity, they are more likely to champion its use (Baaken, 2023). Misalignment—viewing AAC as outside the scope of teaching—can undermine adoption.

In this study, the Role and Identity domain was used to explore how teachers define their communication support responsibilities. Interview guides included prompts about whether AAC falls within their teaching remit and how it aligned with their self-concept as educators. Narrative data were coded for expressions of role congruence or conflict. Insights into identity alignment informed strategies to position high-tech AAC implementation as an essential element of special education practice.

d. Beliefs about Capabilities. Beliefs about Capabilities refers to confidence in one's ability to perform the behavior effectively (Lynch, Ryan, & Cadogan, 2021). According to the TDF, self-efficacy influences both initiation and persistence of behavior change. In clinical research, low confidence among clinicians hindered deprescribing behaviors (Lynch et al., 2021). Likewise, teachers' belief in their capacity to manage AAC devices and scaffold student use drives sustained implementation (El Hajj, 2022). Without adequate confidence, even knowledgeable teachers may hesitate to employ high-tech AAC.

For the current study, the Beliefs about Capabilities domain framed questions on teachers' self-assessed competence and comfort with AAC. Data analysis identified patterns of high and low confidence and linked these to reported usage frequency. These insights guided recommendations for confidence-building interventions, such as mentorship programs and incremental skill-building exercises.

e. Beliefs about Consequences. Beliefs about Consequences involves expectations regarding the outcomes—positive or negative—of performing the behavior (O’Rourke et al., 2021). Within the TDF, outcome expectancies critically mediate decision-making. Healthcare providers’ choices about cannabis recommendations were shaped by weighing benefits versus risks (O’Rourke et al., 2021). In education, teachers may balance anticipated gains in student engagement and autonomy against fears of technical breakdowns, lost instructional time, or unintended classroom disruptions (Vallis, 2024). These beliefs can either motivate AAC adoption or reinforce avoidance.

In this study, the Beliefs about Consequences domain guided exploration of teachers’ expectations and fears. Interview protocols probed perceived benefits and drawbacks of high-tech AAC. Coding categorized statements about student outcomes, classroom management concerns, and logistical anxieties. The findings informed messaging strategies that emphasized verified benefits while addressing common fears.

f. Motivation and Goals. Motivation and Goals refers to the priority placed on the target behavior relative to competing objectives (Vallis, 2024). The TDF posits that clear, explicit goals enhance adherence to new practices. In medication adherence research, defined targets improved regimen fidelity (Vallis, 2024). Similarly, when high-tech AAC is linked to explicit communication goals—such as functional requesting—teachers are more likely to maintain its use despite other demands (van der Waldt, 2024). Lack of goal alignment can result in AAC being sidelined.

For the current study, this domain will under pinned inquiry into how AAC aligned with teachers’ instructional priorities. Interview questions addressed how AAC was integrated within IEP goals and daily lesson plans. Analysis examined at how implementation consistency was influenced by instructors' establishment of particular AAC-related goals. The creation of goal-setting instruments specific to special education settings was encouraged by the findings.

g. Memory, Attention, and Decision Processes. Memory, Attention, and Decision Processes encompasses the cognitive demands associated with planning and executing the behavior (Newlands et al., 2021). According to the TDF, high cognitive load can impede new practice adoption. In clinical trials, complex protocols led to participant dropout due to

overwhelming mental burdens (Newlands et al., 2021). In educational settings, the mental effort of organizing AAC-supported activities—selecting symbols, programming devices, and monitoring usage—can overwhelm teachers without decision aids (Smith, 2021). Simplifying these processes is essential for sustained use.

In this study, the Memory, Attention, and Decision Processes domain shaped the investigation of cognitive challenges. Interview prompts explored difficulties in lesson planning, symbol selection, and device operation. Data coding highlighted segments indicating planning fatigue or reliance on mental shortcuts. Outcomes informed recommendations for checklists, templates, and digital prompts designed to reduce cognitive workload.

h. Environmental Context and Resources. Environmental Context and Resources refers to the availability of physical, organizational, and social supports necessary for behavior execution (Lawrie et al., 2021). Within the TDF, resource constraints—time, equipment, technical support, and administrative policies—directly impact practice adoption. Surveys in healthcare have shown that shortages in equipment and staff reduce engagement with new protocols (Lawrie et al., 2021). Analogously, inconsistent access to tablets, unreliable Wi-Fi, or lack of IT support can stall high-tech AAC use in classrooms.

For the current study, the Environmental Context domain guided questions about resource access and administrative backing. Interviews probed device availability, maintenance procedures, and school-level policy support. Coding identified systemic facilitators and barriers. Insights informed advocacy strategies for resource allocation and policy development at the school and district levels.

i. Social Influences. Social Influences involves the impact of interpersonal factors—colleagues, speech-language pathologists, parents, and administrators—on behavior adoption (El Hajj, 2022; Wittek, 2022). The TDF highlights that professional norms and peer encouragement significantly shape practice uptake. In pharmacy, endorsement from senior colleagues drove changes in prescribing behaviors (El Hajj, 2022). In special education, collaborative support from co-teachers and SLPs can normalize AAC use, whereas skepticism or indifference can impede it (Wittek et al., 2022).

In this study, the Social Influences domain framed exploration of collaborative dynamics. Interview questions asked about peer modeling, SLP partnerships, and parental engagement in AAC initiatives. Analysis mapped networks of encouragement and resistance. Findings guided recommendations for building interdisciplinary teams and peer-mentoring structures to bolster AAC uptake.

j. Emotion. The Emotion domain captures affective responses—anxiety, frustration, enthusiasm—associated with performing the behavior (Vallis, 2024). TDF research shows that emotional states can either facilitate or hinder practice change; clinical trials found that emotional fatigue was a key dropout driver (Newlands et al., 2021). In education, teachers’ feelings about learning new technology influence their persistence: anxiety may lead to avoidance, whereas enthusiasm can catalyze experimentation (Vallis, 2024).

For the current study, the Emotion domain guided inquiry into teachers’ emotional journeys with AAC. Interviews explored feelings at various stages—initial training, first classroom use, and ongoing troubleshooting. Coding identified emotional facilitators and barriers. Outcomes informed the design of emotionally supportive professional development, including peer support groups and stress-management resources.

k. Behavioral Regulation. Behavioral Regulation refers to the self-monitoring strategies and routines that individuals establish to sustain new behaviors (Kwok, 2024). Within the TDF, planned prompts, progress logs, and action plans strengthen adherence. In binge-watching cessation, self-monitoring tools significantly improved outcomes (Kwok, 2024). In clinical referral, clinicians who tracked their actions improved guideline adherence (Atkins et al., 2024). Similarly, teachers who schedule AAC practice or log usage may maintain consistent application.

In this study, the Behavioral Regulation domain framed exploration of the routines and tracking methods teachers use. Interview questions asked about checklists, logs, or digital reminders employed to support AAC integration. Data coding highlighted effective regulation strategies. These insights guided recommendations for implementing monitoring tools—whether paper-based or app-driven—to foster sustained AAC use.

l. Nature of the Behaviors. Nature of the Behaviors addresses the inherent complexity and routine characteristics of integrating AAC into daily practice (Smith, 2021). The TDF posits that

behaviors embedded into established routines are more likely to persist. Nursing research shows that practices that become automatic—such as routine monitoring—are maintained over time (Smith, 2021). For teachers, framing AAC device setup and usage as habitual components of lesson planning will transform sporadic trials into enduring practice.

In the current study, this domain guided analysis of how AAC tasks fit within teachers' existing workflows. Interview prompts explored whether AAC is seen as an add-on or an integrated part of instruction. Coding identified behaviors that have become routine versus those requiring deliberate effort. Findings supported recommendations for embedding AAC steps into standard lesson-planning templates and class schedules, ensuring long-term sustainability.

By mapping special education teachers' experiences to these twelve domains, the study pinpointed the most influential psychological and contextual drivers of high-tech AAC implementation. This structured approach ensured that recommendations for training, policy, and resource allocation directly targeted the factors most likely to foster widespread, enduring AAC use.

Statement of the Problem

The primary aim of this study was to unveil the obstacles and enablers that special education teachers faced when integrating high-tech AAC tools and strategies into their classroom practice. To achieve this aim, the study was guided by the following specific research questions:

1. What are the lived experiences of special education teachers in implementing high-tech AAC to enhance total communication among students with complex communication needs (CCNs)?
2. What major themes emerged based on the significant statements of the co-participants?
3. What creative insights did the researcher gain based on the significant experiences of the co-participants?
4. What proposals or implications can be made based on the data gathered?

II. METHODOLOGY

The study employed a qualitative research design specifically chosen to capture the depth and complexity of special education teachers' lived experiences with high-tech AAC implementation. Unlike quantitative measures that track usage frequency, qualitative inquiry utilizes flexible methods that allow the researcher to probe participants' perspectives in rich detail. This design is uniquely suited for exploring how teachers interpret and navigate the specific barriers and supports within their unique classroom environments (Rogo, 2024).

A phenomenological approach guided this inquiry, moving the focus toward the essence of teachers' experiences rather than on external outcomes. By centering the participants' own voices and meanings, phenomenology allows for a deep exploration of how special education teachers perceive high-tech AAC in their daily practice (Subedi, 2021). In the context of this study, the phenomenological lens was operationalized to uncover the fundamental structure of the teachers' professional reality—revealing the internal and external textures of what it truly means to facilitate a student's voice through technology.

This approach ensured that the study did not merely report on surface-level challenges but instead uncovered the "lived world" of the educator—where instructional demands, ethical considerations, and advocacy efforts intersect. By utilizing Colaizzi's rigorous seven-step analysis, the researcher ensured that the resulting descriptions remained strictly grounded in the authentic, first-hand accounts of the ten co-participants, providing a granularity of insight that traditional observational methods could not achieve.

To maintain the integrity of the phenomenological design, the study followed a systematic path of inquiry:

- **Lived Experience as Data:** The primary data source consisted of the co-participants' own narratives, gathered through semi-structured interviews that encouraged reflection on "real-time" classroom moments.
- **Bracketing and Reflexivity:** The researcher maintained a reflexive journal to set aside personal biases and prior assumptions as an itinerant service provider, ensuring the focus remained entirely on the teachers' described experiences.

- Member Checking: Faithful to the final step of Colaizzi's method, the distilled descriptions were returned to the participants for validation. This step ensured that the study accurately captured the "essence" of their lived reality, confirming that the researcher's interpretations aligned with the teachers' professional truths.

Data Generation and Selection of Co-participants

The researcher employed a semi-structured interview guide to draw out detailed stories from special education teachers about their experiences with high-tech AAC. This guide contained ten open-ended questions, each paired with two probing questions to encourage deeper reflection on specific moments, challenges, and successes. The questions aligned with key domains (i.e., Knowledge, Social Influences, and Environmental Context) from the Theoretical Domains Framework. By structuring prompts around this framework, the tool ensured that gathered narratives spoke directly to factors shaping AAC use in classrooms.

Before data gathering began, the interview guide underwent expert validation. Three professionals reviewed each question for clarity and relevance: a university professor who researches AAC, a district coordinator who oversees AAC programs, and a licensed speech-language pathologist with extensive AAC experience. Each expert commented on wording, probe sequencing, and theoretical alignment. The researcher integrated their feedback to refine question phrasing and ensure the instrument accurately captured the lived realities of teachers (Berget & Kvikne, 2022; Ayre et al., 2024).

Once school permissions and individual consents were in place, interviews were scheduled outside instructional hours. The researcher met each teacher in a quiet, private space, either in person or via secure video call, so participants could speak freely. Conversations followed the semi-structured guide but remained flexible to pursue unexpected insights. Sessions lasted approximately 30–45 minutes and were audio-recorded with participants' approval. This approach balanced guidance with openness, allowing teachers to share rich, personal accounts of AAC implementation.

After each interview, recordings were transcribed verbatim. The researcher checked transcripts against the original audio to correct errors and capture pauses or emphasis. Transcripts

were then divided into meaning units, that is, short passages that conveyed distinct ideas about barriers, facilitators, or instructional strategies. Each unit received a preliminary code that reflected its core meaning. Using these codes, the researcher employed Colaizzi's rigorous procedure to ensure that the analysis remained grounded in participants' own words and experiences.

Meanwhile, the study targeted ten special education teachers drawn from a pool of roughly 100 professionals across U.S. schools who had taught between 2022 and 2025 and supported at least one student using a high-tech AAC device. This population shared direct, recent experience with AAC tools in diverse classroom settings. By focusing on teachers active during these years, the research captured current practices and challenges in implementing modern AAC technologies.

Purposive sampling identified the ten participants most likely to provide deep, varied insights into high-tech AAC use (Scârnci-Domnișoru, 2024). The researcher intentionally selected teachers with different lengths of service, grade levels, and school environments (e.g., urban, suburban, and rural) to ensure internal generalization within the district's special education community. This strategy prioritized richness of data over representativeness of every possible setting.

Phenomenological research values depth over breadth, and ten participants struck a balance between manageability and variety (Subedi, 2021). Eight to twelve interviews typically suffice to reach data saturation in phenomenological studies, where no new themes emerge. By inviting exactly ten teachers, the study affirmed its commitment to thorough exploration of each participant's lived experience while maintaining focus on the phenomenon of high-tech AAC implementation.

Inclusion criteria required that each teacher be employed in a U.S. special education program between 2022 and 2025 and have worked directly with at least one student who used a high-tech AAC device. Teachers who did not meet both conditions were excluded to preserve the study's relevance. This ensured that every voice reflected genuine engagement with high-tech AAC in real classrooms. Continuous attention to these criteria guaranteed that selected participants could speak meaningfully to the barriers and facilitators at the heart of the research.

Thematic Analysis

Following Colaizzi's seven-step method, this analysis follows the rigorous procedure used in the study to ensure findings remained grounded in the teachers' lived experiences.

Step 1: Reading and Familiarization. The researcher began by reading each interview transcript from start to finish, noting first impressions and emotional tones. This all-around reading built a global feel for the teachers' stories, from subtle hesitations to emphatic declarations. By fully immersing in these narratives, the researcher absorbed context, grasped the flow of conversation, and sensed emerging patterns before any coding began.

Step 2: Extracting Significant Statements. Next, the researcher combed through transcripts to pull out every statement that spoke directly to barriers or facilitators of AAC use. These verbatim excerpts (i.e., teachers' own words about device struggles, team wins, or training gaps) were collected into a single list. This step preserved raw data, ensuring that nothing crucial was lost in later interpretation.

Step 3: Formulating Meanings. Each significant statement was then paraphrased into a concise "meaning unit" that captured its core message. For example, a teacher's lament about missing devices became "lack of equipment hinders student participation." These meaning units translated rich, often winding teacher narratives into clear, digestible ideas ready for comparison across participants.

Step 4: Clustering Themes. The researcher grouped related meaning units into clusters, labeling each cluster with a tentative theme name such as "equipment access," "peer support," or "confidence building." This organization revealed which ideas recurred across multiple interviews and highlighted links among teachers' experiences. Themes began to form the backbone of the study's analytical structure.

Step 5: Exhaustive Description. For each theme cluster, the researcher wrote a detailed narrative that wove together the meaning units and original statements. This "exhaustive description" painted a full portrait of how special education teachers perceived and lived out each theme, showing, for instance, exactly how they coped with limited device availability or how they built AAC confidence through mentoring.

Step 6: Distilling the Fundamental Structure. The exhaustive descriptions were then distilled down to their essence. The researcher extracted the “fundamental structure” of the phenomenon, short, powerful statements that captured the heart of teachers’ AAC experiences. These distilled essences served as the study’s core findings, framing the phenomenon in clear, resonant terms.

Step 7: Member Checking. Finally, the researcher returned these distilled descriptions to the participating teachers for member checking. Teachers reviewed and confirmed whether the distilled themes and essences truly reflected their lived realities. Their feedback refined and authenticated the analysis, ensuring that the final report remained faithful to the voices and experiences of those who know AAC implementation best.

Literature Comparison

The Theoretical Domains Framework anchored this study by mapping teachers’ experiences onto domains like knowledge, skills, and social influences. In contrast, much of the reviewed literature employed ecological models, which emphasized multi-layered systems (i.e., family, school, policy) shaping AAC outcomes. While ecological studies captured the broad context, TDF drilled down into the individual cognitive and affective determinants that drove teachers’ day-to-day decisions.

Similarly, RRLs on Diffusion of Innovations and inclusion frameworks prioritized innovation attributes and system-level supports. Those approaches framed AAC adoption as a process influenced by relative advantage and social norms. By comparison, TDF offered granular insight into how beliefs about capabilities and consequences translated those broader factors into concrete teacher behaviors.

By weaving TDF with insights from ecological, diffusion, and inclusion models, the current study promised a more nuanced lens. It linked systemic enablers and barriers—identified in prior research—to specific psychological and social domains. This integration deepened understanding of why certain AAC strategies took hold or faltered within the lived realities of special education teachers.

Ethical Consideration

To ensure credibility, the researcher employed member checking: co-participants reviewed emerging summaries and interpretations, confirming that distilled themes reflected their lived experiences. Triangulation across interview data, reflective field notes, and existing AAC literature further solidified trustworthiness. Peer debriefing with qualitative experts challenged assumptions and refined analytic decisions, anchoring findings in genuine participant perspectives.

Next, an audit trail recorded every methodological choice, from parsing statements to coding revisions, so that an independent auditor could replicate the study's process. The researcher maintained a decision log of coding iterations and theoretical memos, documenting how themes evolved. Regular reflexive journaling captured shifts in researcher perspective, ensuring that methodological adjustments remained transparent and traceable.

Lastly, participant anonymity was safeguarded by assigning pseudonyms and removing identifying data from transcripts. All audio files and documents resided on encrypted drives accessible only to the researcher. The study adhered to institutional and federal guidelines for human-subjects research, with protocols put in place for voluntary withdrawal and emotional support if sensitive topics arose.

III. SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Summary of Findings

The following are the major findings of the study:

1. The lived experiences of co-participants revealed two competing realities: instructional success countered by systemic strain. Teachers were successful in fostering meaningful communication (e.g., requests, choices) through consistent modeling, brief routines, and timely vocabulary. However, this success was constantly challenged by a taxing daily negotiation with systemic barriers. The core lived experience involved managing heavy, non-instructional demands, including chronic time pressure, heavy app customization loads, device logistics, slow

procurement, behavioral spikes, and the immense difficulty of ensuring Contextual Transfer across settings (substitutes, general education, home access). This confirmed that while instructional effort was present, the supporting system was manually maintained and unstable, requiring excessive personal investment.

2. Across accounts, twelve refined themes formed a coherent structure that treats AAC as a living voice: Contextual Transfer, Operational Load, Needs Based Assessment, Voice Access, Ethical Balance, Reciprocal Network, Systematic Evidence, Autonomous Communication, Teacher Resilience, Inclusion Advocacy, Operational Pedagogy, Nurturing Behavioral Governance. The twelve emergent themes converged into the meta-theme of C.O.N.V.E.R.S.A.T.I.O.N. This theme represents the required continuous, coordinated dialogue that must occur among the AAC team (teacher, SLP, para) to maintain the student's voice and operationalize the enabling conditions necessary for success.

3. The study revealed that high-tech AAC implementation is undermined not by teachers' instructional deficits—as students make progress through modeling and mixed pathways of self-study—but by the institutionalized failure of the Reciprocal Network to manage systemic burdens. Specifically, the stability provided by the Speech-Language Pathologist's support is currently fragmented, and progress is continuously halted by logistical failures (procurement, vocabulary confusion, inclusion gaps) that drain Teacher Resilience.

4. The combined evidence—that instructional success is present but continually undermined by chaotic logistics and structural gaps—led to the creative insight that the problem is ecological and requires an administrative solution. The 10-Minute T.A.L.K. Protocol is the necessary design intervention guided by the C.O.N.V.E.R.S.A.T.I.O.N. themes. The protocol's structure (especially the 10-minute cap and the Logistics Check) is designed specifically to transfer the unsustainable burden and the instructional demands from the individual educator to the accountability of the mandated team meeting.

Conclusions

Based on the findings, the following can be concluded:

1. Teachers treated AAC as a student's voice and, despite uneven preparation, heavy customization and word loads, time pressure, entertainment drift, logistics, large classes, substitutes, slow procurement, behavior spikes, and uneven home access, persistence with SLP push-ins, peer modeling, and the prepare, model, measure, maintain rhythm produced meaningful communication, implying schools must fund coaching and tighten operations so the cycle holds.

2. Twelve themes converge (Contextual Transfer, Voice Access, Teacher Resilience, etc.) into the meta-theme of C.O.N.V.E.R.S.A.T.I.O.N. This confirms that high-tech AAC implementation is not a checklist of individual skills but an interdependent ecological problem. The simultaneous failure points across logistics, assessment, and instruction can only be managed by a required, continuous, coordinated dialogue among the team. This necessity mandates the transition from reactive support to a scheduled, collaborative structure.

3. The study fundamentally concludes that the barriers to high-tech AAC implementation are systemic and not due to teacher instructional deficits. The stability provided by the SLP is fragmented, and progress is undermined by logistical failures (e.g., procurement, inclusion gaps) that contribute to the failure of Teacher Resilience. This means that any training or intervention must focus first on restructuring the Reciprocal Network—the support system—before sustained instructional gains can be realized.

4. Implementing the 10-Minute TALK Protocol as a weekly routine yields to be the practical required intervention. It protects teacher's resiliency, and transfers the burden of device maintenance and advocacy away from the classroom teacher to the support team (paraprofessionals and SLPs).

Recommendations

Based on the findings, the following actions are recommended to ensure sustained success in high-tech AAC implementation:

1. For the Institutional Framework Institutionalize the T.A.L.K. Protocol by embedding it into district AAC policy and IEP procedures. This includes conducting 10-minute "Ownership Orientations" for all staff, enforcing a daily two-minute equipment readiness check, and mandating aided language modeling within lessons. To ensure accountability, schools should post Reciprocal Network charts that identify backup support staff and review implementation consistency monthly through brief evidence cycles.

2. For Special Education Teachers Integrate the T.A.L.K. Protocol into daily lesson planning by selecting two to three core words for targeted instruction. Teachers should model device use frequently—utilizing a visible 10-45 seconds wait time—while locking devices to the communication application during instructional blocks. Progress should be monitored by tracking independent student responses to allow for real-time instructional adjustments.

3. For Paraprofessionals Complete targeted behavioral-skills training focused on aided language input, prompt fading, and recasts. Paraprofessionals should participate in a weekly ten-minute "triad" with the teacher and SLP to support the C.O.N.V.E.R.S.A.T.I.O.N. framework by reviewing one student video clip, verifying one data count, and identifying one immediate next step for instruction.

4. For the Assistive Technology (AT) Team Establish an "operational backbone" by guaranteeing a maximum one-week repair or replacement standard and maintaining a dedicated loaner pool. The AT team should utilize managed profiles to whitelist communication apps and provide "transition maps" for software updates that alter icon placement, supplemented by quarterly "find-it-fast" drills for staff.

5. For Related Services Professionals (SLPs, OTs, PTs) Lead the 10-minute T.A.L.K. Protocol by collaborating with teachers to define linguistic targets and co-create icon maps. These professionals should prioritize "push-in" services to coach classroom staff on modeling and fading techniques, using short video artifacts to inform long-term word target planning.

6. For School Administration Protect the student's right to Voice Access by enforcing IEP accommodations for device use beyond the classroom and during state/district testing. Administrators should secure funding for chargers and protective cases, protect designated

planning minutes for T.A.L.K. Protocol teams, and monitor two key monthly indicators: device downtime and the frequency of independent student responses.

7. For the District Special Education Office Formalize collaboration time within the official work calendar for multi-disciplinary teams and standardize the T.A.L.K. Protocol through campus-wide micro-coaching cohorts. The office must establish expedited procurement pathways and conduct terminal audits of assessment fit and cross-setting carryover while authorizing a variety of communication applications that meet diverse student needs.

8. For the State Education Department Issue formal guidance requiring modality-fit assessment accommodations and minimum staffing ratios for AAC users during core instructional blocks. The department should provide dedicated funding for equipment loaners and training, requiring districts to report transparently on access and repair timelines.

9. For Teacher Preparation Programs Embed the T.A.L.K. Protocol within special education coursework through high-tech app labs and role-playing exercises focused on partner strategies and wait-time. Curricula should include case studies on assessment alignment and practicum requirements that feature evidence logs of independent student communication.

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