EDU-610: Final Research Paper

Using AAC Supports to Improve Letter Identification in Students with Significant Disabilities

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Abstract
This study examined whether AAC supports, errorless prompting and choice reduction improved identification accuracy, independence and communication ability. The participants in the study were 4 students in grades 4 and 5 in a low-incidence special education classroom. The data was conducted in one to one literary instruction settings comparing the baseline instruction to 3 intervention sessions implementing AAC device use accuracy, reduced letter choices and errorless prompting. The focus of the sessions was letter identification accuracy (letters A-E). The measures were the letter identification, prompt level and communication attempts/methods. The findings showed notable gains from students with lower baseline performance including increased accuracy and more successful responding with AAC use and showed that students with a stronger baseline maintained a strong performance across new forms of communication with occasional variability. These findings suggest growth in literacy performance and communication ability with the use of AAC devices, errorless prompting and reduction in response choices for students with significant disabilities. This issue is especially relevant in specialized classrooms serving students with significant disabilities, where educators must balance individualized communication needs with access to meaningful academic instruction. In settings where many students rely on AAC systems, identifying effective literacy supports is particularly important.

Introduction and Literature Review

Students with significant disabilities have historically experienced limited access to comprehensive literacy instruction due to assumptions about their learning potential and the prioritization of functional skills over academic content. However, growing research has challenged these outdated beliefs and emphasized that all students can benefit from meaningful literacy opportunities when provided individualized support. Erickson et al. (2009) explained that students with significant intellectual disabilities are capable of developing literacy skills when instruction is systematic, accessible, and responsive to their communication and learning needs. Foundational literacy skills such as letter identification, symbol recognition, and print awareness are especially important because they serve as building blocks for later reading development. Expanding literacy access for students with significant disabilities may also promote greater independence, communication, and participation across school and community settings. As a result, educators have increasingly recognized the importance of providing adapted literacy instruction that maintains high expectations while addressing individual support needs.

One important method for increasing literacy access for students with significant disabilities is the use of augmentative and alternative communication (AAC) systems. Augmentative and alternative communication (AAC) systems can play an important role in increasing access to academic instruction for students with complex communication needs. AAC tools such as speech-generating devices, symbol-based communication systems, and eye-gaze technology allow students to express choices, demonstrate knowledge, and actively participate in classroom tasks when verbal speech is limited. In addition to supporting communication, AAC systems may also serve as a response mode for academic activities such as literacy instruction, vocabulary tasks, and letter identification. The American Speech-Language-Hearing Association (ASHA, n.d.) notes that AAC interventions can improve participation, communication competence, and access to educational environments. When AAC is integrated into instruction, students may have greater opportunities to engage with academic content and demonstrate skills that might otherwise be underestimated through traditional response formats.

Students with significant disabilities may also benefit from highly structured instructional strategies that reduce cognitive load and increase opportunities for success. Research on reading instruction for individuals with significant cognitive disabilities has emphasized the importance of systematic prompting, explicit instruction, and carefully designed teaching procedures (Browder et al., 2006). Errorless learning involves providing immediate cues or prompts before an incorrect response occurs, which may reduce frustration and strengthen accurate responding. Presenting a smaller number of response options at one time can also help students maintain attention and visually discriminate between choices more effectively. Prompting strategies such as gestural, verbal, and physical guidance may further support participation while gradually increasing independence as prompts are faded over time. Together, these approaches suggest that carefully structured response formats may improve both access and performance during literacy instruction for students with significant disabilities.

Although prior research supports literacy instruction, AAC access, and systematic prompting for students with significant disabilities, fewer studies have examined how these strategies can be combined within authentic classroom routines led by practicing teachers. Much of the existing literature relies on small intervention studies or controlled research settings, which may not fully reflect the day-to-day realities of specialized classrooms. Educators often need practical strategies that can be implemented during ongoing instruction while addressing communication, behavioral, and motor needs simultaneously. In particular, limited research has explored how modifying AAC response displays, such as reducing the number of visible choices, may influence student participation and letter identification performance. The present study builds on existing research by examining how reduced AAC choice fields and structured prompting strategies function during one-on-one literacy instruction in a low-incidence elementary special education classroom.

Research Questions

The purpose of this study was to examine whether structured AAC supports and systematic prompting strategies were associated with improved letter identification performance for students with significant disabilities. Prior research has suggested that students with significant disabilities can benefit from adapted literacy instruction, augmentative and alternative communication (AAC) systems, and explicit instructional support such as prompting and reduced response choices. However, fewer studies have explored how these supports function together within authentic classroom literacy instruction. The primary research question guiding this study was: How does reducing AAC response choices and implementing structured prompting strategies influence letter identification accuracy, prompt dependence, and communication attempts during one-on-one literacy instruction for students with significant disabilities? A secondary question was whether students with lower baseline letter identification performance would demonstrate greater improvement than students who began with stronger skills. Based on the existing literature and classroom experience, it was expected that students would demonstrate higher levels of letter identification accuracy, increased participation, and reduced prompt dependence during intervention sessions compared with baseline sessions.

Setting and Intervention

This study was conducted in a low-incidence elementary special education classroom serving students with significant disabilities in grades four and five. The classroom emphasized individualized instruction in communication, functional academics, adaptive skills, and early

literacy development. Students in the study demonstrated complex learning and communication needs and all used augmentative and alternative communication (AAC) systems as part of daily instruction. Three students primarily used speech-generating AAC devices, while one student used an eye-gaze AAC system. Data collection occurred during regularly scheduled one-on-one literacy instruction sessions embedded within the normal classroom routine.

The intervention focused on improving letter identification access and performance through structured AAC modifications and systematic prompting strategies. During baseline sessions, students completed letter identification tasks using their typical instructional formats, which included standard AAC displays or letter cards depending on the student's usual mode of participation. During intervention sessions, response options were reduced to a field of two choices at a time, particularly on AAC devices where only two letters were visible while other options were hidden. Additional supports included visual letter cards when appropriate and errorless prompting procedures in which the correct response was immediately modeled or gesturally indicated before errors occurred. Prompting levels included independent, verbal, gestural, and physical support as needed. These intervention strategies were designed to increase letter identification accuracy, reduce frustration, improve students' ability to engage and communicate during instruction, promote successful AAC use, and encourage greater overall participation.

Data Sources and Sample

Data for this study were collected through teacher-created classroom progress monitoring during one-on-one literacy instruction sessions in a low-incidence elementary special education classroom. Data collection occurred during regularly scheduled instructional periods and was embedded within typical classroom routines. Each student participated in repeated letter identification sessions across baseline and intervention conditions. During each session, students completed five letter identification trials in which they were asked to identify target letters from a field of two response choices. Student responses were recorded on structured data sheets immediately during instruction.The analytic sample included four elementary students with significant disabilities in grades four and five. Three students were in fourth grade and one student was in fifth grade. All students used augmentative and alternative communication (AAC) systems as part of daily instruction due to complex communication needs. Three students primarily used speech-generating AAC devices, while one student used an eye-gaze AAC device. Students were selected for inclusion because they regularly participated in one-on-one literacy instruction and required individualized supports for communication and academic engagement.The independent variable in this study was instructional condition, specifically baseline instruction compared with intervention instruction using reduced AAC response fields, visual supports, and structured prompting strategies. Dependent variables included letter identification accuracy, prompt level, and frequency of communication attempts. Letter identification accuracy was measured as the number of correct responses out of five trials per session and converted to percentages. Prompt levels were recorded as independent, verbal, gestural, or physical assistance. Communication attempts included purposeful reaches, eye-gaze selections, device activations, or other observable attempts to respond during instruction.

Table 1

Descriptive Characteristics of the Sample

Characteristic	**Value**
Sample Size	4 students
Grade 4 Students	3
Grade 5 Students	1
AAC Users	4
Speech Generating Device Users	3
Eye Gaze AAC Users	1

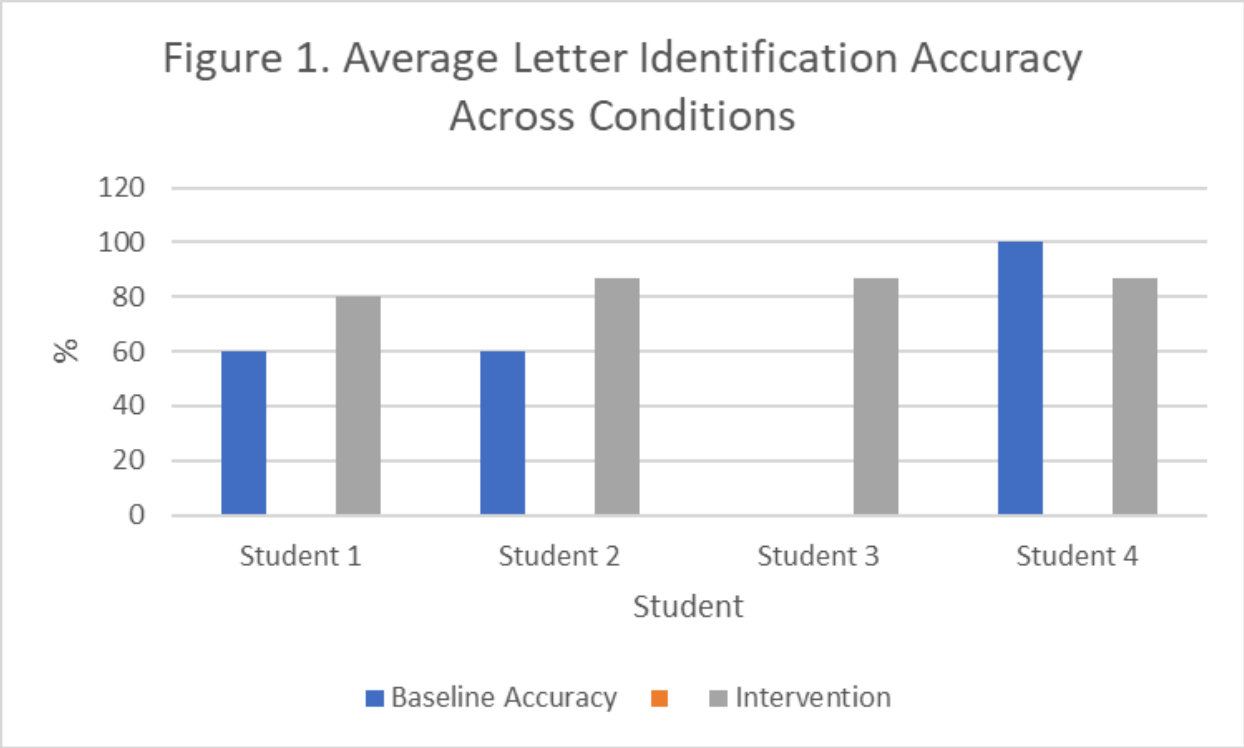
Analytic Method

Microsoft Excel was used to organize and analyze the quantitative data collected during one-on-one literacy instruction sessions. Because this study involved a small classroom-based sample of four students, descriptive statistical methods were used to summarize performance across baseline and intervention conditions rather than inferential statistical tests. The purpose of the analysis was to examine changes in letter identification accuracy, prompt dependence, and communication attempts following the implementation of structured AAC supports and prompting strategies. First, letter identification accuracy was calculated for each session by dividing the number of correct responses by five total trials and converting the result to a percentage. Average baseline accuracy and average intervention accuracy were then computed for each student and compared to identify changes in performance across conditions. Individual session performance was also reviewed to examine trends such as growth, maintenance, or variability over time. Second, prompt-level data were summarized by reviewing the frequency of independent, verbal, gestural, and physical prompts across sessions. Changes in prompting patterns were examined to determine whether students demonstrated increased independence or continued need for support during intervention sessions. Third, communication attempts were

summarized by counting observable response attempts during each session, including purposeful reaches, eye-gaze selections, and AAC device activations. These data were reviewed to determine whether the intervention was associated with increased engagement and participation during literacy instruction. Tables and graphs were created in Excel to visually compare baseline and intervention performance for each student. Interpretation of results also considered contextual factors that may have influenced performance, including student mood, refusal behaviors, and occasional AAC device inconsistencies. Because the study was conducted in an authentic classroom setting with a small sample, findings were interpreted as descriptive evidence of classroom outcomes rather than causal proof.

Findings

Student performance data were analyzed across baseline and intervention conditions to examine changes in letter identification accuracy, prompt dependence, and communication attempts following the implementation of structured AAC supports and prompting strategies. As shown in Figure 1, three of the four students demonstrated improved average letter identification accuracy during intervention sessions compared with baseline performance. Student 1 increased from 60% accuracy during baseline to an average of 80% during intervention sessions. Student 2 improved from 60% accuracy at baseline to an average of 86.7% during intervention sessions, including one session with perfect performance (100%). Student 3 demonstrated the largest gain, increasing from 0% baseline accuracy to an average of 86.7% during intervention sessions. This student had previously demonstrated impulsive responding and inconsistent attention when using traditional formats but showed stronger accuracy when using reduced AAC response fields and structured prompting. Student 4 demonstrated strong baseline performance at 100% accuracy and maintained a high intervention average of 86.7%, with one lower session likely influenced by mood and behavioral factors. Communication attempt data indicated consistently high engagement across students. Most students demonstrated four to five observable communication attempts per session through purposeful reaching, eye-gaze selections, or AAC device activations. Intervention sessions appeared to maintain or increase active participation while also improving task accuracy. This suggests that structured AAC modifications did not reduce student engagement and may have supported more functional responding during literacy instruction. As shown in Table 2, prompt-level data also suggested meaningful changes in student independence and participation. Student 2 demonstrated increased independent responding across intervention sessions compared with baseline, while Student 3 progressed from requiring primarily physical prompting to demonstrating some independent responses. Student 1 and Student 4 continued to require varying levels of support related to AAC device access and motor demands, particularly when device responsiveness was inconsistent. These findings suggest that prompt needs were influenced not only by academic skill but also by motor access and technology factors. Overall, findings suggest that reducing response choices to a field of two, using structured prompting, and integrating AAC supports were associated with improved letter identification performance for students with lower baseline skills while helping higher-performing students maintain strong outcomes.



Average letter identification accuracy across baseline and intervention conditions (n = 4).

Prompt Level Trends

Table 2

Student	**Baseline Prompt Trend**	**Intervention Prompt Trend**	**Interpretation**
Student 1	Mostly Independent/Verbal	More gestural/physical due to device access	Motor/Device Factor
Student 2	Gestural/Verbal	More independent responses	Improved Independence
Student 3	Physical/Gestural	Some independent responses emerged	Growth
Student 4	Independent	Mostly independent with some variability	Maintained

Discussion and Conclusion

The findings of this study suggest that structured AAC supports and systematic prompting strategies may improve letter identification performance, participation, and instructional access for students with significant disabilities. Students who began with lower baseline accuracy demonstrated the strongest gains during intervention sessions, while students with stronger initial skills generally maintained high levels of performance. These outcomes indicate that reducing response choices to a field of two and providing immediate prompting may help students respond more successfully during literacy tasks. The results also have practical implications for special education classrooms. AAC systems are often designed to maximize communication choices, but large response arrays may create visual, motor, or attentional barriers during academic tasks. Modifying AAC displays for specific instructional activities may improve access without reducing the overall value of the communication system. Additionally, combining literacy instruction with communication opportunities may allow students to practice academic and expressive skills simultaneously. Several limitations should be considered when interpreting these findings. The study involved only four students in one classroom and occurred over a short period of time. Because the teacher also served as the researcher, instructional decisions and data collection were not independent. Student mood, refusal behaviors, and occasional AAC device inconsistencies may also have influenced performance. For these reasons, findings should be interpreted as descriptive classroom evidence rather than definitive causal proof. Overall, this study suggests that individualized AAC modifications and structured prompting strategies may be valuable tools for improving literacy participation and letter identification for students with complex communication and learning needs. Future research with larger samples and longer implementation periods would strengthen understanding of these instructional practices.

AI DECLARATION: I used ChatGPT to help clarify assignment expectations, organize ideas, refine section structure, proofread wording, and review formatting for tables, graphs, and APA citations.

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