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Annotated Bibliography
EDUC 812
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Annotated Bibliography Frame of Reference

Craft a purpose statement for your research proposal.

The purpose of this research is to describe the current practices that support writing development for students who are nonverbal.

Draft (not in final form) a research question you want to explore/investigate.

How are students who are nonverbal being taught to decode words in order to encode and communicate through writing?

Boesch, M. C., Wendt, O., Subramanian, A., & Hsu, N. (2013). Comparative efficacy of the Picture Exchange Communication System (PECS) versus a speech-generating device: Effects on requesting skills. *Research in Autism Spectrum Disorders*, *7*(3), 480–493. doi: 10.1016/j.rasd.2012.12.002

Purpose

The purpose of this study is to assess the benefits (student output and cost for implementation) of two different augmentative and alternative communication systems. The augmentative and alternative communication systems outlined in this article are the Picture Exchange Communication System (PECS) and a speech generation device (SGD).

Thesis

Due to the integration of alternative communication systems into learning environments to support students who are nonverbal, the study seeks to determine which alternative communication system is most beneficial for the development of student output.

Review of Literature

PECS is outlined as an intervention for teaching functional communication skills. The PECS system is designed for students to move through six phases of the intervention, with the end result being reciprocal communication between adults and peers. However, the study explains that not all students make it to this sixth phase. PECS is designed to build initiation of requesting behavior for children's needs to be met, and move towards advanced communication and independence in interpersonal exchange. PECS is supportive for students who are nonverbal, and also benefit students with autism due to its sole visual stimuli, as opposed to auditory stimuli. In comparison, the SGD digitizes or speech by stating the words and phrases that the user activates. In this study, the ProxTalker is used as the SGD being assessed. The ProxTalker combines the pictures featured in PECS with the SGD function of digitized speech.

Methods

Three elementary age students with severe autism were recruited to participate in the study. In order to participate, the students had to have autism spectrum disorder, be between the ages of 4 and 12 years old, and not using any speech output technology. SGD and PECS books were available and within reach of the participant. Verbal and physical prompts were not used, but the non-verbal prompt of and expectant look was to engage children to interact with the materials. Children participated in 50-71 sessions.

Implications for Future Practice

The outcomes of this study show that either system, PECS or an SGD, benefit students in their communication. Moving forward, a longitudinal study of children who solely use one device or the other would support in the research of how students develop their writing skills based on these two augmentative communication systems. Each of these systems support students in communication through the use of pictures as symbols to relay meaning; but how does this support students in their graphemic writing development?

Statement of Purpose

This article was chosen for its relevance due to its documentation of the benefit of the PECS system as a form of symbolic communication, as well as its documentation of a digitized synthetic speech system, ProxTalker. The combination of these two systems in the ProxTalker system provide students with the ability to create a string of symbols and auditory experience the outcome. The auditory stimulus may support in future writing development and decoding ability.

Coleman-Martin, M. B., Heller, K. W., Cihak, D. F., & Irvine, K. L. (2005). Using Computer-Assisted Instruction and the Nonverbal Reading Approach to Teach Word Identification. *Focus on Autism and Other Developmental Disabilities*, *20*(2), 80–90. doi: 10.1177/10883576050200020401

Purpose

This study was created to determine if the use of computer-assisted instruction would be an appropriate support for students using the Nonverbal Reading Approach (NRA). The NRA is a protocol for teaching students with severe speech impediments to decoding words internally, and then chooses the correct spelling of the word from an array of choices.

Thesis

This article is researching the possibility that teacher initiated NRA intervention is not as beneficial as students working through a solely computer generated NRA protocol. Within the NRA structure, students would be able to participate in the decoding, choice, and feedback within their own pace – as opposed to waiting for teacher feedback, and organization. Computer assisted instruction (CAI) offers students 1-to-1 support in heir learning, and errors can be correctly immediately.

Review of Literature

Four students participated in this study. An example of outcomes follows. When providing the baseline for Alice within each of the interventions, the range of success was within the 0-20% range of accurate vocabulary words identified within the three baseline sessions. However, when the teacher only protocol was implemented, Alice inconsistently grew progressively in their percentage of their correctly identified baseline words. When the method of teacher plus CAI was implemented, Alice was 100% accurate in their decoding in sessions 1 and 4, but only had 80% success in sessions 2 and 3. However, when the CAI only assessment was provided, students were consistently achieving with an 80% success rate.

Observing Alice's rates against the other students in the study, the consistent outcome is that teacher intervention plus CAI in the intervention led to a;; students correctly identifying 100% of vocabulary words by the fourth session.

Methods

In this study, three conditions for the NRA were used: teacher only instruction, teacher plus computer-assisted instruction, and computer based instruction. Following the three trials of the NRA, a teacher questionnaire was provided.

Implications for Future Practice

Seeing that within a study of four participants, teacher plus CAI had the most consistently positive outcomes makes me think that there is a place for computer-supported instruction within classrooms. I would love to see this study done again with timestamps, to see if students become more fluent in their decoding, as well as more accurate. When weighing the pros and cons of CAI integration, and holding the understanding that fluent decoding is what is going to promote comprehension in reading and ability to then encode, I am interested in exploring the NRA and CAI's role in promoting fluency as well as accuracy.

Statement of Purpose

This article is chosen for my research as it showcases the use of technology as a beneficial component in a decoding intervention for students who are nonverbal.

Diamond, K. E., Gerde, H. K., & Powell, D. R. (2008). Development in early literacy skills during the pre-kindergarten year in Head Start: Relations between growth in children's writing and understanding letters. Early Childhood Research Quarterly, 23, (467-478). doi: 10.1016/j.ecresq.2008.05.002

Purpose

The purpose of this study is to examine how the knowledge of letter names, sounds, and print concepts contribute to students success in communication via writing.

Thesis

Children's literacy skills when entering kindergarten are indicative of future reading achievement in early elementary school and beyond (Diamond, Gerde & Powell, 2008). The process in which children are being exposed to literacy in an authentic way has an impact on the rate of development. The formation of letters (handwriting) does not fully support writing development, but rather the co-construction of letter name, sound, and symbol is what promotes literacy retention.

Review of Literature

Students who are more secure in their ability to identify letters, the initial sounds of words, and were able to demonstrate knowledge of print concepts were more apt to begin writing clearly. Collecting data from the beginning to the end of the school year within a Head Start classroom, research found that learning to read and write was a bidirectional process. As students became more secure in their letter naming, their writing of those letters followed. With progression in writing came further development of reading skill.

Methods

Observations and testing of students occurred from 35 different Headstart classrooms (approximately 280 students), three times throughout the school year. Observation and individual assessment were the tools used in this study. Children were tested on writing, alphabet knowledge, and initial letter sounds.

Implications for Future Practice

This study indicates that teaching writing skills has a positive effect on reading development. This bidirectionality indicates that students should be exposed to both writing and reading practices concurrently in order to foster optimal growth. The study shows that as the school year progresses, and alphabetic knowledge increases, that writing ability increases as well. This supports the notion that as children are exposed to reading, writing ability increases, and as writing ability increases, reading ability grows as well.

Statement of Purpose

This research is valuable because it indicates that as students are learning to identify their letters and the sounds made, writing should be integrated into instruction. When thinking about students that are nonverbal who are learning to identify pictures as symbols for communication, I am wondering if opportunities should be provided for students to create their own symbols as representations for communication. Students are learning to communicate by associating a picture with meaning, which is similar to the process of connecting a letter to a sound. As children are learning this associative skill, would it be supportive to allow students to practice making their own PECS cards?

Drasgow, E., & Halle, J. W. (1995). Teaching Social Communication to Young Children with Severe Disabilities. *Topics in Early Childhood Special Education*, *15*(2), 164–186. doi: 10.1177/027112149501500203

Purpose

Drasgow & Halle (1995) are attempting to enhance communication repertoires of young children who are functioning at the prelinguistic, or non-symbolic stage of communication. By studying how children with communicative disabilities interact with one another, the intent is to determine appropriate interventions for support.

Thesis

Children who have communicative disabilities are not able to access conventional forms of literacy such as speech, signing, or creation of print. This limits participation in social and physical environments.

Review of Literature

This article looks at the three features of communication. The features outlined our contexts, forms, and functions. The form of communication refers to the physical characteristics of the communicative act, such as body movement, vocalizations, and eye contact. The function of communication is defined by the effect on the listener, and the listeners ability to act and react to the communication. The final idea of context aligns to the analysis of the conditions under which the child communicates.

Methods

For this study the use of interviews, direct observation, and environmental modifications were used. The people interviewed were the ones who spent the most time with the learner including parents and teachers. This study was conducted around one 4-year-old student.

Implications for Future Practice

Although the study focuses on one child, and discusses the context for social communication through vocalization and verbalization, the thought that communication can be outlined as form, function, and context can translate into purposes for writing.

Statement of Purpose

The three part description of communication aligns to my research because I can begin to look at research the critical wins of what is the purpose for communication outside of just communicating need. Students who are nonverbal maybe communicating for other reasons besides needed, and is important to look at the form while they are communicating with nonverbal tools.

Edmister, E., Staples, A., Huber, B., & Garrett, J. W. (2013). Creating Writing Opportunities for Young Children. *Young Exceptional Children*, *16*(3), 24–35. doi: 10.1177/1096250612473128

Purpose

This article outlines the protocol for an inclusive writing opportunity in a kindergarten classroom: Big Paper. Within detailing the protocol for this writing experience, the authors outline a variety of tools children can use to interact with the writing plane, and maximize participation and expression by all.

Thesis

The work for this article is grounded in inclusion, and social constructivism. The author stands in the camp of all children can access writing to express themselves, and show up to the writing process in a variety of ways. All ways are accepted and encouraged. The author uses the vignette of a student using augmentative and alternative communication (AAC) to depict how inclusive writing practices can be.

Review of Literature

Following the implementation of the activity, Big Paper, Edminster et al (2013) highlight the inclusive practices that appear in this kindergarten setting. First, children are encouraged to write or draw about the topic of their choosing. This access point allows all children to bring their 'voice' to the Big Paper. From there, the teachers provide and model the use of a plethora of materials (pencils, markers, stamps, crayons, and AAC devices) to ensure that all students have an entry point to the project, and are able to expand on their thoughts with a variety of methods. Following, the article states the ways teachers prompt students to expand on what they are working on with open ended statements and questioning.

Methods

The article showcases open ended questioning and partner assisted screening as two functions to support children in their writing process.

Implications for Future Practice

Having the protocol for Big Paper as a basis for inclusive practice is a valuable tool to have. The examples of open-ended question and suggestions for writing tools are helpful resources for developmentally appropriate practices with young children. What other writing activities can be shifted from a cognitive camp to a social constructivism and inclusion camp?

Statement of Purpose

This article is the first in my research to suggest that writing can come before reading. This article states that children should be expressing themselves in different form, using different materials, and for different social contexts. Edminster et al (2013) also states that teachers and adults should be modeling this variety of writing, in a ways that is collaborative, messy, and interactive. This article encourages a fully immersive and inclusive writing process that allows children to explore, negotiate, and test the limits of materials. This article includes augmentative and alternative communication (AAC) as a form of writing, alongside pencils, letter stamps, and keyboards. The inclusion of AAC as a normalized system for writing is key for my research.

Edwards, C. P., & Willis, L. M. (1999). Integrating Visual and Verbal Literacies in the Early Childhood Classroom. *Early Childhood Education Journal*, *27*(4), 259–265. doi: 10.1023/b:ecej.0000003364.99437.5d

Purpose

Edwards & Willis (1999) outline that literacy can be defined as the ability to read and write messages for three reasons, and the Reggio Amelia approach to writing values children's output as a form of communication.

Thesis

Children use different media in order to express themselves through symbolic writing children should work with different materials to define its strengths, and limitations for communication. Using a variety of tools to communicate allows children to express themselves in meaningful ways.

Review of Literature

Edwards & Willis (1999) define literacy being defined as the ability to read and write messages for three reasons: recording and preserving experiences, reflection and extending one's thoughts and feelings, and communicating and sharing ideas with others. This article outlines the notion that for young children, it is natural to combine symbols when seeking to express themselves.

Methods

This article outlines the Reggio Emilia approach, which features an integrated arts curriculum. The Reggio Amelia approach comes from Italy, and this article combines the approach with current thinking in North America. This article utilizes teacher anecdotes and practices as a form of research.

Implications for Future Practice

Edwards & Willis (1999) make suggestions for teachers, such as using unusual literacy is in the classroom. This could look like drama, clay, or photography as a form of symbolic representation and meaning. Teacher should encourage children to involve multiple symbolic languages by providing a variety of materials that will allow students different methods for representation. Offering unusual combinations of materials allow children to make judgments about their strengths and limitations. Documenting soon as were through taking photos allows children to reflect on their work, and make future choices.

Statement of Purpose

This article was chosen to support my research because it validates the importance of multiple writing tools to convey information. Writing is not simply just pencil to paper, and the Reggio Amelia approach validates multiple tools and mediums for children to express themselves with. This article provides validation for children's multiple entry points in accessing information, and conveying meaning.

Ganz, J. B., Hong, E. R., & Goodwyn, F. D. (2013). Effectiveness of the PECS Phase III app and choice between the app and traditional PECS among preschoolers with ASD. *Research in Autism Spectrum Disorders*, *7*(8), 973–983. doi: 10.1016/j.rasd.2013.04.003

Purpose

The purpose of this article is to showcase the difference between the Picture Exchange Communication System (PECS) physical board and the electronic app version, within Phase III of the PECS protocol.

Thesis

Researchers entered this study to determine which version of PECS is most preferred by children, and generates effective communication within Phase III of the protocol. Phase III of PECS involves children making requests by discriminating between picture choices on their (digital or physical) PECS board.

Review of Literature

In this article, the phases of the PECS are outlined in detail. Phase 1 in PECS is where the child makes a request using a picture exchange. In this phase there is a prompter who is coaching the child on what to do. Phase 2 of PECS is the exact same, but the distance between the person giving a prompt and the child requesting is increased. In this phase there is a prompter coaching a child on what to do. In Phase 3 there is no prompter, and the child is talk to discriminate between the multiple symbols on their communication book. Phase 4 involves teaching the child to use a sentence structure, such as "I want…" and then choosing picture to complete the request. Within Phase 5, the child is taught to answer questions from a prober. The child may be prompted with, "What do you want?" to which the child would respond with the PECS sentence starter of "I want…" and then provide the picture to show intended outcome. Finally, in Phase 6 the child is taught to answer questions such as, "What do you like?" In this phase children are able to respond to other questions besides, "What do you want?" and then trained to make requests independently. The difference between Phases 5 and 6 is that Phase 5 is centered around children making the request for a specific object, and communication being exclusively used for sharing of needs and wants. In Phase 6, the PECS phrases are open ended, and children are provided with a range of sentence starters to begin to initiate conversation for the sake of social interaction, as opposed to response/request only.

Methods

Three participants, ages 3 and 4 years old, with autism spectrum disorder (ASD) and complex communication needs (CCD) were recruited for this study. This study took place during an 8-week summer clinic at an intensive autism clinic for preschool aged children. The protocol involved teaching children how to use the PECS app and then providing both choices for communication. Data was collected around the number of times children reached for either communication tool.

Implications for Future Practice

Having a notion of student preference when it comes to the implementation of the PECS system can provide educators and researchers insight as to how to incorporate the PECS program into their environment. The use of the PECS app allows students to have immediate access and manipulation to dozens of icons, while the stagnant board requires an adult to facilitate the expansion of the PECS library. Within this study, the preferences of three children were considered. Student preference is valuable knowledge, but a next step would be to observe the

rate of language acquisition when using the app versus the stagnant board. Does having the app, and a library of images at the tip of the fingers enable students to access more images and request a multitude of objects within a shorter time frame?

Statement of Purpose

This article begins to scratch the surface of how student motivation and preference within the PECS program contributes to the learning process.

Heller, K.W., Fredrick, L.D., Tumlin, J. et al. Journal of Developmental and Physical Disabilities (2002) 14: 19. https://doi.org/10.1023/A:1013559612238

Purpose

The purpose of the study is to examine the effectiveness of the Nonverbal Reading Approach (NRA).

Thesis

Students who are functioning with severe speech and verbal impairments require support in learning to decode. When learning to read, frequently instructors prompt students to 'sound out' words, but when students lack the ability to do so, the NRA is there to support.

Review of Literature

Significant reading difficulties are often present ins students who have speech and language impairments due the inability or challenge of articulating sounds, words, or stories. Even when augmentative and alternative communication (AAC) systems are available, there is a slow rate of communication (having to type and select the symbols), and there is also a limitation to the amount of symbols available for students to choose from. These two factors can interfere with the ability for students to communicate efficiently and effectively. The article states that "decoding is the act of translating printed words into a representation similar to oral language," (Heller et al., 2002). Without being able to hear how a student is decoding a word, it is challenging for instructors to give feedback and correct any misconceptions. The NRA uses internal speech, distractor arrays, and error analysis with students AAC in order to teach students to silently verbalize the phonemes in words, and sound out words internally. The NRA provides an array of choices for students to pick from when orally given a word, and then the student picks one in written form. Then the instructor is able to analyze the choice to determine the miscue.

Methods

The NRA was used with three students who had severe speech impairments, and difficulty decoding. The participants were tested on a series of 20 words, and prompted to sound out the word internally, and choose the correct word from an array.

Implications for Future Practice

The NRA protocol provides a structure to support students in learning to decode without the verbal ability to do so orally. This protocol is a starting point to begin research into further methods for decoding, and subsequently encoding. The next step in this research is how to address students ability to encode words and communicate with written symbols.

Statement of Purpose

This article is included in my study because it is the first article I have found that shows intentional support, intervention, and protocol for students who have severe speech and language impairments learning to decode. The NRA is shown in this study across grade levels (elementary through high school), to show that this protocol is appropriate and available for all students learning to decode. This study additionally outlines the downfalls to AAC as a method of communication that is both slow in rate of communication, and limiting in its range of words and phrases.

Johnson, D. J. (1984). Language Problems of Learning Disabled Children. *Topics in Early Childhood Special Education*, *4*(2), 21–35. doi: 10.1177/027112148400400203

Purpose

The purpose of this article is to highlight the progression of skills required to become a writer. All symbol systems including verbal speech, decoding, and written language were observed in the study to chronicle the interrelationships.

Thesis

Written language is the last verbal system to be acquired. In order to become a fluent communicator through writing, students must move through the levels of the language hierarchy. Written language being at the highest point means that difficulties in written language expression can be attributed to a disconnect within other layers of the hierarchy.

Review of Literature

Johnson (1984) outlines the language hierarchy as beginning with nonverbal cognition. Within this level, students are learning conceptualization and symbolism, and are developing their working memory and perception. Once students have developed their non-verbal understandings, they can begin to grow their skills of listening (auditory receptive language). Following the ability to listen is the skill of speaking (auditor expressive language). Once students are able to articulate verbally, then they can move into the range of visual receptive language, or reading. Finally, students work their way into visual expressive language (writing). Johnson's (1984) language hierarchy is bi-directional meaning that if there is a breakdown in a lower-lever skill, all subsequent skills are affected.

Methods

Johnson (1984) expands on the different diagnoses that can manifest as a disability in literacy or writing ability. Johnson outlines sensory acuity, intelligence, background of experience nonverbal functions, verbal behavior, perception, comprehension, memory, and linguistic awareness as functions that make up the pathway to writing. Each student has a variety of abilities in each of these areas, suggesting that all areas need development in order to be fully literate.

Implications for Future Practice

Johnson's (1984) language hierarchy shows the five levels of skills required to become a writer. However, the hierarchy lacks the intricate details that go into achieving each level of the hierarchy. This structure provides a roadmap to writing for researchers to follow as they begin to navigate the less traditional paths to written literacy.

Statement of Purpose

This article supports my research because it highlights the necessity of speaking skills as a prerequisite for writing skills. The language hierarchy that Johnson (1984) created provides a visual ladder of skills for students to work through in order to become a writer, but does not detail what the ladder looks like if students have an impairment in one of these areas. For example, if students are unable to speak, how are the other levels of the hierarchy affected as students work towards the skill of writing? This research provides a basis for looking at non-traditional paths to writing.

Peterson, S. S., Mcintyre, L. J., & Forsyth, D. (2016). Supporting Young Children's Oral Language and Writing Development: Teachers and Early Childhood Educators Goals and Practices. *Australasian Journal of Early Childhood*, *41*(3), 11–19. doi: 10.1177/183693911604100303

Purpose

The purpose of this study is to bring attention to the need for teacher professional development in oral and written language. .

Thesis

Teachers in a Northern province of Canada are integrating oral language, and writing into their classroom, but are focused more on the development of fine motor skills, and concepts of print. Be in authentic structure of teaching reading is cause for concern because students are not developing their skills holistically, or for social purposes.

Review of Literature

Learning to write is not simply about learning how to generate written text. Peterson, Mcintyre & Forsyth (2016) indicate that children communicate by attaching meaning to written symbols. As children make circles, dots, and lines hand-eye coordination is being developed, and this intentional physical representation is a form of communication. Working under the impression that all children have this amount of exposure to writing in the form of creating pictures, lines, dots, and marks, this foundation can be built off of that to help students learn to write despite any learning disability.

Methods

This study was conducted with 36 primary teachers, early childhood educators, and school administrators in Alberta, Saskatchewan, Manitoba, and Ontario. The study was a part of a larger action research study, the Northern Oral Language and Writing through Play study. The study consisted of five questions, and outlining the practices detailed within those responses.

Implications for Future Practice

This study shows that there is a disconnect between theory and practice. Teachers want to support children in communicating authentically, however they also want students to be able to communicate clearly, and in written form. Being so, teachers are pushing the fine motor skill acquisition, and let her development, as opposed to nurturing students experimental use of symbols for communication.

Statement of Purpose

This article was chosen to showcase the importance of children's contributions to writing, no matter the symbol. As children learn to express themselves through written communication, their attempts (shapes, pictures, dots, and lines) are valid forms of writing as communication. This provides validity to the wide spectrum of what constitutes as writing, and functions as an inclusive model for educational standards.

Reutzel, P., Mohr, K. A., & Jones, C. D. (2017). Exploring the relationship between letter recognition and handwriting in early literacy development. *Journal of Early Childhood Literacy*, *19*(3), 349–374. doi: 10.1177/1468798417728099

Purpose

The purpose of this study is to investigate the correlation between letter naming and letter writing fluency.

Thesis

Using template matching theory, it can be assumed that children identify shapes and symbols by associating each physical correspondence to a previously constructed internal representation.

Review of Literature

Reutzel & Jones (2017) coined the phrase "kinemes," which translates to letter recognition includes awareness of shapes, and the motor memory of the form. When it comes to literacy and fluency, children are working toward the ability to just write quickly as they are thinking. When children have to think about how to decode words, it slows them down because they are thinking about their handwriting formation, as well as the encoding of the word. This literature suggest that teachers should practice guiding students to not only identify a letter and the sound it makes, but then form the letter simultaneously as to promote fluency.

Methods

This study required students to participate in three selected components. The first component was a letter naming fluency, the second component was the recognition and manipulation of upper and lower case letters, and the third component it was the written production of writing pseudo-letters. The 48 participants in the study were kindergartners. In the United States. Students worked one on one to identify, manipulate, and draw. Fluency was determined by the time it took for students to complete the task.

Implications for Future Practice

When students see a letter, shape, or picture, he relayed it to your internal dialogue and meaning of what that thing is. This is why when teaching phonics, some programs feature the teaching strategy as 'letter, sound, picture.' This three step approach allows a scaffold for students to pull up on. When students look at symbols in another language, there have no way of trying to figure out what it is, because there is no previous association to what that symbol is, or the sound it makes. This experience is a form of dissociation. This research suggests a fourth step in the learning framework: kineme exposure.

Statement of Purpose

This literature is valuable to my study because it highlights the notion that learning letter and sound correspondence is not the only step in promoting fluency in children. The formation of letters can be incorporated into the initial instruction as to support the triad of skills required for written form (symbol identification, sound, and symbol formation).

Schwartz, I. S., Garfinkle, A. N., & Bauer, J. (1998). The Picture Exchange Communication System. *Topics in Early Childhood Special Education*, *18*(3), 144–159. doi: 10.1177/027112149801800305

Purpose

The purpose of this study was to outline the uses for the Picture Exchange Communication System (PECS), and study the progression of students' advancement through the phases of the PECS system.

Thesis

Students build upon their communication skills in a systematic way with the support of adults and peers. With consistent implementation and scaffolding, students can effectively create a sentence.

Review of Literature

PECS is a popular and natural to use tool to facilitation communication because it does not require any prerequisite behaviors, and PECS is based on child initiation. Generalization strategies are embedded in the system through the use of simple picture cards generate by Boardmaker for Windows (1995). Children use images to request multiple items with many communicative partners (adults and then peers), and develop persistence in their communication tactics in order to receive what is desired.

Methods

The training steps in the study were the implementation of PECS phases. The six PECS phases include basic exchange, distance, persistence, discrimination, sentence building, and PECS with peers. During the study children learn to exchange a 2" x 2" symbol with a communicative partner to initiate an action or receive a material. This study took place over four years, with 31 children, and PECS data was collected for each child's individualized education plan (IEP) data book.

Implications for Future Practice

This study determined that the average time from beginning of PECS implementation to children to be able to communicate with peers and adults by creating a sentence independently was 14 months. The range of time from Phase 1 to Phase 6 was 3 to 28 months amongst the children in the study. This study outlines a general timeline required to train students to communicate independently using the PECS symbols.

Statement of Purpose

This study details a timeline, and provides clarity around how long it takes for students to develop the ability to communicate independently, once beginning to communicate with PECS. If students are able to form sentences to communicate using PECS on average of 14 months after initial implementation, then this study could possibly be extended into what written communication comes after PECS, and the time frame it could take for students to transfer their knowledge of PECS into written form.

Vue, G., Hall, T. E., Robinson, K., Ganley, P., Elizalde, E., & Graham, S. (2015). Informing Understanding of Young Students' Writing Challenges and Opportunities. *Learning Disability Quarterly*, *39*(2), 83–94. doi: 10.1177/0731948715604571

Purpose

The purpose of this article is to outline the skills needed for students to become proficient writers.

Thesis

Reading is an essential skill for deep thinking, learning, and expression of thought. Students with learning disabilities, and those students who struggle as readers, need additional support in acquiring the skills of learning to write: skills, knowledge, strategies, and motivation.

Review of Literature

This article approaches reading from a cognitive development perspective, and chronicles the cognitive strategies and linguistic requirements that children go through in order to transform their verbal language into written representation.

Methods

Researchers conducted five focus groups within two middle schools to address the needs of this project. First, researchers met with students with learning disabilities to learn with their knowledge of the writing process, and then inquired what features would be beneficial for them in a digital writing environment. This design thinking method allowed participants to give feedback into the study. These focus groups were arranged by grade, and met for 45 minutes at a time throughout the school year.

Implications for Future Practice

As technology advances, app and internet based resources have the potential to further develop reading instruction. The use of text paired with pictures, diagrams, audio narration, animations, and videos can reduce the cognitive workload for students. The support from these scaffolds would create a reduction of strain in the working memory would allow students to focus on the meaning and comprehension. This allows children to have a deeper understanding of what they are reading and learning, and they are not putting so much work into formulating their idea, This would allow them to put their working memory toward effectively transcribing.

Statement of Purpose

This article is supportive of my research because it outlines specific methods to support children in their quest to become writers. By providing students with scaffolds and entry points to comprehension, the working memory is freed up to focus on the task of transcribing. This provides guidance around how to support children from internal thought to written transcription.

References

Boesch, M. C., Wendt, O., Subramanian, A., & Hsu, N. (2013). Comparative efficacy of the Picture Exchange Communication System (PECS) versus a speech-generating device: Effects on requesting skills. *Research in Autism Spectrum Disorders*, *7*(3), 480–493. doi: 10.1016/j.rasd.2012.12.002

Coleman-Martin, M. B., Heller, K. W., Cihak, D. F., & Irvine, K. L. (2005). Using Computer-Assisted Instruction and the Nonverbal Reading Approach to Teach Word Identification. *Focus on Autism and Other Developmental Disabilities*, *20*(2), 80–90. doi: 10.1177/10883576050200020401

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