

Toward Positive Literacy Outcomes for Students with Significant Developmental Disabilities

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Abstract: Three classroom teachers and their 23 students with significant developmental disabilities were studied across 8 weeks as a new literacy and communication instructional program, *MEville to WEville*, was implemented. Before and after the implementation, the students were tested on a variety of literacy measures, their teachers were interviewed, and each classroom was observed. During the implementation, each classroom was observed at least once each week for a total of 35 hours of observation. Measured outcomes and benefits of the *MEville to WEville* program were evident for the students in each classroom. Students demonstrated increases in their attempts to initiate and sustain social interactions, and improvements in their literacy skills and understandings. Although observed differences did not reach statistical significance, the outcomes represent a significant practical difference for the children in the current study.

Keywords: Literacy, Communication, Curriculum, Instruction

Research regarding the predictors of literacy learning success and the instructional approaches that promote success are readily available [see e.g., The National Reading Panel Report (National Reading Panel, 1998); The Rand Reading Comprehension Report (Rand

Corporation, (2004); or Preventing Reading Difficulties in Young Children (Snow, Burns, & Griffin, 1998)]. It is now well recognized that literacy learning difficulties can be ameliorated if practices drawn from the extensive scientific research base are implemented to prevent failure before it occurs. Limited evidence, however, is available that specifically addresses the literacy learning needs of students with significant disabilities, particularly those with accompanying complex communication needs (for a complete review see Erickson, Koppenhaver, & Yoder, 1994; Koppenhaver, Spadorcia, & Harrison, 1998).

Research supports the fact that students with significant disabilities can learn to read, at least words in isolation. Students with a wide range of cognitive impairments have learned to read single words in a variety of contexts, under a variety of conditions (for a complete review see e.g., Browder & Xin, 1998; Erickson et al., 1994; Katims, 2000). For example, in a series of studies, students with moderate cognitive impairments demonstrated the ability to: (a) learn words and perform an action associated with each word (Brown & Perlmutter, 1971); (b) read words presented with a picture that was faded over time (Dorry, 1976; Dorry & Zeaman, 1973, 1975); and (c) read words paired with sign language (Sensenig, Mazeika, & Topf,

1989). In addition, research has shown that students with severe cognitive impairments can learn to read words as well in small groups as they can working individually with their teacher (Favell, Favell, & McGamsey, 1978), and that they can learn words incidentally working in small groups (Farmer, Gast, Wolery, & Winterling, 1991) when the small group instruction is systematic (Fabry, Mayhew, & Hanson, 1984).

Furthermore, a few published case studies suggest that students with significant disabilities can learn higher level reading and writing skills when word instruction is a part of a more comprehensive, systematic instructional program provided by a highly skilled educational team with intensive support from consultants with expertise in literacy and severe disabilities (e.g., Erickson, Koppenhaver, Yoder & Nance, 1997; Katims, 1991; Gipe, Duffy, & Richards, 1993). One published study involving a comprehensive, year-long literacy intervention suggests that students with moderate cognitive impairments can develop word identification and reading comprehension strategies, metalinguistic understandings (e.g., phonemic awareness), and confidence in their ability to decode unfamiliar words (Hedrick, Katims, & Carr, 1999).

A New Literacy and Communication Program

In 2004, AbleNet, Inc. published a new literacy and communication instructional program called, *MEville to WEville*. Developed to meet the instructional needs of students in grades K-6 with the most significant multiple disabilities, the program also addresses the needs of the students with moderate cognitive impairments who are often in the same classes. The entire *MEville to WEville* program is intended to teach students about themselves and their place in their family and the larger community. The themes of the two units

studied in the investigation described here were: “I have feelings” and “I’m an individual.” Within each unit of *MEville to WEville*, activities are divided across categories described in the following sections.

Language development lessons. The lessons in this category include Learning New Songs, Learning New Words, and The Word Wall. The focus of these lessons is teaching new words and developing students’ expressive language skills through singing songs, chanting words, saying words, and using words in oral and written phrases and sentences.

Reading and listening comprehension lessons. The lessons in this category include Vocabulary Comprehension and Story Comprehension. The focus of these lessons is providing opportunities to read, experience, listen to, and respond to a variety of books and stories.

Writing development lessons. The Writing Activity lessons in this category provide students with opportunities to express themselves in writing and to develop their writing skills.

Reading development lessons. The Reading Activity lessons in this category provide students with opportunities to read and reread (independently, with help from an adult or peer, and/or with the support of assistive technology) the books they created in the Writing Activities and the books they have heard in the Story Comprehension lessons.

Literacy experience lessons. The lessons in this category include Literacy Activities and Literacy Projects. These lessons are extensions of the literacy learning activities in each of the other categories and encourage students to use the skills they are learning across engaging games and activities (e.g., scavenger hunts, program-specific board games, and creating puppets).

Table 1
Summary of Participants

Class 1 Mrs. B (2 assistants)	Class 2 Mrs. C (2 assistants)	Class 3 Mrs. P (3 assistants)
<ul style="list-style-type: none"> • 9 students (5 girls, 4 boys) • Ages 5 – 7 • 3 white, 1 Hispanic, 4 African American • Moderate-Severe Intellectual Disabilities • 2 use wheelchairs • 2 with complex communication needs 	<ul style="list-style-type: none"> • 6 students (3 girls, 3 boys) • Ages 5 – 7 • 4 white, 2 African American • Severe-Profound Intellectual Disabilities • 3 use wheelchairs • 6 with complex communication needs 	<ul style="list-style-type: none"> • 9 students (3 girls, 6 boys) • Ages 8-12 • 3 white, 1 Hispanic, 4 African American • Severe-Profound Intellectual Disabilities • 4 use wheelchairs • 8 with complex communication needs

The instructional approach employed in *MEville to WEville* deviates from the repeated trials, mastery-focused instruction that dominates the research literature regarding literacy instruction for students with cognitive impairments (see, Browder & Xin, 1998; Erickson et al., 1994). *MEville to WEville* supports integrated literacy and communication learning through a series of divergent activities that offer the opportunity for students to learn skills through repetition with variety. Rather than repeating the same skill until it is learned to a predetermined level of mastery, students are taught to apply skills across contexts. Skills reappear cyclically with increased expectations for independent use of the skills with each re-introduction. Over the course of the nine parts that comprise the three units, students have repeated exposure to skills in varied contexts, for varied purposes. The intended result is increased comprehension and the ability to apply the new skills when and where appropriate.

Methods

This paper describes the impact that *MEville to WEville* had on the literacy and

communication skills of 23 students with significant cognitive impairments.

Research Questions

The purposes of the study were to determine: (a) what factors contributed to the positive outcomes and benefits of *MEville to WEville*, and (b) how *MEville to WEville* influenced the literacy skills and understandings of the students.

Participants

Three teachers and 23 students from three self-contained special education classrooms participated in the study. One of the three teachers had participated in general literacy training offered by the Center for Literacy and Disability Studies and indicated an interest in participating in future research. When approached about participating in this study, she facilitated the process of recruiting the other teachers in her school and securing permission from the district office. All three teachers are assigned to classrooms designated as multi-categorical handicapped (MCH). The children placed in these classrooms all have documented cognitive impairments and meet

the criteria for an educational label of multihandicapped defined by the school system as follows, “pervasive primary disability that is cognitive and/or behavioral in combination with one or more other disabilities the combination of which causes such developmental and educational problems that the child cannot be accommodated in special programs that primarily serve one area of disability.”

All of the students assigned to the three teachers were recruited to participate in the study and all parents provided written consent. The students ranged in age from 5 to 12 years and represented a variety of ethnic backgrounds. The students were all identified as having severe to profound cognitive impairments and more than half did not use speech to communicate. More detailed demographic information about the participants is provided in Table 1. In addition to the 3 teachers and 23 students, 8 classroom assistants, 2 speech-language pathologists, one occupational therapist, and 1 guidance counselor participated in the study.

Setting

The classrooms were located in an elementary school in the Piedmont region of North Carolina. The school had approximately 500 students, with 18.4% classified as children with disabilities, and 69.8% of the school population qualifying for free/reduced lunch. In addition, 28% of the students in the school spoke English as their second language. Both the school principal and assistant principal expressed their belief that the MCH classes were an important part of their school, stopped in the classrooms regularly to check in with the teachers and children, committed school funds to support the purchase of technologies and materials for the classes, and were generally viewed as highly supportive of the special education staff in the school.

Procedure

The total project was carried out over a 12-week period. In the two weeks before and after implementation, pre- and post-tests were conducted as were teacher interviews, ecological classroom inventories, and observations of literacy instruction. During the eight weeks of implementation, at least one observation was conducted in each class, each week. Student work samples, communication boards, teacher lessons, and email correspondence with teachers are examples of documents that were collected during the implementation.

There was not a specific implementation protocol for the intervention. Teachers were provided with a prepublication version of the first part of *MEville to WEville* and were instructed to use it as they deemed appropriate for their classes. Teachers agreed to use *MEville to WEville* every day for at least 30 minutes, but no other constraints or controls were put in place for this exploratory investigation.

The procedures for completing the pre- and post-tests were quite informal as the students in the classrooms presented with very significant disabilities and many had never been formally assessed, certainly not by an unfamiliar other. All of the assessments were created to allow for a pointing response. A single researcher assessed the students who could point with a finger or provide an obvious eye-pointing response. Two researchers worked together to assess students who could not provide an obvious pointing response. In some cases, members of the classroom staff were asked to support our efforts to get as much information as possible from each student. Nevertheless, in many cases there were subtests we simply could not complete.

Participant Observation

Five researchers (one faculty member, three doctoral students and one master's student) from a large research university approximately 30 miles from the school conducted weekly observations of the implementation of the *MEville to WEville* program in each of the three classrooms. The primary goal of these observations was to collect data regarding classroom interactions and the teachers' implementation of the program and use of technologies to support student learning, communication, and interaction. One observation was completed in each of the classrooms pre- and post-implementation. In addition, 31 (35 hr and 47 min) observations were completed during implementation. Of these, 8 observations (5 hr and 19 min) were completed in Ms. C's classroom, 9 (13 hr and 1 min) in Ms. B's classroom, and 14 (17 hr and 17 min) in Ms. P's classroom. The differences in the total number of observations in each class were due to two primary factors: the availability of observers and the time spent on *MEville to WEville* in each class. When possible, after completing a scheduled observation, observers would check with other teachers to see if they had a *MEville to WEville* lesson coming up. If another teacher indicated that she was going to begin a lesson in the time frame available to the observer, an unscheduled observation was completed.

Documents

During implementation, a variety of documents that were relevant to the literacy instruction in the classroom were collected. These included student work samples and communication boards, as well as teacher lesson plans, activity logs, and email correspondence.

Student Measures

The student measures completed at pretest and posttest are described in the following section.

Writing. The original plan was for the students to produce a writing sample using the writing tool (e.g., pencil, keyboard) that was most physically accessible to them. Unfortunately, the students with physical impairments did not have access to alternative writing tools. Most often these students used a pencil with considerable hand over hand support from their teacher or a teaching assistant. Thus, independent writing samples were obtained using pencil, pens, and markers for all students since this was the most familiar tool.

Letter identification. Each student was presented with an array of alphabet letters and was asked to point to a letter spoken by the researcher. This task was completed for upper case and lower case letters separately. All students who were able to use their finger to point to an array of 6 items were asked to identify the letter from a group of 6. There were 7 children who were unable to use their finger to point. We attempted to have these children eye-point to select from an array of 6, then 3, and finally 2 choices. We acknowledge the dramatic difference in the cognitive challenge presented with a choice of 2 and an array of 6 and support the interpretation that the children's ability to choose was related equally to their limited knowledge of letters and the physical challenge they encountered when trying to communicate a choice.

Concepts about print. Using an approach based on Clay's (1993) concepts about print assessment, each student engaged in an interaction with a modified book with the data collector. During the interaction, the student's knowledge of the orientation of the book, directionality, orientation of pictures and text within the book, and concept of word, letter,

and one-to-one match between spoken and written words was assessed.

Phonological awareness. Sets of phonological awareness tasks that do not require speech production were administered (Howell, Erickson, Stanger, Wheaton, 2000; Erickson & Hanser, 2002). Students indicated their response by pointing to a picture presented in an array of 3. The tasks included: initial consonant similarity (e.g., Which word has the same beginning sound as 'milk?'), rhyme recognition (e.g., Which word rhymes with 'hat?'), and phoneme blending (e.g., Which word do you get when you put these sounds together, /c/ /a/ /t/).

Analysis

All quantitative data generated from the pre- and post-tests were analyzed using simple descriptive statistics. A constant comparative method was employed to analyze the qualitative data. An inductive process of culling the data to identify categories and themes followed by the careful construction of codes and reanalysis of the data was employed (Bogden & Biklen, 1992; Huberman & Miles, 1994; Merriam, 1998). The specific codes that led to the results reported here include: communication response, communication initiation, assistive technology use, peer-to-peer interaction, social responsiveness, and composition of text (with and without dictation).

Outcomes and Benefits

Influence on Informal Assessment of Literacy Skills and Understandings of the Students

Analysis of the pre- and post-tests administered to the students revealed no statistically significant differences on any of the areas assessed. There were however, very encouraging practical differences between pretest and posttest for a group of students

who typically would not be expected to demonstrate progress on the generalized application of skills taught during an 8-week period. Table 2 illustrates that overall scores on the posttest were higher than scores on the pretest, with some students across all ability levels (e.g., ranging from those who could not respond by making a choice from two items at pretest to those who were able to identify a significant number of letters) demonstrating progress. The data is grouped by classroom for ease of presentation and use by the reader, not because the classroom was the unit of analysis in this investigation.

Note that the percentage of students who could attempt the individual assessments increased as much as 12% from pretest to posttest, and only one mean score was lower at posttest than pretest (Initial Consonant Same decreased by 4%). At the time of the pretest, the most difficult task was the phoneme blending task with only 12% of the students able to attempt it. By posttest, 29% of the students were able to attempt the task and the average score was 150% higher. The easiest task at pretest was the writing task with 83% of the students attempting to write. By posttest 87% of the students attempted to write (recall that this was independent writing not hand-over-hand).

Outcomes Noted During Observations

In addition to the outcomes noted through the informal assessment measures, other positive outcomes were noted through the participant observations. For example, students began initiating more communication and interaction with adults and peers. In other words, they directed a communication attempt to a teacher or a peer without prompting or in response to a question or comment. Prior to implementing *MEville to WEville*, the students were frequently passive participants. Our pre-implementation observations suggest that very few students

initiated interactions. Instead, they responded only when asked a direct question or were otherwise prompted to respond. Most students did not appear to be actively engaged and/or eager to communicate. When technology was present during the pre-

implementation phase, students waited for the device to appear in front of them or for a direct prompt from an adult before they used the device. By the end of the project, more students were seeking out and using the devices without prompting and all students

Table 2
Pre-test and Post-test Summary Information

Literacy Tasks	% Students Attempting Pre-test	% Students Attempting Post-tests	Pre-Post-test % Change	Pre-test <i>M</i> (<i>SD</i>)	Post-test <i>M</i> (<i>SD</i>)	Pre-Post-test <i>M</i> Difference
Writing						
All Students	83	87	+4	1.54 (1.18)	1.96 (1.60)	+.42
Class 1	67	83	16	.67 (.52)	.67 (.52)	0
Class 2	89	100	11	2.22 (1.20)	2.78 (1.30)	.56
Class 3	89	78	-11	1.44 (1.13)	2.00 (1.87)	.56
Letter Id:						
Upper Case All						
Students	75	83	+8	6.21 (8.24)	7.42 (9.09)	+1.21
Class 1	33	50	17	.33 (.52)	.83 (.98)	.50
Class 2	67	100	33	8.00 (7.60)	10.78 (8.94)	2.78
Class 3	78	89	11	8.33 (10.14)	8.44 (10.51)	.11
Letter Id:						
Lower Case						
All Students	25	37	+12	3.88 (8.16)	5.96 (9.48)	+2.08
Class 1	0	0	0	0 (0)	0 (0)	0
Class 2	33	78	45	4.22 (6.80)	10.22 (9.19)	6.00
Class 3	33	22	-11	6.11 (11.32)	5.67 (11.25)	-.44
Print Concepts						
All Students	50	62	+12	1.79 (3.11)	2.88 (3.71)	+1.09
Class 1	0	33	33	0 (0)	.33 (.52)	.33
Class 2	78	89	11	2.33 (2.60)	4.78 (3.23)	2.45
Class 3	56	56	0	2.44 (4.22)	2.67 (4.47)	.23
Initial						
Consonant						
All Students	21	29	+8	.96 (2.14)	.92 (1.67)	-.04
Class 1	0	0	0	0 (0)	0 (0)	0
Class 2	32	44	12	1.22 (2.73)	1.56 (2.13)	.34
Class 3	33	33	0	1.33 (2.18)	.89 (1.54)	-.44
Rhyme						
Recognition						
All Students	21	21	0	1.00 (2.15)	1.04 (2.26)	+.04
Class 1	0	0	0	0 (0)	0 (0)	0
Class 2	22	22	0	1.44 (2.88)	1.56 (3.13)	.12
Class 3	33	33	0	1.22 (1.99)	1.22 (1.92)	0
Phoneme						
Blending						
All Students	12	29	+17	.33 (1.01)	.83 (1.55)	+.50
Class 1	0	0	0	0 (0)	0 (0)	0
Class 2	11	44	33	.44 (1.33)	1.44 (1.88)	1.00
Class 3	22	33	11	.44 (1.01)	.78 (1.56)	.34

demonstrated generally increased levels of engagement.

Activities in *MEville to WEville* also promoted the development of social relationships with their peers in special and general education. One activity that appeared to be particularly successful involved the students using switch-adapted cameras and scripted conversations programmed on a sequential message communication device to take photos of and interact with people around the school. These scripted conversations enabled the students to interact without adult support, and they promoted sustained, successful interactions between the research participants and peers throughout the school. The teachers realized the benefits of these scripted conversations, and created many more scripts for the students to use across a variety of circumstances, for example, when the students went to buddy reading in the general education classrooms or when they responded to questions about their project in the school science fair.

Discussion

The analysis of the classroom observation data suggests several factors that likely contributed to the positive student outcomes that were directly observed and measures. For example, *MEville to WEville* supported interactions and collaboration between home and school for many of the students. The program provides teachers with notes to send home. The notes (“homework sheets” as the teachers called them) encouraged families to share important information about their child with their classrooms and to send in photos and materials related to upcoming lessons. As these notes began coming back in, one teacher noted, “Children are actually bringing back some of their homework for this unit and there is an overall increase in parental interest. Look at the homework sheets for each child on the chalkboard”. While the

children in the study lacked the ability to direct their parents to read, complete, or return the notes, they certainly benefited from them. Their teachers were able to relate the new information they were learning at school to the information provided by their parents. Furthermore, access to the personally meaningful materials and photos their parents sent to school likely increased interest and understanding during the lessons.

Integrating Assistive Technologies

For the teachers, implementing the program meant that they did not have to spend large amounts of time creating their own lessons and materials. Instead, they were able to focus their energy on addressing the assistive technology needs of their students. One teacher in particular had previous experience using the technologies, but prior to *MEville to WEville* had found it very difficult to find the time to integrate the technology into the classroom routine. About half way through the project she shared, “I have also been able to spend a little more time on the cool stuff - like the Book Worm, switch [activated] digital camera, preparing communication boards, and preparing IntelliTools [IntelliPics® Studio and IntelliTalk® II by IntelliTools, Inc.] and am excited about using this assistive technology more and more over the next few months”. The observed integration of assistive technologies into a variety of lessons and interactions is also likely to have contributed to the positive outcomes demonstrated by the students.

Conclusion

During a time when we are all being pushed to provide instruction that is scientifically supported, empirical evidence demonstrating the positive outcomes of a comprehensive instructional program for students with the most significant cognitive impairments should be embraced. Caution must be taken in

interpreting the results of this study as the gains are modest at best, but they are gains that have a practical significance for a group of student participants who have had as many as 9 years of school with little to no literacy learning success. In fact, the majority of the student participants experience cognitive and communication impairments that are so complex that they have had limited success with learning even basic communication and interaction skills. Any program that yields measurable positive outcomes with this group of 23 very hard-to-teach students is a program worthy of further implementation and investigation.

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