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Mental Retardation

Christine: A Case Study of Literacy Acquisition by an Adult With Developmental Disabilities

Monica Gordon Pershey and Thomas W. Gilbert

Abstract

Christine, an adult with developmental disabilities, had no history of education. A nonreader, she began to receive literacy tutoring at age 35. In 7 years she was educated through an eclectic approach that primarily entailed echo reading of brief passages, such as sentences and stories. She moved from holistic recognition of print to an ability to respond to instruction about analysis of some features of print, thereby gaining insights into decoding and spelling. This approach contrasts with literacy instruction that teaches adults with developmental disabilities to memorize small units of decontextualized print (letter–sound correspondences or survival words) before reading full text. Implications for facilitating literacy in adults with developmental disabilities by using contextually supported reading instruction are explored.

Christine was born in 1956. Shortly after her birth, her doctors found that she had a severe heart defect. Until the age of 6, she was hospitalized frequently. Within the first few years of her life, it was clear that multiple developmental delays were present. When Christine reached school age, school officials told her parents to keep her at home—the school had no place for her, they had no one to teach her, and there was nothing that they could teach her. Her parents, immigrants from Greece, were compliant. Hard-working people, content and secure within their community, these parents taught their child to take care of her own physical needs, interact properly with other people, and contribute to home and family life. When Christine reached adulthood, she went to work at a sheltered workshop for people with developmental disabilities, where she was trained to perform packing and light assembly duties. Christine is known to her family, friends, and the habilitation supervisors at the workshop to be a woman with a pleasant disposition, a friendly nature, a variety of recreational interests, and the ability to stay with a task until its completion. Among those who know her, Christine is recognized to have the desire to learn new things and the determination to master new skills. People around her notice that she is sensitive to what others think and feel.

Our purpose in presenting this retrospective case study is to discuss the progress in literacy acquisition of one woman with developmental disabilities over the course of 7 years of instruction and to speculate whether conclusions can be drawn about contextually supported reading instruction for adults with developmental disabilities.

The first of three research objectives was to provide a description of the degree to which an adult with developmental disabilities who had no previous literacy skill can acquire some reading and writing capabilities. Second, in addition to presenting a report of Christine's progress, we critiqued the instructional approaches used to help develop Christine's literacy capabilities. Importantly, the approaches used to teach her are in contrast with much of the literature on facilitating literacy in adults with developmental disabilities. Commonly, instructional practices are related to teaching functional skills for daily living, for example, word recognition (Barudin & Hourcade, 1990; Erickson, Koppenhaver, & Yoder, 1994; Giordano, 1996; Katims, 2000; Lalli & Browder, 1993). Typically, adults with developmental disabilities are taught to memorize small units of decontextualized print (letter–sound correspondences or survival words such as *MEN*, *WALK*, *EXIT*). In teaching Christine and

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observing how she learns, however, we witnessed her reading abilities develop initially and primarily from exposure to authentic, connected texts, such as brief stories or sentence-length passages (e.g., greeting card verses and the lines of a prayer).

Our third objective was to examine how increased interaction with and use of print has had an impact upon Christine's quality of life. This is the issue of social validation of the importance of educational procedures and outcomes. An intervention is socially valid when learners perceive that the changes that have ensued are of practical value (Storey & Horner, 1991). Growth in literacy abilities has had several implications for Christine that will be described. A final objective was to generate hypotheses for future study of the development of literacy in adults with developmental disabilities.

To place Christine's case in context, we must consider whether there is information on teaching adults with developmental disabilities using a combined whole–to–part and part–to–whole approach. Is there documentation pertaining to engaging adults with developmental disabilities in meaningful reading of connected text? If this has occurred, what supports and strategies are used? What are the characteristics of individuals with developmental disabilities who benefit from these practices? How do their gains enhance their overall quality of life?

As Yin (1989) suggested, some investigators think that the purpose of a literature review is to learn what is known on a topic and find some answers. Others think that reading previous research will help investigators form more insightful or specific questions about a topic. In this case, finding answers in the existing literature was almost impossible, but finding questions was very easy.

We posed several exploratory questions about approaches to literacy instruction for the developmentally disabled population. Are people with developmental disabilities able to acquire literacy abilities? If so, how can they be successfully taught? Can a combination of whole–to–part and part–to–whole approaches be beneficial, as may be the case with typically developing learners (Vacca, Vacca, & Gove, 1995)? How does this combined approach supplement the discrete skills interventions generally found in the literature on teaching persons with developmental disabilities? (A further question, which is beyond the scope of this study, remains: If this combined approach is successful, how can it be made practical, efficient, and serviceable so that it can be used by caregivers [i.e., group home and institutional workers who must achieve functional, measurable outcomes that they can document on service plan charts]?)

A comprehensive report on access to literacy instruction for persons with developmental disabilities, autism, and cerebral palsy was written by Erickson, Koppenhaver, and Yoder (1994). They argued against the belief that skills mastery is a prerequisite to access to books and other literacy materials. Writing experiences, interactions with literate people in discussions about texts, shared literacy events, self-selection of texts, and many other literacy behaviors can precede skills mastery. Emergent literacy, no matter what the age of the learner, is viewed as a social, psychological, cognitive, and language-based process that proceeds inductively when used in meaningful contexts. Sequential learning via direct instruction may be a part of the literacy-acquisition process. However, the lack of progress that individuals with developmental disabilities may experience in a skills-instruction paradigm has often resulted in their exclusion from literacy experiences that involve access to authentic text (Kliewer & Landis, 1999). Although the initial presentation of discrete skills may benefit some learners with developmental disabilities and a program of skills instruction need not exclude exposure to authentic, connected text, it is worthwhile to contrast skills-based instruction with an approach where initial presentation of authentic text is followed by contextually relevant instruction in reading skills.

There are a few articles in which authors have reported on the use of combined whole–to–part and part–to–whole instruction with adults who have developmental disabilities, although documentation of use of an integrated approach with children dates back to Maria Montessori's work in the 1800s (see Katims, 2000, for mention of several approaches and research findings). In a university-sponsored program in Australia, researchers used an eclectic, predominantly whole–to–part approach to teach this population. However, they noted that a need for planned curricula, assessment tools, alternative format materials (such as easy readers featuring stories of interest to adults), computer software, and teacher education and professional development opportunities remains (van Kraayenoord, 1994). Gillette (1991) utilized echo reading, repeated oral readings, assisted reading, and content study strategies to teach a group of adults with developmental disabilities in a short-term intervention program.

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Gains were seen in reading fluency, vocabulary, book orientation, and interest in and enjoyment of reading.

Adults with developmental disabilities who have difficulty mastering literacy subskills may be prevented from gaining access to intellectually stimulating, meaningful, and pleasurable texts and using print as a means of communication. Some investigators have revealed that persons with developmental disabilities can make progress toward gathering meaning from text when they are taught to read words in context (Katims, 2000). These outcomes realize Vygotsky's (1978) social constructivist assertion that learners might acquire literacy more readily if meaningful, shared reading is introduced first and supports the subsequent recognition and understanding of printed symbols.

Mulvaney, Fitzhugh, and Wagner (1980) utilized peer tutoring among the residents of a state facility for adults with developmental disabilities. A 54-year-old man whose IQ was 62 taught printing and spelling for an 8-week period to a 48-year-old woman with an IQ of 57. The authors partially attributed positive outcomes to the "natural... normalized, free-flowing social interaction" (p. 524) that took place. Two factors that seemed to contribute to productive literacy instruction were that peer interactions were motivating for the learners and that the learners chose the content of the tutorials.

Story-reading followed by introduction of the uppercase alphabet through multisensory input was employed successfully with a few adults (Fuller, 1991). Learners referred to letters by their usual phoneme (the sound they symbolize) rather than by their letter names. Simple stories using short sentences (noun plus action verb) provided idea units that were comprehensible to the learners. Skills acquisition followed from discussion of story content, for example, cause and effect relations, dichotomous ideas, etc. Fuller (1991) hypothesized that discussion of text and story retelling were the supports that made decoding possible.

It appears that individuals with developmental disabilities who are working on enhancing their literacy abilities benefit by possessing certain attributes to some degree (however, one should not assume that a lack of any of these traits would preclude literacy acquisition). First, an attitude of independence and determination and a desire to learn are a plus (Gipe, Duffy, & Richards, 1993; Moutray, 1997). These characteristics are contrary to a perception of self as not self-determining, which is common among adults with developmental disabilities (Wehmeyer & Metzler, 1995) and which may be a by-product of living the routinized existence that is customary in residential facilities (Sturm & Koppenhaver, 2000). Individuals with developmental disabilities who describe their paths toward literacy often discuss how their own self-advocacy and determination were critical to the process (Bennett, Jaccoma, & Weinstein, 1997; Marcaccio, 1991; Sturm & Koppenhaver, 2000).

Second, cognitive and experiential background knowledge are important. This may include, for example, awareness of the symbolic nature of reading and writing in daily life (e.g., one writes numbers to tell quantity) as well as procedural knowledge about using literacy practices (e.g., one writes numbers to tell quantity; on a check, these numbers represent a quantity of money; a check is written then taken to the bank in exchange for money; money is used to obtain desired goods).

Third, adults with developmental disabilities who possess metacognitive abilities are also at an advantage for acquiring literacy capabilities. *Metacognition* (i.e., thinking about thinking) enhances active participation in learning and brings control to the learning situation. Competencies that allow for understanding text, such as predicting, inferring, and being aware of an author's purpose, to name a few, are relevant metacognitive acts. Fourth, representational capabilities, such as attending to new information, selectively organizing it mentally, and meaningfully interpreting it, allow individuals to interact with print. Fifth, executive reasoning allows learners to behave in a planned manner, differentiate task demands, apply a variety of reading and learning strategies, and self-monitor and self-evaluate their comprehension. Maintaining and generalizing learning strategies, two of the most significant problems that many adults with developmental disabilities have, can be addressed in routines that are directly taught but may remain areas of weakness for a number of these adults (Barudin & Hourcade, 1990; Fuller, 1991; Wong, 1986).

Although data on the language capabilities that adults with developmental disabilities would appear to need in order to learn to read are not available, it seems from testing and observation of Christine's language behaviors that language abilities typical of the 3-year developmental range are necessary. Adults whose cognitive–linguistic development is comparable to a preschool level of func-

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tioning are often considered to be moderately to severely mentally retarded (D. Smith & Luckasson, 1995).

In 1995, in two *Speaking of Equality* monographs, The Roeher Institute, a Canadian research and advocacy organization for persons with mental disabilities, published a collection of case sketches of persons with intellectual limitations who sought literacy instruction. The common experience of these individuals may be summarized as exclusion from the mainstream with, at times, concomitant segregation, institutionalization, presumption of illness, discrimination, poverty, loneliness, and vulnerability to abuse and violence. Access to literacy is viewed as potentially empowering. Independence, competence, employability, and social relationships were goals reported by the persons profiled in the monographs. Individuals with developmental disabilities may "inhabit landscapes that are marginalized and pathologized, surrounded by impermeable label borders" (P. Smith, 1999, p. 117). Literacy is desired in large part because it may bring inclusion within the social mainstream. Ecological analysis of a learner's environment and functional needs may play a part in designing the individualized content and nature of literacy instruction for an adult with developmental disabilities (Barudin & Hourcade, 1990; Feuerstein, Rand, & Hoffman, 1979). (For additional reading on issues of instructional equity, literacy access, self-determination, and quality of life, see Poplin, 1988; Raphael, Brown, Renwick, & Rootman, 1996; P. Smith, 1999; and Trent, Artiles, & Englert, 1998.)

Method

A retrospective, structured, clinical case study was undertaken to address three research questions: (a) To what degree can an adult with developmental disabilities who had no previous literacy skill acquire some reading and writing capabilities? (b) By what methods of instruction might this occur? (c) How might increased interaction with and use of print impact upon quality of life for an adult with developmental disabilities? A primarily qualitative approach was chosen because, as Miles and Huberman (1984) stated, "with qualitative data one can preserve chronological flow, assess local causality, and derive fruitful explanations" (p. 15). In the present study we attempted to capture the flow of how Christine acquired skill in a recursive rather than linear fashion, document what appears to have induced gains to occur, and explain the effects of acquisition of emergent but incomplete literacy capacities on Christine's life. Miles and Huberman (1984) maintained that qualitative studies also have the advantage of being able to explore social processes, "ephemeral, fluid phenomena with no existence independent of social actors' ways of construing and describing them" (p. 16). Qualitative interpretation of behavior in context reflects not only how people behave but also the settings they are in, the events as they occur and as the participants interpret them, and the various interactional processes taking place. As we will show, the events that occurred reflect situated cognition and demonstrate that literacy is a social process that is in part dependent upon intersubjectivity (see Moll, 1990).

Participants

Although Christine was not introduced to reading and writing by family members or by habilitation workers, she was keenly observant and thinking about print's many meanings. One day when she was about 35 years old, Christine spoke to a habilitation supervisor at her workplace. She told the supervisor that she wanted to learn to read and write. She needed this, she said, so that she could always live in her own home and would never need to live in a group home or institutional facility. She was sure that she could not be on her own if she needed to someday if she could not read and write.

The habilitation supervisor introduced Christine to Tom, the second author, who is a clinician at a group home for adults with developmental disabilities and who had been investigating literacy education in this population. Tom and Christine began to work together on developing Christine's reading and writing abilities.

Tom's initial observations of Christine yielded the following information. Christine spoke English in a limited fashion, supplementing her speech with some sign language acquired at the workshop as well as some Greek, the language that her parents spoke to her during her childhood. Christine's speech was characterized by numerous sound articulation errors, most likely caused by poor motor coordination of the muscles that control the tongue, lips, and jaw. Her repertoire of speech sounds was severely restricted; she was able to produce only about 25% of the speech sounds of English and no more in Greek. Her speech was characterized by excess and equal stress and volume patterns, so she did not sound

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melodious but rather spoke with a squawking quality. Even so, her affect and intention were conveyed by the tone of her voice (e.g., questioning, surprised, angry). She spoke in short, simple sentences and participated in conversation, but she understood only a portion of what was said to her. She relied on well-ingrained patterns of socially appropriate interchange: taking turns speaking, nodding, smiling. She was a bit passive and did not always ask for clarification when she did not understand something, but her facial expressions at times revealed her lack of comprehension.

Home life for Christine was generally stable, but, inevitably, as for almost all adults, changes did occur. Her father passed away; her mother was debilitated for several years by a serious illness and ultimately passed on, too. Although her older sister remained in the family home, she pursued a challenging and demanding career. Christine, too, went to work each day and lived a "9 to 5" routine. She took care of many of her personal needs independently but relied on her immediate and extended family and family friends to help her negotiate in the world.

Literacy activities were commonplace in Christine's home. Newspapers, magazines, the Bible, cookbooks, checking accounts, correspondence, etc., were used by all members of Christine's family. Christine observed these literacy behaviors but never read. She was not read to, with the exception of listening during church services. At some point while growing up, she learned to write her first name.

Tom administered the Slosson Reading Test (Slosson, 1963) on which Christine may have scored two correct responses, perhaps recognizing the words *is* and *up*. Her IQ throughout her life was reported as being in the low 40s. Speech and language testing conducted at a university clinic during Christine's first year of tutoring placed her skills within the preschool range.

Procedure

Tom devised an eclectic approach that primarily entailed reading in unison, echo reading, language-experience stories (stories dictated by Christine to Tom for him to scribe) (Stauffer, 1970), recognizing letters and words on sight, writing by copying model sentences, writing to dictation, and using invented writing for communicative purposes (e.g., notes, greeting cards). A few years later Tom contacted the first author, a language and literacy researcher, to help him assess Christine and document and analyze her case.

Artifacts and documentation. Tom, as Christine's tutor for over 7 years, was a participant–observer in this study. He carefully collected volumes of records of Christine's progress, including, but not limited to, progress notes, lesson plans, audio and video tapes that document progress in reading aloud, worksheets, writing to dictation, samples of texts that she copied word by word, language-experience stories (Stauffer, 1970), and samples of writings done with Tom or out of his presence, such as notes and greeting cards. (See Appendices A and B for samples of Christine's work.) Data also include Tom's writing conventionally near Christine's invented writing to ensure future comprehensibility, notes on informal meetings with Christine's family and habilitation supervisors, and a cross-reference guide to different work samples by date, teaching strategy used, materials used, or language mode (reading, writing). Tom has kept counts of various phenomena, such as number right on a vocabulary concept worksheet, competency in letter formation, or use of spelling patterns in short words while writing. As a progress assessment, a series of convergent, structured tasks was administered during the 7th year of their teaching–learning partnership (results appear in Table 1).

Findings

Teaching Approaches and Observations of Performance in Context

Given the relatively little information available on teaching literacy skills to persons with developmental disabilities (Erickson et al., 1994; Giordano, 1996; Katims, 2000; van Kraayenoord, 1994), Tom designed methods of instruction that he presumed would be suitable, but he did so without benefit of documentation of efficacy. Many of the teaching approaches are practices that Tom tried for the first time in his 30-year experience with adults who have developmental disabilities, although the approaches resemble familiar emergent literacy and language therapy practices. When Christine asked to begin literacy instruction, Tom acted upon the premise that young children first "read" by recognizing logos and familiar signs and words (Harste, Woodward, & Burke, 1984). They move from memorizing familiar words and texts to developing insights about the discrete features of written language (Dyson, 1984).

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Table 1 Results for Christine: Assessment Protocol

Task No.	Performance summary
1. Oral language sample, articulation sample	Preschool language skills, severely compromised articulation with reduced phonological repertoire
2. IQ	Moderate mental retardation: IQ measured three times in last decade as 41, 42, and 55
Cognitive structures	Preoperational
3. Slosson Reading Test	Grade equivalent 1.5
Reading isolated words (additional informal assessment of primer level words)	46/120 words correct Additional 24 words correct after being cued to spell the words aloud and map sounds onto letters
4. Photo story dictation, 2 trials, pictures of sports and family dinner	Unable to produce enough details about the pictures to create a simple story
5. Writing to dictation	25/26 uppercase letters in alphabetical order 25/26 uppercase letters in random order
Words (from reading isolated words subtest (Slosson)	9/40 correct; additional 8 close approximations using semiphonetic and phonetic spelling (Gentry, 1982)
Sentences (basic vocabulary)	0/20 completely correct; several correct words within sentences, done slowly, word by word
6. Concepts about print	Known concepts: question mark, where to start reading, directionality of left to right and top to bottom of page, whole word, whole sentence, beginning of sentence, end of sentence, where paragraph begins, last word of story, title
7. Copying printed passage (10 sentences of primer level text)	About 50% accuracy
8. Scanning	Located 7/7 different embedded words
9. Matching words	11/14 and 6/18 on two different sets of words
10. Matching sentences	5/5 correct
11. Letter-naming	25/26 correct (uppercase)
Letter–sound correspondences	13/26 correct given her typical speech patterns (uppercase)
12. Building word from a model	Independent using trial and error, 10/10 Spelled accurately after model was removed
13. Matching words to pictures	5/10
14. Spoken word to match first sound of a printed word	9/16 correct
15. Reading graded sentences	No grade level equivalent obtained 80 sentences read with mistakes present in every sentence (trials conducted on numerous occasions) Used rereading, context cues, and sounding out at decoding strategies
16. Reading graded passages	No grade level equivalent obtained 2 stories read with assistance
17. Comprehension questions	3/12 comprehension questions correct
18. Retelling	No narrative was produced; a few single words relating to each story were produced

(Table 1 continued)

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Table 1 Continued

Task No.	Performance summary
19. Predicting content	Noun concepts were predicted using one-word utterances No fluent expression of possible story lines
20. Pseudowords	Confused; testing discontinued
21. Pressure writing	20 words written in 3 minutes (4 misspelled) (8 proper names, 5 nouns, 4 pronouns, 1 article, 2 prepositions)
22. Phonemic awareness	Auditory recognition of 7/15 rhymes Unable to reproduce beginning, middle, or ending sounds in words Produced isolated sounds that generally did not coincide with her speech approximations of the sounds in question
23. Single word fill-in-the-blank assessed by pointing to words in an array	7/15 correct
Single word fill-in-the-blank assessed by filling in the blank	No subsequent tasks were administered
24. Reading directions	14/20 commissions correct
25. Visual memory for letters	Arrays of random letters were recalled–correct for arrays of 1, 2, 3, and 4 letters
26. Reading for meaning	10/10 synonyms 6/10 opposites

Pondering the notion "What does Christine really want?" Tom decided that Christine wanted to interact with full-length text. By asking to be taught to read, Christine had shown that she was aware that there is a "literacy club" (F. Smith, 1988) and that literacy is something that a member of the club can teach to a prospective member. Tom's initial objective would be to engage Christine in "real reading" as soon as possible. Tom reasoned that exposure to connected text would allow Christine to see first and foremost what reading is in actual practice and that skills preparation might delay her "club" membership and perhaps prove frustrating (Katims, 2000). From a Freirean point of view, Tom acknowledged that, for Christine, reading would be "an act of cognition" (Freire, 1983, p. 67) rather than an acceptance of a transfer of information from Tom.

Using the Laubach reading system (Laubach, Kirk, & Laubach, 1991), which is a series of short, simple stories followed by word study and comprehension questions, Tom and Christine began weekly 30-minute sessions, building to an hour then 2-hour sessions. Two-hour sessions seemed to help Christine retain most effectively from session to session, perhaps due to the concentrated effort and repetition that took place. "Real reading" consisted of using echo and impress methods of instruction (Ashby-Davis, 1981). First, Tom read a line, then Christine and Tom read the line together, then, at times (and with increasing frequency), Christine said the line alone. It took the pair 6 months to read and reread the first 12 lessons in the first book of the Laubach system. It took another 6 months to get through the five supplementary texts to the first book, then another 6 months to read the 12 lessons in Book 2 of the Laubach system. Tom's criteria for moving from one story to the next were based upon his observations during diagnostic teaching. Generally, he moved on when Christine was leading a portion of the echo reading, when she could find single words in text upon request, and/or when she expressed a desire to read something new and different.

Tom's supposition was that literacy could be taught through modeling, sharing, and engagement. Tom positioned himself as Christine's peer learner. He, however, was the more capable peer who led

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their reading and discussions about text. It is important to understand that peers work differently together than do teacher–student dyads (F. Smith, 1988). Tom began to slip out of the leadership role at times. Sometimes they read lines together; sometimes Christine read and Tom echoed her, either word-by-word or after a line was read. Listening to tapes of their reading, one hears a medley of voices: words said by Tom with Christine trailing, words said in unison, words said by Christine with Tom's baritone repeating her words, like a shadow following closely behind.

The flow of reading is the most important factor in this process. Fluency was presumed and achieved from the very beginning because Tom could read fluently and Christine, even if not always decoding, could repeat lines from short-term memory. As Tom dropped into the echo position, he could see that Christine recognized words on sight. Over time, Tom helped her expand her repertoire of forms recognized by teaching sight words and single letters. They worked at strengthening her comprehension of single words. She learned to categorize groups of related words, recognize singular and plural words, and other such tasks.

After Christine began to participate in cooperative reading of text, she was responsive to explicit instruction in sound–symbol correspondence, print features, and spelling. She began to be cognizant of reading as an act of both meaning making and code-breaking. Her progress revealed that (a) as a learner, Christine began to make choices about what she wanted to learn and expressed curiosity about sound–symbol correspondence, print features, and spelling and (b) diagnostic teaching and immediate responses to her questions were efficacious.

As Tom taught specific decoding skills and they explored letter–sound correspondence, this instruction coincided with Christine's experiments with writing to family and friends, a social behavior that she enjoyed. At first she dictated messages that other people wrote for her. Then she began drafting messages in invented writing and wanted other people to check them and dictate to her what corrections to write to perfect the document. Finally, at the time when her mother was very ill and the family's attentions were focused there, Christine began to have to rely on herself as writer and editor. Christine started sending messages to Tom and others that she had created by herself. These messages remained simple but useful communications, such as "Please come see me on Saturday." "I want to read a new book." "Tell Mary I want to go to camp." Her messages generally evidenced goal-directed thinking: She knew what to say and placed sentences in a reasonable sequence to make her point. She automatically shifted between high-level goals for message content and low-level goals for spelling, letter formation, and layout (Sturm & Koppenhaver, 2000). Her independent writing progressed from prephonemic use of letters to semiphonetic and phonetic spelling (Gentry, 1982). Her writing increasingly featured familiar words that she decoded readily. The samples in Appendices A and B are from her 6th year of instruction. To produce the samples found in Appendix A, Christine told a literate adult what she wanted to say and the adult spelled all of the words for her. The samples in Appendix B were spelled on her own. Even after she had acquired some independent spelling, she continued to ask for spelling assistance so that her messages could be more complex and more intelligible.

Christine's comprehension of text, however, was more difficult to assess. During the first few years of their collaboration, it was seldom clear whether Christine comprehended what they were reading. It was and remains difficult for her to answer questions about text content, other than yes/no questions, or to retell a story. Throughout their partnership, comprehension of text has been expressed by a variety of other behaviors that Christine has demonstrated. For example, while reading aloud, Christine will sometimes sign a word here and there in the text, seemingly saying words to herself. She has worked on many primary level worksheets that emphasize a range of skills, from comprehension of categorization of objects to changing a present tense verb to its past tense form. She can at times self-correct a reading miscue. She has participated in writing many language-experience stories with Tom where she uses words that have been used in their texts. Text comprehension has also been inferred from Christine's written language. Because she is able to produce paragraph length text that is comprehensible to readers, she comprehends paragraph-length information, if only that which she has produced herself.

Measurement of Progress

In the 7th year of their collaboration, as Christine's capabilities grew increasingly stable and her range of literacy behaviors became more diverse, it was possible to address the question of whether discrete literacy behaviors could be demonstrated in

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contexts that deviated from directed, supported instruction and practice and, thus, required generalization of learning. Based on an analysis of the artifacts that Tom collected, it became apparent that Christine was revealing complex behaviors related to language, phonology, comprehension, reasoning, memory, self-organization, and other areas. We drew upon measures found in Clay (1985, 1993), Gentry (1982), Roskos and Walker (1994), Scott and McCleary (1989), Silvaroli (1997), Stieglitz (1997), and Yopp (1992). We developed an assessment protocol (Appendix C) to measure the capabilities that Christine revealed. The reliability and validity of these tasks for assessment of literacy capabilities in a variety of learners have been established by the authors just mentioned, although not for persons with developmental disabilities.

These measures open a window to a learner's reading skills. The tasks are given in an order intended to minimize practice effects. Although some of these measures may seem to be mere screenings, quite the contrary is true. It took approximately 50 hours over the course of about 8 weeks for Tom and Christine to complete these tasks. At times Christine's performance required Tom to modify the protocol by increasing or decreasing the number of trials presented. Tom kept notes and audiotaped all sessions. Then he transcribed the tapes, and Christine's performance was analyzed. These data are not intended to quantify her skills or present a posttest measure but, rather, simply show how she performed at a given point in time. Table 1 summarizes her performance.

Question 1: Can an Adult With Developmental Disabilities Acquire Reading and Writing Capabilities?

Some of the data collected in the 7th year of the tutorial may shed light on the first research question, to what degree can an adult with developmental disabilities who had no previous literacy skill acquire some reading and writing capabilities? Reading entails both decoding and comprehension of meaning. A reader determines the correspondence between letters and sounds and monitors the meaning of the words, sentences, and paragraphs read. Christine demonstrated both code- and meaning-based reading capabilities. Word-level skills were her strongest area. She decoded and/or recognized single words and demonstrated comprehension at the word level on a variety of tasks (Tasks 3, 8, 9, 13, 23, and 26). She used the letters of the alphabet to read and write and made sense of letters and sounds (Tasks 5, 7, 11, 12, 21, and 25). She accomplished these tasks, although orally her phonological capacities are quite compromised (Tasks 14, 20, and 22); she repeatedly demonstrated accurate spelling as well as good approximation of spellings using careful letter–sound matching.

Christine's sentence level and paragraph level capabilities are less strong. Her limited oral language (Tasks 1, 2, 4, 10, 15, 16, 17, 18, and 19) made discussion of sentence meaning and text events very problematic. Note that of 80 sentences (Task 15), not one was read without at least one error. It is difficult to assess to what degree these miscues affected her comprehension at the sentence level, although her performance on text discussion tasks was no better when she was merely listening to text read aloud. It is likely, however, that the process of beginning literacy instruction with whole text (Task 6) and later teaching grapheme–phoneme correspondences has allowed Christine to develop insights into reading for word meaning in context (Task 24) and using the letter–sound system to read and write. She progressed from a general recognition of printed words during echo reading of text to the ability to analyze some of the features of print.

Christine attained these literacy capabilities, even though her IQ throughout her life has been in the low 40s (Task 2). Notably, Christine's IQ, as measured at the end of her 5th year of tutoring, was 55, but her performance on Piagetian tasks (see Harp & Brewer, 1991) indicated that she had not progressed beyond preoperational thought. It is not possible to state that these traditional measures were predictors of her potential to acquire literacy. It might be said that she seems to have made gains in spite of her abilities as documented by testing.

Question 2: By What Methods of Instruction Might an Adult With Developmental Disabilities Acquire Reading and Writing Capabilities?

Christine's progress might reveal an answer to the second research question, By what methods of instruction might an adult with developmental disabilities who had no previous literacy skill acquire some reading and writing capabilities? During the 7 years that Tom and Christine worked together, this

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variable mix of whole–to–part–to–whole literacy learning has progressed. Tom offered instruction that was always within Christine's zone of proximal development (Vygotsky, 1978); he was responsive to her growth and how this zone changed yet also realized that other areas of skill were not growing. At the time of the present writing, Tom and Christine read a variety of texts. Predictable texts help Christine acquire new sight words, so rhyming poetry, Christmas, Easter, and other religious songs, basals, controlled readers, and menus are used. She and Tom also read many unpredictable texts, such as special populations' newspapers and adapted versions of classic books like "The Wizard of Oz" (Laiken, 1989). They have read many books designed for teaching English as a second language because the repetitive and simplified vocabulary and simple story lines provide accessible text.

Christine and Tom continue to work weekly and Tom documents the content of their sessions and the literacy behaviors that Christine demonstrates. New insights into spelling patterns and how to use and learn from print are ongoing for Christine. Areas of need remain. Most notably, due to limitations in her speech output and expressive language, it is still difficult for Christine to demonstrate her comprehension of text on demand, whether discussion is about a text that was read in the immediate or remote past. Christine does, however, converse about past life events readily. Also, work to improve functional skills, such as simple mathematics and filling out forms, is ongoing. There is no doubt that she is an active participant in a variety of social processes that include literacy behaviors. It is also apparent that instruction needs to transition from literacy as a process of social participation and intersubjectivity (Moll, 1990; Vygotsky, 1978) to literacy as a synthesis of more complex processes. Van Dongen (1986) proposed that three abilities must occur simultaneously: (a) learning language (e.g., improving vocabulary, sentence formation), (b) learning through language (e.g., improving concept formation, fund of information), (c) learning about language (e.g., learning linguistic conventions such as letter skills, punctuation, affixes). Subsequent growth in literacy will entail that Christine understand the concepts required in each area of reasoning and be able to shift her attention across these three language domains during interaction with text. A mix of whole–to–part and part–to–whole instruction may facilitate attaining this objective.

Question 3: How Increased Interaction With and Use of Print Impact Quality of Life

The third research question, Can we determine subjective social validation of how increased interaction with and use of print has had an impact upon Christine's quality of life (Storey & Horner, 1991), can be addressed by describing events that have taken place in her life that are related to her capacity to read and write. Growth in literacy abilities has coincided with an enhanced lifestyle for Christine. By her own report, reading for enjoyment has enriched her daily life considerably. For recreation, she enjoys reading stories, prayers, poems, and song lyrics. Her self-selection of texts is an aspect of self-direction of some of her learning. She did not have much occasion to choose what she would learn about before she began to read. Her note-writing is crucial to her sense of feeling connected to others. Christine values corresponding with people and now has the opportunity to send messages that can be understood by others (gratifying for her because her speech is very hard to understand). At workshop, Christine's paychecks for piecework have increased, and she applies skills in telling time and counting money that she learned through tutorial with Tom. Christine better understands her pay for piecework performance. In all of these activities she has displayed better self-monitoring. In addition, she attends weekend school for adults with developmental disabilities at a community center and children's story reading programs at a local library. Although some might question the age-appropriateness of the latter activity, Christine is comfortable there, and the librarians and families have been welcoming and accepting.

Tom's discussions with Christine's sister indicate that Christine seems more self-satisfied since beginning her literacy tutorials. Reading and writing have opened up possibilities for participation and enjoyment. Perhaps Christine is not aware of how far from functional her skills actually are; although she has not attained independent literacy for daily living, the wish that she had for herself, Christine has learned to read for pleasure and write to communicate socially. Relative to literacy, she has attained the four socially valid outcomes proposed by Carpenter, Bloom, and Boat (1999): self-esteem, self-determination, empowerment, and joy.

Recreationally, unrelated to literacy, Christine increasingly participates in developmental disabilities group outings to local tourist attractions and

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attends summer camp. Literacy has coincided with greater self-efficacy in interpersonal situations. She goes to dinner and movies with friends. Christine's family includes her in numerous recreational interests. She and her sister take vacations around the United States and have purchased and maintain a new, spacious, suburban home.

Discussion

This case study has generated evidence of an individual's performance. Several observations can be made based on this evidence. The first observation is that Christine's literacy capabilities have flourished under socially stimulating conditions. Social relevance was fundamental to the process. The interactive, peer-assistance nature of the tutorial sessions as well as Christine's motivation to send notes and cards to persons she knows and her interest in read-aloud programs at the library all show that her introduction to literacy was associated with social purposes (see Vygotsky, 1978).

A second observation is that Christine displayed many of the social, intellectual, and behavioral traits that are reported in the literature to be contributing factors in the acquisition of literacy by adults with developmental disabilities. She demonstrated motivation, symbolic awareness, metacognitive self-monitoring, and self-direction of some of her learning (Barudin & Hourcade, 1990; Fuller, 1991; Gipe, Duffy, & Richards, 1993; Moutray, 1997; Wong, 1986).

Third, this investigation has generated evidence that practitioners providing literacy instruction with adults who have developmental disabilities may utilize a combined, eclectic approach that includes whole–to–part and part–to–whole strategies. Due to the lack of literature on using an approach of this type with this population (Katims, 2000), it is impossible to say that the present data reflect a theoretically established position. It is possible to state, however, that this investigation may contribute to data on reading acquisition in this population.

Fourth, it must, of course, be observed that a case study of one individual has certain limitations. One empirical inquiry cannot yield unequivocal evidence nor does it provide much basis for generalization to theoretical propositions about teaching other individuals or populations. Christine is not a "sample" from which we can generalize statistical frequency for improvement. Outcomes for Christine are not assumed to represent the data that might have been collected from a larger pool. Nor can this study be replicated at will. There is not a sequence of specific tasks that can be offered to other individuals in hopes of provoking changes in their literacy behaviors. The tasks and teaching approaches used were designed to meet Christine's specific needs. There is the possibility of replication of the general approach, although any specific tutoring plan for an adult with developmental disabilities must be individually designed. It would be useful to develop databases reflecting multiple case, time-series studies that can be compared and through which external validity can be established via cross-case comparisons; or researchers might formulate comparative analyses of the effects of alternate teaching approaches with matched pairs of participants.

A fifth observation relates to the need to study literacy growth in persons with developmental disabilities as a demonstration of how learning takes place within social contexts. The learning partners, their activities, and the instructional process itself merit exploration through a Vygotskian perspective. Examination of linguistically mediated social processes that help a learner transition within a zone of proximal development are of both theoretical and practical interest (Moll, 1990; Rosa & Montero, 1990; Wertsch, 1990).

Implications

Implications based on the evidence of descriptive data, that is, the information that has been gathered about Christine's progress during meaningful real-life events, are that adults with developmental disabilities should not be considered to be unsuitable candidates for literacy instruction. A holistic, socially based program of fluent reading tutorials may have some merit in providing access to literacy for this population. Importantly, adults with developmental disabilities who wish to learn to read should be taken seriously, and practitioners can make reading and writing available to them through a variety of individualized teaching approaches (Kliewer & Landis, 1999). This and other studies may contribute to developing a workable theory of how adults with developmental disabilities may acquire literacy and may help to focus future investigations in the field.

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Editor-in-charge: Christopher Kliewer

Authors:
Monica Gordon Pershey, EdD, Assistant Professor, Department of Speech and Hearing, Cleveland State University, 1899 E. 22nd St., Cleveland, OH 44114-4434 (E-mail: m.pershey@csuohio.edu).
Thomas W. Gilbert, MEd, Clinician, Northeast Care Center, 12627 York Rd., North Royalton, OH 44133 (E-mail: tgilbert@necare.org)

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Appendix A

Samples of Writing With Spelling Assistance, Sixth Year of Instruction

To produce Samples 1 and 2 (see Figures 1 and 2), Christine told a literate adult what she wanted to say and the adult spelled the words as Christine wrote. Interestingly, Christine's exploration of extended text has led her to express the desire to learn more about the phonological and orthographic features of language, as she has written, "I WANT TO HAVE HOOKED ON PHONICS WHEN YOUR ARE NOT ABLE TO MEET WITH ME I DON'T WANT TO STOP MEETING WITH YOU MY FRIEND TOM."

Sample 2 reads, "DEAR TOM PLEASE TELL ME YOU ARE COMING TO MY CHRISTMAS PARTY I PAID FOR YOU ALREADY PLEASE HELP ME SAY MY PRAYER." Christine is referring to rehearsing to lead the group in a prayer at the party. She and Tom practiced by reading the prayer repeatedly in unison.

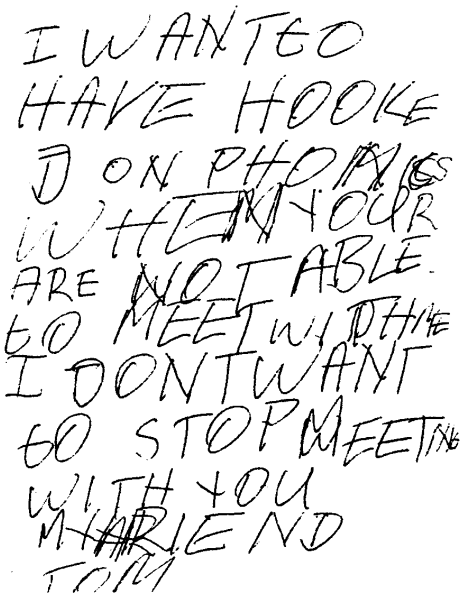

Figure 1

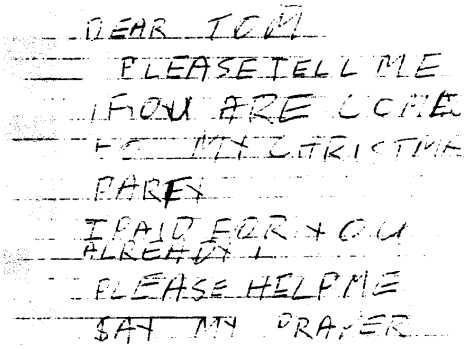

Figure 2

Appendix B

Samples of Independent Writing, Sixth Year of Instruction

Christine produced Samples 3 and 4 (see Figures 3 and 4, respectively) without assistance. Sample 3 was written to Tom after she had just had a demeaning encounter with a bus driver who told her that she could not read. She vented her anger in writing. This incident exemplifies how persons with developmental disabilities are sometimes labeled, judged harshly, given inconsiderate treatment, and presumed to lack credibility, even by those persons who earn a living providing services for them. Sample 3 reads, "To [Tom] the bus driver said i can't read why he tell me.

In Sample 4 Christine is asking Tom to return a book to her that he borrowed. She often instructed the people to whom she wrote that a specific task should be performed on a certain day. She also frequently

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used her notes to make plans for something to take place, as she did in Samples 1 and 2. Sample 4 says, "Tom please give me back my book remember my books thank you read my note on friday." This sample is one of the few times that Christine used some lowercase letters.

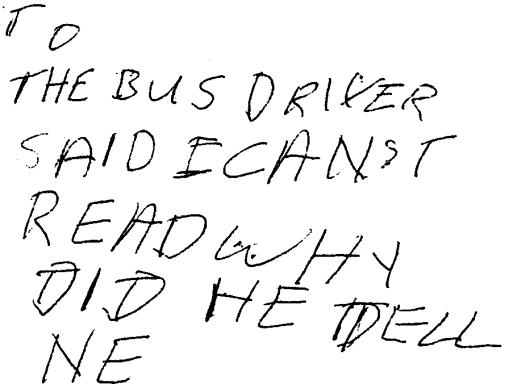

Figure 3

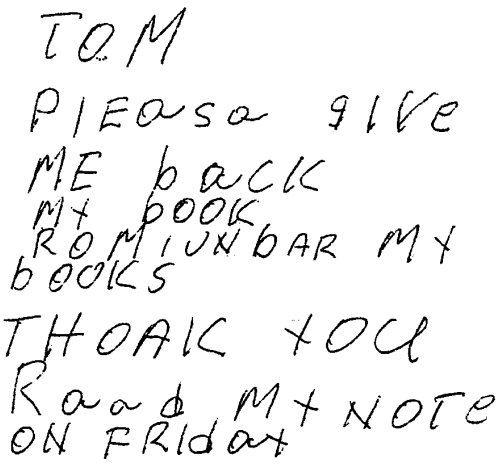

Figure 4

Appendix C

Assessment Protocol

Note: Printed passages used should be about primer level. All cards, etc., should be typed in large print in a type face that does not use Greek letters (example: γ) or be block printed in capital letters. Begin with no assist and move incrementally through minimal to maximal assist. Always make note of all assist given.

1. *Oral Language Abilities Testing:* Determine language age, articulation clarity; use sampling or standardized instruments.
2. *IQ on file*; *Cognitive Structures*: Piagetian tasks of concrete operations (Harp & Brewer, 1991).
3. *Reading Isolated Words:* Audiotaped; learner reads from graded word lists, miscues noted; use Slosson Reading Test (Slosson, 1963).
4. *Photo Story Dictation* Audiotaped (2 forms): Learner dictates a story about a photograph (e.g., people playing basketball). Tutor writes this story. Learner reads the story; miscues noted.
5. *Writing to Dictation:* Learner writes single letters dictated by tutor—26 letters uppercase, 26 lowercase, in and out of alphabetical order (104 forms). Learner writes single words dictated (20 words). Learner writes the sentences read aloud by tutor. Tutor writes a summary of how this was done—word-by-word, phrase-by-phrase, or as whole sentences (10 sentences).
6. *Concepts About Print* (Clay, 1985) (2 trials per item): Tutor shows a page of text to learner. Asks learner to point to the following: a period, a capital letter (uppercase), a question mark, an exclamation point, a small letter (lowercase), where I start reading on this page, a whole word, a whole sentence, the beginning of a sentence, the end of a sentence, where a paragraph begins, the first word of the story, the last word of the story, the title of the story, which way I go when I read (left to right and top to bottom).
7. *Copying a Printed Passage* (1 trial): Show learner a short paragraph, ask learner to copy it, mark for errors. (Learner can use a cover, pointer, or other visual aid; take note of need for tracking, etc.)
8. *Scanning* (1 trial per task): Show learner a page of text in which his/her name is embedded. Ask learner

to find his/her name on the page. Show learner a word on a card. Ask learner to find the same word in a printed story.

9. *Matching Words* (15 words): Learner looks at a stimulus word then locates it again in an array of three or four choices of visually similar words. Example: *SNOW, SWAN, SNOW, NOW, SOW.*
10. *Matching Sentences* (5 sentences): Learner looks at a stimulus sentence then locates it again in an array of three or four visually similar choices. Example: There are no blue cats. There are no blue cars. There are no blue cats. There are no big cats.
11. *Letter-Sound Correspondence* (26 items uppercase, 26 items lowercase): Tutor points to each letter of alphabet, asks learner what sound the letter stands for. Assess both upper- and lowercase.
12. *Building a Word From a Model* (10 words): A model word (e.g., *help*) is given on a card. Individual letter tiles of *h, e, l, p* are given to learner. Learner must arrange the tiles to spell the word. Ask learner to read word aloud (task may be completed without reading). Then, model is removed. Learner must spell the word again.
13. *Matching Words to Pictures* (10 words): Show learner an array of three or four single, simple pictures (ball, house, bird, cat, etc.). Provide word on single card. Allow learner to match the printed word to one of the pictures. Set up a new array, repeat until all words are used.
14. *Supplying a Spoken Word That Begins With the Same Phoneme As a Given Printed Word* (10 to 15 trials): Show learner a printed word on a card. Ask learner to tell another word that begins with the same sound. Example: "*see S.*" Learner should use a word beginning with *s*. (Note: Do not penalize *c/k, c/s,* and other spelling-based, nonphonemic errors.) Repeat using pictures to elicit sounds, no print, if learner isn't reading the words.
15. *Reading Graded Sentences Aloud* (10 or 20 items audiotaped): Miscue analysis via running record (Clay, 1993).
16. *Reading Graded Passages Aloud* (2 paragraphs, 2 trials, audiotaped): Sequence: Read first passage, then answer questions (see 17 below). Read second passage, answer questions. Miscue analysis for passages.
17. *Comprehension Question for Passages* (6 questions per passage).
18. *Retelling* (2 trials, audiotaped): Tutor reads the graded passage to the learner. Learner retells the passage on tape. First passage has a picture. Learner may look at picture while retelling. Second passage has no picture. Learner may not look at the print during retelling either time. Tutor should not cue or prompt unless learner is nonresponsive.
19. *Predicting Content* (2 trials, audiotaped): Tutor shows learner a picture. Asks what he or she thinks the story will be about. Then story is read to learner. Learner is asked to discuss what was/was not predicted.
20. *Pseudowords–Word Attack* (10 to 20 words): Tutor shows learner a list of pseudowords to sound out. Tell that they are not real words, they are make believe or funny words. (Examples: *blick, pronk, zoby, glimp, glack, clate*).
21. *Pressure Writing* (1 trial): Give the learner paper and pencil and set a timer for 5 minutes. Learner writes any words he or she can for 5 uninterrupted minutes. Initial directions should be to try to work fast—a list, sentences, paragraph are all ok. Scoring also includes developmental spelling features assessment (Gentry, 1982).
22. *Phonemic Awareness Assessment* (Yopp, 1992): Recognizing rhyming words (10 word pairs). Isolating first, middle, and ending sound in a spoken word (10 words for each sound position). Blending speech sounds: tutor says "k—a—t," learner replies "*cat*" (10 words).
23. *Single Word to Fill in the Blank in a Sentence* (20 items per level): Answers are provided in an array of 3. Point to the word in the array. Fill in the blank by copying the word from the array. Spontaneously write the answer to fill in the blank. Example: We drank water and ———. MILK, SIT, or DOG.
24. *Reading Comprehension–Following Directions* (20 items, audiotaped for reading miscues): Learner will read a list of 20 directions for physical commissions, either aloud or silently, then execute the commission. Examples: Point to the floor. Scratch your head. Look up. Clap your hands. Close your eyes.
25. *Visual Memory for Random Letters* (10 items): Show the array of random letters, read aloud, cover up, recite from memory. Begin with one letter and progress to as many as learner can remember.
26. *Reading for Meaning–Synonyms and Opposites* (20 items): Learner reads a word then selects its synonym (10 items) or opposite (10 items). Learner should read without assist if possible. Examples: *DOG, PUPPY, FISH, POP, COKE, MILK, RAIN, SUN, WATER, CHAIR, SEAT, WINDOW, HAT, COAT, CAP.*

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