

Effects of American Sign Language on  
Hearing Children's Pre-Literacy Skills as an  
Early Education Intervention Model

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**Abstract**

The purpose of this paper is to explain the positive impact of American Sign Language (ASL) as an early intervention to encourage strong pre-literacy skills in young hearing children with and without disabilities. The research interpreted in this paper will illustrate the effect of ASL on pre-literacy skills and why it is an effective intervention. The hope of the author is for early childhood educators to embrace this intervention and seek opportunities to promote pre-literacy skills in all young children from birth to six.

For over 30 years using sign language with young hearing children has been an area of interest in the education field. There have been several research experiments, both qualitative and quantitative on the use of sign language with typical and special needs hearing children birth to six. The research has demonstrated that there are many benefits to utilizing sign language with hearing children. Some of the benefits noted in the research are developing larger vocabularies, possessing greater self-esteem, and increased phonemic awareness and spelling skills. The research has deemed that American Sign Language (ASL) is a useful intervention for early education curriculum and is not only for deaf children. ASL is currently recognized as the third most utilized language in the United States according to Daniels (2004). The focus of this paper is on the positive effects of ASL in an early education literacy curriculum.

American Sign Language (ASL) is defined as a natural, living language that has all the structures of other languages. Linguists have recognized ASL as a “bona fide language” since 1960 according to Daniels (2001). ASL has similar properties as English. However it uses a visual-gestural modality to express phonology, morphology, and syntax (Daniels, 2001). It is noted in the research that children’s motor and visual skills develop before their oral skills, therefore making ASL a natural language for young children to be taught (Lawrence, 2001). Furthermore their motor skills are more adaptable to signing before writing, consequently making it beneficial to learn how to spell while using ASL finger spelling (Daniels, 2001 and Lawrence, 2001).

Pre-literacy skills are composed of receptive and expressive vocabulary, phonemic awareness, knowledge of letter-sound relationship, and the ability to combine this knowledge to read words in print. The implications of using ASL in an early

education literacy curriculum are beneficial according to research done by Daniels, DiCarlo et al., Vernon et al., and Lawrence. An overview of their research is noted in

Table 1.

Table 1: Implementing American Sign Language as an Early Education Intervention

Title	Developer	Comments
Dancing With Words Signing for Hearing Children's Literacy	Daniels, Marilyn (2001)	A book compiling the results of Dr. Daniels studies on the effect of sign language on hearing children's language development and useful implications for teachers and parents. The book includes and introduction to sign language as a natural, living language and develops the readers knowledge on the history and structure of ASL. Dr. Daniels continues to provide information on several research experiments she has completed with typical and special needs children in preschool and kindergarten settings. The book continues to provide information on theory and application in the school and at home.
Happy Hands: The Effect of ASL on Hearing Children's Literacy	Daniels, Marilyn (2004)	A study that investigated the effect of ASL instruction on typical hearing kindergarten children's literacy in four areas: receptive English vocabulary, expressive English vocabulary, ASL ability, and English emergent reading level. This experiment was modeled after an experiment done in the United Kingdom in 1997, Sing in Education. The U.S. study was conducted in a public school in rural Vermont with 41 full day Kindergarten students. There was a non-treatment group and treatment group. A difference between the U.K. experiment and the U.S. experiment was that the U.K. teacher delivered instruction in voice off BSL; since she was deaf (BSL was her native language). In the U.S. the teacher delivered instruction with voice on and voice off, she was fluent in ASL, however it was not her native language.

Effects of Manual Signing on Communicative Verbalizations by Toddlers With and Without Disabilities in Inclusive Classrooms	DiCarlo, Stricklin, & Banajee (2001)	A study that evaluated the effects of ASL on toddler's verbalizations in an inclusive preschool setting. This study was conducted because there were a few parents concerned that ASL would effect a typical child's verbalizations in a negative way. The results showed that this was not the case and showed support for using sign language in an inclusive classroom with both children with and without disabilities as an effective means to support communicative verbalizations.
Using Sign Language in Your Classroom	Lawrence (2001)	This paper is a review of the research on ASL in elementary classes of hearing children. It discusses using the manual sign language alphabet in early education to support learning the phonetic sounds of the alphabet. The paper notes that "sign language appears to enhance brain activity on both sides of the brain and has been proven successful in a total communication reading program for students with learning disabilities" (Lawrence, 2001). Included in the paper are several activities to use within the classroom setting to support early literacy.
Using Sign Language to Remediate severe Reading Problems	Vernon, Coley, & DuBois (1980)	The paper focused on identifying remediation strategies that can be used with students with academic achievement difficulties. The study looked at the use of sign language and the manual alphabet to improve spelling skills of learning disabled children. The results supported the use of sign language and the manual alphabet in remediation of reading problems. It also provided activities for application in the classroom.

## Models

### Dancing With Words, Singing for Hearing Children's Literacy by Dr. Marilyn

Daniels was selected because it compiled major research findings in this area. Daniels describes experimental studies conducted since 1991 on ASL as a factor in acquiring English and the effect of sign language on hearing children's language development. Chapter 4 recounts these studies in chronological order. Daniels first study in 1991 was completed with fourteen hearing children who learned ASL in preschool. The Peabody Picture Vocabulary Test (PPVT) was utilized to assess the children's acquisition of English and the influence of ASL. The scores indicated a positive relation between ASL and acquisition of English. According to Daniels (2001) the mean score for a typical child should be 100 or close to it. According to the PPVT the children that learned ASL in preschool had a mean score of 109.57 with a standard deviation of 7.38. Daniels (2001) noted that this was "a powerful number that clearly indicates that children who learned ASL as preschoolers acquired larger English vocabulary than is expected of typical children."

With these results Daniels decided to continue her research on the effects of sign language on hearing children's language development and developed a second experiment. "The investigation attempts to discover whether adding sign language to pre-kindergarten curriculum increases hearing children's receptive English vocabulary" (Daniels, 2001). In this experiment Daniels expand the participant number to sixty and incorporate a pre and post-test using the revised Peabody Picture Vocabulary Test (PPVT-R). The pre-test showed that prior to ASL intervention there were little variances in the children's vocabulary (2001). Daniels experiment followed a model where the

teacher utilized sign language when making requests, giving commands, during read alouds, and teaching the manual alphabet. The model included a control group and a treatment group of pre-kindergarten morning and afternoon classes from the same school. The results of the experiment were statistically significant in support of using sign language to promote language development in pre-kindergarten classroom (Daniels, 2001). According to Daniels (2001) the mean scores on the PPVT-R for the signing classes were 94.6 (morning) and 92.3 (afternoon) and the mean scores for the nonsigning classes were 78.9 (morning) and 77.6 (afternoon), with standard deviations of 10.2 and 13.1. "A two-way analysis of variance indicated that the main effect of signing was statistically significant,  $F(1, 56) = 22.06, p < .001$ , and that the main effect of class meeting time and the interaction effect were not statistically significant,  $F(1, 56) = .32, p = .58$ , and  $f(1, 56) = .03, p = .87$ " (2001). Daniels notes that "the scores from both sign classes were 15 points higher than those from the classes receiving no sign instruction" (2001).

Daniels continued her research on the effects of ASL on hearing children's literacy by conducting an investigation on the effect of ASL instruction on typical hearing kindergarten children's literacy in four specific areas, which were receptive English vocabulary, expressive English vocabulary, ASL ability, and English emergent reading level (Daniels, 2004). This experiment was modeled after an experiment conducted in the United Kingdom (U.K.) in 1997, Sign in Education. In the Sign in Education project a deaf teacher fluent in British Sign Language (BSL) instructed a class to hearing students using BSL. The results showed significant support in using BSL in the kindergarten classroom (Daniels, 2004).

Daniels replicated this model to see if the effects would be the same in the United States (U.S.) as they were in the United Kingdom (U.K.). Two testing measurements were used during this experiment, the revised Peabody Picture Vocabulary Test (PPVT-R) and the Marie M. Clay (1993) Reading Recovery Observation Study (RROS). The RROS assesses letter identification, word test, and concepts about print and is used to “determine their emergent reading level for first grade placement” (2004). This was a nine month experiment with two full day kindergarten classes, one the treatment group and the other the non-treatment group. The treatment group received ASL instruction and the non-treatment group did not, otherwise the teaching practices in both classes were the same (2004). “The original research design called for a control class for aspects 1, 2, and 4. Although efforts were made to secure permission to use the school’s other kindergarten class as a control class, the administration refused. They feared the teacher of the proposed control class would be upset if her students did poorly, including morale issue” (2004). Therefore the results focus on pre and post-test for the treatment group in areas 1, 2, and 3 and then results from the RROS (aspect 4) were compared between the treatment group and the non-treatment group (2004).

Results of this study were noteworthy, see table 2.

Table 2: Results of Daniels 2004 Research

<b>Four areas of interest</b>	<b>Treatment Group (Pretest)</b>	<b>Treatment Group (Posttest)</b>
Receptive English Vocabulary	Standard score of 101.9 with a standard deviation of 4.47. Age equivalent score of 68.0 months (5 years, 8 months).	Standard score of 115.9 with a standard deviation of 11.62. Age equivalent score of 93.8 months (7 years, 8 months).
Expressive English Vocabulary		Mean score 104.08 with a standard deviation of 10.72 on the AGS Expressive Vocabulary Test. There was no significant difference between expressive and receptive vocabulary (Daniels, 2004).
Sign Language Evaluation		"Students demonstrated and average rating on their ASL ability based on their age and the video-taped task" (2004).

<b>Emergent Reading Level (RROS)</b>	<b>Treatment Class</b>	<b>Non-treatment class</b>
	Mean score of 50.6 with a standard deviation of 2.29	Mean score of 33.2 with a standard deviation of 15.4

"A directional t-test for independent groups showed a significantly higher score for the treatment class ( $t(16) = 3.55, p.001$ )" (2004). In a nine month period students in the treatment class gained two full years of vocabulary growth, their receptive English vocabulary increased 14 points, and their emergent reading level results demonstrated a significant difference in letter identification (2004).

Further research in this area has been conducted by McCay Vernon, PhD, Joan Develin Coley, PhD, & Jan Hafer DuBois, MEd (1980). Vernon et al. found that using ASL manual alphabet improves learning in disabled children's spelling skills (Vernon et al., 1980). The study was conducted in Berkeley County, West Virginia and children were chosen based on three criteria: 1) classified as visual learners, 2) demonstrate

poor spelling skills, and 3) were assigned to a second-grade spelling test in the regular classroom (1980). The treatment took place with three resource room teachers who were voluntarily trained in ASL finger spelling. The treatment plan was to incorporate finger spelling into their typical spelling instruction. The qualitative results were positive. “All three teachers reported that the children were able to read and finger spell the words after the third instructional period” (1980).

Another model that supports the use of ASL on communicative verbalizations is a study conducted by Cynthia F DiCarlo, Sarintha Stricklin, & Meher Banajee in 2001. DiCarlo et al. conducted a study in an inclusive childcare program involving toddlers with and without disabilities. The purpose of their study was to “evaluate effects of manual signing by staff in an inclusive setting on the frequency of verbalizations among children with and without disabilities” (DiCarlo et. al., 2001). The primary focus was the effect of ASL on the children without disabilities vocabulary since there had been concerns communicated by parents (2001). The study was conducted in order to show parents that ASL has a positive effect on children with and without disabilities and it increases communicative verbalizations rather than decrease those (2001).

The researchers categorized verbalizations in three categories: 1) vocal sound that was directed at another person, 2) manual signs or sign approximations, and 3) voice output communication aide (VOCA) through the use of an AlphaTalker (2001). “Results suggested that manual signing by staff in an inclusive early intervention classroom did not result in decreases in the verbalizations of toddlers without disabilities. Verbalizations among the toddlers without disabilities continued at the baseline frequency while the signing program was in effect even though these children

began to use manual signing” (2001). This study illustrated that incorporating ASL sign language into an early childhood education curriculum is not harmful to children.

In fact, “research studies have shown that sign language enhances brain activity on both sides of the brain” (Lawrence, 2001). Lawrence further states the findings of research done by psychologist David P. Corina of the University of Washington in Seattle, “sign language comprehension is accompanied by substantial neuronal activity in parts of both the right and left hemispheres of native signers...” (2001). An MRI was used to compare the blood flow in the brain while volunteers watched the use of ASL in sentences (2001). “We know that when both sides of the brain are operating, students have more ways to make connections for learning. If we link the written word with sign, it will increase students’ chances of success in reading” (2001).

### **Effectiveness of ASL Sign Language**

As educators it is important to incorporate interventions that will facilitate the highest level of learning. Educators can use ASL as an intervention to develop larger vocabularies, better phonemic awareness, knowledge of letter-sound relationships, and enhance spelling skills. It is believed that incorporating ASL sign language and finger spelling into and early education literacy curriculum will be rewarding for both the teacher and the students. An important question answered in Daniels book Dancing With Words Signing for Hearing Children’s Literacy is, “why? Why is sign effective?” (Daniels, 2001). In Chapter 9 Daniels explains some of the known facts and theories of why sign language is an effective intervention in literacy.

The first known fact is memory, “memory is related to language storage and retrieval. It is known that languages are stored in the left hemisphere of the brain”

(2001). Daniels sights research done by Hoemann (1978), according to the research Hoemann found that ASL had a memory store and English had a memory store (2001). This study plus future studies concluded that “all languages, whether spoken or signed, are categorically coded and housed in distinct memory stores even in the earliest stages of their acquisition” (2001). This is an important fact, because “as a result of the way the human brain stores all languages, the young student learning a new language has two places to look for the information” (2001). This dual memory store is beneficial to young children because it creates a “built-in redundancy that establishes two independent language sources for children to use for search and recall” (2001).

A second known fact is growth or brain growth. The visual components of sign language create “an increase of brain activity by engaging the visual cortex and presenting an additional language to the young learner” (2001). With increase language activity the brain is stimulated and the formations of synapses or connections among the brain cells are created. “Using sign language and English in tandem provides a much richer language base of brain activity and brain growth and development” (2001).

There are several other known facts that answer why sign language is an effective intervention for young children such as, visual, movement, meaning, play, and hand. The visual aspect of sign language has a close link to brain growth and memory. “Research on ASL shows sign is perceived in a visuospatial manner by the right hemisphere of the brain and subsequently processed by the left hemisphere.” (2001). The known facts that Daniels states incorporate the known fact

that children and people have different learning styles. Essentially ASL is an effective intervention in an early education literacy curriculum because it meets the needs of all children at their individual learning levels and supports their individual learning styles.

### **Methods of Using ASL Sign Language to Support Pre-Literacy Skills**

Research has proven using ASL as a supportive factor in an early childhood literacy curriculum increases pre-literacy skills in the area of vocabulary development, phonemic awareness, letter-sound relationship, and spelling ability. Various types of methods were referred to in the literature, such as incorporating ASL finger spelling when teaching the manual alphabet or using sign language for commands or requests. ASL can be utilized in many different ways. Lawrence list a variety of activities to use in a classroom setting as well as a game invented by Kathleen Brennan called SIGN-O, “which incorporates sign language in a game” similar to BINGO (2001). The activities that Lawrence brought to the attention of educators during the Annual Convention and Expo of the Council for Exceptional Children in April of 2001 are as followed:

- Signed phonetic alphabet. During this activity the teacher teaches phonetic alphabet while incorporating the signed alphabet.
- Learning signed words for reading. This activity promotes learning sight words through finger spelling and read a-louds.
- Spelling hangman. This is an activity that reinforces the learning in the activities listed above. Students play hangman via standard rules, however they need to sign the letter they guess.

- Reading books with sign language. The teacher chooses a book to read a-loud to the class and introduces the main vocabulary of the text with sign language. As you read the students can sign the vocabulary of the text. A good way to begin is using books with sign language in them. Lawrence references two books, Anase the Spider: Why spiders stay on the ceiling by Collins, S.H. (1997) or Fruits and Vegetables by Collins, S.H. (1997).
- Choice menu board, developed by Hodgdon, L.A. (1998) and published in his book Visual strategies for improving communication: Volume I: Practical supports for school and home. Essential this activity incorporates sign into daily routines and centers in the classroom. A teacher would label activities or centers with a picture, the written word, and the ASL sign to reinforce vocabulary.

Lawrence justified these activities by sighting the research of Greenberg, Vernon, DuBois, and McKnight (1982) and Brennan and Miller (2000) that state “involving sign language in a total communication reading program has proven successful for students with learning disabilities and mental retardation” (2001). She also pointed out the importance of using sign language in a classroom setting allows the teacher to “add a kinesthetic aspect to the lesson (of reading), and putting to use more of the learning modalities, makes language easier to acquire” (2001).

### **Discussion**

For over 30 years research has continued to prove that ASL is a valuable addition to an early education curriculum. It supports receptive and expressive language development in typical hearing children as well as children with disabilities. ASL incorporates kinesthetic, visual, and auditorial learning and makes language

more tangible. “When each letter of the alphabet is taught to children in this fashion (ASL finger spelling) with an accompanying key sign word that demonstrates the letter’s primary sound, emerging readers have a key to unlock the visual motor and phonological properties of letters (Daniels, 2001). Daniels also states that “a child’s familiarity with the letters of the alphabet and speech sounds or phonemes is a strong predictor of the child’s future reading capacity” (2001).

Incorporating ASL into an early education literacy curriculum as a valuable intervention is a meaningful and enlightening choice. The effect it has on children’s learning is powerful and has long term benefits. It is a valid early intervention to be used with all children, both typical and children with special needs. A quote from Gallaudet based on his convictions and stated in Daniels paper in 2004 sums up the importance of meeting the needs of all children any way educators can. “The more varied the form under which language is presented to the mind through the various senses, the more perfect will be the knowledge of it acquired, and the more permanently will it be retained” (Daniels, 2004). ASL sign language imparts students the ability to achieve substantial literacy skills at an early age that will sustain them for life.

### **Implications**

ASL is a powerful intervention that facilitates learning in early education by meeting the needs of all learning styles. Research shows that ASL enhances pre-literacy skills and helps build the bridge of communication with pre-verbal children. An effective intervention model for developing pre-literacy skills ASL is easily incorporated into all aspects of language development. Educators need to integrate

ASL into all daily routines and activities. Research suggest that labeling objects and activities, using ASL finger spelling to teach the alphabet and spelling, as well as using ASL sign to teach vocabulary during read a-louds and guided reading groups is beneficial for all learning styles and stimulates and increases brain growth.

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