

# Investigating the Effects of Integrated Systematic Decoding, Spelling and Communication Instruction for Students with Complex Communication Needs

Gretchen Hanser Ph.D., Doctoral Research Findings, May 2008, gretchen@gretchenhanser.com

## **Research Summary**

The purpose of the study was to investigate the impact of an integrated decoding, spelling and communication intervention on literacy and communication outcomes for three students with complex communication needs who use a particular augmentative and alternative communication system (AAC).

**Intervention:** *Literacy Through Unity: A Systematic Literacy and Communication Instructional Program* (Erickson & Hanser, 2006), was designed for students who use Prentke-Romich AAC devices organized with multiple meaning icons. This intervention consisted of 75 scripted lessons intended to teach students to decode and spell high frequency words, and to use icon sequencing to communicate the words. The intervention was systematic, explicit and provided conventional literacy instruction with unadapted print. There were three different types of lessons: Word Wall lessons, Making Words with Icons lessons, and Making Words with Letters lessons. The intervention was grounded in Adams' model of word reading (1990) and in research based literacy practices cited in the National Reading Panel Report (2000). The underlying educational approach was constructivist in nature, an approach that is commonly used in early literacy instruction in general education classrooms.

**Recruitment:** Potential students had to meet specific criteria. Potential students had to: 1) be between the ages 7-17 years old, 2) have a Vanguard, Vantage or Pathfinder with Full Unity, 3) have ongoing availability of device, 4) have reasonable access skills, 5) have Peabody Picture Vocabulary Test age equivalent score of 5 years or greater, 6) have a facilitator, 7) work on the intervention DAILY, and 8) suspend any other word & icon instruction.

**Student Identification:** Students who met the above eligibility criteria were screened using a 2-stage process.

**Stage 1 Screening** consisted of four tests: Concepts About Print, Letter Identification, Motor Access and the Peabody Picture Vocabulary Test. Students who reached criterion on these fundamental, emergent literacy tests qualified for Stage 2 tests.

**Stage 2 Screening** consisted of five tests: Word Identification, Word Generation, Developmental Spelling, Icon Sequencing, and Expressive Communication. Performance criteria were also set for Stage 2 tests, however they were exclusion criteria. If students did too well on two or more of the Stage 2 tests, they did not qualify for the study as their skills were beyond what was taught in the intervention.

**Students Meeting Criteria:** Three students with significant disabilities were identified for the study. Each of the students had cerebral palsy and used a wheelchair.

Student 1: 13 year old using a Vantage with Unity 84 via direct selection  
Student 2: 13 year old using a Pathfinder with Unity 128 via direct selection  
Student 3: 7 year old using a Vanguard with Unity 45 via 2 switch scanning

**Facilitators:** Each student had one consistent adult facilitator who implemented all of the lessons. Facilitators were trained by the researcher and were required to suspend all other reading and icon sequencing instruction during the study.

**Timeline:** Prior to the intervention, baseline data and pre-testing were done. During the intervention, students received 45-60 minutes of daily instruction over a 5-7 week period. The researcher made weekly visits to collect device data and to do fidelity checks on the facilitators implementing the lessons. After the intervention, additional data collection and post-testing were done.

### **Research Questions & Designs:**

**Design 1 Questions:** Would there be an increase in students' use of icon sequencing?  
Would there be an increase in students' use of letters?

Questions were addressed using a Multiple Baseline Across Subjects Design (using a non-concurrent design). Each of the AAC devices had an internal electronic recorder, the Language Activity Monitor (LAM), which recorded all data about students' use of the device, including their use of icon sequences and letters. This data was downloaded and was used to calculate the frequency of icon sequences and letters generated per day by each student. Data was collected during 4 phases: baseline, intervention, 1 week post, and 5 weeks post.

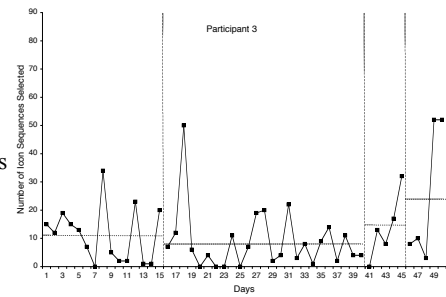
**Design 2 Questions:** Would there be an increase in word identification scores?  
Would there be an increase in developmental spelling scores?

Questions were addressed using a Simple Pretest-Posttest Design consisting of 5 assessments. Students' progress was measured across the five pretest-posttest measures that assessed word identification, developmental spelling, word generation, icon sequencing, and expressive communication. (These were the Stage 2 assessments.)

## Results:

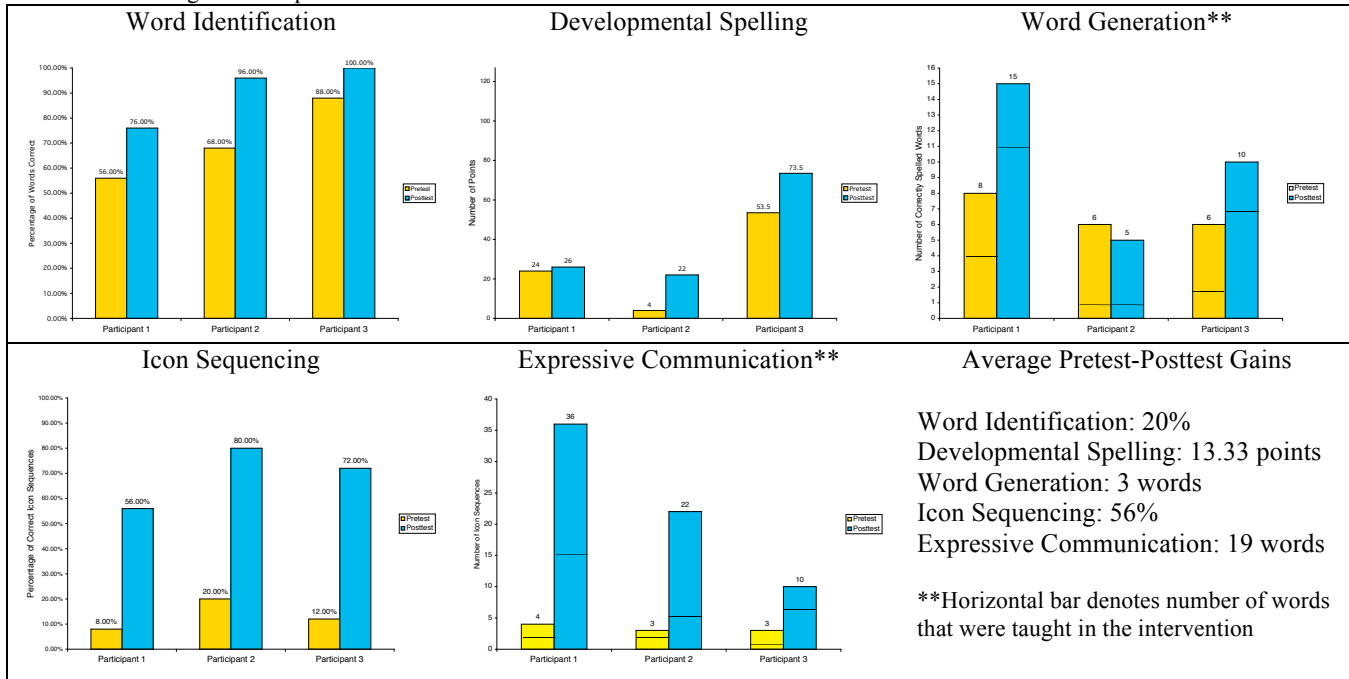
### Design 1: Change in Frequency of Icon Sequence and Letter Use?

Clear change in frequency was not evident. Students' daily use of icon sequences and letters for daily communication had a high degree of fluctuation. One graph, shown here, represents student 3's frequency of use of icon sequences (vertical axis) over the four phases (horizontal axis). The mean use in each phase was calculated and marked by a horizontal line. Small changes were seen in the mean use during each phase for students when comparing baseline to the 5-week post phase.



### Design 2: Change in Pretest-Posttest Scores?

Increases in student test scores are clear seen in graphs below. Students made gains from pretest-posttest in all areas, with the exception of student 2's word generation posttest.



## Summary

Results from design 1, the multiple baseline across subjects design, found high day-to-day fluctuations in the frequency of students' spontaneous use of icon sequencing and letters on their communication devices. Although slight increases were seen, the fluctuating nature of daily use suggested that students learned little about decoding and icon sequencing. However, pretest-posttest gains clearly demonstrate that students did learn the material. Generalization was seen on the developmental spelling and expressive communication measures which included items that were not taught in the intervention. Given the short intervention (5-7 weeks) and the pretest-posttest gains, the results are educationally significant. The findings suggest that integrated communication, decoding and spelling instruction based on constructivist-based practices was successful in teaching students decoding and icon sequencing. Further research is needed into methods that teach students to take this knowledge and to further generalize it to spontaneous communication.

## Literacy Instruction Implications

- Students with significant disabilities CAN learn phonics. They are not "sight word only" readers.
- Making Words with Letters & Word Wall instruction was an effective approach to teaching phonics.
- Students with significant disabilities can learn to read *without* the use of picture-supported text.
- Developmental spelling was a useful indicator for understanding students' knowledge of phonics.

## Communication Instruction Implications

- Logic underlying Unity facilitated student problem solving/use of a strategy.
- Students need to have ongoing access to their devices. Students' devices were not consistently available. This may have limited daily use and opportunities for generalization.

## Overall Educational Implications

- Student progress can be measured over time. Day to day measures did not capture gains in knowledge measured on the pre-posttests.
- Instruction that integrates device vocabulary and reading instruction can be a useful way to design lessons for other AAC systems.
- Constructivist based instruction was an effective teaching approach and offers an alternative to the traditional behaviorist based approach.

For more information see: Hanser, G., & Erickson, K. (2007). Integrated word identification and communication instruction for students with complex communication needs: preliminary results. *Focus on Autism and Other Developmental Disabilities*, 22(4), 268-27.