Benefits of Computer Assisted Instruction on Early Literacy Skills in Young Children

Alyson Rodman
Benefits of CAI on Early Literacy Skills in Young Children

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Lexia Learning Systems
“Our Data Has Faces”
Of the more than 20 million children ages 0-5 in the US, about 5.5 million are enrolled in early childhood education.

By the age of five, children entering kindergarten differ greatly in their linguistic and cognitive skills.

Children from low SES backgrounds are the most likely to enter school unprepared.

Young children who demonstrate strong early literacy skills do better learning to read in the primary grades.

National Institute for Literacy: NELP Report
Skills that begin to develop in the preschool years, such as alphabet knowledge, phonological awareness, letter writing, print knowledge, and oral language.

Early Literacy Skills can be a strong predictor of later literacy development:

- Alphabet Knowledge: Letter names and sounds
- Phonological Awareness: Ability to manipulate sounds in words
- Rapid Naming: Quick identification of letters, objects, or numbers
- Writing Letters: In isolation or the child’s own name
- Phonological memory: Remembering and recalling spoken content

Code-focused intervention can improve literacy skills

National Institute for Literacy: NELP Report
Challenges Facing Early Childhood Educators:

- New Standards: Common Core and new state policies are pushing literacy skills into lower grades
- Balancing Skills Instruction with Social-Emotional Development
- Significant Individual Differences in Student Readiness
- Lack of resources, time, and materials
Systematic and structured
Dynamic Practice and Unlimited Repetition
Independent and Individualized
Engaging
Intensive and Consistent
Flexible Implementation
Lexia Learning Systems:
Early Reading and Primary Reading

- Phonological awareness/phonic word attack skills
- Immediate corrective feedback
- Differentiated practice using recursive branching
- Focused learning environment
Lexia Learning Systems: Dynamic Branching and Embedded Assessment

- Collects Real-Time Data on Each Student's Performance
- Provides Scaffolded Support and Feedback Along the Way
- Supplies Unlimited, Additional Practice when Necessary
- Uses Student Data to Create Reports and Inform Instruction
Lexia Learning Systems: Sample Activities

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Research Review: Comparing CAI to Classroom Reading Instruction

- Mitchell and Fox (2001):
  Found that for Kindergartners and low-performing first graders, activities from *Daisy Quest* and *Daisy’s Castle* (CAI program) were as effective as teacher instruction in building phonological skills.

- Lonigan et al. (2003):
  At-risk preschool students in the treatment group using *Daisy Quest* and *Daisy’s Castle* made greater gains than controls on tests of phonological skills.
Hecht and Close (2002): At-risk kindergartners receiving PA training using Waterford Early Reading Program scored higher in letter-sound knowledge, phonological skills, and word reading than controls.

Cassady and Smith (2003): Kindergartners using WERP made greater gains than controls on tests of phonological awareness. The importance of integrating CAI into classroom instruction is highlighted.
Macaruso, McCabe & Hook (2006):
Using Lexia *Phonics Based Reading* and *Strategies for Older Students* with first grade students we found significant differences between treatment and control groups for 1st grade Title I students.

Macaruso and Walker (2008):
Using Lexia *Early Reading* with matched kindergarten classes we found higher post-test scores on measures of phonological awareness for Treatment students with group differences more dramatic for low performers.
Research Review: Effectiveness of *Lexia Reading* as a CAI program

First Grade: Title I Students

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>Post-test</th>
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<tbody>
<tr>
<td>Lexia Title I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Title I</td>
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</tbody>
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Mean NCE Scores
Research Review: Effectiveness of *Lexia Reading* as a CAI program

Kindergarten Highly Controlled Design

- **Lexia, 55.8**
- **Control, 41.6**

Gates-MacGinitie – Mean NCE Scores
Current Study:

Lexia Reading as CAI for Early Childhood

- Extension of previous study:
  Preschool classes using Lexia *Early Reading*

- Replication of previous study:
  Larger sample of low-performing kindergartners using Lexia *Early Reading* and *Primary Reading*
Current Study: Preschool Students

- Public School Early Childhood Education program:
  Revere, MA – urban district north of Boston

- Pairs of classes taught by the same teacher

- Random assignment of classes:
  4 treatment and 4 control groups

- Four pairs of classes in study:
  Treatment classes showed sufficient CAI use

- Same curriculum for all classes:
  Language and Emergent Literacy Skills
Public School Kindergarten classes
Revere, MA – urban school district north of Boston

Six treatment classes and two control classes

Analyses restricted to low performers
Total Test standard scores on GRADE equal to or below 85

Only students with sufficient CAI use in treatment group

Same curriculum for all classes
Scott Foresman Reading Street
Preschool
- CAI use in classroom
- 2 or 3 weekly (10–15 minute) sessions over four months
- Sufficient CAI use – at least 200 minutes
- 19 treatment and 19 control students

Kindergarten
- CAI use in classroom (3 classes) or laboratory (3 classes)
- 2 or 3 weekly (15–20 minute) sessions over seven months
- Sufficient CAI use – at least 600 minutes
- 47 treatment and 19 control students
Preschool (Level P)
- phonological awareness
- visual skills
- concepts
- listening comprehension

Kindergarten (Level K)
- phonological awareness
- early literacy skills
- listening comprehension
- word reading (10 item pretest / 20 item post-test)
Preschool Results: Total Test Gains

- Lexia, 101.2
- Control, 96.1

Grade Test Standard Scores

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<thead>
<tr>
<th>Pre Test</th>
<th>Post Test</th>
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<tr>
<td>96.1</td>
<td>96.1</td>
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<tr>
<td>98.0</td>
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<td>104.0</td>
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</table>
Preschool Results: Phonological Awareness

GRADE Test Raw Scores

<table>
<thead>
<tr>
<th></th>
<th>Pre Test</th>
<th>Post Test</th>
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<tbody>
<tr>
<td>Lexia</td>
<td>8.4</td>
<td>15.8</td>
</tr>
<tr>
<td>Control</td>
<td>12.4</td>
<td>12.6</td>
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</tbody>
</table>
Kindergarten Results: Total Test Gains

GRADE Test Standard Scores

Pre Test  Post Test

Lexia, 98.7
Control, 94.1
Kindergarten Results: Word Reading

- Pre Test: Lexia, 8.7
- Post Test: Lexia, 9.0
- Pre Test: Control, 7.7
- Post Test: Control, 8.0
Phonics-based CAI enhances early literacy skills in preschoolers and kindergartners

Benefits for preschoolers mainly in phonological awareness

Low performers in kindergarten show overall benefits: Most notably in word reading
Best Practices: Successful Implementation

- Carefully Select and Integrate programs with Curriculum
- Partner with your Tech Department/Coordinator to ensure success
- Establish a schedule to promote consistent student use
- Provide Professional Development for staff and set expectations for the use of data
**Best Practices: Classroom Recommendations**

- Use centers as a way to rotate students through independent technology and literacy skill building
- Use multisensory/multimodal approaches to integrating technology and literacy instruction
- Display content and progress data visually to reinforce what students are doing independently
- Encourage cooperative learning
- Model the rich literacy skills you are teaching
Questions?
Thank You!

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