Effective Early Childhood Education Programs:  
A Systematic Review

Educator’s Summary
September, 2010

The education of young children who are at risk for school failure is widely recognized as an important factor in determining future school success. Previous reviews of programs for children between the ages of three and five, or before they begin kindergarten, demonstrate that early childhood education is a worthwhile investment.

This report systematically reviews research on the outcomes of programs that teach young children in a group setting before they begin kindergarten. The purpose of the review is to:

(i) assist educators and policy makers in selecting the types of programs to implement
(ii) inform researchers about the current evidence on early childhood programs and guide further research

Need for a Review

Recent brain research and other research on cognitive development are reinforcing evidence that early education is crucial in getting children off to a good start in life. Based in part on this research, local and national policymakers are establishing new early childhood programs and trying to improve the quality of the ones that exist. Evaluations of Head Start have demonstrated mixed findings. While there have been positive impacts on social development and health outcomes, there has been little impact on oral language development, an important precursor to success in school.

Recent reviews of educational programs and practices have found that investing in children’s early education pays off in terms of later success in school (Camilli, Vargas, Ryan, & Barnett, 2009; Chambers et al., 2006; Coghlan et al., 2009). However, a more focused meta-analysis of the effects of early childhood curricula on children’s receptive and expressive vocabulary found that interventions did not differ from their respective control groups on vocabulary development (Darrow, 2009).

Many new programs have been developed and evaluated in recent years. The findings from these recent evaluations need to be synthesized to help policy makers and practitioners decide which programs are ready to be implemented.
The Present Review

The present report reviews the evidence for the effectiveness of early childhood programs, applying consistent methodological standards to the research. The aim of this review is both to assist educators and policy makers in deciding on the types of programs to implement and to inform researchers about the current evidence on preschool programs and guide further research. The scope of the review includes all types of programs that child care center directors, Head Start directors, or principals might consider adopting to prepare their children for success in elementary school and beyond.

Review Methods

The review uses a form of best evidence synthesis, adapted for use in reviewing “what works” literatures in which there are generally few studies evaluating each of many programs. Best-evidence syntheses apply consistent, well-justified standards to identify unbiased, meaningful information from experimental studies, discussing each study in some detail, and pooling effect sizes across studies in substantively justified categories.

Search Procedures

The Center for Reviews and Dissemination (CRD) at the University of York conducted an exhaustive initial search to locate all studies that have compared alternative approaches to early childhood education from 1960 to the present. Studies from all countries were included, as long as the studies were available in English. Study inclusion criteria included the use of randomized or matched control groups, evidence of initial equality, and study duration of at least 12 weeks.

Studies included valid measures of language, literacy, phonological awareness, mathematical, and/or cognitive outcomes that were independent of the experimental treatments. A few key studies have followed subjects into secondary school and even adulthood. The outcomes that were included to assess the long-term effects of the interventions were education and social adjustment factors such as delinquency/crime, employment, teenage pregnancy, and graduation from higher education.

The studies compared children taught in classes using a given program or specified replicable practice to those using an alternative program or standard practices. The group setting could be prekindergarten or preschool classes in elementary schools, child-care centers, or Head Start centers. Any early childhood setting that offered a regularly scheduled educational program to a group of preschoolers was included.
Studies without control groups, such as pre-post comparisons and comparisons to “expected” scores, were excluded. Studies need to have least two teachers and 25 children per condition in the analysis with no indications of initial inequality.

A total of 38 studies evaluating 27 different programs met these criteria for outcomes assessed at the end of preschool and/or kindergarten.

**Effect Sizes**

In general, effect sizes were computed and pooled across studies for each program and for various categories of programs. Effect sizes were broken down for measures of language, literacy, phonological awareness, mathematics, and cognition outcomes.

**Importance of Lasting Effects**

In studies of early childhood programs, it is often the case that children in innovative treatments are taught skills not ordinarily introduced until the following year, in which case it is not surprising that they improve on measures administered at the end of preschool. For this reason, it is particularly important to document outcomes at least through the end of kindergarten and hopefully beyond.

**Program Ratings**

The review concludes that on academic outcomes at the end of preschool and/or kindergarten, of the 27 early childhood programs included in the review, six showed strong evidence of effectiveness and five had moderate evidence of effectiveness. Programs were rated as follows.

**Strong Evidence of Effectiveness**

Six early childhood programs produced strong evidence of effectiveness, with a sample size-weighted effect size of at least +0.20 in at least two studies, one of which was randomized. The effects for these programs were on language, literacy, and/or phonological awareness. For some of the studies, the meaningful effects were seen only at the end of preschool (*Direct Instruction and Interactive Book Reading*), and for others, positive effects were apparent at the end of kindergarten (*Curiosity Corner, ELLM, and Ready Set Leap!*).
<table>
<thead>
<tr>
<th>Rating</th>
<th>Program</th>
<th>Description</th>
<th>Contact / Website</th>
</tr>
</thead>
</table>
| ★      | Curiosity Corner                             | A comprehensive cognitive-developmental program developed by the Success for All Foundation. It aims to develop the attitudes, skills, and knowledge necessary for later school success with an emphasis on children’s language and literacy skills.                                                                                                                                  | E-mail: sfainfo@successforall.org  
Website: www.successforall.org/Programs/curiositycorner.html                        |
| ★      | Direct Instruction                            | A teacher-directed program in which specific cognitive and literacy skills are broken down into small units and taught explicitly. The main focus of the program is on basic academic concepts, such as arithmetic and reading.                                                                                                                                         | E-mail: info@nifdi.org  
Website: www.nifdi.org                                                              |
<p>| ★      | Early Literacy and Learning Model (ELLM)     | A literacy-focused curriculum and support system designed for young children from low-income families. The ELLM curriculum and support system is designed to enhance existing classroom curricula by specifically focusing on children’s early literacy skills and knowledge.                                                                                                        | Website: <a href="http://www.unf.edu/dept/fie/ellm">www.unf.edu/dept/fie/ellm</a> - plus-home.html                                |</p>
<table>
<thead>
<tr>
<th>Rating</th>
<th>Program</th>
<th>Description</th>
<th>Contact / Website</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Interactive Book Reading</td>
<td>A program designed to promote the language and literacy proficiency of young children. Teachers actively engage their children in shared reading time by asking open-ended questions, encouraging them to use newly acquired vocabulary from the book, and providing opportunities to elaborate on what children read and hear.</td>
<td>No contact information currently available</td>
</tr>
<tr>
<td></td>
<td>Let's Begin with the Letter People</td>
<td>A program that emphasizes early language and literacy development through play. In addition to classroom teaching, the program has a strong home/parent component.</td>
<td>Website: <a href="http://www.abramslearningtrends.com/lets_begin_with_letter_people.aspx">www.abramslearningtrends.com/lets_begin_with_letter_people.aspx</a></td>
</tr>
<tr>
<td></td>
<td>Ready Set Leap!</td>
<td>A comprehensive preschool curriculum which combines literacy-focused instructional approaches with multisensory technology. The program stresses the importance of experiential learning, social and emotional development, teacher-child relationships, and home-school connections.</td>
<td>Website: <a href="http://www.leapfrogschoolhouse.com">www.leapfrogschoolhouse.com</a></td>
</tr>
</tbody>
</table>
Moderate Evidence of Effectiveness

Five programs had at least one randomized or two matched studies and a weighted mean effect size of at least +0.20.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Program</th>
<th>Description</th>
<th>Contact / Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>Breakthrough to Literacy</td>
<td>A systematic and integrated literacy and language program which aims to promote language development and literacy skills among preschool children. The program uses systematic, direct instruction built around a series of weekly books in the classroom.</td>
<td>Website: <a href="http://www.breakthroughtoliteracy.com">www.breakthroughtoliteracy.com</a></td>
</tr>
<tr>
<td>☐</td>
<td>Bright Beginnings</td>
<td>An integrated curriculum with a focus on language and early literacy. The curriculum goals are to provide a child-centered, literacy-focused program that is consistent, and to include instruction that addresses the needs of the whole child.</td>
<td>Website: <a href="http://www.cms.k12.nc.us/cmsdepartments/ci/pre-kservices/Pages/default.aspx">www.cms.k12.nc.us/cmsdepartments/ci/pre-kservices/Pages/default.aspx</a></td>
</tr>
<tr>
<td>☐</td>
<td>PreK Mathematics Plus DLM Software</td>
<td><em>PreK Mathematics</em> is a supplemental curriculum designed to develop informal mathematical knowledge and skills in preschool children with content organized in seven units. The <em>DLM Early Childhood Express</em> math software includes 26 numerical, quantitative, geometric, and spatial activities.</td>
<td>E-mail: <a href="mailto:SEG_customerservice@mcgraw-hill.com">SEG_customerservice@mcgraw-hill.com</a></td>
</tr>
</tbody>
</table>

The Best Evidence Encyclopedia is a free web site created by the Johns Hopkins University School of Education’s Center for Data-Driven Reform in Education (CDDRE) under funding from the Institute of Education Sciences, U.S. Department of Education.
<table>
<thead>
<tr>
<th>Rating</th>
<th>Program</th>
<th>Description</th>
<th>Contact / Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>☑</td>
<td>DLM Express plus Open Court</td>
<td>The <em>DLM Early Childhood Express</em> program is a comprehensive curriculum, designed to promote children’s social, emotional, intellectual, aesthetic, and physical development. <em>Open Court Reading Pre-K</em> contains eight thematic units that address children’s identity, families, friends, social interactions, transportation, the physical senses, nature, and transitions.</td>
<td>Website: <a href="http://www.sraonline.com/oc_home.html">www.sraonline.com/oc_home.html</a></td>
</tr>
<tr>
<td>☑</td>
<td>Project Approach</td>
<td>A set of teaching strategies that enables teachers to guide children through in-depth investigations of real world topics. The curriculum is designed to use children’s interests as the starting point for organizing and developing classroom learning activities.</td>
<td>Website: <a href="http://www.projectapproach.org">www.projectapproach.org</a></td>
</tr>
</tbody>
</table>
Limited Evidence of Effectiveness: Strong Evidence of Modest Effects

Three programs met the criteria for ‘moderate evidence of effectiveness,’ except that they had lower weighted mean effect sizes, between +0.10 and +0.19, on one or more outcome clusters.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Program</th>
<th>Description</th>
<th>Contact / Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>🟢</td>
<td>Doors to Discovery</td>
<td>A preschool program that is based on oral language, phonological awareness, concepts of print, alphabet knowledge, writing, and comprehension. The program focuses on the use of learning centers and shared literacy activities in the preschool classroom.</td>
<td>Website: <a href="http://www.wrightgroup.com">www.wrightgroup.com</a></td>
</tr>
<tr>
<td>🟢</td>
<td>Language Focused Curriculum</td>
<td>A curriculum that has a thematic organization and focuses on the use of daily dramatic play to teach and use linguistic concepts. There are both teacher-led and child-led activities with explicit attention to oral language development that is enhanced by teacher-child conversations.</td>
<td>Website: <a href="http://www.brookespublishing.com/store/books/bunce-69223/index.htm">www.brookespublishing.com/store/books/bunce-69223/index.htm</a></td>
</tr>
<tr>
<td>🟢</td>
<td>Literacy Express</td>
<td>A preschool curriculum that is designed to promote children’s emergent literacy skills. The curriculum is structured around thematic units that are sequenced in order of complexity.</td>
<td>E-mail: <a href="mailto:phillips_literacyexpress@live.com">phillips_literacyexpress@live.com</a></td>
</tr>
</tbody>
</table>

The Best Evidence Encyclopedia is a free web site created by the Johns Hopkins University School of Education’s Center for Data-Driven Reform in Education (CDDRE) under funding from the Institute of Education Sciences, U.S. Department of Education.
**Limited Evidence of Effectiveness: Weak Evidence with Notable Effects**

Four programs had a weighted mean effect size of at least +0.20, but did not qualify for ‘moderate evidence of effectiveness’ due to insufficient numbers of students.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Program</th>
<th>Description</th>
<th>Contact / Website</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EMERGE</td>
<td>A literacy-based program designed to help children from low-income families acquire early literacy skills. The program supports children’s development of four early literacy skills.</td>
<td>E-mail: <a href="mailto:mgetting@wisc.edu">mgetting@wisc.edu</a></td>
</tr>
</tbody>
</table>
|       | PATHS             | A social-emotional curriculum, delivered in a developmentally-appropriate sequence. The curriculum emphasizes affective awareness of self and others, targeting children’s ability to self-regulate their behavior. | E-mail: prevention@psu.edu  
Website: www.prevention.psu.edu/projects/PATHS.html          |
|       | Sound Foundations | A phonemic awareness program that focuses on recognition of phoneme identity across words with special attention paid to nine key phonemes. Large pictorial posters with words using these key phonemes are used in the class to help children learn them. | Website:  
www.macmillanenglish.com/methodology/books/Sound-Foundations.htm |
Insufficient Evidence of Effectiveness

Studies of the following programs did not meet the criteria for limited evidence of effectiveness.

BELL
Creative Curriculum
DARCEE
Dialogic Reading
Ladders to Literacy
Montessori
Project Construct
REDI
Tools of the Mind
Waterford

No Qualifying Studies

These programs did not have any qualifying studies.

Abecedarian
Building Blocks
Early Authors Program
High/Scope
Reggio Emilia
Scholastic Preschool Program

Program Ratings Basis

Strong Evidence of Effectiveness

Programs in this category were evaluated in at least two studies, one of which is a large randomized or randomized quasi-experimental study, or multiple smaller studies, with a sample size-weighted effect size of at least +0.20, and a collective sample size across all studies of 250 students or 20 classes. The effects can be on any of the academic or cognitive outcomes, at the end of preschool and/or kindergarten.

Moderate Evidence of Effectiveness

Programs in this category were evaluated in at least one randomized or two matched studies of any qualifying design, with a collective sample size of 125 students or 10 classes, and a weighted mean effect size of at least +0.20 across all measures in a particular domain.
Limited Evidence of Effectiveness: Strong Evidence of Modest Effects

Programs in this category have studies that meet the criteria for ‘moderate evidence of effectiveness’ except that the weighted mean effect size is $+0.10$ to $+0.19$ across all measures in a particular domain.

Limited Evidence of Effectiveness: Weak Evidence with Notable Effects

Programs in this category have studies that have a weighted mean effect size of at least $+0.20$, but do not qualify for ‘moderate evidence of effectiveness’ due to insufficient numbers of studies or small sample sizes.

Insufficient Evidence of Effectiveness

Qualifying studies do not meet the criteria for ‘limited evidence of effectiveness.’

No Qualifying Studies

Programs in this category do not have any qualifying studies.

Discussion

This systematic review identified several programs with positive effects on important outcomes continuing to the end of kindergarten and beyond, suggesting that the preschool experience had impacts not limited to early exposure to academic content. Hopefully, additional longitudinal studies will be conducted to determine the long-term impacts of the current programs, most of which combine elements of academic instruction with more child-initiated activities.

Beyond the curricular emphasis, another factor that differentiates programs is the degree of support that the teachers are provided in implementing the new curriculum. In most of the studies reported here, teachers received more support for implementation of the program than teachers typically receive when the program is implemented at scale. It usually takes ongoing support for teachers to learn to implement the innovative forms of instruction that new programs require. Researchers need to conduct research on educational programs as they are implemented at scale, without the additional support often provided in experimental studies.

Conclusion

The findings of this review add to a growing body of evidence that early childhood programs can have an important impact on increasing the school readiness of young children. There is a
tremendous need for systematic, large-scale, longitudinal, preferably randomized evaluations of the effectiveness of preschool interventions in bringing children from high-risk environments to normative levels of academic achievement. However, this review identifies several promising approaches that could be used today to help children begin elementary school ready to succeed.

Full Report

The full report can be downloaded at www.bestevidence.org.