Issues in Early Childhood Education

Prepared for Arlington Public Schools

In this literature review, The Hanover Research Council examines key topics in early childhood education. In particular, we explore recent scholarly research and policy recommendations related to: early literacy, early mathematics concept development, school readiness among preschoolers, and the three domains of the Classroom Assessment Scoring System (CLASS). We organize our discussion according to three prominent themes in the literature, including: the integrated and inter-related dimensions of early childhood education; holistic approaches to preschool education emphasizing academic achievement and social-emotional development; and recommendations and guidelines for early childhood educators and policymakers.
Introduction

Within the research on early childhood education, there is strong evidence suggesting the short- and long-term benefits of a high-quality preschool education for children’s future academic success, social development, and school readiness.¹ A number of studies have indicated that children who attend a high-quality early childhood education program are more ready for kindergarten and have better language and cognitive skills in early elementary grades than children who do not attend such programs.² As the literature suggests, these benefits may also accrue throughout a child’s life. Specifically, a number of studies have demonstrated that children who attend a high-quality preschool program tend to complete more years of education, are more likely to attend a four-year college, and often earn higher incomes later in life.³ In light of these benefits, policymakers and leaders in early childhood education are evaluating the best strategies for investing in early childhood education programs, developing rich curricula and effective instructional tools, and preparing teachers to address the learning needs of young children.

In the following report, Hanover provides a literature review of some central topics within early childhood education by exploring a variety of academic and professional sources, including peer-reviewed journals; academic books; studies, reports, and newsletters by federal agencies, professional associations, and education non-profit organizations; and general education websites. Specifically, we identify recent and major publications within the research and policy communities related to:

- Early literacy for three and four year olds
- Early mathematics concept development
- Encouraging school readiness among preschoolers
- Domains of the Classroom Assessment Scoring System (CLASS)

Topics in Early Childhood Education

In general, we found that the academic and policy literature within each of the four above areas in early childhood education tend to overlap and inform each other. Given the mutually constitutive nature of academic and policy-oriented discourse in early childhood education, we have identified the following themes and trends in the current literature. While by no means comprehensive, this list offers an introductory overview of some of the major areas of inquiry, research topics, and policy concerns within each subfield of early childhood education:

² Ibid., 1.
³ Ibid., 2.
Early Literacy for Three and Four Year Olds

According to the literature, the development of early literacy skills is highly correlated with children’s long-term academic success. Per the research in this area of inquiry, scholars are interested in identifying the precise mechanisms by which early literacy skills are developed and how they translate into future academic achievement. Guided by research findings, policymakers are interested in exploring best practices within the classroom, school, and policymaking world that promote early skills development. Although the research and policy communities explore concepts in early literacy from different analytical perspectives, in general there appears to be significant overlap in terms of the kinds of research questions and practical concerns raised by each, including:

- The inter-relationships between early literacy and later academic achievement, social-emotional development, and language development;
- Pedagogical strategies and best practices in preschool instruction that encourage literacy development;
- Guidelines for the development of a preschool curriculum emphasizing early literacy acquisition;
- The promotion of early literacy standards at the state and national levels;
- Evaluations of current instructional practices, curricula, and current state initiatives to promote early literacy.

Early Mathematics Concept Development

Despite scholarly findings indicating that children have an innate ability to understand mathematical concepts, the literature indicates that current preschool programs do not place enough emphasis on early mathematical skills development. This disconnect between research and practice has stimulated discussion about the best strategies for promoting early mathematics education in preschool programs. In particular, the literature suggests several lines of inquiry, including:

- Children’s proven ability to perform mathematics;
- Evaluations of current curricula and teaching strategies with regard to early mathematics education;
- The need for more advanced mathematical content in preschool curricula;
- The demand for more specialized teacher training in mathematical instruction;
- The value of incorporating a variety of pedagogical practices – such as free time and planned instruction – in teaching mathematics to young children;
- The role of technology as an instructional tool for mathematical concepts.

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Developing School Readiness

As a multidimensional objective of early childhood education, school readiness is defined as the “skills, knowledge, behaviors, and accomplishments that children know and can do as they enter kindergarten in…social and emotional development, approaches to learning, language and literacy development, creativity and the arts, cognition and general knowledge, and physical well being and motor development.”

Like the literature on early literacy and early mathematics concept development, research on school readiness among preschoolers effectively combines both academic and policy concerns. To this extent, the following literature suggests several common themes in both academic and policy-oriented arenas:

- Evaluations of current preschool programs’ impact on students’ level of school readiness;
- The proven positive correlation between attendance in a high-quality preschool program and school readiness;
- Defining school readiness and “ready schools” in terms of selected indicators;
- The value of social-emotional development, including supportive interpersonal relationships, in promoting school readiness among preschoolers;
- Need for further teacher training in strategies for promoting social-emotional development.

Domains of the Classroom Assessment Scoring System (CLASS)

The Classroom Assessment Scoring System (CLASS) is an observational tool developed by researchers at the University of Virginia in 2003 to evaluate classroom quality. Used in over 2,000 classrooms, CLASS “describes multiple dimensions of teaching that are linked to student achievement and social development.” Generally speaking, the CLASS research tool elucidates key features of instructional quality that are relevant for policymakers, including strategies for improving student-teacher interactions and providing more directed teacher training. Among the topics of discussion within the literature on the CLASS observation tool are:

- A description of and rationale for specific domains of the CLASS;
- The relationship between classroom quality and overall effectiveness of preschool programs;
- Positive assessment of emotional climate and need for improved instructional quality across the country’s preschool classrooms;

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7 Ibid.
The need to provide preschool teachers with training resources for improving instructional quality.

Roadmap of Literature Review

Having noted the main issues and research trends within each of the four topics, we organize the following literature review according to three overarching themes that extend across each of the topics in early childhood education. The following list is an overview of the thematic areas and corresponding subthemes presented in this report:

- **Integrated and Inter-related Dimensions of Early Childhood Education**
  - Role of preschool curricula in children’s school readiness, and early literacy and mathematical skills development;
  - Nexus between early literacy, mathematical skills development, and school readiness as an objective of preschool education;
  - Utility of CLASS in assessing the quality of preschool programs in terms of emotional support, classroom organization, and instructional support.

- **Holistic Approaches to Early Childhood Education Emphasizing Academic Achievement and Social-Emotional Development**
  - Value of promoting social-emotional development within the preschool classroom;
  - Academic skill development in the context of supportive emotional and instructional environments;
  - Relationship between social-emotional development and school readiness of young children.

- **Recommendations and Guidelines for Early Childhood Educators and Policymakers**
  - Best practices in curricula and instructional strategies for early childhood teachers for the promotion of early literacy and mathematical skills;
  - Importance of strong administrative leadership within preschools and early childhood education programs;
  - Policy recommendations for state political leaders.
Integrated and Inter-Related Dimensions of Early Childhood Education

Summary

Early literacy, mathematics concept development, school readiness, and the relevance of the CLASS observation tool are each treated as distinct research topics within the wealth of scholarship on early childhood education. However, as our overview of the literature suggests, these topics are in fact organically related. For example, just as progress in children’s understanding of mathematics suggests gains in early literacy skills, school readiness is comprised of a number of broad influences such as classroom quality and children’s academic achievements in literacy and mathematics. To treat each of these research areas as analytically distinct would be to overlook significant inter-relationships between them. As a result of this synthesis, Hanover identified several points of intersection across the literature, including the:

- Role of preschool curricula in children’s school readiness, and early literacy and mathematical skills development;
- Nexus between early literacy, mathematical skills development, and school readiness as an objective of preschool education;
- Utility of CLASS in accounting for quality of preschool programs in terms of emotional support, classroom organization, and instructional support.

For the purposes of organization, we arrange our discussion of the literature according to these sub-themes.

Literature Review

* A significant amount of research in the field of early childhood education focuses on the impact of preschool curricula on children’s school readiness and academic skills development.*

In a comprehensive nation-wide study of preschool programs servicing children from predominantly low-income families, the National Center for Education Research explores the effects of 14 curricula on preschoolers’ and kindergarteners’ school readiness. The authors examined the impact of different curricula on students’ reading and pre-reading skills, phonological awareness, early language, early mathematics knowledge, and behavior (including problem behaviors and social skills), all of which are correlated with academic success in elementary school. The study concludes by examining each of the 14 curricula’s impact on (1) student-level outcomes in pre-kindergarten; (2) student-level outcomes in kindergarten; and (3)

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classroom-level outcomes in pre-kindergarten. Among the curricula which were found to have no impact on either preschool student-level or classroom-level outcomes were Early Literacy and Learning Model (ELLM), Language-Focused Curriculum, Project Approach, Project Construct, and Ready, Set, Leap! On the other hand, the following list briefly summarizes the positive outcomes for curricula that were able to demonstrate an effect on preschool student-level and/or classroom-level outcomes:

- **Bright Beginnings**: A positive impact was found at the classroom level on early literacy instruction and phonological awareness instruction.
- **Creative Curriculum**: A positive impact was found at the classroom level on overall classroom quality, teacher-child relationships, early literacy instruction, and early language instruction.
- **Creative Curriculum with Ladders to Literacy**: A positive impact was found at the classroom level on early literacy instruction.
- **Curiosity Corner**: A positive impact was found at the classroom level on early language instruction.
- **DLM Early Childhood Express supplemented with Open Court Reading Pre-K**: A positive impact was found on reading, phonological awareness, and language development in pre-kindergarten. A positive impact was found at the classroom level on phonological awareness instruction.
- **Doors to Discovery**: A positive impact was found at the classroom level on early literacy instruction and early language instruction.
- **Let’s Begin with the Letter People**: A positive impact was found at the classroom level on classroom quality and early literacy instruction.
- **Literacy Express**: A positive impact was found at the classroom level on classroom quality and phonological awareness instruction.
- **Pre-K Mathematics supplemented with DLM Early Childhood Express Math Software**: A positive impact was found on students’ mathematical knowledge at the end of pre-kindergarten.

In a study of the state-wide preschool program in Oklahoma, authors Gormley et al. discuss the value of a preschool education in terms of children’s academic and social development. As one of the country’s most highly-regarded preschool programs, the Oklahoma state pre-kindergarten program reaches a higher percentage of four-year olds than any other state system. Given the wide reach of pre-kindergarten programs in the state, the authors conducted a study of preschoolers in the Tulsa Public Schools (TPS) system on several aspects of school readiness. Through regression analysis, the study concludes that the TPS preschool program “sharply improved” preschoolers’ cognitive development on indicators such as letter-word

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11 Ibid.
identification, spelling, and applied problems. Overall, the reported effects were higher than predicted, and somewhat greater than the effects noted by the top five preschool programs in the country.\textsuperscript{13} The authors also examined Head Start programs in Tulsa, and found improvements in cognitive ability, though less than the TPS effects.\textsuperscript{14}

Bierman \textit{et al.} corroborate the effects of the Head Start curriculum in their recent study, entitled “Promoting Academic and Social-Emotional School Readiness: The HEAD START-REDI Program.”\textsuperscript{15} In this article, the authors explore the impact of REDI (Research-based Developmentally Informed) intervention targets in specific competencies of school readiness of preschool children in low-income or disadvantaged households. Specifically, the authors were concerned with the following target skills:\textsuperscript{16}

- **Social-Emotional Skills**
  - Effective Pro-Social Skills (helping, sharing, taking turns)
  - Self-Regulation Skills (controlling aggression)
  - Emotional Competence (recognizing and regulating emotions)
  - Social Problem-Solving Skills

- **Language and Emergent Literacy Skills**
  - Oral Language Skills (vocabulary, syntax)
  - Emergent Literacy (phonological awareness, print knowledge)

As part of the year-long intervention study, the authors compared a sample of Head Start preschool classes with Head Start REDI enriched classrooms. The specific instructional components in the REDI intervention included brief lessons, hands-on extension activities, and skill-specific instruction. In conclusion, Bierman \textit{et al.} found support for the REDI enriched curriculum vis-à-vis the dimensions of social-emotional skills and language and emergent literacy skills. Specifically, students exposed to the REDI enriched curriculum outperformed the control group on one of three measures of language development and two of three measures of emergent literacy.\textsuperscript{17} As the primary take-away from this study, the authors suggest that current Head Start programs do not sufficiently address critical aspects of school readiness.

\textsuperscript{13} Ibid., 1724.
\textsuperscript{14} Ibid.
\textsuperscript{16} Ibid., 1803-1805.
http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/43/87/ca.pdf
Given the significance of effective preschool curricula, a major theme within the literature relates components of school readiness to academic achievement in early literacy and mathematical skills development.

As a factor in school readiness, social-emotional development is highly correlated with literacy skills, per the academic literature. Espinosa argues that there is strong evidence that social-emotional development in infancy is the foundation of language development, and that social-emotional well-being continues to affect both language and literacy as the child matures.\(^{18}\) Summarizing previous scholarship in this area of inquiry, Espinosa notes the relationship between “joint attention” during infancy and the development of an expressive vocabulary.\(^{19}\) The paper then goes on to offer an overview of research describing the relationship between language development during the first five years of life and learning to read in elementary school. Among the aspects of language development that are positively correlated with reading skills are the development of vocabulary, narrative skills, and phonological processing,\(^{20}\) while some of the most effective strategies used to promote language learning include play sessions, shared book readings, and high quality early childhood programs.\(^{21}\) Concerning preschool programs in particular, the author offers recommendations for providing an environment that is supportive of children’s social and emotional development, including:\(^{22}\)

- A strong emphasis on oral language development;
- A curriculum that includes school-related skills and knowledge;
- Small class sizes;
- Collaborative and respectful relationships between teachers and parents;
- Well-qualified teachers who engage in collaborative planning, assessment, and reflection.

In addition to providing children with an environment that is linguistically rich and developmentally supportive, teaching mathematics may also help promote early literacy skills. Brenneman et al.’s 2009 study examines the effect of mathematical skills development on early literacy.\(^{23}\) Similar to other findings in this review, Brenneman’s report is based on the assumption that young children have foundational competence in mathematics and science prior to beginning formal schooling. Beyond counting and identifying numbers, preschoolers have noteworthy

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\(^{19}\) Ibid., 33.

\(^{20}\) Ibid., 34-35.

\(^{21}\) Ibid., 36-41.

\(^{22}\) Ibid., 42.

competence in a number of conceptual areas, such as numerical operations, geometry and spatial relations, measurement, algebraic thinking, and data analysis.\textsuperscript{24} Additionally, the report acknowledges the relationship of early mathematical skill development to other aspects of early childhood education, such as school readiness and literacy development. Specifically, studies that explore school readiness suggest that early mathematical development is strongly correlated with later mathematics and reading achievement,\textsuperscript{25} since math interactions expose young children to new vocabulary, abstract reasoning, and oral language development. Given the value of early mathematical education, the report identifies five critical areas of concern:

- Development of Early Learning Standards that focus on the “big ideas” of mathematics, including more advanced mathematical concepts;
- A quality curriculum that encourages learning through experience with concrete materials and objects;
- Viable performance-based assessment measures that identify preschoolers’ learning needs;
- More intensive teacher preparation in math and science competencies;
- Efforts to increase parental involvement in early mathematics education of young children.

Together, mathematics concept development and early literacy skills development comprise a significant part of preschool’s objective in encouraging school readiness. However, as other researchers have noted, the quality of preschool programs also has a considerable impact in terms of preparing children for kindergarten and early elementary school.

To this end, the Classroom Assessment Scoring System (CLASS) has emphasized the importance of quality emotional support, classroom organization, and instructional support in promoting school readiness.

Broadly speaking, the CLASS—as a research-based tool for evaluating the quality of pre-K through third grade education—evaluates three domains that contribute to the classroom quality of early childhood and elementary education programs: emotional support, classroom organization, and instructional support.\textsuperscript{26} The following list provides definitions for the measures of each of the three domains.

- Emotional Support
  - Positive Climate: enjoyment and emotional connection among students and their peers and the teacher.

\textsuperscript{24} Ibid., 2.
\textsuperscript{25} Ibid., 4.
\textsuperscript{26} Classroom Assessment Scoring System. “What is CLASS?” http://www.classobservation.com/what/dimensions.php?type=1
- Negative Climate: degree of anger, hostility, or aggression demonstrated by students or teachers in the classroom.
- Teacher Sensitivity: teacher’s responsiveness to students’ emotional and academic needs.
- Regard for Student Perspectives: extent to which teachers’ interactions with students and classroom activities emphasize students’ interests, points of view, and motivations.

- Classroom Organization
  - Behavior Management: how well teachers monitor, prevent, and redirect children’s behavior.
  - Productivity: how effectively teachers manage time and create classroom routines to maximize time spent on learning activities.
  - Instructional Learning Formats: how teachers engage students in and facilitate activities so that learning opportunities are maximized.

- Instructional Support
  - Concept Development: the extent to which teachers promote higher order thinking and problem solving.
  - Quality of Feedback: how teachers extend students’ learning through their participation and responses in activities.
  - Language Modeling: the degree to which teachers facilitate and encourage children’s language.
  - Literary Focus: the quality with which teachers deliver activities focusing children on “code units” of early literacy, such as letters, words, and phonemes.

Underlying the rationale for the CLASS is the understanding that certain efforts—such as reduced class sizes, teacher education and credentials, and new curricula—are insufficient for ensuring that children benefit from instruction. Rather, the quality of student-teacher interactions is critical for students’ academic and personal success, as well as for the identification of opportunities for teacher education, professional development, monitoring, and evaluation.

More concretely, each of these domains can be operationalized according to observable interactions. With regard to Emotional Support, the Center for Early Education and Development at the University of Minnesota identifies several defining characteristics of each of the four measures.

- In a Positive Climate, teachers and students:

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In a Negative Climate, teachers and students:
  - Frequently express anger towards each other or engage in teasing;
  - Are not able to diffuse conflict;

Teachers are considered sensitive when they:
  - Consistently and effectively respond to students’ questions, concerns, and needs;
  - Are able to anticipate areas of difficulty for their students and provide support;
  - Create an environment in which students feel safe to explore and learn.

Teachers that have considerable regard for student perspectives:
  - Emphasize students’ interests and motivations;
  - Promote students’ autonomy and encourage discussion among students.

In terms of Classroom Organization, the authors present examples of each of the three indicators:

- Behavior Management explores instances when students are more likely to behave, including when:
  - Expectations and rules are clearly articulated;
  - Behavior management is proactive (as opposed to reactive);
  - Students are praised for good behavior.

- Characteristics of highly productive classrooms include:
  - Clearly defined learning activities throughout the school day;
  - Clear expectations and instructions;
  - Fast and efficient transitions between activities.

- Teachers provide high-quality instructional learning formats when they:
  - Provide stimulating learning materials and instruction;
  - Utilize many “modalities” to provide instruction;
  - Seek opportunities to actively engage students.

Instructional Support, the third and final domain of the CLASS observation system for preschool programs, is exemplified in the following situations:

- Effective concept development occurs when teachers:
  - Focus on the process of learning itself;
  - Provide students with problem-solving opportunities;
  - Apply concepts to students’ lives.

- High quality language modeling occurs when teachers:
  - Encourage and elaborate on students’ comments;
  - Engage in meaningful conversations with students;
  - Consistently expose students to a variety of language uses.
High quality feedback is marked by its:
  - Emphasis on the process of learning, rather than factual information;
  - Relevance to specific work of the student;
  - Helpfulness in aiding students attain a deeper understanding of concepts.

In this way, the CLASS domains are not based on the presence of instructional materials, the physical classroom environment, or the use of a specific curriculum; rather, scoring in the CLASS is based entirely on student-teacher interactions.²⁹ Thus, the CLASS focuses on what teachers do with the materials they have. In terms of the validity of the CLASS tool as an accurate measure of instructional quality, each of the domains was derived from a comprehensive review of constructs assessed in classroom observation instruments used in early childhood and elementary education research, literature on effective teaching strategies, focus groups, and pilot studies. Furthermore, many experts have agreed that the CLASS does, in fact, measure facets of the classroom experience that are correlated with student success.³⁰

Using the CLASS observation tool, researchers have highlighted the significance of quality—as a multi-dimensional feature of preschool programs—on children’s academic and social development. In a follow-up study to the National Center for Early Development and Learning (NCEDL) Multi-State study and SWEEP study (presented under Theme 3 in this literature review), Howes et al. examine the degree to which preschoolers demonstrate development in academic achievement and social skills, particularly in relation to classroom quality.³¹ Using NCEDL data provided in the two above-mentioned studies, the authors provide some broad generalizations about preschool classroom quality. Overall, Howes et al. find the quality of children’s classroom experiences is more significant than structural features of preschool programs in predicting development in academic skills and behavior.³² Specifically, the authors conclude:³³

- Children’s small to modest gains in academic and social skills are correlated with classroom instructional climate, and secondarily with teacher-child relationships and the amount of exposure to key areas of instruction.
- Children in high-scoring instructional climate classrooms where teachers both encouraged communication and provided support for students became more proficient in language and early literacy skills.

³⁰ Ibid., 103.
³² Ibid., 47.
³³ Ibid., 45-46.
❖ Gains in school readiness can be attributed to sensitive, responsive interactions with teachers and by teacher-child interactions that focus on skill development.
❖ No correlation was discovered between instructional quality and math gains.
Holistic Approaches to Early Childhood Education Emphasizing Academic Achievement and Social-Emotional Development

Summary

As the previous section illustrated, early childhood education not only addresses children’s emergent academic skills, but it also emphasizes their social development. Many scholars have noted the correlation between children’s academic achievements and positive social-emotional development. As a result, a major theme within the literature emphasizes the need for a holistic approach to early childhood education, taking into consideration children’s social-emotional development and involving the collective efforts of not only preschool educators, but also children’s parents, family members, and the community-at-large. Among some of the key topics within this area of inquiry are the:

- Value of promoting social-emotional development within the preschool classroom;
- Development of academic skills in the context of supportive emotional and instructional environments; and the
- Relationship between social-emotional development and school readiness of young children.

Literature Review

While high-quality instruction is no doubt a significant component of a young child’s preschool education, the CLASS observation tool suggests the value of strategies that promote social-emotional development in the classroom.

In a study of over 200 prekindergarten classrooms, La Paro et al. discuss the development, testing, and use of the CLASS observation tool.34 Concerning the domains of the CLASS, La Paro et al. suggest that the quality of preschool instruction can be used as an alternative measure of accountability among preschool programs. As the authors note, historically, the literature on early childhood education has defined quality in terms of teacher credentials, class size, the provision of materials and other organizational or physical aspects of the classroom.35 However, the authors’ main thesis is that these indicators are irrelevant for measuring quality in pre-k and early elementary education classrooms because of “their reliance on assessments of aspects of the physical environment that have less relevance in publicly funded instructionally oriented settings.”36 Given the value that La Paro et al.

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36 Ibid., 412.
assign to instructional practices as an indicator of quality of early education, the authors note the CLASS domains “can be observed reliably across a variety of classroom settings and serve as a starting point for consensus on the constructs involved in an operational definition of classroom quality for prekindergarten and early elementary classrooms.”37 Within their justification for the CLASS domains, the authors highlight: (1) the foundational importance of student-teacher interactions as a mechanism for contributing to students’ academic achievements; (2) the role of classroom management in establishing structure and promoting learning; and (3) the value of instructional support in encouraging student engagement.38

As one of the main developers of the CLASS observation tool, Robert Pianta offers his perspective on the intrinsic value of a multi-dimensional measurement of classroom quality. In a 2007 article in Education Next, Pianta explores a number of issues related to high-quality early education.39 In particular, he provides background information related to the three domains of the CLASS, including an overview of features of effective instruction, such as:

- Explicit instruction in critical skills
- Sensitive and caring interactions
- Responsive feedback
- Verbal engagement and stimulations
- A classroom environment that is not excessively structured

According to the author, standard measures of teacher quality—such as degrees or experience—are not accurate indicators of high-quality instruction that contributes to students’ success. As Pianta notes, “what we do know is that pre-K teachers’ training in child development, experience in working with young children, and support systems focused on their instructional behaviors and classroom management do matter—for the quality of both of teachers’ social interactions with children and their implementation of curricula.”40

Given the relevance of the CLASS domains, Pianta proposes two strategies for improving classroom quality. Firstly, he calls for a standardization of student-teacher interactions to ensure that effective features of instruction are uniform across early education programs. In addition, he argues for more effective professional development and training systems for teachers in strategies that promote child achievement.

37 Ibid., 412.
38 Ibid., 412-414.
40 Ibid.
Ultimately, learning environments that provide both instructional and emotional support for children are more successful at developing their skills in early literacy and mathematics.

In one of the most widely-cited studies of early literacy development, Snow et al. demonstrate the significance of high-quality instruction in conjunction with an encouraging learning environment.\textsuperscript{41} In Preventing Reading Difficulties in Young Children, the authors identify several reasons why some children may encounter challenges in reading, including difficulty in understanding and using the alphabetic principle; failure to transfer comprehension of oral language to reading and acquire a set of reading strategies; and absence or loss of motivation to read.\textsuperscript{42} While the focus of their recommendations is on literacy instruction in the first through third grades, the authors make some valuable conclusions about the role of preschool education in later child literacy. In particular, the authors emphasize that “excellent instruction is most effective when children arrive in first grade motivated for literacy and with the necessary linguistic, cognitive, and early literacy skills.”\textsuperscript{43} Therefore, the authors recommend “attention to ensuring high-quality preschool and kindergarten environments.”\textsuperscript{44}

With regard to children ages zero to five, the National Institute for Literacy offers specific strategies for instructors and parents to develop children’s literacy ability.\textsuperscript{45} In particular, the Panel identifies a number of conventional literacy skills that have the greatest predictive impact in terms of later literacy achievement, such as decoding, reading comprehension, and spelling.\textsuperscript{46} As the Panel reports, among the skills that have the greatest positive correlation in terms of young children’s literacy are: alphabet knowledge, phonological awareness, rapid automatic naming of letters or numbers, rapid automatic naming of objects or colors, writing (or more specifically, writing one’s own name), and phonological memory. As a result, the Panel identifies the kind of instructional techniques that can enhance these skills as well as environmental factors that contribute to gains in children’s literacy, including:\textsuperscript{47}

- Code-focused interventions for the development of children’s phonological awareness, alphabet knowledge, and phonics;
- Language-enhancement interventions aimed at developing expressive and receptive language skills, phonemic awareness, and verbal intelligence;

\textsuperscript{42} Ibid., 4-5.
\textsuperscript{43} Ibid., 5.
\textsuperscript{44} Ibid., 6.
\textsuperscript{46} Ibid., vii.
\textsuperscript{47} Ibid., See chapters 3 – 5 and chapter 7.
Shared reading practices between children and their parents and/or teachers;
Home and parent programs aimed at improving children’s oral language skills and general cognitive ability.

Similarly, the quality of a child’s learning environment has important implications for their mathematical skills development. In a 2000 publication, the National Council of Teachers of Mathematics (NCTM) lays out a series of standards for mathematical education in preschool through high school. The report stresses that preschool children indeed possess informal mathematical knowledge that can be further developed by adults who provide “environments rich in language where thinking is encouraged, uniqueness valued, and exploration is supported.” Special emphasis is placed on the value of Number and Operations and Geometry standards in preschool through Grade 2, which can be supported through understandings of patterns, measurement, and data. In particular, the report states that “it is absolutely essential that students develop a solid understanding of the base-ten numeration system in prekindergarten through grade 2.”

In a 2007 official position statement, the NCTM lays out the value of early mathematics education for future learning outcomes and the need for more high-quality teaching environments that support mathematical learning opportunities. As the statement notes, among the key features of early mathematics education are learning experiences that incorporate familiar contexts, and build on family relationships, children’s cultural and linguistic backgrounds, and the informal knowledge of young children. The statement also highlights the importance of effective teacher preparation that promotes teachers’ mathematical learning. Combined with teachers’ deep understanding of early mathematics, pedagogical strategies should, as the statement suggests, be comprised of both informal and formal methods that encourage children to communicate and explain their mathematical thinking.

Lastly, social-emotional development and the provision of emotionally-supportive learning environments have been linked to school readiness among three- and four-year-olds.

In an overview of scholarly research in the cognitive, emotional, and social development of young children, Thompson identifies three categories of personal qualities of school readiness, including: intellectual, motivational, and socio-

50 Ibid.
More precisely, the author suggests that the combination of a child’s understanding of (1) basic literacy and mathematical concepts; (2) the value of attending school; and (3) other people’s feelings and perspectives, lays the groundwork for children’s school readiness. Based on the evidence presented within the academic discourse on child development, the author concludes that school readiness is in large part an outcome of a child’s home and/or child care environment. In particular, he specifies two main findings: firstly, the preschool years are a period of “considerable growth in the psychological foundations of school readiness,” and; supportive relationships are the main factor in a child’s positive early social and emotional development. To this effect, the author proposes the following recommendations for facilitating an environment that is conducive to a child’s school readiness, including: strengthening family experiences; improving child care quality; focusing on the transition to kindergarten; and attending to the special needs of vulnerable children.

Groark et al. present a similar conclusion to Thompson. In Evidence-based Practices and Programs for Early Childhood Care and Education, one of book’s central theses is that school readiness among young children is comprised not only of cognitive and early literacy skills, but social-emotional skills as well. To support this claim, the authors present an overview of recent scholarly research on the factors contributing to social-emotional development. Among the identified factors that contribute to a child’s school readiness are: health care (including vision care and a clean and safe environment), emotional development, a positive family and home environment, access to high quality child care, and a supportive community environment. Given the multidimensional nature of school readiness, the authors recommend a comprehensive approach to interventions that can improve a child’s school readiness, including:

- Developing school readiness should be an inclusive effort, involving the participation of parents, the school, and the community.
- Assessments should be in place in order to evaluate a child’s special needs or talents and for educators to be able to develop an individualized plan of study beginning in preschool through elementary school.

53 Ibid., 21.
54 Ibid., 24-25.
56 Ibid., 4.
57 Ibid., 11-17.
58 Ibid., 20-21.
Investing in early childhood education to improve the number of high-quality preschool programs will produce high returns for the community.

In light of the connection between social-emotional development and school readiness, researchers have emphasized the need for more thorough early childhood education policies and instructional strategies. For example, the Kauffman Foundation offers some guidelines for promoting school readiness vis-à-vis social-emotional development of young children.\(^{59}\) In the overview to the Foundation’s comprehensive report on school readiness, the author concludes with five broad policy recommendations:\(^{60}\)

- Social-emotional development and academic achievement are mutually reinforcing and must be understood as representing the “continuum of development” needed for children to succeed in school.
- The knowledge base linking social, emotional, and cognitive development needs to be more widely distributed among policymakers, teachers, and parents.
- Programs need to provide training and education to promote social-emotional development and the importance of strong relationships between young children and their families, teachers, and caregivers.
- Mental health services in community-based settings that are offered to young children and their families can help promote strong social-emotional and cognitive development.
- Policies that enhance the social, emotional and cognitive well-being of young children must be a priority for policymakers and should receive sufficient public funding.

Strategies to promote social-development in early childhood education are particularly relevant for young children growing up in vulnerable environments.\(^{61}\) Highlighting the relationship between early emotional development and school readiness, researchers at the National Center for Children in Poverty explore interventions that assist children who are at risk for poor social, emotional, and behavioral development.\(^{62}\) With regard to strategies for improving children’s early emotional development, the authors suggest that teachers can provide critical support for vulnerable children.\(^{63}\) In particular, the authors call for greater training support...


\(^{60}\) Ibid., 5.


\(^{62}\) Ibid., 3.

\(^{63}\) Ibid., 4.
for teachers in order to be able to assist children in their early social development and provide a positive, safe, and stimulating classroom environment. In light of the link between successful social-emotional development and school readiness, the authors propose the following policy recommendations:

- Provide teachers with the resources and training to maintain “emotionally positive” and “cognitively enriching” classroom environments;
- Focus on classroom-based strategies to promote social and emotional competence that combine child-focused strategies with strategies targeted to parents, teachers, and other caregivers;
- Invest in mental health and child development consultants who can not only help children and their families, but also assist teachers in implementing evidence-based preventive and early intervention strategies related to social and emotional competence as well as enhance classroom quality and effective management practices;
- Focus special attention on children and families experiencing cumulative sources of stress.

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64 Ibid., 4.
65 Ibid., 5.
Recommendations and Guidelines for Early Childhood Educators and Policymakers

Summary

One of the main objectives of research on early childhood education is to inform educational practices and policies that support children’s academic development and school readiness. The CLASS observation tool in particular has proven to be an invaluable research tool for evaluating the quality of early childhood education programs and for identifying key areas of improvement. Emphasizing the value of sound instructional strategies and policies on the quality of young children’s education, scholars and researchers have put forth a number of recommendations and guidelines for preschool educators, school leaders, and policymakers. Specifically, their research discusses:

- Best practices in curricula and instructional strategies for early childhood teachers for the promotion of early literacy and mathematical skills;
- Importance of strong administrative leadership within preschools and early childhood education programs;
- Policy recommendations for state political leaders.

Literature Review

Concerning the development of early literacy and mathematical skills in young children, scholars and researchers have explored the best strategies for educators as well as reviewed the effectiveness of skill-specific curricula.

In a report produced by the federal agency responsible for providing national leadership on literacy issues, the National Institute for Literacy offers strategies for parents of three and four year olds to promote children’s literacy development, including: talking and listening, shared book reading, and teaching children about print and letters.66 In particular, the report offers guidelines for important characteristics of teachers, classrooms, and instruction for preschool-aged children. These guidelines include:67

- Teachers
  - Keep a well-run and orderly classroom that encourages play and participation;
  - Use a variety of creative strategies to promote literacy skills.

http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/3d/c7/a2.pdf
67 Ibid., 15.
Classes
- Have plenty of books and other reading material for children to handle;
- Have designated areas for different activities;
- Have lots of print on labels, signs, and posters;
- Contain plenty of writing utensils and magnetic letters.

Instruction
- Teachers frequently read aloud to children, play word games with children, or have children say or sing nursery rhymes and songs;
- Instructors listen and talk with children throughout the day, and help children learn the meaning of new words;
- Teachers play games that encourage listening skills;
- Children have opportunities to scribble, draw, or attempt to write;
- Teachers point out and use print to explain print concepts to children;
- Instructors teach the alphabet.

In addition to providing guidelines for preschool classrooms, researchers have also identified particular skills that should be promoted within early childhood curricula. Within the literature on children’s literacy development, phonological awareness—defined as the ability to detect and manipulate the sound structure of words independent of their meaning—has been proven to be significantly related to children’s later ability to read.\(^{68}\) Given the relationship between early literacy skill development in preschool and later literacy achievement, Phillips et al. propose a number of pedagogical strategies for raising children’s phonological awareness, including:\(^{69}\)

- Systematic and explicit instruction comprised of instructional sequencing, modeling, and explaining the task; scaffolding; providing positive and constructive feedback;
- Providing clear and consistent articulation of words;
- Providing non-verbal cues to support children’s engagement and minimize behavioral problems during instruction;
- Linking print knowledge with oral language.

Aside from phonological awareness as an objective of early childhood education, Van Kleek acknowledges that while preschool education typically targets pre-literacy skills such as decoding and comprehension, the ability to engage in “inferencing” is rarely considered part of the preschool curriculum.\(^{70}\) In her view, the ability to fill in information that is not explicitly provided in a text is an essential oral language skill in

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\(^{69}\) Ibid., 8-13.

reading comprehension and may underlie difficulty in reading comprehension.\textsuperscript{71} As a strategy to promote inferential skills, Van Kleek proposes three broad categories of questions that can be asked while reading stories to preschoolers: causal (i.e. related to elements of story grammar), informational (i.e. related to questions of elaboration or definition) and evaluative.\textsuperscript{72} In addition, four recommendations for book-sharing interventions are offered:\textsuperscript{73}

- Ask literal questions to lay the foundations for critical, inferential questions and also to encourage participation among children;
- Embed scripted questions and “think aloud” responses into storybooks to enhance participation in book-sharing;
- Use strategies to enhance children’s engagement in story-telling, such as making comments and promoting a positive social-emotional environment;
- Take into account children’s world knowledge.

In this view, the role of oral language in the early literacy development of children aged three and four years old is especially critical.\textsuperscript{74} Targeted at preschool teachers, Roskos \textit{et al.} make a number of recommendations about important oral language skills for young children, necessary language and literacy experiences, and strategies for promoting oral language development. In particular, the authors offer six instructional approaches for creating “powerful learning contexts in which children can explore, learn, and use language in ways that advance their talking, reading, and writing.”\textsuperscript{75} The following list presents an overview of pedagogical strategies that have proven effects in developing oral language comprehension, vocabulary, alphabet knowledge, phonological awareness, and print knowledge:

- Singing and Rhyming Activities
- Storytelling
- Shared Reading
- Shared Writing
- Show and Tell
- Guided Play

Regarding the effectiveness of curricula and particular instructional strategies for promoting early literacy development, the literature offers an array of evaluative studies. In a study funded by the U.S. Department of Education’s Office of Special Education Programs (OSEP), Johanson \textit{et al.} explore the impact of “LitTECH Outreach,” a three-year technology-based preschool literacy project, on literacy

\textsuperscript{71} Ibid., 627-628.
\textsuperscript{72} Ibid., 632-633.
\textsuperscript{73} Ibid., 634-639.
\textsuperscript{75} Ibid., 49.
among young children with and without disabilities in childcare centers, prekindergarten programs, and other early childhood facilities in Illinois and Missouri.\textsuperscript{76} Among the key components of the LitTECH curriculum are: a literacy-rich environment with print and electronic books, and interactive software; valuable experiences for children related to words and their meanings; book sharing; and play activities.\textsuperscript{77} Based on their test sample of over 1,500 children, researchers concluded that LitTech positively impacted children’s emergent literacy skills, including: interacting with print materials, comprehending stories, displaying book handling skills, responding to pictures and print, and demonstrating emergent writing behaviors.\textsuperscript{78} Other benefits of the LitTech program included gains in technology skills, and improved language development and communication skills.\textsuperscript{79}

In an effort to assess the effectiveness of various preschool literacy curricula, the What Works Clearinghouse (WWC) presents an overview the “Curiosity Corner” curriculum.\textsuperscript{80} As an early literacy program designed to promote young children’s language and literacy skills, Curiosity Corner was found to have no discernible effects in terms of oral language development, print knowledge, phonological processing, cognition, and math skills among three and four year olds.\textsuperscript{81} Though one of the studies meets WWC evidence standards, the other meets WWC criteria with reservations. As the Curiosity Corner curriculum is currently implemented at more than 300 sites—such as preschool classes, childcare centers, and Head Start centers—in mostly high-poverty neighborhoods in 29 states, this study suggests a re-evaluation of the use of this curriculum as an effective means of fostering early literacy.

In another WWC report, the Institute of Education Sciences compiles findings from three studies on the effectiveness of shared book reading, a general practice aimed at enhancing young children’s language and literacy skills as well as their general appreciation for books.\textsuperscript{82} Overall, the report finds that all three studies—comprised of a collective sample of 124 children—met WWC evidence standards, and determined that shared book reading had mixed effects on children’s oral language and potentially positive effects on phonological processing.\textsuperscript{83} As shared book reading


\textsuperscript{77} Ibid., 7-9.

\textsuperscript{78} Ibid., i-ii.

\textsuperscript{79} Ibid., ii.

http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/43/87/b0.pdf: 1.

\textsuperscript{81} Ibid.


\textsuperscript{83} Ibid.
is one of the most prevalent recommended strategies within the literature on early literacy, this report ultimately reiterates the positive effect of shared book reading experiences for young children on their literacy development.

As a key learning outcome of early childhood education, the development of mathematical skills is another area of concern in the literature on early childhood education. In a defining study on standards for early childhood mathematics education, Clements et al. present a comprehensive overview of major trends in: standards in early childhood education; curriculum, teaching, and assessments; and professional development of mathematical educators.\(^{84}\) In particular, the book offers specific recommendations related to policy, curriculum, and instruction for early childhood mathematics. These recommendations are founded on the assumption that: (1) an understanding of children’s learning capabilities and specific learning goals are essential for high-quality early childhood education; and (2) preschool children are able and interested in engaging in significant mathematical thinking and learning.\(^{85}\) With these underlying assumptions in mind, the authors offer 16 recommendations for development of early childhood mathematics education. Among the authors’ most significant recommendations are:\(^{86}\)

- Instruction should be informed by students’ different foundational experiences, and socio-cultural and individual backgrounds.
- Program, teaching, and assessment standards should be based on research and focus on overarching concepts of mathematics.
- Mathematics education should be integrated with other subjects and everyday life.
- Teachers should encourage children to incorporate and reflect on mathematics in their everyday activities. Teachers should incorporate a mix of teaching strategies to promote mathematical learning.
- Technology can enrich the mathematical learning experience.
- Teachers should make an effort to understand each child’s individual mathematical strategies.
- Teachers should have a deep understanding of the mathematics to be taught as well as knowledge of children’s skills and thought processes.

Alternative guidelines in the literature seem to correspond with Clements et al’s recommendations. In a joint statement by two of early childhood education’s leading professional organizations, the NAEYC and the NCTM present their position on the value of mathematics education of three to six-year-old children for future


\(^{85}\) Ibid., 26-28.

\(^{86}\) Ibid., 29-85. Summary of recommendations found on pages 3-5.
mathematical learning and achievement. The following represents an overview of guidelines and recommendations for preschool teachers and childcare professionals with regards to the development of early mathematical skills of young children:

- Enhance children's interest in mathematics to make sense of their physical and social worlds;
- Build on children's experience and knowledge, including their family, linguistic, cultural, and community backgrounds; their individual approaches to learning; and their informal knowledge;
- Base mathematics curriculum and teaching practices on knowledge of young children's cognitive, linguistic, physical, and social-emotional development;
- Use teaching practices that strengthen children's problem-solving and reasoning processes;
- Ensure that the curriculum is coherent and compatible with known mathematical relationships and sequences of ideas;
- Integrate mathematics with other activities;
- Provide ample time, materials, and teacher support for children to engage in play;
- Actively introduce mathematical concepts, methods, and language through a range of appropriate experiences and teaching strategies;
- Support children's learning by thoughtfully and continually assessing all children's mathematical knowledge, skills, and strategies.

In a policy paper by the Society for Research in Child Development, the authors explore additional childhood mathematical curricula and teaching strategies. After reviewing studies on child cognition from the past several decades, the authors conclude that in ordinary circumstances, young children develop an “everyday mathematics” comprised not only of “numeracy” but of concrete and abstract concepts. Given children's immense ability to learn mathematics, the authors suggest that Early Childhood Mathematics Education (ECME) should be informed by psychological research and should promote the “learning of subject matter and ways of thinking by means of various components of the educational experience.” To this end, the authors posit that mathematical subject matter currently taught in preschools is limited in content (i.e. such as the names of shapes and basic counting) Preschoolers, as the authors note, are capable of understanding much more advanced mathematical concepts—such as number and operations, geometry (shape and

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89 Ibid., 5.
90 Ibid., 6.
space), measurement, and pattern “algebra.” In this way, a more advanced ECME curriculum should also promote mathematical thinking by way of six components:

- The Classroom Environment should contain a variety of mathematical learning objects like blocks and puzzles;
- Play provides opportunities for learning everyday mathematics and applying mathematical principles, such as block play;
- In the Teachable Moment, teachers seek spontaneous learning opportunities in play sessions;
- Projects can involve the application of principles such as measurement, space, perspective, and representation;
- Planned activities for the teaching of mathematics emphasize curricular goals;
- In Deliberate Teaching, preschool educators present planned instruction of mathematical principles.

As the report concludes, an integral part of curriculum development is the quality of teaching instruction in ECME, which is a direct outcome of teacher qualifications, teachers’ belief in mathematics as an educational priority, and the frequency of instructional sessions in mathematics.

In a 2008 study of 11 preschool classes at a Child Development Center in the Southwest U.S., Rudd et al. observed how teachers incorporated mathematical language into the early childhood curriculum. The authors explore eight categories of mathematical concepts, including: number, spatial, geometry, measurement, seriation, operations, pattern, and display. As the study concludes, over 70 percent of mathematical concepts employed were either “number” or “spatial.” A remaining 20 percent of utterances were categorized as “measurement” concepts. In this way, the authors conclude that only less than ten percent of utterances relation to more advanced mathematical concepts, such as geometry, seriation, operations, patterns, or display. Consequently, the authors argue that this dearth in instruction of higher mathematical concepts is demonstrative of the wider lack of emphasis on higher mathematics in preschool education. Given young children’s ability to grasp categorically advanced mathematical concepts, the authors recommend that preschool educators:

- Need specialized training in teaching mathematics to young children;

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91 Ibid., 6.
92 Ibid., 6-8.
93 Ibid., 8-11.
95 Ibid., 79.
96 Ibid., 80.
97 Ibid., 76-77.
Must possess a theoretical understanding of the mathematical curriculum; and
Should utilize both informal and planned experiences in instruction of mathematical concepts.

Along with recommendations for early childhood educators, the literature also makes recommendations for school leaders, particularly with regard to cultivating specific skill sets and school readiness among young children.

Building upon the notion that strong early literacy skills among preschoolers are indicative of academic and literacy achievement in kindergarten and first grade, Young et al. put forth a series of recommendations for successful early literacy in preschools. Known as Project ELI, the literacy initiative is comprised of ten components aimed at improving administrative leadership and institutional leadership in early literacy:

- Decide which literacy skills should be taught;
- Create/adopt an early literacy and language development model;
- Develop universal curriculum and instruction;
- Provide training and support for embedded strategies and intentional teaching;
- Engage in decision-making for groups and individual children;
- Design and carry out more intensive teacher-directed instruction;
- Monitor progress, modify intervention, and move to most intensive support;
- Design and implement more intensive intervention for struggling students;
- Monitor and continue to examine program options on an individualized basis;
- Link with elementary schools about outcomes for individual children, groups, and the entire program.

In addition to promoting early literacy, institutional leaders in early childhood education play an important role in encouraging young children’s school readiness. In a defining report on school readiness, the National Education Goals Panel recommends broad strategies for school and policy leaders to strengthen preschoolers’ transition to school. In particular, the report outlines ten features of “ready schools” that effectively create a learning climate for preschoolers to prepare them in their transition to kindergarten and elementary school. Among the widely-cited features, ready schools:

- Smooth the transition between home and school.

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99 Ibid., 3-6.
101 Ibid., 5.
Strive for continuity between early education programs and elementary schools.
Help children learn and make sense of their exciting and complex world.
Are committed to the success of every child.
Pledge to the success of every teacher and adult who interacts with children during the school day.
Introduce or expand approaches that have been shown to raise achievement.
Are learning organizations that alter practices if they do not benefit children.
Serve children in communities.
Take responsibility for outcomes.
Have strong leadership.

Building upon the 1998 guidelines established by the National Education Goals Panel, the Ready School Assessment Tool provides more specific definitions of “ready schools.” In particular, the tool is comprised of a questionnaire and rating scale that evaluates eight different dimensions of “ready schools,” including that:

Schools have strong leadership, particularly on the part of the Principal.
School staff and parent groups collaborate with preschoolers and their families to prepare them for the transition to and from kindergarten.
Schools provide administrative, classroom, and support and staff activities for teachers.
Schools provide an engaging learning environment that actively engages children in a variety of learning activities.
Schools employ effective curricula that help children achieve appropriate grade-level outcomes.
Schools enhance parents’ capacities to develop their children’s school readiness and supports children’s learning both inside and outside of the classroom.
Schools respect diversity of all children by interacting with their families in ways that are compatible with their background.
Schools engage in ongoing assessments in an effort to improve instructional practices and assist children toward achieving curricular goals.

Finally, the literature provides recommendations for state policymakers regarding the promotion of early literacy and mathematical skills, school readiness, and classroom quality in preschool programs.

In a 2006 policy brief, the National Institute for Early Education Research presents a number of broad policy recommendations informed by scholarly research on early

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http://www.readyschoolassessment.org/about/tool.shtml

literacy. Specifically, the authors call for: (1) the development of national and state-wide standards on oral language development and phonological awareness; (2) the development of an effective early literacy curriculum, including an emphasis on oral language, alphabetic code, and print knowledge and use; (3) the development of assessments to gauge a child’s early literacy development; (4) improvement in training of early childhood teachers; and (5) improvement in home-based involvement and parental support of literacy efforts.

Other scholars have evaluated states’ efforts to promote literacy in the preschool classroom. In a 2002 report by the National Association for the Education of Young Children, researchers explore states’ efforts to promote early childhood literacy in educational institutions. For each of the report’s key policy recommendations noted below, we provide several statistics regarding successful state initiatives:

- **A comprehensive system of early childhood professional preparation and development:**
  - Nearly three-quarters of states have training and preparation programs for early childhood teachers to learn how to foster literacy skills;
  - 21 states, including California, Pennsylvania, and Virginia, have professional development programs focused on literacy for young children.

- **Sufficient resources to ensure that schools include a range of high-quality children’s books, computer software, and multimedia resources reflecting various cultural and family backgrounds:**
  - One-third of states are providing resources to early childhood classrooms and teachers, including books, literacy materials, and computers and software.

- **Appropriate assessment strategies that promote children’s learning and development**
  - Over half of all states reported they had developed guidelines or benchmarks regarding children’s literacy.

- **Increased public investment to ensure access to high-quality preschool and childcare programs**
  - Six states, including Louisiana, Minnesota, Nevada, New York, South Carolina, and Vermont, used federal Reading Excellence Grants to partner with early childhood programs in particular school districts.

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105 Ibid., 4-9.


107 Ibid., 2-14.
Aside from early literacy policy recommendations, scholars have also proposed policy guidelines for the promotion of mathematical skills in preschool programs. In a 2008 article, Uy notes that one of the key problems in early mathematics education is the failure to successfully apply research findings about the value of early mathematics education to preschool curricula.108 Emphasizing children’s innate ability to learn and perform mathematics, the author suggests that early mathematics education has long-term consequences on children’s future learning and that a key challenge for policymakers and advocates of early mathematics education will be to alter the public’s “mind-set” that young children are not ready to learn mathematics.

Thus, among the key NAEYC and the NCTM recommendations for developers of instructional programs and policymakers for early mathematics are that they:109

- Create more effective early childhood teacher preparation and ongoing professional development opportunities;
- Use collaborative processes to develop well-aligned systems of appropriate high-quality standards, curriculum, and assessment;
- Design institutional structures and policies that support teachers' ongoing learning, teamwork, and planning;
- Provide resources to overcome the barriers to young children’s mathematical proficiency at the classroom, community, institutional, and system-wide levels.

States also play a critical role in providing support to early childhood education programs in cultivating school readiness among young children. Grounded in the assumption that preschool education is highly correlated with successful academic performance in later years, Ramey and Ramey’s 2004 study examines preschool’s effect on school readiness.110 According to the research literature, the seven key experiences that are essential to school readiness among young children are:111

- Encouragement in exploration
- Mentoring in basic skills
- Celebration of development advances
- Practice and development of new skills
- Protection from disapproval, teasing, and punishment
- Rich and responsive communication
- Guided behavior

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111 Ibid., 473.
Nonetheless, as the authors conclude, not all preschool programs provide students with adequate experiences for school readiness. The authors note three probable reasons underlying this achievement gap: (1) teachers are not sufficiently prepared to provide a high-quality learning environment; (2) programs lack intensity; and (3) many programs have a corrective, as opposed to a preventative, focus to learning.\textsuperscript{112} Given these shortcomings, the authors propose three policy recommendations:\textsuperscript{113}

- States should develop a comprehensive early childhood education initiative that is linked to a K-12 learning and achievement plan.
- Funding to preschool programs should be combined from various sources and should be contingent on performance evaluations.
- Child and program assessments should be viewed as an evaluation of preschool performance.

Finally, policymakers play a vital part in ensuring quality in the preschool classroom. In a 2005 study, Early \textit{et al.} combine two major NCEDL studies examining over 700 pre-kindergarten classrooms in 11 states.\textsuperscript{114} Among the main objectives of the studies were to provide: a demographic overview of preschoolers; characteristics of preschool classrooms, activities, and instructors; an evaluation of parental involvement in early education; and an assessment of program quality. With regards to program quality, both studies adopt the CLASS and ECERS-R measures.\textsuperscript{115} Within the CLASS measure, a majority of classroom achieved a moderate score on the Emotional Climate Composite scale, and a low score on the Instructional Climate Composite.\textsuperscript{116} In other words, the studies conclude that most preschool classrooms have a “pleasant, warm atmosphere,” but do poorly in terms of instructional quality, particularly with regards to helping children learn new concepts and providing constructive feedback.\textsuperscript{117} Given these findings, the authors propose the following policy recommendations:\textsuperscript{118}

- To ensure programs are operating at their potential, states need to rely on additional standards aside from professional standards and structural measures of quality (such as ratios, teacher credentials, etc.).

\textsuperscript{112} Ibid., 478.
\textsuperscript{113} Ibid. 488-489.
\textsuperscript{115} Ibid., 20.
\textsuperscript{116} Ibid., 23-24.
\textsuperscript{117} Ibid., 31.
\textsuperscript{118} Ibid., 33.
To improve the quality of instruction, states need to provide further resources—such as mentoring, technical assistance, and increased provision—to preschool teachers to further their knowledge.

In a 2005 study, Pianta et al. present a large-scale overview of teacher, classroom, and program predictors in quality pre-kindergarten programs. Drawing upon the National Center for Early Development and Learning’s Multi-State Pre-Kindergarten Study, this study explores attributes of the quality of state-funded preschool programs in six states using the ECERS-R, Emerging Academics Snapshot, and CLASS tools. The following list describes the features under consideration:

- Length of Program (i.e. Half or Full Day Program)
- Location of Program (i.e. In or Out of Elementary School)
- Classroom Child: Teacher Ratio and Level of Poverty
- Teacher Credentialing – Training
- Teachers’ Psychological Characteristics

In conclusion, the main contribution of the study is that classrooms in which a majority of children whose families were below the poverty line, where teachers did not have a B.A. in Early Childhood Education, and where teachers expressed more traditional beliefs about the adult-centered nature of interactions contributed to lower global quality. By contrast, the authors also found that the length of the program, the location of the program in relation to the elementary school, and the student-teacher ratio had little to no impact upon global quality measures.

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120 Ibid., 157.
Conclusion

In this report, Hanover has identified major trends and themes within four key areas of research in early childhood education, including:

- Early literacy for three and four year olds
- Early mathematics concept development
- Encouraging school readiness among preschoolers
- Domains of the Classroom Assessment Scoring System (CLASS)

In reviewing the literature within each of these four topics, we identified several overarching themes that extend across each of these areas of inquiry. In this way, Hanover offers three broad conclusions. Firstly, as an overview of the current academic and policy literature indicates, the four areas of interest are highly interrelated. For example, the development of early literacy skills and an understanding of mathematical concepts is positively correlated with school readiness among preschoolers. Also, as the literature suggests, strengthening mathematical skills among young children has a positive effect in terms of their early literacy skills development. Finally, as the discussion of the CLASS observation tool indicates, the classroom quality of early childhood education greatly influences children’s gains in academic and social skills, as well as their level of school readiness. To this end, policy recommendations (and consequently, improvements) in one of the four areas have potential effects in other dimensions of early childhood education.

Secondly, given the interdependence between each of these areas of inquiry, the literature emphasizes a holistic approach to early childhood education. That is, as our review suggests, academic achievement is correlated with gains in social emotional development. Specifically, the literature indicates that a child’s social-emotional development is associated with gains in literacy and school readiness. Furthermore, young children’s social-emotional skills are largely a result of a synthesis of classroom, school, family, and community efforts. Early childhood education policy should, in this manner, focus not only on academic achievement within the classroom, but should take into consideration the multi-dimensional aspects and effects of children’s social-emotional development.

Finally, a major concern within each of the four areas of inquiry is focused on the quality of preschool programs, in terms of instructional strategies, the broader preschool curriculum, and levels of social-emotional support in preschools. In this way, the literature points to several broad policy recommendations, including the need for: (1) further professional development and training opportunities for preschool teachers; (2) a variety of instructional and pedagogical strategies in preschool classrooms; (3) stronger and more effective curricula emphasizing early...
literacy and early mathematics skills; and (4) comprehensive state-wide and national standards for preschool programs and assessments of learning outcomes.

As an introduction to topics in early childhood education, this literature review suggests the integrated nature of each of the three thematic areas. Put differently, guidelines for educators and policy recommendations take into account the need for a holistic approach to early childhood education. At the same time, developing a comprehensive preschool program also requires that educators understand the inter-relationships between early literacy and mathematical skills development, social-emotional development, and classroom quality.
Note

This brief was written to fulfill the specific request of an individual member of The Hanover Research Council. As such, it may not satisfy the needs of all members. We encourage any and all members who have additional questions about this topic – or any other – to contact us.

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