Research Basis for Hatch Innovations

Solutions for Success in an Early Learning Environment

The purpose of this White Paper is to present the research basis for a powerful set of innovative products designed to prepare children to be ready and successful in school.

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The Early Learning Experts

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Setting the Stage: Research Basis for How Young Children Learn

While physical, social/emotional, and cognitive functioning make up the three primary developmental domains, educators know these are interrelated in complex ways. Due to this, all the domains need attention because each influences the other. One good example is that children's early experiences are linked to their impulse management and social skills. When a child has self-regulation and can relate well to others, he or she can more fully benefit from an educational setting. This can then allow for growth in the cognitive domain. Research shows that understanding and attending to such links between domains is needed for high quality learning and development[1].

The landmark report "Eager to Learn: Educating our Preschoolers"[2] highlights that young children are better able to learn than current practices sometimes allow. An educational preschool experience with the goal of preparing children for kindergarten means including more academic areas such as letters and counting, as well as helping to build traits like being inquisitive, persistent, and independent. It is possible to motivate young children to learn concepts on their level by building on their natural eagerness to learn. Combining child-directed discovery along with direct teacher instruction on basic pre-academic skills such as vocabulary, language, and math supports the most effective learning for young children.

Using Intentional Teaching Approaches with Young Children. Numerous longitudinal preschool interventions have found lasting and positive effects for children when the programs are of high quality and allow for both teacher- and child-directed learning[3]. The following section outlines key evidence-based practices and features that represent such programs[4].

Program Features. Several features of preschool programs are connected to school readiness. The social relationships between teachers and children, along with the nature of the classroom environment, contribute to effective learning for young children. For example, these programs have:

- A great deal of reading,
- One-on-one teaching,
- Functional and environmental print displayed for children,
- The presence and use of planful lessons,
- Materials for play available that support literacy, and
- Opportunities for children to have meaningful experiences firsthand.

Teacher Practices. One of the best solutions for children being better prepared for school is for preschool teachers to be intentional in instructional practices for children. One example of an evidence-based approach to effective learning is through bringing in the three 'P's of Purposeful, Planful, and Playful©. The three 'P's work in the following way: Before choosing an activity, teachers will always first ask, "What is the purpose of this?" The answer should be:

- It builds one or more of the skills necessary for school readiness,
- It expands and builds on children's current level of understanding, and
- It encourages the understanding of new information that has direct links to what children will need to succeed in kindergarten.

Once these answers are in place, the next step involves careful planning, which will incorporate activities and materials that are purposeful but playful for young children, and that support both guided instruction and free play. This includes such areas as:

- Selecting activities that take advantage of the overlap between language, literacy, and math skill domains;
- Identifying fun phonological awareness games to use when transitioning children from one activity to another;
- Providing books, materials, activities, games, and conversations that are engaging and playful; and
- Using a scaffolding approach when working with children to broaden capacities and skills.

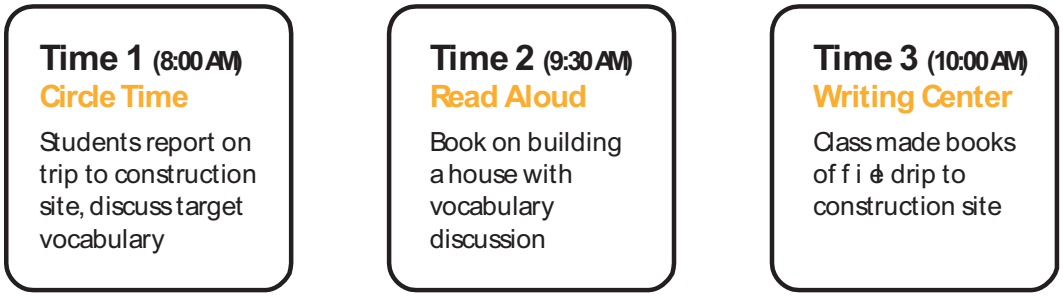
More about Scaffolding. Scaffolding sets up a positive and meaningful interaction between the child and the teacher. With foundations in well established educational theory and practice (for example, Vygotsky's Zone of Proximal Learning; and Differentiated Learning for individualized instruction), scaffolding allows for teachers to build on each child's interests and level of functioning in order to develop skills. After a teacher models for the child, then she or he can guide the child in reproducing the behavior, determining along the way if the skill should be presented more simply or in a more advanced manner for the child, and finally seeing the child carrying out the target end behavior on their own. Children can learn very effectively when an adult scaffolds the instruction. This also helps children progress from being "other-regulated" (the teacher) to "self-regulated" as their attention, cognitive, language, and motor skills advance.

The Power of Positive Interactions. Perhaps the single most important factor is ***consistently high levels of positive interactions***. Achieving this can best occur through a *Responsive Interaction Style*--which research shows consists of six key essentials for optimal support of young children's cognitive and social development[4]:

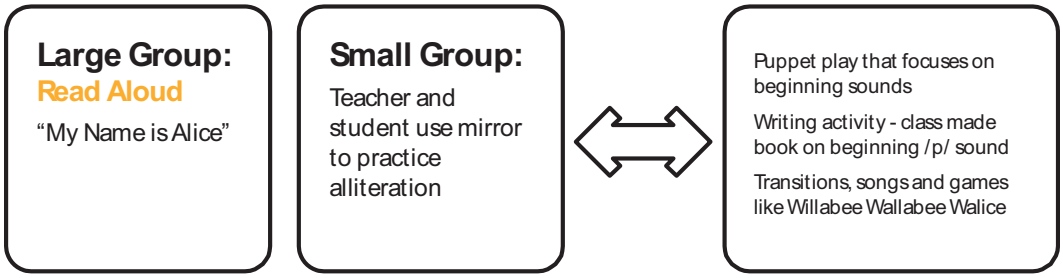
1. Rich language input: a) use of labels for objects & actions b) providing explanations & rationales
   c) frequent book reading on many topics,
2. Responsiveness to children's signals,
3. Maintaining and building on interests,
4. Fewer restrictions,
5. More choice when providing strategies, and
6. Adapting support to children's changing needs.

The basic goal for early childhood teachers is to bring content together with a responsive interaction style. Methods to achieve this include:

- *Learning in a supportive social context*. Approaches are scaffolding, observing, pacing, modeling, questioning, commenting, and non-verbal cues such as gesturing.
- *Efficient development of memories*. Using "Time Windows" as children develop networks of associations with repeated learning experiences that are related in content.
- *Teacher planning that builds background knowledge***.** How this can look across the day



- *Balance of teaching strategies.* Example of direct and indirect instruction on teaching alliteration (beginning sounds of words).



- *Flexible groupings of children for learning*: One-on-one: Provides teacher opportunity to individualize instruction and meet special needs. Small groups: Allows children more opportunity for talking, provides teacher opportunity for scaffolding, encourages hands-on activities and child discovery. Large groups: Builds a sense of community, sets the stage for the introduction of theme, provides opportunities for information about new concepts.

The Power of Play

Play for young children serves many purposes. Chief among these is the role of play in the cognitive, social/emotional, and physical development of children[6,7]. Cognitive skills include language development (both verbal and non-verbal), imagination, and creativity. Social skills include social competence such as conversational skills, turn taking, and taking the perspective of others[8-10], while physical skills can include gross and fine-motor and perceptual-motor[9].

In defining play, a helpful description shows play as an activity that is[11]:

- Valued positively by the player,
- Self-motivated,
- Freely selected, and
- Engaging for the player.

To help children enjoy and learn through play, an early childhood setting that supports discovery and exploration has been shown to be the most effective. More specifically, this means allowing young children to have hands-on experiences and to manipulate materials in an environment purposively planned by the teacher, so that children can learn and practice skills and concepts[6].

The early childhood teacher has a key role as a facilitator of play in the classroom[7]. The following represent key components of this important role[6]:

- Organization of materials to support children's use of the materials;
- Planning adequate time so that children can engage in more complex play; and
- Integration of instructional objectives, allowing the children to include their own original ideas, approaches to solving problems, and the opportunity to follow their own interests.

Key Message: Learning occurs best in a supportive social context. Cognitive readiness can be achieved in ways that support the whole child. Teacher's scaffolding needs to adjust and adapt to child's competencies. Play supports all domains of children's learning. Overall, being "multi-faceted" is the new role of the preschool teacher. Teachers become organizers of the environment, facilitators, managers, and scribes for children as they play and explore with materials and activities. While doing so, the child-directed learning will add to the teacher-directed activities. This leads to a successful balance for optimal learning.

Educational and Instructional Technology

It is well established that three and four year olds need a strong focus on cognitive development along with attention to their social/emotional development to be ready for kindergarten. Technology can play a key role in this preparation. Experts confirm that preschool age children are developmentally ready and able to benefit from instruction with technology. The use of educational technology is now known to have a major, positive impact on the social, emotional, language, and cognitive development of children.

It is recommended that many opportunities be given during the preschool years for exploration using technology tools in a playful, supportive environment. Researchers further agree that a number of technology applications have the potential to support and extend learning in the young child through their unique capability to provide excellent instruction in these important developmental areas that are critical for educational success. For example, research has found that preschoolers,

who used computers with supporting activities for key learning goals, had more gains than children without computer experiences. Among others, these included gains in knowledge, long-term memory, verbal skills, problem solving, and manual dexterity[12-14]. A set of studies with low-income children found those who received a computer curriculum had increases in cognitive, motor, and language scores compared to similar children in a regular curriculum[15,16]. Recent research published in the journal *Pediatrics* found that young children who had access to a computer compared to those who did not, performed better on measures of cognitive development and school readiness as measured by the Boehm Test of Basic Concepts and the Wechsler Preschool and Primary Scales of Intelligence. The lead author notes the findings suggest that "computer access before or during the preschool years is associated with the development of preschool concepts and cognition"[17].

The Power of Computers to Teach. Computers constitute environments that support teaching and learning by providing effective, supportive experiences[18,19]. "There are several characteristics of effective computer software that can guide its development, including[20]:

- Actions and graphics should provide a meaningful context for children;
- Attention should be given to reading level, attention span, clear instructions, and simple choice;
- After adult support, children should be able to use the software independently;
- There should be multiple opportunities for success;
- Feedback should be informative;
- Children should be in control; and
- Software should allow children to create, program, or invent new activities.

Key Message: Technology can positively and strongly support young children's learning and they are developmentally able to benefit from well-designed educational and instructional technology.

Using the Hatch Technology Products to Help Children Achieve Critical Outcomes

TeachSmart®: The TeachSmart® Learning System is an interactive, hands-on technology tool which enables early childhood teachers to plan for playful and purposeful activities for children. This tool offers strategies and activities that reflect the latest scientific research for pre-literacy and mathematics concept acquisition in young children, as well as science and social studies. Features include lesson plans, national and state standards, templates for teachers to create original activities, free play, ideas to extend concepts into the classroom, assessments, and digital portfolios.

iSS: iStartSmart™ is a research-driven instructional technology system designed to increase school readiness skills and provide standards-based, individualized progress monitoring at the touch of a button. The program is driven by adaptive teaching technology that moves preschool-age children positively through 18 skill development areas known to predict success in kindergarten, developing competency before moving to the next skill area or level. Other features include an area to add activities, free play, and ideas to extend concepts into the classroom.

Computer Learning Centers: For over 20 years, Hatch® has been the leading provider of developmentally appropriate computer solutions for early childhood classrooms across the country. Solutions are available for Toddlers through School Age groups.

Kindergarten Readiness

Research has identified the critical skills preschoolers need to master to be successful in kindergarten [4, 21]:
Oral Language: It is important for preschoolers to build vocabularies that tell them about the world. They need to learn to use language to make relationships, develop categories, and solve problems.
Phonological Awareness: Using sounds in words to process spoken language is essential for successful reading later on. Young children need to become sensitive to hearing and using sounds in words.

Print Knowledge: Knowing the units of print (letters, word) and being able to connect the letter with the sound it makes forms another important foundation for successful reading; along with having a basic understanding of book and print concepts.
Math: Young children need to know that numbers show how many, describe order, and are used to measure. For geometry, early concepts mean recognizing shapes, directions, and locations; and their relationships. Classification and using information to ask and answer questions are early data analyses concepts. Preschoolers can have exposure to algebra as they learn about patterns; and that patterns represent relationships.
Social-Emotional: To engage and participate successfully in learning experiences and to build positive attitudes about school requires young children to have age-appropriate emotional security and social skills. Two key areas are the ability to self-regulate and to relate well with others, both adults and peers. Among others, skills that facilitate success in early schooling include being able to identify emotions accurately in themselves and others, coping skills, pro-social skills for interactions to be positive, managing negative emotions, enjoying learning, and being able to work somewhat independently.

In the following sections we will be taking a closer look at each of these areas.

Social-Emotional Development

Longitudinal studies reinforce the importance of social-emotional skills for adjustment in childhood through adulthood[22,23]. Self-regulation and the ability to relate well to others shapes a child's capacity to benefit from educational experiences[24]. Large scale studies show that a high quality preschool experience fosters the growth of these skills[25] and evidence is growing that interventions (specific teaching practices and curriculum materials) are effective in promoting skill growth in this area[26,27]. Positive social-emotional development facilitates engagement in learning which is important for cognitive growth and academic achievement, facilitates positive peer relationships which is a key developmental milestone; and both, in turn, facilitate adjustment in early childhood. Social-emotional skills buffer children against risk and promote mental health. Children who fail to gain these competencies during preschool more often experience learning problems and academic delays. They enter school at risk for escalating behavior problems, are vulnerable to peer rejection and victimization, and risk adolescent problems of school failure, substance use, depression, and criminal activity.

To promote positive outcomes:

- Create an environment that promotes every child feeling good about coming to school,
- Design an environment that promotes child engagement,
- Focus on teaching children expectations,
- Teach skills that children can use in place of challenging behaviors, and
- Provide opportunities for children to develop critical social/emotional skills using the backdrop of cognition in a variety of familiar as well as new contexts and environments.

The role of self-control and self-regulation. A number of studies support the notion that self-control is a resource that can be increased through suitable "exercise". Self control includes emotional as well as behavioral regulation and should increase with age due to the development of the sensory system. Children with more well-developed self-control are empowered, engaged, and enthusiastic at school. Children who have developed self-control find it easier to follow rules and obey the teacher, but self-control is more than being compliant. The term self-regulated can be used to describe learning that is guided by metacognition (thinking about one's thinking), strategic action (planning, monitoring, and evaluating personal progress against a standard), and motivation to learn[28,29].

Culminating in a strong sense of self. Providing children with challenging tasks and meaningful activities that can be mastered, and chaperoning these efforts with support and encouragement will help ensure the development of a robust sense of self. Students who have been verbally encouraged to set their own goals experience increases in confidence, competence, and commitment to attain those goals.

Key Message: A high quality preschool experience fosters the growth of key social-emotional skills and specific teaching practices and curriculum materials are effective in promoting skill growth in this area.

Using the Hatch Products to Help Children Achieve Critical Social-Emotional Outcomes

Positive Beginnings: Positive Beginnings® is a series of classroom management systems that provide early childhood teachers with the materials necessary for managing their preschool classroom. This proven, research-based system comes with everything teachers need to encourage active participation and organization.

Fit 4 You: The Fit 4 You® Kit provides a wealth of information and activities to help the teacher increase young children's participation and development in four key areas: Physical Development, Nutrition, Cognitive Development, and Social/Emotional Development. The Fit 4 You® Kit introduces exercise and wellness in the classroom.

Physical Health

Research shows that the connection between health and education is close, complex, and interdependent[30]. Better academic outcomes are seen for healthy children compared to those who are less healthy. Further, there is a relationship between a child's success in school and gaining higher education levels and better health as an adult[31]. High quality early childhood programs must attend to the health of the children they serve to reach goals in the cognitive, emotional, and academic areas.

One area in particular that is receiving increased attention is obesity among young children, as its prevalence is increasing to the point that it is now seen as being at epidemic proportions. National Health and Nutrition Survey (NHANES 2003-2004) data show that the number of obese preschool age children is approximately 14%[32]. Being medically overweight is linked to a number of poor school outcomes including lower performance on intelligence and achievement tests, decreased range of interests, less capacity social adaptation capacity, and a greater likelihood of placement in remedial classes[33-37]. One of the reasons for this includes sleep disturbances, which may factor into impaired attention, learning problems, and school failure[38-39]. Additionally, overweight children often have poorer attendance in school due to health problems and face risk for behavior problems, low self-esteem, and depression[40-42], all of which can negatively impact success in school.

Key Message: Health and school success are intertwined. Attention to healthy practices in early childhood is important to lay the foundation for a child who is ready and able to learn to his or her fullest potential.

Using the Hatch Products to Help Children Achieve Critical Health Outcomes

Fit 4 You: The Fit 4 You® Kit provides a wealth of information and activities to help the teacher increase young children's participation and development in four key areas: Physical Development, Nutrition, Cognitive Development, and Social/Emotional Development. The Fit 4 You® Kit introduces exercise and wellness in the classroom.

Emergent Literacy

The formation of reading and writing concepts and skills is a process that is dynamic in the earliest stages of children's literacy development[24]. The emergent literacy perspective holds that for young children, reading and writing develop hand-in-hand and are strengthened through experiences that encourage meaningful interaction with written and oral language[43]. Examples are following along in a book as an adult reads aloud or telling a story through a drawing[44]. By way of being exposed to written language, prekindergarten children come to have an awareness of print, letter naming, and phonemic awareness. Experiences with oral language allow for the development of listening comprehension, vocabulary, and language competence. A thorough review of the emergent literacy literature suggests that early childhood literacy experiences affect successful reading acquisition.

Research findings can inform early childhood classroom instruction in emergent literacy in the following ways[45]:

- Reading and writing experiences with print facilitate the development of understanding the purpose, conventions, and functions of print;
- Interacting with others who are modeling language (both oral and written) helps children learn how to pay attention to language and apply what they have learned to literacy situations;
- Phonological awareness and letter recognition in particular facilitate beginning reading acquisition by assisting children to develop effective word-recognition strategies (e.g., detecting pronunciations and storing associations in memory); and
- Storybook reading, both the content and the interaction between the teacher and children, has an impact on children's attitudes, knowledge, and strategies toward reading.

The National Early Literacy Panel (NELP)[46] found strong evidence for the importance of the following skills for later reading and writing success:

- Alphabet knowledge,
- Phonological awareness,
- Rapid naming tasks involving either naming of letters and digits or naming of objects and colors,
- Writing/writing name, and
- Phonological short-term memory.

Key Message: When integrating these findings into early childhood instruction in reading, what is recommended (and what many educators likely already practice), is a balanced approach. Such an approach combines the language- and literature-rich activities connected with whole language focused on increasing meaning, understanding, and a positive attitude toward language. With clear and direct instruction around skills needed for the development of fluency, children move more smoothly along to being proficient in reading[6 47].

The National Early Literacy Panel Findings

For your convenience, we have summarized the findings for you. The reference and link to the full report follow.

A Scientific Synthesis of Early Literacy Development and Implications for Intervention. Large-scale studies have shown that young children—those entering kindergarten and first grade—vary greatly in their attainment of the early precursor skills that provide the launching pad for later literacy learning (West, Denton, & Germino-Hausken, 2000; West, Denton, & Reaney, 2000). In 1997, the U.S. Congress asked that a review of research be conducted to determine what could be done to improve reading and writing achievement. The resulting Report of the National Reading Panel: Teaching Children to Read (NICHD, 2000) has been influential in helping to guide reading-education policy and practice in the United States. However, that report did not examine the implications of instructional practices used with children from birth through age 5. To address this gap in the knowledge base, the National Early Literacy Panel (NELP) was convened.

Key Findings of the National Early Literacy Panel

A. Identification of the Domain of Early Literacy Skills. Conventional reading and writing skills that are developed in the years from birth to age 5 have a clear and consistently strong relationship with later conventional literacy skills. Additionally, six areas representing early literacy skills or precursor literacy skills had medium to large predictive relationships with later measures of literacy development. These not only correlated with later literacy as shown by data drawn from multiple studies with large numbers of children but also maintained their predictive power even when the role of other variables, such as IQ or socioeconomic status (SES), were accounted for. These six areas include

- Alphabet Knowledge (AK): Knowledge of the names and sounds associated with printed letters
- Phonological Awareness (PA): Ability to detect, manipulate, or analyze auditory aspects of spoken language (including the ability to distinguish or segment words, syllables, or phonemes), independent of meaning
- Rapid Automatic Naming (RAN) of letters or digits: The ability to rapidly name a sequence of random letters or digits
- RAN of objects or colors: The ability to rapidly name a sequence of repeating random sets of pictures of objects (e.g., "car," "tree," "house," "man") or colors
- Writing or Writing name: The ability to write letters in isolation on request or to write one's own name
- Phonological Memory: The ability to remember spoken information for a short period of time.

B. Instructional Practices that Enhance Early Literacy Skills. The panel also set out to identify studies that employed experimental or quasi-experimental methods to determine the effectiveness of instructional strategies, programs, or practices in imparting conventional literacy skills or any of these precursor skills to young children. These included:

- Code-focused interventions: Interventions designed to teach children skills related to cracking the alphabetic code. Most code-focused interventions included PA instruction.
- Shared-reading interventions: Interventions involving reading books to children. These interventions included studies of simple shared reading and those that encouraged various forms of reader-child interactions around the material being read.
- Parent and home programs: Interventions using parents as agents of intervention. These interventions may have involved teaching parents instructional techniques to use with their children at home to stimulate children's linguistic or cognitive development.
- Preschool and kindergarten programs: Studies evaluating any aspect of a preschool or kindergarten program, such as effects of educational programs, curricula, or policies.
- Language-enhancement interventions: Studies examining the effectiveness of an instructional effort aimed at improving young children's language development.

The code-focused instructional efforts reported statistically significant and moderate to large effects across a broad spectrum of early literacy outcomes. Code-focused interventions consistently demonstrated positive effects directly on children's conventional literacy skills. Book-sharing interventions produced statistically significant and moderate-sized effects on children's print knowledge and oral language skills, and the home and parent programs yielded statistically significant and moderate to large effects on children's oral language skills and general cognitive abilities. Studies of preschool and kindergarten programs produced significant and moderate to large effects on spelling and reading readiness. Finally, language-enhancement interventions were successful at increasing children's oral language skills to a large and statistically significant degree. Together, these findings suggest that there are many things that parents and preschools can do to improve the literacy development of their young children and that different approaches influence the development of a different pattern of essential skills. *It should be noted that the interventions that produced large and positive effects on children's code-related skills and conventional literacy skills were usually conducted as one-on-one or small-group instructional activities.* These activities tended to be teacher-directed and focused on helping children learn skills by engaging in the use of those skills. Almost all of the code-focused interventions included some form of PA intervention. These PA activities generally required children to detect or manipulate (e.g., delete or blend) small units of sounds in words. Teaching children about the alphabet (e.g., letter names or letter sounds) or simple phonics tasks (e.g., blending letter sounds to make words) seemed to enhance the effects of PA training.

National Early Literacy Panel. (2009). Developing Early Literacy: Report of the National Early Literacy Panel. Washington, DC: National Institute for Literacy. http://www.nap.edu/catalog.php?record_id=12519#toc

Using the Hatch Products to Help Children Achieve Critical Literacy Outcomes

TeachSmart®: The TeachSmart® Learning System is an interactive, hands-on technology tool which enables early childhood teachers to plan for playful and purposeful activities for children. This tool offers strategies and activities that reflect the latest scientific research for pre-literacy and mathematics concept acquisition in young children. Click here to see the product and read the Efficacy Study in which children using the TeachSmart® made significant gains in literacy and mathematics.

iSS: iStartSmart™ is a research-driven instructional technology system designed to increase school readiness skills and provide standards-based, individualized progress monitoring at the touch of a button. The program is driven by adaptive teaching technology that moves preschool-age children positively through 18 skill development areas known to predict success in kindergarten, developing competency before moving to the next skill area or level.

Computer Learning Centers: For over 20 years, Hatch® has been the leading provider of developmentally appropriate computer solutions for early childhood classrooms across the country. Solutions are available for Toddlers through School Age groups.

Journeys Literacy: Journeys into Early Literacy® is a complete early education literacy program designed to build upon and extend children's knowledge of letters, words and the processes they use in learning to read.

Right on Target: The Right On Target™ Kit is a bridge between current research, specific state and national prekindergarten standards, and classroom implementation. Teachers can feel comfortable knowing the kit will help provide an optimal learning experience to support school readiness.

Lending Libraries: The Hatch® Lending Library is a blend of traditional and contemporary picture books for young children and their families. Each book is accompanied by a laminated activity card that prompts families to talk with their child about the story, as well as engage in fun learning activities. The activity cards explain to both parents and teachers how crucial pre-reading skills such as vocabulary development, alphabet knowledge, and phonemic awareness are developed within each book. Each Lending Library includes 20 pre-packaged bags with activity cards on a sturdy organizer rack which allows easy access for parents and children to select books. Available in Spanish as well.

Scientific Research Basis of Emergent Mathematics

During early childhood, children pay attention to dimensions of their environment that are mathematical in nature and make use of a variety of mathematical concepts to make sense of their world. Young children sort, count, find patterns, compare quantities, and move through space. Young children also exhibit a noteworthy capacity to formulate, represent, and solve simple mathematical problems and to reason and explain their mathematical activities. Wanting to quantify their world through the lens of mathematics appears to come naturally[48].These activities are the beginnings of foundational skills that will help children successfully learn math in school[49,50].

Facilitating preschoolers' engagement with math concepts is encouraged by many researchers and educators through activities that are hands-on[51], natural[52], have meaning for children[53,54], and come from everyday life[55]. Instead of using drill and rote to teach skills, early childhood educators can offer experiences that have much depth and present opportunities that are appropriate in their developmental sequence through play[56].

Some of the key practices the National Council of Teachers of Mathematics[57] and the National Association for the Education of Young Children[58] recommend are:

- Build on children's natural interest, experiences, and knowledge in math;
- Base mathematics curriculum and teaching practices on knowledge of young children's developmental levels;
- Ensure the curriculum follows the sequence of important math concepts;
- Provide for children's full and continued interaction with key math ideas;
- Teach math through a range of strategies, including play; and
- Continually assess.

A landmark study from the National Research Council Committee on Early Childhood Mathematics found that virtually all young children have the capability to learn and become competent in mathematics[59]. In fact, well before first grade, children can learn the ideas and skills that support later, more complex mathematics understanding. There is expert consensus that two areas of mathematics are particularly important for young children to learn: (1) number, which includes whole number, operations, and relations, and (2) geometry, spatial thinking, and measurement. However, the study also found that time spent in mathematics instruction is extremely low in early childhood settings.

Putting concepts forward in a developmentally appropriate sequence gives children the opportunity to build on their present understanding and knowledge, and allows them to apply what they have learned. The general order of introducing math concepts in such a developmentally appropriate sequence is presented below[60]:

- Free exploration of materials (becoming aware of and developing vocabulary for attributes and properties of materials),
- Spatial relationships (vocabulary for position and direction),
- Classification (sorting items into a specified position or set based on attributes),
- Patterning (arranging items in a specific sequence based on attributes),
- One-to-one correspondence (matching items from sets into a one-to-one relationship) and set comparison,
- Ordering (arranging items by an attribute of size), and
- Numeration (understanding the concept of number).

Key Message: Young children are very interested in mathematics and are capable of learning in this area. Unfortunately, in many cases in early childhood settings, children get very little mathematics instruction. The most successful approach is to avoid rote learning however and focus instead on activities that are from the everyday lives of the children.

The National Research Council's Mathematics Learning in Early Childhood Findings

For your convenience, we have summarized the findings for you. The reference and url for the full report follow.

A Scientific Synthesis of Early Math Development and Implications for Intervention. Mathematics education has risen to the top of the national policy agenda as part of the need to improve the technical and scientific literacy of the American public. There is particular concern about the chronically low mathematics and science performance of economically disadvantaged students and the lack of diversity in the science and technical workforce. Particularly alarming is that such disparities exist in the earliest years of schooling and even before school entry. Recognizing the increasing importance of mathematics and encouraged by a decade of success in improving early literacy, the Mathematical Sciences Education Board of the Center for Education at the National Research Council established the Committee on Early Childhood Mathematics. The majority of support for this study was provided by the U.S. Department of Health and Human Services, ACF, and Office of Head Start among other sponsors.

Key Findings of the National Research Council

A. Identification of the Domain of Early Math Skills. The committee found that virtually all young children have the capability to learn and become competent in mathematics. In fact, well before first grade, children can learn the ideas and skills that support later, more complex mathematics understanding. There is expert consensus that two areas of mathematics are particularly important for young children to learn: (1) number, which includes whole number, operations, and relations, and (2) geometry, spatial thinking, and measurement.

B. Instructional Practices That Enhance Early Math Skills. For most children the potential to learn mathematics in the early years of school is not currently realized. This stems from a lack of opportunities to learn mathematics either in early childhood settings or through everyday experiences in homes and in communities. This is particularly the case for economically disadvantaged children, who start out behind in mathematics and will remain so without extensive, high-quality early mathematics instruction. The report informs the field that results from two robust studies indicate that children in state Pre-K programs spend a great deal of time NOT engaged in any type of instructional activity. The study illustrated that during the preschool day, the average student spent 44% of the time engaged in non-curriculum activities (literacy, mathematics, science, social studies, etc.) What are children doing? In preschool classrooms, much of the time (22%) was spent engaged in routine activities such as transitioning, waiting in line, or washing hands. Pre-K children in the NCEDL studies were exposed to mathematics content in only 6% of the classrooms observations. In the state-funded Pre-K classrooms observed in the NCEDL study, mathematics was often taught in conjunction with art, music, and fine motor activities. The committee thinks that the integration of mathematics with other activities may or may not be effective in supporting children's mathematics knowledge development. In an observational study of New Jersey preschools, it was found to provide little support for children's mathematics skill development and seldom used mathematics terminology (Frede et al., 2007). Of particular interest, is that over 40% of the classrooms in the study were rated good to excellent quality on the ECERS-R measure of the environmental quality of early childhood programs. Apparently, mathematics teaching and learning is relatively rare even in classrooms that are otherwise judged to be high quality. Many widely used early childhood curricula do not provide sufficient guidance on mathematics pedagogy or content. When early childhood classrooms do have mathematics activities, they are often presented as part of an integrated or embedded curriculum, in which the teaching of mathematics is secondary to other learning goals. Emerging research indicates, however, that learning experiences in which mathematics is a supplementary activity rather than the primary focus are less effective in promoting children's mathematics learning than experiences in which mathematics is the primary goal.

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Using the Hatch Products to Help Children Achieve Critical Mathematics Outcomes

TeachSmart®: The TeachSmart® Learning System is an interactive, hands-on technology tool which enables early childhood teachers to plan for playful and purposeful activities for children. This tool offers strategies and activities that reflect the latest scientific research for pre-literacy and mathematics concept acquisition in young children. Click here to see the product and read the Efficacy Study in which children using the TeachSmart® made significant gains in literacy and mathematics!

iSS: iStartSmart™ is a research-driven instructional technology system designed to increase school readiness skills and provide standards-based, individualized progress monitoring at the touch of a button. The program is driven by adaptive teaching technology that moves preschool-age children positively through 18 skill development areas known to predict success in kindergarten, developing competency before moving to the next skill area or level.

Computer Learning Centers: For over 20 years, Hatch® has been the leading provider of developmentally appropriate computer solutions for early childhood classrooms across the country. Solutions are available for Toddlers through School Age groups.

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Scientific Research Basis of Emergent Science

For preschool children, science comes naturally. Young children are extremely interested in learning about the world around them. Learning best from experiences that are personal, they are active and intrinsically motivated[61,62]. Their building of knowledge happens most effectively when they are allowed to have choices and participate with other people in activities that cultivate solving problems through experimentation[63-66]. Both the National Science Education Standards[67] and Benchmarks for Science Literacy[68] recommend that the approach to science with young children be action-oriented and inquiry-based[69]. Research supports that for the early childhood period, having teachers focus on process (such as through posing questions that guide children in exploring ideas to gain knowledge) is actually more important than preschoolers knowing a large number of science facts (which is more appropriate during early elementary school)[70,71].

The following represent process areas and their general sequence in science exploration[71]:

1. Questioning: Posing questions about objects, events, or phenomena. Appropriate questions often begin with "What causes...?" "How does…?" "What makes…?" "What if…?" "Why…?".
2. Hypothesizing: Based on children's experience, developing possible explanations and forming an initial explanation or statement that can be tested. Promote explanations with "I think…" "What do you think…?" "Why do you think…?".
3. Planning: Conceiving investigations to test a hypothesis and constructing children's own investigation using methods to collect information. "How can we find out?".
4. Predicting: Applying ideas or evidence to predict and state a future outcome based on a pattern of evidence or an explanation. Often involves an action and a reaction or an if-then statement. A prediction is not a wild guess and

children may have several predictions."What do you think will happen when…?" "If we do…, then what will happen?".

5. Investigating: Conducting a planned "experiment" to test the children's ideas based upon a hypothesis. Investigations make use of a majority of the prior process skills.
6. Interpreting: Considering evidence, evaluating, and drawing a conclusion by looking at the "data" or what happened to find a pattern or other meaning in what children saw. This let's them answer the questions "What did you find out?" and "What did you see/hear/etc.?".
7. Communicating: Presenting reports, using supporting sources, and representing observations, ideas, conclusions, or models by talking, writing, drawing, etc. "Can you tell me what happened?" "Can you draw a picture of what you saw?".
8. Relating and Applying: Connecting knowledge to other experiences. Relating makes connections to similar concepts and applying uses the knowledge obtained to help solve a challenge. "Where else do you see…?" "What if we did this with…?".

Key Message: To provide an environment in the early childhood classroom that supports science learning for preschoolers, provide a selection of appealing materials for exploration and manipulation, adequate time for children to formulate and test their ideas, and a social atmosphere that conveys that questioning and experimenting are as important as knowing the correct answers.

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discover! Science: Turn the classroom into a fun-filled science lab. discover! Science™ prepares young learners for kindergarten and beyond with easy-to-implement science projects — comparing trees, creating a fish habitat, exploring how things change, studying their growing bodies, and much more.

Scientific Research Basis for Social Studies

Learning about the social world and their place in it is an activity of much interest to children. Social studies as the area of how people live, work, get along with one another, find solutions to problems, and influence and are influenced by their social and physical environment, begins with children developing relationships with the important people in their lives, learning to communicate, and much exploration of their immediate surroundings. Eventually children understand more about their larger community, then gradually more about their expanding community, and in due course come to view themselves as citizens in a society. As they embark on this journey, young children are developing a beginning awareness that can be connected to the main social studies content areas such as geography, civics, economics, and history[72,73]. The National Council for Social Studies[74] has identified the main goal of the study of the social sciences as supporting young children in developing the skills to make decisions for the good of the public. Some of the focus of social studies now must incorporate living in societies that are both culturally diverse and interdependent across the world.

When working with preschoolers in the area of social studies, some key considerations about three- to five-year-olds will help teachers as they implement lessons. Preschoolers are characterized by[73]:

- Seeing the world mainly from their own point of view;
- Living in the present and understanding time in a narrow sense, such as today, yesterday, tomorrow, this morning, etc.;

- Developing a fuller understanding of new concepts when given opportunities to engage in socially rich dramatic play;
- Generalizing, often from one experience, by seeing connections between events and objects;
- Learning most effectively when experiences are meaningful and relevant to their own lives;
- Gaining a sense of fairness and rules; and
- Over time, developing the skills to work cooperatively with others.

Important in the teaching of social studies is to address both content and process (process being action-oriented strategies). The processes that research has found to be most effective for young children work very well within the classroom as a representation of a community[72, 74], and can easily be connected to the content so that "big ideas" are used to make meaningful connections for children and deepen their understanding of their social environment[72].

Best practices for teaching Social Studies[72,75]:

- Build on what children currently know. For instance, after studying neighborhood and community, move on to the home state.
- Develop concepts and processes of social studies instead of presenting facts in isolation. For example, create visual maps illustrating the classroom, the school, and/or community.
- Offer hands-on activities. Let children draw a timeline of when each of them was born or make a chart to show how many brothers and sisters each child has.
- Draw on relevant social studies all through the year. Have discussions with the children about class problems, revising class rules as a result, or have children think about the concept of scarcity with respect to items or activities from which they want to choose.
- Make the most of child interests. Reflect on why the outdoor city pool is closed to swimmers in the winter or what makes an airplane stay in the sky.

Key Message: Children's active participation in society (both in the present and as adults) is supported as they are exposed to social studies. Experiences and situations that are relevant to children allow an effective mechanism for learning about social studies in the early childhood setting.

Using the Hatch Products to Help Children Achieve Critical Social Studies Outcomes

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Positive Beginnings: Positive Beginnings® is a series of classroom management systems that provide early childhood teachers the materials necessary for managing their preschool classroom. This proven, research-based system comes with everything teachers need to encourage active participation and organization and promotes a sense of community in the classroom.

Teaching Young English Language Learners

The Vital Role of Oral Language Proficiency. A common thread that unifies the research on ELL children and monolingual English-speaking children is the emphasis on the development of oral language proficiency as a necessary prerequisite for later literacy[76]. A well accepted finding at this point is that children taught in English-only classrooms or those transitioned to English instruction before they can fully demonstrate well-established oral language abilities in their own language and

have achieved some degree of English oral proficiency, do not progress as well as those who have the chance to learn and become competent and proficient through and in two languages[77,78].

Language of Instruction. The Report of the National Literacy Panel on Language Minority Children and Youth found that "English language learners may learn to read best if taught both in their native language and English from early in the process of formal schooling. Rather than confusing children, as some have feared, reading instruction in a familiar language may serve as a bridge to success in English because decoding, sound blending, and generic comprehension strategies clearly transfer between languages that use phonetic orthographies, such as Spanish, French, and English"[79].

Transfer of Early Literacy Skills across Languages. The potential for transfer, that is, the ability to apply one's previous learning to a new skill, is crucial when determining the language of instruction. (*L1=1st language/home language/native language; L2=2nd language/language of school). Recent research on the transfer of preschool literacy skills from Spanish to English supports the transfer hypothesis, where "building on a child's language abilities in his or her L1 will not only help the child fully master that language, but provide him or her with the tools to deconstruct the L2. Early development of language skills, such as semantics, syntax, narrative discourse, and morphology, as well as phonological awareness, will provide the child with a 'meta' understanding of language that he or she can apply to language development and literacy skills in the L2"[80].

Best Practices for Teaching Young ELL Children

Literacy. The following are instructional approaches recommended based on a review of three national data sets[81].

Use the children's main language in a strategic manner and build upon home language skills;

- Have expectations, instruction, and routines that are consistent;
- Provide extensions of explanations and opportunities for practice;
- Use visual cues and physical gestures;
- Highlight the similarities/differences between English and the native/home language;
- Restate children's language and encourage them to expand on that language; and
- Frequently assess comprehension.

Mathematics. An incremental developmental process in instruction is recommended for ELL children by the National Council of Teachers of Mathematics (NCTM)[82].

1. Build a conceptual understanding of mathematics by starting each new concept with concrete examples and experiences.
2. Provide opportunities for children to make connections among concrete experiences, semi-concrete graphical depiction, abstract symbolic representations, verbal language, and written expression to allow them to construct a comprehensive understanding of the new math concept(s).

As mathematics can be taught using many modalities, it has a distinct advantage for learning opportunities for children. In addition to verbal language, math ideas can be expressed through graphical depiction, symbolic representations, and the manipulation of concrete objects, all of which are fairly free of spoken language. This can contribute to ELL children being able to understand new concepts in math. However, it is also important to take into account the linguistic complexity of the language used in math instruction and the language proficiency of the children. This is because if new concepts are introduced in a language that is not familiar, the children then must grapple with two unknowns: the language and the concept, which makes learning daunting[83]. Teachers must control and monitor that children are progressing in both math language and concepts. Further, the National Research Council Committee on Early Childhood Mathematics points out that operations situations (e.g., addition and subtraction) and the word problems that describe them, allow excellent opportunities for ELL students to learn language, including integrating art, language practice, and pretend play to help generalize their budding knowledge about mathematics[59].

Progress Monitoring and Assessment. There are many drawbacks to current standardized assessment measures all around for ELL children. Two of the most widespread are measures having varying levels of attention to ensuring comparability across languages. The second is the norm group not matching or including too few children similar to those being assessed. To compensate for these issues, researchers recommend the use of multiple measures that may include standardized tests and curriculum-embedded assessments in addition to narrative language samples and observation of children's language usage in natural settings[79,84,85].

Two types of progress monitoring and assessment being recommended by research are:

- The use of language samples, particularly storytelling, is one promising alternative approach to assessment as it matches well with showing a child's ability to comprehend and produce both oral and written narrative structure (e.g., introduction, character development, referencing)[86].
- Equally exciting is using dynamic assessment in order to reduce test bias because it focuses on learning potential[87]. Major characteristics of the dynamic assessment model include a test-teach-retest format and a focus on the learning process, particularly strategies related to problem solving that underpin the ability to be successful during test taking. Much of the rationale behind this approach is based on Vygotsky's theory of the zone of proximal learning and scaffolding[88].

Key Message: The conclusions from this research suggest that essential metalinguistic skills can be gained by young children through learning more than one language, that they are quite capable of learning early language and literacy skills in two languages, and that many early language and literacy skills learned in L1 positively factor into English language/literacy and mathematics development. That said, the research also shows that many if not most ELL preschoolers, especially if they are in low-income families, are already behind when they enter early childhood programs, and continue to fall behind. The good news is that there is a growing body of research-based best practices that have demonstrated positive results for these tenuous learners.

Using the Hatch Products to Help ELL Children Achieve Critical Language & Mathematics Outcomes

TeachSmart®: The TeachSmart® Learning System (Spanish version available) is an interactive, hands-on technology tool which enables early childhood teachers to plan for playful and purposeful activities for children. This tool offers strategies and activities that reflect the latest scientific research for pre-literacy and mathematics concept acquisition in young children.

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Journeys Literacy: Journeys into Early Literacy® is a complete early education literacy program designed to build upon and extend children's knowledge of letters, words and the processes they use in learning to read.

Journeys Mathematics: Journeys into Early Math® is a complete early education mathematics program designed to build upon and extend children's knowledge of mathematical skills, concepts and the processes they use in learning mathematics.

Right on Target: The Right On Target™ Kit is a bridge between current research, specific state and national prekindergarten standards, and classroom implementation. Teachers can feel comfortable knowing the kit will help provide an optimal learning experience to support school readiness.

Lending Libraries: The Hatch® Lending Library is a blend of traditional and contemporary picture books for young children and their families. Each book is accompanied by a laminated activity card that prompts families to talk with their child about the story, as well as engage in fun learning activities. The activity cards explain to both parents and teachers how crucial pre-reading skills such as vocabulary development, alphabet knowledge, and phonemic awareness are developed within each book. Each Lending Library includes 20 pre-packaged bags with activity cards on a sturdy organizer rack which allows easy access for parents and children to select books.

Teaching Special Needs Learners

Technology and Children with Disabilities. Young special needs children who have been unsuccessful in interacting with their environment through traditional methods can often experience immediate success through access to appropriate technology. As children with disabilities experience these successes, their self-esteem improves and inclusion efforts are less challenging.

The following represent specific areas in which special needs children can benefit[89-92]:

The Technology-Related Assistance for Individuals with Disabilities Act. Attention to the purpose of P.L. 100-407, The Technology-Related Assistance for Individuals with Disabilities Act of 1988 is key[89]. "The primary purpose of this Act is to assist states in developing comprehensive, consumer-oriented programs of technology-related assistance, and to increase the availability of assistive technology to individuals with disabilities and their families. The Act was reauthorized in 1994, by P.L. 103-218. The reauthorization requires the development of a national classification system for assistive technology devices and services."Assistive technology device" is defined by the Act as "any item, piece of equipment, or product system whether acquired off the shelf, modified or customized that is used to increase, maintain, or improve functional capabilities of individuals with disabilities."

Universal Design for Learning. Interactive whiteboards are designed to engage a wide variety of children in the learning process by supporting the principles of universal design for learning. Teachers have multiple ways to represent information through text and images that are interactive with sound and video. Touch boards in particular give multiple options for engaging with material and information, as children can use their finger, the pen tool, or other objects such as a tennis ball. Interactive whiteboards additionally give children an instant and tactile connection, thereby increasing their engagement[90].

Fine motor delay. Special needs children with fine-motor development delays can access the interactive whiteboard and touch screen computers in multiple ways by using special pens, a finger or fist, or any object, such as a tennis ball. Those who cannot type or write benefit from lessons and participate in activities using drag-and-drop techniques on the board. Even students with severely limited movement can operate interactive whiteboards. The sense of accomplishment and mastery for students with physical challenges boosts self-esteem while increasing their engagement in the lesson. For example, "…pupils with special educational needs, are highly motivated by being able to demonstrate their skills and knowledge with the tapping and dragging facilities of the interactive whiteboard" [91].

Visually challenged. The size of the images displayed on the whiteboard make it ideal for children who are visually challenged, and allows teachers to use interactive whiteboards to adapt material for these children. For example, text and graphics can be resized, and brightness or contrast can be adjusted. Writing on the board is also facilitated for these children because the brightness and scale is greater than that of a pen and paper or traditional chalkboard. When playing videos, the image is enlarged so children can view detail not visible on a smaller computer screen. The interactive whiteboard takes it a step further as they are also able to interact with objects on-screen and participate more fully in the activity[90].

Hearing challenged. Interactive whiteboards have been found to be very useful when teaching deaf or hard of hearing children because the finger-touch capabilities allow their hands to be free of pen tools, which can interfere with signing. Additionally, holding the attention of children with the materials on the interactive whiteboard limits the need for children to have to look down (using written material on a table), and teachers to have to regain their attention and focus. This increases the opportunities for communication between teachers and students[92].

Mentally and behaviorally challenged. Keeping children focused who have full autism, Asperger's syndrome, attention-deficit disorder and other mental or behavioral challenges can be very challenging for teachers. Because the interactive whiteboard provides a stimulating focal point for lessons, it can easily capture the interest of the children, provide positive reinforcement, give children different sensory experiences to allow information to be processed, and support new ways to share information for those children with expressive communication problems[90].

Interactive whiteboards and IEPs. Interactive whiteboards also allow an excellent means to design and review Individual Education Plans (IEPs). The power of a Digital Portfolio can clearly be seen here, as educators, specialists, administrators, and parents can see, often in real time, the work of a child and therefore their status with respect to their short-term and long-term goals[90].

Content. Appropriate content on technology applications is key to success. Content must be able to address all areas including physical, social-emotional, and cognitive. The use of scaffolding, both teacher driven and software driven (intuitive); capability to be customized to the individual learner; and the presence of a strong progress monitoring component are especially important for special needs learners.

Key Message: Children with special needs can experience success in school if their learning environments are adapted to their needs and goals. Technology can greatly facilitate their ability to participate in learning and appropriate content can engage and inspire them to progress.

Using the Hatch Products to Help Special Needs Children Achieve Critical Outcomes

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Right on Target: The Right On Target™ Kit is your bridge between current research, specific state and national prekindergarten standards, and classroom implementation. Teachers can feel comfortable knowing the kit will help provide an optimal learning experience to support school readiness.

Fit 4 You: The Fit 4 You® Kit provides a wealth of information and activities to help the teacher increase young children's participation and development in four key areas: Physical Development, Nutrition, Cognitive Development, and Social/Emotional Development. The Fit 4 You® Kit introduces exercise and wellness in the classroom.

discover! Science: Turn the classroom into a fun-filled science lab. discover! Science™ prepares young learners for kindergarten and beyond with easy-to-implement science projects — comparing trees, creating a fish habitat, exploring how things change, studying their growing bodies, and much more.

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Assessment and Progress Monitoring in Early Childhood

Assessing and teaching are highly and necessarily connected. When children are assessed as part of the teaching-learning process, teachers are able to learn what each child can do, and determine what he or she is next ready to learn. The National Education Goals Panel has developed principles and recommendations for early childhood assessments. Similar to the purpose of scaffolding discussed earlier, early childhood teachers can use both formal and informal assessments to establish what children already know and understand, what concepts and skills could be understood with more practice and experience, and which are too difficult without providing additional support. Assessments of children's learning can also be utilized by teachers for feedback on their own teaching practices in order to modify curriculum, adapt instructional activities, and fine-tune classroom routines to be the most effective possible.

Portfolio Assessment. The term authentic assessment is used by educators to describe and recognize a performance-based, realistic, and instructionally fitting method of assessment[93]. One type of authentic assessment very appropriate in early childhood is the use of portfolios[94,95]. A portfolio is defined as a purposeful collection of student work showing effort or achievement in one or more areas[95-97]. The portfolio is a record of the child's learning over time and incorporates the following[95]:

- What the child has learned;
- How the child has gone about learning;
- How the child thinks, questions, analyzes, synthesizes, produces, creates; and
- How the child interacts--intellectually, emotionally and socially--with others.

In deciding which pieces to include, teachers can turn to reflecting on the purpose of the portfolio. In this way the portfolio can be fully utilized and not become just a random sample of children's work. Several purposes for portfolios have been identified[98-100], such as to:

- Make sense of children's work,
- Communicate about their work,
- Relate the work to a larger context,
- Motivate children,
- Promote learning through reflection and self-assessment, and
- Be used in evaluations of children's' thinking and writing processes.

In early childhood education, after determining the purpose(s), the most effective portfolio includes an ample variety of work samples. To make the portfolio even more meaningful, successive drafts of work on specific projects or tasks can show the progress a child has made. Researchers also agree that allowing children to have some input into which items they would like to include in their own portfolios leads to children become more aware and analytical about the work they complete[95,96,101]. Some of the common elements of a portfolio include[95,102]:

- Work samples,
- Photographs,
- Audio and visual recordings,
- Observation notes,
- Instructional objectives checklists, and
- Screenings or progress monitoring results.

The use of the portfolio approach has several strengths for the early childhood educator. One is for evaluating growth and achievement through the capability to compare the individual child's current work to his or her previous work-as it is not appropriate to use portfolios to compare children to one another[95]. An important consideration is to link how the child is progressing toward standards connected to the curriculum (both of which of course need to be developmentally appropriate). This connection serves as a strength for supporting curriculum and instructional planning[103]. A final area of strength is that one of the most meaningful ways that educators can share information with parents is through the portfolio because it represents such a concrete example of a child's work and progress[95,104].

Key Message: Conducted appropriately, progress monitoring and informal assessment can make the difference between a child who is ready for school and a child who is not. They represent powerful information to help assure children attains the skills in literacy, math, science, social studies, and social-emotional functioning needed for success in the preschool years and throughout their school career.

Using the Hatch Products to Help Children Achieve Critical Outcomes through Progress Monitoring

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Classroom Design and Management in Early Childhood

The importance the role of classroom management and the physical environment play in early childhood programs is now well established[2,4]. These can directly impact the kinds of behaviors that children exhibit and whether the environment is orderly or chaotic. This in turn has a strong relationship with how well children will be able to learn.

Classroom Design. With respect to the physical space, the following should be taken into consideration[4]:

- Traffic patterns that flow well;
- Materials placed where children can access them;
- Storage that is organized;
- Adequate supplies and equipment;
- Well defined areas and boundaries;
- Thoughtful placement of centers;
- Work areas for large group, small group, and independent or one-on-one learning;
- Furniture that fits the children and activities; and
- Rich with print and with children's work.

Classroom Management. The management of the classroom revolves around how and which activities occur and are conducted throughout the day. In addition to an orderly and carefully thought out physical environment, attention to an orderly routine is also critical for children to experience success each day. Effective classroom management means that there is an overall structure that is predictable but that also is dynamic for interesting learning to occur.

Key components include[4]:

- Daily plans, which can be supported with charts for the children (e.g., Helpers, Attendance, Centers);
- A system that helps children know what to do (e.g., color coding);
- Consistent use of and fair enforcement of rules; and
- Frequent feedback.

Key Message: It is also important to recognize that the interactions that occur in a well-designed and managed classroom are the key to seeing their full potential for children's learning. When classroom set-up and management run smoothly, the teacher and children can attend to building strong, trusting and responsive relationships with one another and to the excitement of learning. Research strongly supports that the primary mechanism through which children learn is through responsive interactions between themselves and adults. Together, emotional support, classroom organization, and instructional support offer great opportunity for young children's success[105].

Using the Hatch Products to Help Children Achieve Critical Outcomes Through Classroom Environment

Instant Classroom: The Instant Classroom is an unbeatable way to create a fully-functional early childhood classroom customized to fit a program's needs. Hatch tailors a classroom especially for each customer and a trained Hatch Classroom Integration Consultant (CIC) will do all the set-up work. When you say goodbye to your CIC, each classroom will be complete and ready to use immediately.

Positive Beginnings: Positive Beginnings® is a series of classroom management systems that provide early childhood teachers the materials necessary for managing their preschool classroom. This proven, research-based system comes with everything teachers need to encourage active participation and organization and a sense of community.

Summary

The purpose of this paper was to bring together the research basis for a powerful set of innovative products designed to prepare children to be ready and successful in school. Here we have presented the research that comprehensively defines "high quality" early childhood education programs with a focus on positive outcomes for young children in the area of school readiness. From this research, Hatch has culled a solid set of multi-dimensional and interconnected design principles on which the Hatch Innovative Product line is built. Hatch is pleased to both use and promote this process.

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TeachSmart® Learning System Shows Positive Effects

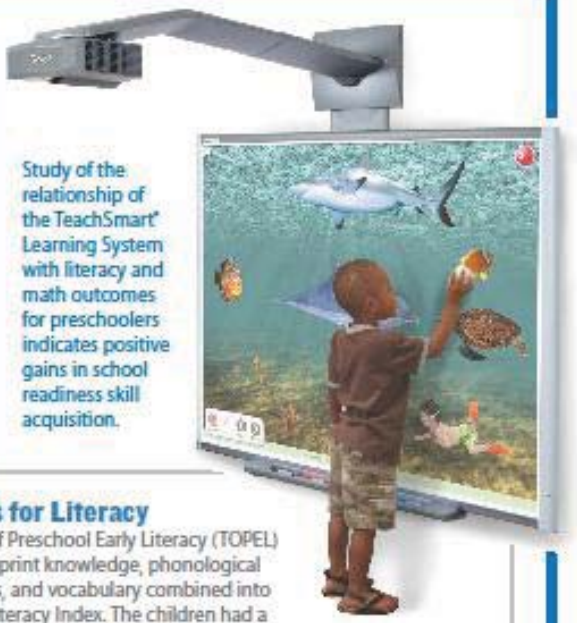
Summary

Developing and properly using instructional technology hinges on many factors including the developmental appropriateness of the equipment itself and the content to which children are exposed.

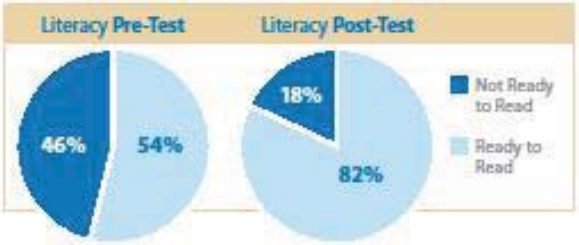
The results of our recent study found that pre-kindergarten children in classrooms using the TeachSmart® Learning System**—an interactive whiteboard with instructional activities designed for preschoolers—**made significant gains from fall to spring in literacy and mathematics.

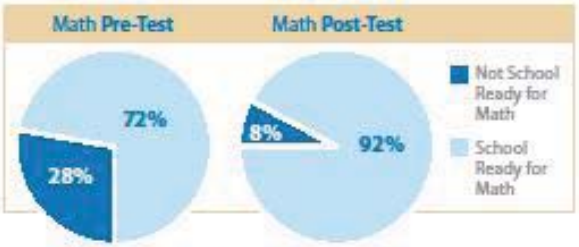
Participants

The study included 87 randomly selected children in school district preschools in the 2009-2010 school year. The children were tested on measures of literacy and mathematics near the beginning, and again near the end, of their pre-k year. There were two measures for literacy and one for math. The data was collected and analyzed by outside consultants.



Study of the relationship of the TeachSmart® Learning System with literacy and math outcomes for preschoolers indicates positive gains in school readiness skill acquisition.





Results for Literacy

The Test of Preschool Early Literacy (TOPEL) measures print knowledge, phonological awareness, and vocabulary combined into an Early Literacy Index. The children had a significant increase in their Early Literacy Index over the course of the year, where they began well below average and ended as average.

The Get Ready to Read! (GRTR) Literacy Screener also measures early literacy skills, including knowledge of letter and sounds, recognition of spoken words and phonological knowledge. The children again had a significant increase. The score calculated from the Screener provides an index of readiness to learn to read. At pre-test, 46% of the children were Ready to Read, at post-test 82% were Ready to Read.

Results for Mathematics

The CPALLS+ Math Screener looks at the skills important for the development of math knowledge; including counting, shapes, operations and number identification. Children in the study showed a significant increase from fall to spring. The Screener also gives an index of progress towards school readiness in mathematics. The results from the pre-test show that 72% of children achieved a high enough score to be considered ready for math in school. At post-test, that number had increased to 92%.

Comparing with "Business as Usual"

Results for children in "Business as Usual" classrooms showed no gains on the Get Ready to Read! Literacy Screener. Children in the TeachSmart® classrooms made significant gains in literacy.

Conclusion

The importance of these findings is twofold: (1) The literacy and math skills on which these at-risk preschool children increased are known to be predictors of success in school, both in the short-term in kindergarten and first grade, and beyond to have an impact on their entire schooling experience. (2) The study supports that instructional technology as both a vehicle for presenting educational information and as a vehicle for bringing strong content and skills, can be used successfully with young children in early childhood education settings.

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