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The state of state pre-kindergarten standards

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Abstract

Recent federal initiatives, including Good Start Grow Smart, and the Child Care and Development Grant (CCDF), call for states to develop early learning standards for children ages 3–5 in language, literacy and mathematics. To date, 43 states have such standards, with the remaining seven in progress. In this article, we argue that coherent, quality standards and their benchmarks (indicators) must be solidly grounded in research, and reflect age-appropriate outcomes for young children. We first review what is known about the key predictors of early literacy and mathematics achievement, and summarize recommendations from organizations that have examined the quality of state K-12 standards. We then take a look at how states are organizing their standards and benchmarks in these content domains in early learning. We end by highlighting benchmarks based on this summary of research that reflect clear, rigorous, and developmentally appropriate expectations for young learners. Finally, we urge states to review their standards in these and other areas to ensure that standards-based reform in early childhood serves to benefit children's learning and development.

1. Introduction

Standards-based education,[1] once an ambitious initiative to reform K-12 education, is about to establish a foothold in the pre-kindergarten (pre-k) years. Federal initiatives, including Good Start Grow Smart (2002), Child Care and Development Fund (CCDF) state plans (2002), and proposals for the reauthorization of Head Start call upon states to rigorously review, and in some cases, develop pre-k guidelines or

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[1] Standards-based education, or early learning standards are defined as expectations for what children should learn and be able to do at certain age levels.

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standards in literacy, language, and mathematics to be aligned with state K-12 standards. Seen as a critical part of a state's architecture for developing systems of service delivery for young children (Schweinhart, 2003), early learning standards have the potential to help frame content and curriculum, professional development, and assessments, for helping children in early care and education settings to develop school readiness skills.

This initiative has received, at best, only cautious enthusiasm among many in the early childhood community (Burns, Midgette, Leong, & Bodrova, 2003; Scott-Little, Kagan, & Frelow, 2003). There are risks involved in applying standards-based reform to early childhood. For one, early childhood educators have traditionally recognized individual differences in learning and development (Bowman, Donovan, & Burns, 2000; Bredekamp & Copple, 1997). Expectations for what young children should know and be able to do at certain ages have been related to relative growth trajectories for each individual child rather than on absolute targets or benchmarks. Second, early education has typically emphasized the integration of content areas, not isolated subject learning (Schickedanz, Pergantis, Kanosky, Blaney, & Ottinger, 1997). Many fear that teaching could become highly fragmented, with subject matter holding little meaning for the young child. And third, early childhood education has focused on the whole child—cognitive, physical, social/emotional development (Bredekamp & Copple, 1997). Emphasizing academic skills to the exclusion of others might neglect important other areas of development, especially given the brief, all too typical 2½ h day. School readiness (Blair, 2002), after all, is a multi-dimensional set of behaviors associated with children's successful adjustment to formal schooling.

To build coherent, unified state systems, then, standards-based education must be approached from what is known about young children's learning and development—an early childhood perspective—rather than on merely aligning standards with K-12 systems. Early learning standards must build on what is known about the distinctive features of early childhood, and be solidly grounded in research in key content domains. This research base should provide the foundation for establishing standards and performance indictors, reflecting important key ideas, age-appropriateness, and desired outcomes for young children, ensuring that early learning standards serve to benefit, not detract from effective learning and positive development in the early years.

To date, however, there is much to be learned about young children's developing knowledge and understanding in many content domains. More often than not, standards developers have had to rely on the consensus of experts in content areas, such as science, history, and the arts rather than on solid scientific evidence. Without such evidence, unfortunately, developers have run the risk of establishing benchmarks that may not accurately portray what *all* children should know and be able to do. Further, developers may overlook skills and abilities that are not immediately evident but are critical for children's later success, and fall prey to a disturbing, and growing trend to push discrete academic skills of kindergarten and above, to the preschool years.

Contrary to other content domains, however, there is now a corpus of research-based evidence in early literacy development (Dickinson & Neuman, in press; Neuman & Dickinson, 2001; Snow, Burns, & Griffin, 1998), and to a lesser extent, mathematics (Clements, Sarama, & DiBiase, 2004; Kilpatrick, Swafford, & Findell, 2001), that could be useful in establishing appropriate standards and benchmarks in early learning. Given the current emphasis in policy circles on these particular skills, this information may be helpful to state leaders in the process of developing, reviewing, and revising their standards. In addition, analyses of K-12 standards by a number of organizations (e.g., ACHIEVE; AFT) have provided suggestive guidelines that might be useful for framing early learning standards.

In this article, we first review what is known about the key predictors of early literacy and mathematics achievement. We summarize recommendations from organizations that have examined the quality of state K-12 standards. We then take a look at how states are organizing their standards and benchmarks in these content domains (e.g., subject matter understandings) in early learning. We end by highlighting benchmarks based on this summary of research that appear to reflect clear, rigorous, and developmentally appropriate expectations for young learners.

Standards-based reform (David, Shields, Humphrey, & Young, 2001), premised on an ambitious set of goals that include: (a) high expectations for what children should know and be able to do; (b) reliable assessments of basic skills for purposes of accountability; (c) alignment of curricula to standards and assessments; and (d) quality professional development, is now becoming a reality in early learning. In 2000, 16 states reported early childhood standards (Quality Counts, 2002); in 2005, this total has now more than doubled to 43 states. Consequently, with K-12 education increasingly pointing the way for early childhood education, we believe the development of early learning standards represents a critical juncture for early childhood. It requires us to address a fundamental issue: How to retain the traditional strengths of early care and education and at the same time to *appropriately* align it with more formal educational systems.

Tapping the local expertise of early childhood specialists, early learning standards could lead to a common understanding within each state of what is necessary to help all children thrive, as well as a shared plan for achieving these goals. Such efforts could represent a critical tipping point for extending services, enhancing salaries and professional development, and potentially ending chronic fragmentation in services.

1.1. Early learning skills associated with literacy development

The last decade has brought a growing consensus on the range of skills that serve as the foundation for later reading and writing ability (National Reading Panel Report, 2000; Neuman & Dickinson, 2001; Snow et al., 1998). To become a skilled reader, children need a rich language and conceptual knowledge base, a broad and deep vocabulary, and verbal reasoning abilities to understand messages that are conveyed through print. Children also must develop code-related skills, an understanding that spoken words are composed of smaller elements of speech (phonological awareness); the idea that letters represent these sounds (the alphabetic principle), the many systematic correspondences between sounds and spellings, and a repertoire of highly familiar words that can be easily and automatically recognized (McCardle, Scarborough, & Catts, 2001).

But to attain a high level of skill, young children need opportunities to develop these strands, not in isolation, but interactively. Meaning, not sounds or letters, motivates children's earliest experiences with print (Neuman, Copple, & Bredekamp, 2000). Consequently, although standards and indicators may identify a typology of skills that serve as important precursors to eventual literacy, it is important to recognize that in practice, children acquire these skills described below in coordination and interaction with meaningful experiences.

1.1.1. Language

Verbal abilities are consistently the best predictors of later reading achievement (Scarborough, 2001). Skilled readers typically draw upon multiple levels of the language system (Dickinson, McCabe, & Essex, in press), with abilities encompassing vocabulary, syntax, and discourse. Vocabulary size in optimal set-

tings may increase exponentially in the early years (some estimate about seven words a day) (Snow et al., 1998), with children learning to comprehend words spoken *to* them before they are able to produce them on their own. Word knowledge, however, is not just developed through exposure to increasingly complex language, but to knowledge-building experiences (Neuman, 2001) that involve children in developing, and refining networks of categorically related concepts.

With opportunity and practice, children's word knowledge is put to use in syntactic structures that grow in length and complexity. Children's sentences often start at two (Bloom, 1970), but quickly lengthen to four or more words, as children communicate their ideas increasingly through language. Snow and colleagues (Snow, 1991; Snow, Baines, Chandler, Goodman, & Hemphill, 1991) have shown that conversations that are physically removed from immediate objects or events (i.e., 'what if?') are tied to the development of abstract reasoning, and related to literacy skills like print production and narrative competence.

With word learning occurring so rapidly, children begin to make increasingly fine distinctions of words not only of their meaning but of their sound. They begin to make implicit comparisons between similar sounding words, a phenomenon described by linguists as lexical restructuring (Goswami, 2001; Metsala, 1999). For example, a 2-year-old child probably knows the words "cat" from "cut"; "hot" from "not". Distinguishing between these similar sounding words both quickly and accurately, children begin to hear sequences of sound that constitute each known word. Children with large vocabularies become attuned to these segments, and acquire new words rapidly; children with smaller vocabularies may be limited to more global distinctions. Consequently, vocabulary size and vocabulary rate are important for lexical restructuring (i.e., making sound distinctions between words) (Goswami, 2001), and are strongly tied to the emergence of phonological awareness.

1.1.2. Phonological awareness

Discriminating units of language (i.e., words, segments, phonemes) is linked to successful reading (National Reading Panel Report, 2000). It is, however, as described above, both a cause and a consequence of vocabulary development, and learning to read (Ehri & Roberts, in press). Typically developing children begin first to discriminate among units of language (i.e., phonological awareness), then within these units (i.e., phonemic awareness). Phonological awareness refers to the general ability to attend to the sounds of language as distinct from its meaning. Phonemic awareness is the insight that every spoken word can be conceived as units of sounds that are represented by the letter of an alphabet (Snow et al., 1998). Evidence (Lonigan, in press; Whitehurst & Lonigan, 1998) suggests that children achieve syllabic sensitivity earlier than they achieve sensitivity to phonemes, and sensitivity to rhyme before sensitivity to phonemes. Children's entry to these skills typically begins with linguistic activities such as language games and nursery rhymes (Maclean, Bryant, & Bradley, 1987) that implicitly compare and contrast the sounds of words, and include alliterative phrases (i.e., bibbily bobbily boo begins with /b/). But implicit comparisons, alone, may be insufficient. Phonological awareness, and phonemic awareness are meta-linguistic abilities (Adams, 1990). Children must not only be able to recite and play with sound units, they must develop an understanding that sound units map onto whole or parts of written language.

Phonological awareness should not be confused with phonics. The term phonics, or decoding assumes that children understand the phonemic composition of words, and the phoneme-grapheme (sound/letter) relationship. Studies that have attempted to accelerate learning through early phonics training have shown no effects (Snow et al., 1998); in fact, evidence suggests that such training, without a firm

understanding of phonemic awareness may be detrimental to remembering words and learning to spell.

1.1.3. Letter knowledge

Knowledge of the alphabet letters is a strong predictor of short- and long-term reading success (Bond & Dykstra, 1967; Chall, 1967). However, its influence on later reading is not about knowing the letter names, per se. Rather, the learning of letter names *mediates* the ability to remember the sounds associated with the letters (Ehri, 1979). Once again, there is a reciprocal relationship between skills: Letter knowledge plays an influential role in the development of phonological awareness, and higher levels of letter knowledge are associated with children's abilities to detect and manipulate phonemes. For example, the child who knows the letter 'b' is likely to remember the sound of /b/. Consequently, letter knowledge may reflect a greater underlying knowledge and familiarity with literacy related skills such as language, and print.

Research (Gibson & Levin, 1975) indicates that children differentiate letters according to their visual form, their horizontal, vertical and diagonal segments. Given the complexities of the visually distinct forms of letters (upper case, lower case, printed form), current learning theory (Adams, 1990) suggests that simultaneously teaching two versions of letters with their confusable sounds and labels may be overwhelming to the young child. However, there is no substantial evidence to suggest which particular form (upper or lower case) should be taught first.

1.1.4. Print conventions

Recognizing that concepts about print in English language are not intuitive, Clay (1979), in her pioneering work with Maori children in New Zealand, identified a set of conventions that could be understood without being able to read. These conventions included among others, the directionality of print in a book (left-to-right, top-to-bottom, front-to-back) differences between pictures and print, uses of punctuation, and definitional characteristics of a letter, and a word. Knowing these conventions, she found, helped in the process of learning to read.

With the exception of a study by Tunmer, Herriman, and Nesdale (1988) demonstrating the relationship of these skills to later reading success, however, there is little evidence to suggest the predictive power of these skills on later achievement. Rather, print conventions act as an immediate indicator of children's familiarity with text, and are not integrally related to the other language based skills associated with reading success. Therefore, while such conventions might be helpful to young children in navigating through books, these skills may not in the long run play a powerful role in learning to read.

In sum, research supports a particularly strong linkage between oral language, phonological awareness, letter knowledge, and to a much lesser extent, print conventions, in the preschool years. These skills are highly interdependent. Phonological awareness appears to be, in part, a product of vocabulary development and vocabulary rate. Letter knowledge appears to support phonological awareness. Code-related skills are highly predictive of children's initial early reading success while oral language skills become highly predictive of comprehension abilities and later reading achievement.

Early learning standards in language and literacy, then, would do well to emphasize oral language skills as the foundation from which other skills are derived. Phonological awareness and letter knowledge, and to a lesser extent, print conventions help children begin to uncover the mysteries of how print works

through the alphabetic principle. Each of these skills integrated in meaningful activity, has an important role to play in children's literacy development.

1.2. Early learning skills associated with mathematics achievement

Research (Clements et al., 2004) suggests that children have an intuitive interest and understanding of mathematical concepts long before entering school. They explore their worlds, sorting, classifying, comparing, and contrasting objects through playful and daily activities. Like literacy, mathematical knowledge begins during infancy, and undergoes extensive, qualitative development over the first 5 years. Accumulating evidence (Kilpatrick et al., 2001) suggests that these early experiences may have long lasting effects on children's capabilities and later achievement.

Research in mathematics (Baroody, 1987; Clements et al., 2004) is tied to children's developing capabilities, the diverse strategies they use in problem-solving and reasoning, and the sets of attitudes and beliefs that support their learning. Studies designed to examine to what extent a particular sub-skill is predictive of later achievement appear less prevalent in the literature than in the field of literacy (Kilpatrick et al., 2001), at least in the early years. Consequently, although national professional standards (NCTM, 2000) have outlined a set of core ideas within mathematics, these skills or strands of mathematical proficiency for preschool children are particularly closely intertwined, and should not be treated isolated topics (NAEYC/NCTM, 2002).

1.2.1. Numbers and operations

Number and quantitative ideas are the most fundamental concepts in the early years (Kilpatrick et al., 2001). Numbers and operations include counting, comparing, grouping, uniting, partitioning and composing. Some infants, even younger than 6 months of age, appear to show a rudimentary understanding of addition and subtraction, suggesting that children might be endowed with intuitive and informal capabilities in these areas (Clements, 2001).

As many early childhood specialists would attest (Bowman et al., 2000; Clements et al., 2004; Fuson, 1988), counting is not simply reciting numbers by memory (like A, B, C's). Research (Clements, 2001; Ginsburg, 1989) suggests a developmental sequence in counting that moves from the perceptual (e.g., one-to-one correspondence between object and number) to the more abstract (e.g., counting in the absence of objects), with intermediate steps that includes four interrelated aspects (Kilpatrick et al., 2001): enumerating objects, instantly recognizing how many items in a small configuration or subitizing (e.g., that's three), understanding that the last number when counting refers to how many items are counted, and number names. Kaufman, Lord, Reese, and Volkmann (1949) coined the term subitizing for the rapid, accurate judgement of knowing how many items lie within a group.

It turns out that number names is particularly challenging for preschoolers (Geary, Bow-Thomas, Fan, & Siegler, 1993). In English, these names are not in a predictable sequence like in some other languages. Research (Geary et al., 1993) on children's acquisition of number names indicates that U.S. children often learn them through rote memory, leading them to make occasional errors like "fiveteen." Comparing English-speakers with Chinese speaking children (which uses predictable sequences), for example, Miller (2004) found that number names played a significant role in mediating children's mastery of the symbolic system. Numbers and operations, therefore, incorporate a combination of skills including knowledge of number names, conceptual understanding of the mathematical

principles that underlie counting, and ability to apply the knowledge to solve rudimentary mathematical problems.

1.2.2. Geometry and spatial relations

Children's understanding of basic geometric reasoning (Lehrer, Jenkins, & Osana, 1998), their informal knowledge about shapes and forms begin forming before the preschool years as well. Many children by age 4 (Clements, 2001), for example, can identify some shapes (e.g., square; circle), focusing first on global appearances of these forms to be followed later on by a variety of attributes to describe them. Similarly, young children bring an understanding of measurement, such as mass, length and weight, however, in both cases, they do not know how to reason about them (Kilpatrick et al., 2001).

Although knowledge of children's developmental reasoning is not as extensive as numerical thinking, research (Clements, 1984) has begun to challenge the traditional view of stage-like sequences of development, traditionally associated with Piaget. Rather, studies (Clements et al., 2004) suggest that given appropriate activities and sufficient opportunities, children can move to more advanced levels of reasoning. Activities that help children learn to recognize, compare, and order objects, to judge whether two objects are the same size or not, and use the *language* associated with these attributes (e.g., smaller, larger) (Miller, 2004) improve the likelihood that children will develop greater proficiency in elementary grades. Engaging children in these learning opportunities, according to a recent consensus report (Kilpatrick et al., 2001), should complement the attention traditionally given to number and operation in the early years.

1.2.3. Algebra and data analysis

Like the other two areas, many of the central conceptual structures of algebra, and probability, begin in these early years (NCTM, 2000). Algebraic reasoning (Ginsburg, 1989) is thought to begin with a search for patterns, and organizing things; data analysis with classifying, organizing and representing them in a way that can be understood. For example, children can sort objects and depict their findings in a graphic display. They can compare what they have studied by describing, and making conclusions. However, research in these two domains (Clements et al., 2004) is far less extensive than in the other areas, especially with respect to the early years.

What is known, however, is that children use a variety of strategies to engage in day-to-day problem solving, and that diversity of strategies is a feature of later mathematical proficiency (Geary, 1994). In some circumstances, the number of difference strategies (Miller, 2004) children can show to solve problems predicts their later learning. In addition, children who are likely to be successful in math have a set of beliefs and attitudes that support their learning. Consequently, the strands of mathematical proficiency seem particularly inter-related, suggesting that children need opportunities to reason about the relationships among concepts that are meaningful, interesting and worthwhile, and that enable them to believe they are capable learners.

A growing consensus among mathematics experts (Clements et al., 2004; NAEYC/NCTM, 2002), therefore, recommend that early learning standards should focus on the big ideas and conceptual understandings related to number and operations, and geometry and spatial reasoning as foundational for young children's mathematical acting, thinking and learning. Patterns, sorting, sequencing and measurement should be woven throughout children's early learning experiences, recognizing that problem solving and reasoning are at the heart of mathematics learning.

1.3. Criteria for quality standards

Although relatively new to the field of early childhood, virtually every state in the nation now has K-12 standards, largely through the impetus of two education summits, Goals 2000, and the Improving America's School Act. Subject to considerable scrutiny, a cottage industry of organizations (e.g., ACHIEVE; McRel; Princeton Review; Accountability Works), as well as unions (e.g., AFT), interest groups (e.g., Fordham), and associations (IRA/NCTE, 1996; NCTM, 2000), have rated, ranked, and reviewed standards for quality. We examined this literature, as well position papers by organizations on criteria for quality standards (Kendall & Marzano, 1997; NAEYC/NAESC/SDE, 2002) and content learning (Bredekamp & Rosegrant, 1992, 1995; Neuman et al., 2000) as it might apply to early learning content standards for language, early literacy, and mathematics. We also examined guidance documents from the Child Care Block Grant (2002) and policies and materials related to the Good Start Grow Smart (2002) initiative. Synthesizing these sources, we highlight five critical features that seem particular to developing quality early childhood standards:

- *Big ideas.* Standards and indicators should focus on the big ideas that young children should know and be able to do (Clements et al., 2004; Roskos, Vukelich, & Clements, 2001). These skills should be grounded in the core discipline, and represent foundational understandings of important, key ideas. Indicators that attempt to prescribe how these big ideas are taught, however, should be avoided (NAEYC/NAESC/SDE, 2002).
- *Research-based.* Standards and indicators should be research-based (IRA/NAEYC, 1998; NAEYC/NAESC/SDE, 2002; NCTM, 2000). Indicators that are built on a solid foundation of research in child development, early childhood, language, early literacy, and mathematics ensure that skills are reasonably achievable for all pre-k children, age-appropriate, and necessary for school readiness.
- *Clearly written.* Standards and indicators must be written clearly enough for teachers, parents, policymakers, and the general public to understand (AFT, 1998). Educational jargon can be off-putting, alienating the very public from which educators seek support. A clear indicator, for example, should be measurable, focus on a particular targeted skill (instead of many skills), and send an unambiguous message as to what preschoolers will know and be able to do.
- *Comprehensive.* Standards and indicators should be comprehensive (AFT, 1998), representing the knowledge and skills essential for achievement. Indicators need to be balanced, to adequately cover the domain, and not overemphasize one set of skills over another.
- *Manageable.* Standards should be manageable, and realistic given the constraints of time (NAEYC/NAESC/SDE, 2002). Given the competing demands and limited hours (many programs are still only 2½ h long), states should be parsimonious in the number of indicators required. Too many indicators put undo demands on teachers, and place impossible expectations on children.
- *Applicable to multiple early childhood settings.* Standards and indicators should be appropriate for learning in multiple early childhood settings (Child Care Block Grant Guidance, 2002). Learning in the early years occurs in many different educational settings–some children are in family day care arrangements, others, in center-based care, still others with family members. Standards and indicators should be consistent across settings, helping to eliminate the fragmentation that has traditionally plagued the early childhood field.

In sum, our review of the literature in language, literacy, and mathematics as well as a review of standards documents indicates a substantial knowledge base on standards *development* (i.e., not their

impact), and content domains (in these three areas) that may be helpful to early childhood experts in states who are in the process of developing, reviewing, and/or revising early childhood standards.

1.4. Examining early learning standards in states

Based on this research literature, our purpose was to examine how states are organizing their standards and benchmarks in the content domains of language, literacy and mathematics, and to highlight indicators that appear to reflect clear, rigorous, and developmentally appropriate expectations for young learners.

1.5. Sample

We requested standards (e.g., in draft or final form) from state early childhood directors through a list obtained by the Council of Chief State School Officers (CCSSO) in three content areas associated with Good Start Grow Smart initiative: language, literacy, and mathematics. A total of 43 states responded to our request (see Table 1). As reported by Scott-Little et al. (2003), we found major variations in the terminology and structure of standards throughout states. For example, some states use the term *standard* (i.e., New York) to indicate the knowledge required in each domain, while others used *guideline* (i.e., Oklahoma), or *expectation* (i.e., New Jersey). Performance levels, as well, are alternately called benchmarks, milestones, outcomes, performance objectives, or performance indicators. Standards, or their alternate term identify the skill area or domain (i.e., language, literacy, mathematics). Similarly, performance measures, such as competencies, benchmarks, indicators refer to the degree to which these skills are expected to be performed.

2. Method

Given the variations among states, our first analysis examines the structure and organization of the standards documents. To conduct this analysis, we content analyzed several features in the documents: the layout (e.g., the number of descriptive levels or tiers used), structure (e.g., how levels are sequenced), the resources used to guide the selection of topics, and the target audience identified (whether or not they used age spans or were age specific).

Our second analysis examines the content of standards and indicators. Here, we use the literature reviewed in the previous section to identify exemplars of indicators from states that appear to be consistent with quality criteria. To conduct this analysis, we read standards and indicators across all the state documents. Then, through discussion and additional validation from content domain specialists, we identified quality indicators in each skill area. By highlighting different organizational strategies, and quality exemplars, we hope to provide helpful guidance to states in the process of working on early learning standards.

2.1. How are states organizing early learning standards?

2.1.1. Number of descriptive levels

We identified six different descriptive levels that states use to specify a standard: (1) domain (overarching classification of content, i.e., the language arts, language, early literacy); (2) category or skill area

Table 1
States standards in early learning

State	Title of early learning standards (guidelines)
Arkansas	Early Childhood Education Framework (1999)
Arizona	Early Childhood Education Standards (DRAFT)
California	Prekindergarten Learning and Development Guidelines (2000)
Colorado	Building Blocks to Colorado's Content Standards (2003)
Connecticut	The Connecticut Framework: Preschool Curricular Goals and Benchmarks (1999)
Delaware	Early Learning Foundations for School Success
District of Columbia	Standards for Teaching and Learning (1999–2000)
Florida	Florida School Readiness Performance Standards for 3, 4, 5 year-olds (2002)
Georgia	Georgia's Pre-K Program Learning Goals (DRAFT)
Idaho	Idaho Early Learning Standards (2003)
Illinois	Illinois Early Learning Standards (2002)
Indiana	Foundations for English/Language Arts and Mathematics
Iowa	Iowa Early Learning Standards (2003)
Kansas	Early Learning Guidelines (DRAFT)
Kentucky	Kentucky Early Childhood Standards (2003)
Louisiana	Louisiana Standard for Programs Serving Four-Year-Old Children (2002) DRAFT
Maryland	Maryland State Department of Education Prekindergarten and Kindergarten Content Standards (2002) DRAFT
Massachusetts	Early Childhood Standards (2001) DRAFT
Michigan	Early Childhood Standards of Quality for Pre-k (2005)
Minnesota	Minnesota Early Childhood Indicators of Progress
Missouri	Missouri Pre-K Literacy and Mathematics Standards
Mississippi	Guidelines for 3-year and 4-year olds (2004)
Nebraska	Early Learning Guidelines (2005)
New Hampshire	Early Learning Guidelines (2005)
New Jersey	Early Childhood Education Program Expectations (DRAFT)
Nevada	Pre-kindergarten Content Standards (2004)
New Mexico	Performance Standards and Benchmarks for Three- and Four Year Old Children
New York	Core Curriculum PreK-1
North Carolina	Language Development and Communication
Ohio	Early Learning Content Standards (2002)
Oklahoma	Priority Academic Student Skills
Pennsylvania	Early Childhood Learning Continuum Indicators
Rhode Island	Early Learning Standards
South Carolina	Prekindergarten Standards (2002)
Tennesee	Tennesee Early Learning Standards (2004)
Texas	Prekindergarten Curriculum Guidelines (1999)
Utah	Utah Early Childhood Standards
Vermont	Vermont Framework of Standards for Early Development and Learning (2002) DRAFT
Virginia	Virginia's Foundation Blocks for Early Learning: Guidelines for Literacy and Mathematics
Washington	Framework for Achieving the Essential Academic Learning Requirements: Reading, Writing, Communication Birth to Five Years (2002)
West Virginia	Early Learning Standards Framework (2004)
Wisconsin	Model Early Learning Standards (2003)
Wyoming	Early Childhood Readiness Standards

within a domain (e.g., reading, writing, vocabulary); (3) an indicator that describes a general skill type (e.g., uses *vocabulary*); (4) an indicator that describes a specific skill type (e.g., identifies *color words*); (5) an example of what learners might do (e.g., join in word games); and (6) an example of teacher behavior (e.g., reads to children several times daily to develop vocabulary). (See Anderson & Krathwohl et al., 2001, on the taxonomic organization of content.)

Some states use three levels to identify a standard. Ohio, for instance, uses a three-level arrangement: general domain, category, and several skill indicators. Virginia, on the other hand, uses four levels: domain, category, specific skill indicators, and examples of curriculum activities considered to be evidence of learners' performance level. (See schematics A and B below.)

Schematic A

3-Level Arrangement
(Ohio)

Domain: English Language Arts
↓
Category: Vocabulary
↓
Specific Skill Indicator: *Name items in common categories*

Schematic B

4-Level Arrangement
(Virginia)

Domain: Literacy
↓
Category: Vocabulary
↓
Specific skill Indicator: *Use single words to label objects.*
(specific skill)
↓
Example: *Play Simon Says [with children].*
(teacher behavior)

And a few states, adding more detail, use a five level arrangement. For example, Idaho standards include a domain, a category, a general skill indicator, a specific skill indicator of performance and an example of an activity that children could do that would support such learning. (See schematic C below.)

Schematic C

5-Level Arrangement
(Idaho)

Domain: Language Arts/Communication
↓
Category: Reading
↓
General Indicator: Phonics/Phonemic Awareness
(general skill)
↓
Specific Indicator: *Attend to different sounds in words*
(specific skill)
↓
Example: *Play (participate in) rhyming games*
(learner behavior)

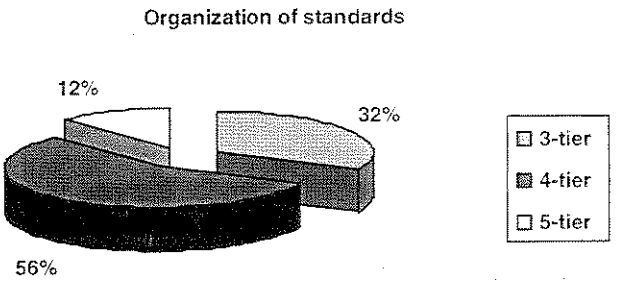

Fig. 1. Number of descriptive levels.

Described in Fig. 1, about half of the states use a four-level arrangement; almost one-third of the states, three-level arrangement; and 12%, five-level arrangement.

2.1.2. Structure

Related to the descriptive levels, states vary in the way they sequence standards and indicators. For example, almost all states (92%) organize their standards first by domain area (e.g., language arts). In most states, the domain is then broken down into a particular category or skill (e.g., writing) (82%), followed by specific indicators related to the skill sub-types. A smaller number of states follow these indicators with examples to help identify whether or not indicator has been met (65%). But there are variations in this sequence, with some states moving from domain directly to indicators. Less than half of states (41%) include domain, category, skill indicators and examples in sequence.

2.1.3. Resources

States rely on different resources for their early learning standards. We identified three primary sources: The National Education Goals Panel; the Head Start Outcomes Framework; and States' K-12 subject area standards. In addition, some states use all of these resources in combination to develop their standards.

The National Educational Goals Panel classifies "ready to learning" or school readiness skills across five domains: (1) physical well-being and motor development; (2) social and emotional development; (3) cognition and general knowledge; (4) approaches toward learning; and (5) language and communication (Kagan, Moore & Bredekamp, 1995). Somewhat similar, the Head Start Child Outcomes Framework (2000) extends these categories to include eight developmental domains: (1) language development; (2) literacy; (3) mathematics; (4) science; (5) creative arts; (6) social and emotional development; (7) approaches to learning; (8) physical health and development, with seven domain elements or sub-domains, and 100 performance indicators. And still other states use their existing K-12 standards as a resource to align early learning standards with existing K through 12 standards. In this case, they tend to rely on traditional subject area categories, including language arts, math, science, social studies, art, music, physical education and health.

Fig. 2 indicates that about half of the states use traditional subject areas as the basic resource for their early learning standards. Four states rely on NEGP standards and five states on Head Start Outcome Framework, and eight states use multiple resources.

2.1.4. Target audience

Like K-12 standards, states vary in defining the target population for their standards. For example, the majority of states (75%) use a global term, such as early learning standards, to apply to all preschool-age

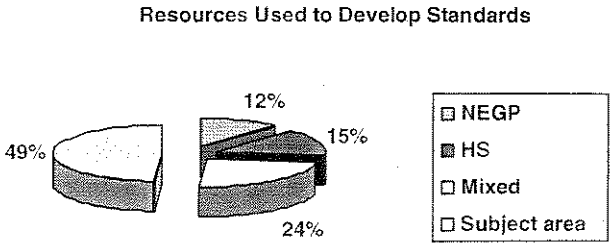

Fig. 2. Resources used for developing standards.

children. Within this global term, states sometimes refer to different age spans, such as pre-k through kindergarten, or preschool through grade one. Some states (25%), however, describe the learner population in more precise terms, referring to specific ages such as standards for ages 3 and 4. Only one state (to date) includes standards and indicators for children below age 3 (Fig. 3).

In summary, early learning standards and indicators vary widely across states in their organization, structure, resources, and audience for which they are intended. In fact, we found no two states totally alike. Rather, early learning standards in states reflect their own unique character and their particular constituency, most likely resulting from the early childhood expertise and groups involved in their development.

2.2. *Examining quality in early learning standards*

Similarly, we found variations in standards and indicators in language, literacy, and mathematics in states as well. But here, differences appear to reflect the specificity of the indicators or benchmarks more than the particular domain or skill itself. For example, within the domain of early literacy, some states focused on highly particular indicators, such as "begins to identify characters in a story," followed by "begins to identify setting in a story," while others, used broader categories, such as "begins to retell stories." More often than not, states that include more detailed indicators have larger numbers of them (e.g., 120 indicators), while those states that use broader indicators have smaller numbers (e.g., 12 indicators).

Recognizing that parsimony may be particularly important for early childhood educators (based on reviews of quality standards and the practical realities of the early learning context), we highlight exemplars that reflect big ideas in language, literacy, and mathematics. Identifying skills reported in research as important for later learning, we attempt to provide multiple examples in each content domain to demonstrate the different ways that states address expectations.

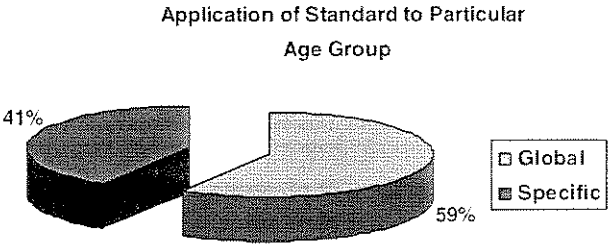

Fig. 3. Target audience for standards.

2.3. Exemplars in early literacy development

2.3.1. Language development

Language skills play a prominent role in early literacy development. The exemplars we highlight focus on the central contributions of vocabulary, syntax, and discourse skills as identified in the research. In each section, we suggest a simple typology for how skills begin to develop.

Language development	
Skill area	Examples of indicators
Vocabulary	Identifies common words in basic categories (CA) Uses new vocabulary in spontaneous speech (LA) Uses new vocabulary to retell a story (PA) Begins to develop a vocabulary of object names and common phrases in English (ESL) (TX)
Syntax	Uses complete sentences (MO) Uses more complex and longer sentences (VT) Uses multiple-word sentences to describe ideas, feelings, and actions (CT)
Discourse	Initiates and extends conversations (AZ) Connects information and events to personal experiences by sharing or commenting (OH) Engages in turn-taking exchanges and rules of conversation with adults and peers (VA)

In each case, exemplars describe foundational understandings of important, key ideas that are built on a solid research base. Each is jargon-free, focusing on a target skill that can be measured. Indicators suggest a developmental trajectory that might engage children in scaffolded activity that is increasingly challenging but achievable. In addition, each indicator is applicable for children in many different child care arrangements.

2.3.2. Phonological awareness

Indicators associated with phonological awareness address the importance of distinguishing units of language, from words to syllables to the substitution of one sound for another. Apart from playing and reciting rhymes and alliterative phrases, exemplar indicators require children to demonstrate meta-linguistic awareness, as they actively engage in thinking about sounds in words.

Phonological awareness	
Skill	Exemplars
Phonological awareness	Distinguishes individual spoken words in sentences (NY) Identifies words that rhyme (OH) Generates simple rhymes (VA) Begins to create and invent words by substituting one sound for the other (TX) Segments syllables in spoken words (WY)

These indicators carefully target skills related to phonological awareness, and not the more advanced skill of phonemic awareness, the ability to detect or discriminate greater subtlety of sound units that make a difference in meaning. Learned well, these phonological skills lay the foundation for developing sensitivity to phonemes and code-related strategies central for learning to read.

2.3.3. Letter knowledge

Although research suggests that some knowledge of alphabet letters predicts later achievement, it has never been clearly established how many letters or what style of letters (upper- or lower-case) children should know by the end of the preschool years. However, even with this limitation indicators that appeared to be most clear did opt for a recommended number instead of the vaguer term of "some knowledge of letters." Skills of letter knowledge include identifying letters (in isolation), in context, and out of alphabetic sequence, helping children move toward greater fluency in recognizing letters.

Letter knowledge	
Skill	Exemplars
Letter knowledge	Associates at least 10 letters with their shapes or sounds (WY) Recognizes beginning letters in familiar words (WY) Identifies letters out of alphabetic sequence (WY)

Connecting skills of phonological awareness and letter knowledge, the final exemplar focuses attention on the developing insight of the alphabetic principle.

2.3.4. Print conventions

Given that many basic concepts of print (e.g., identifies title of book; holds a book right side up) have not shown to be highly predictive of later success in reading, exemplar indicators highlighted genre features, such as text grammar, narrative competence that are indicative of developing familiarity with text, and decontextualized language (Snow, 1991). Like other exemplars, these indicators have a meta-cognitive aspect, determining how children use print to develop meaning in narrative as well as expository text.

Print conventions	Comprehends and responds to fiction and informational text read aloud (NY) Predicts what will happen next in a story (CO) Retells stories with beginning, middle, and end (DC) Connects information and events to real life experiences when being read a story (OH)

Helping children understand that print has meaning, and that print genres (e.g., narrative, expository) have different structures that can be learned and internalized early on, is directly associated with children's facility with print (Neuman, 1999) and later reading comprehension (Snow et al., 1998).

In summary, we highlighted exemplary indicators, grounded in the core disciplines of language and literacy that reflected key research-based understandings of what young children should know and be able to do prior to kindergarten. By focusing on big ideas related to their predictive value for latter achievement, we attempted to be parsimonious in our selection, recognizing the multiple demands on providers in child care settings.

2.4. Exemplars for developing mathematics skills

2.4.1. Numbers and operations

As the foundation for mathematical learning, performance indicators identifying what children should know and be able to do in numbers and operations focus on counting from the perceptual to the more abstract level, identifying number names, and engaging with numbers through grouping, comparing, and separating them in different ways. Unlike literacy skills, we found that states interpreted these skills very

differently. In this section, we highlight examples among states that appear to be rigorous, research-based, clearly written and succinct.

Numbers and operations	
Skill	Exemplars
Counting numbers	Counts to 10 in the context of play or activities (OH) Demonstrates understanding of one-to-one correspondence (NJ) Determine "how many" in sets of five or fewer objects (SC) Count the items in a collection of one to five and know that the last counting word tells "how many" (VA) Use the names for numbers and associate number words with collections or sets of objects counted including zero (CO) Uses numbers and counting as a means for solving problems (WY)

Indicators include counting[2] with and without objects (i.e., subsitizing), the language of numeracy, and number names, and the importance of these skills for solving meaningful problems.

Operations	Compares sets of equal, more, and fewer, and uses the language of comparison (NJ) Groups and regroups a given set of objects (OH) Describes changes in groups (sets/collections) by using more when groups of objects (sets) are combined (added together) (VA) Describes changes in groups (sets/collections) by using fewer when groups of objects (sets) are separated (taken away) (VA)

Indicators that focus on numbers and operations engage children in rudimentary understandings of how to manipulate groupings for adding and subtracting, and for developing numerous strategies for doing so.

2.4.2. *Geometry and spatial relations*

Indicators highlight the importance for children to recognize, describe, and focus on the attributes of various shapes and forms. Early on, children need to begin to manipulate these objects, and seek ways to organize them, in terms of their size, weight, or length. Indicators focus on the intentionality of these activities and the importance of developing specific words to describe their explorations.

Geometry and spatial relations	
Skill	Exemplars
Geometry	Recognizes shapes (VA) Describes how shapes are alike and different (SC) Matches and sorts shapes (WA) Begins to use words that identify where things are in space (TX) Uses positional words to describe the location of objects (PA)
Measurement	Experiences, compares, and uses language related to time (LA) Begins to use terms to compare the attributes of objects (bigger, smaller, lighter) (VA) Order a set of objects according to size, weight, and length (PA) Begins to use tools to measure objects (TX)

[2] Like alphabet letters, there is little consensus among states on benchmarks for counting. Some states require children to be able to count to 5; others, to 10, and still others, to 20. To our knowledge, there is no research evidence to suggest which of these numbers are most accurate indicators of children's number knowledge.

Exemplars focus on the big ideas associated with children's developing understanding of shape, form, size, and weight. Although our knowledge is far less extensive in these areas than numerical thinking, evidence indicates that these skills have important long-term influences on children's mathematical understandings.

2.4.3. Algebra and data analysis

Algebraic thinking and data-analysis skills receive less emphasis in states than in the other areas of number and operation, geometry and measurement. Patterning, a component of algebra, however, is a most common feature, important not only because it is accessible early on, but because it supports other conceptual areas, such as predicting, categorizing, and organizing.

Algebra and data analysis	
Skills	Exemplars
Algebra and data analysis	Sorts and classifies objects (NY) Begins to predict what comes next when patterns are extended (TX) Recognizes, duplicates, and extends simple patterns (WY)

As children sort and look for ways of organizing things, they begin to represent them in ways that can be easily understood, including graphing, and representing displays for making conclusions.

In summary, based on the substantial research, mathematics indicators focus on foundational skills of number, shape, space, and measurement in the early years using concrete objects to help young children "mathematize" what they intuitively grasp. Exemplars highlight these big ideas with clear, rigorous, yet age-appropriate expectations that will serve to benefit children's readiness for more formal mathematics learning in the primary grades.

3. Conclusions

In this paper, we examined the structure and quality of state standards and indicators in three target areas associated with the Good Start, Grow Start initiative: language, literacy and mathematics. We conducted this analysis on the premise that well-developed, age-appropriate, clearly written indicators may have a crucial role in bringing about effective language, literacy and mathematics practices to preschool programs in a variety child care contexts. We argued that clear, comprehensive, challenging but achievable expectations that accurately reflect the research base in early childhood content domains might help to build bridges across different programs, and funding streams (Schweinhart, 2003), creating a common foundation for what children should know and be able to do in the early years.

Our analysis indicated wide variations across states in the structure, organization, and terminology used to reflect expectations for content learning. Drawing from the expertise in early childhood within states, this was not to be unexpected. Standards-setting processes, after all, should represent the individual and unique character of state early childhood programs, and reflect a consensus-building effort among constituencies throughout the state. But at the same time, we must recognize that any further analyses of standards-based reform in early childhood must be situated in the context in which these efforts reside. More than likely, there will be large variations in dissemination of standards, monitoring, and licensing related issues among states that will influence their potential application, relevance and effects.

Examining the research base in language, literacy, and mathematics, we then highlighted exemplar indicators that appeared to reflect this growing knowledge base. We used this research as our lens to look for the big ideas in these content domains that have shown strong predictive value for later achievement. State leaders might consider using this analytic tool to reduce the number of indicators in each area. Some states, for example, currently require over 80–120 indicators in these content domains alone.

However, at the same time, we recommend parsimony, we also recognize the importance of clarity. We selected indicators that were jargon-free, and that could be clearly understood not only to early childhood educators but the public at large. Clarity can also benefit providers by helping them better understand the curricular focus and whether or not children are learning. In some cases, for example, indicators may require so many different behaviors (e.g., "demonstrates understanding of directionality, order, positions of objects, and positional words") that the focus and the ability to determine if children have met these goals is lost. By striving for the big ideas, states may avoid some of complexities within domains that are better-detailed and addressed in curriculum lessons than in standards and indicators. The recent joint position statement of NAEYC/NAESC/SDE (2002) recognizes the importance of emphasizing significant, developmentally appropriate content and outcomes.

Although we examined content domains separately, we found striking complementarity and synergy among them. There is clearly a reciprocal relationship between these domains, with children's manipulation of objects in time, space, category, providing rich opportunities for developing language for literacy and language for mathematics. Skills that engage one domain appear to enhance the others, suggesting that an integration of content and curriculum is crucial for young learners. Consequently, although written by domain, we would strongly suggest that states find ways of showing how these standards can promote integrated learning, and not treat these areas as separate subjects. Integrated learning might also support more meaningful activity, which the research literature suggests is critically important in these early years.

Indicators reflect expectations for what all children should know and be able to do. Although we believe this is a legitimate goal, at the same time we caution educators to recognize that there are variations in beginning learning that reflect different cultural traditions, experiences, and individual differences. Our field of early childhood is built on an understanding of children's development, recognizing common developmental benchmarks *and* individual variation. As the IRA/NAEYC position statement (1998) corroborates, therefore, we need to use content indicators in a way that help us to identify normal variation among children from extraordinary variation, and provide appropriate accommodations for children who need them.

We also caution educators of the potential empirical fallacy implicit in the choice of particular standards and indicators. Alphabet knowledge, for example, has been shown to be a predictor of children's later reading proficiency. However, this relationship does not imply a *causal* connection between alphabet knowledge and achievement. Even though many children are capable of learning *all* their alphabet letters in prek, whether or not this is an efficacious goal is highly suspect. As early childhood educators, therefore, we need to clearly differentiate between what children *can* do, and what they *should* do.

Even the best of standards for young children's learning, however, will be ineffective unless we use them to build quality programs with greater coherence in children's early care and education. Some states, for example, may have high quality standards, but little authority to implement or monitor them. In other states, standards may apply to state prek programs but have little to no jurisdiction in programs such as child care. Such differential authority structures, if not carefully monitored, could seriously hinder rather than support great coordination between programs.

It is too early to determine whether or not early learning standards will help to promote quality practices in early childhood. But it is not too early to recognize that standards will have an increasingly powerful role in guiding decisions about issues as far-reaching as teacher licensure, professional development, curriculum, and assessment. Consequently, we urge states to review, develop, revise as necessary, their early learning standards to ensure quality, age-appropriate, research-based indicators that serve to benefit children's learning and development.

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