



HIGH-QUALITY TEACHING LITERATURE SUPPORT SUMMARY

I. Definition, Description, and Example of Element

Early childhood classroom quality is a result of both structural and process features (National Institute of Child Health and Human Development [NICHD], 2006). Structural quality features refer to those that are measurable and regulated, such as teacher–child ratio, group size, and teacher education level (NICHD, 2006). Process quality features refer to the more proximal factors of direct care teachers and staff give children to assist children with physical, linguistic, intellectual, emotional, and social development (Cryer et al., 2003). In other words, process quality refers to the quality of teaching or teacher–child interactions that more directly link to child outcomes. While state policies are essential to building structural features (e.g., group size and teacher–child ratio requirements) to support teaching and learning, there is little evidence directly linking such structural features to children’s developmental progress (Pianta et al., 2016).

In the Implementation Development Map (IDM), the High-Quality Teaching (HQT) Element focuses on process features of high-quality teaching and learning policies at the pre-K state agency level and the implementation of these policies at the program and classroom level. At the state level, there would be clearly established guidelines on early learning educator competencies, credentialing standards, comprehensive early learning guidelines, effective data gathering and analysis, and the prevalence of supports for high-quality teaching. At the program and classroom level, the Element examines the actual quality of teaching throughout the early childhood system through gathering of child, teacher, classroom, and program data. In this Element, you will find indicators relating to infrastructure at the state pre-K system, and indicators relating to implementation at the program and classroom level. Infrastructure indicators come at the beginning and focus on state policy, supports, and data systems such as: statewide standards, if the state has a clear process for collecting data, and using data for the purposes of continuous improvement. The implementation indicators capture the degree to which high-quality practices are occurring at the program or classroom level. For all programs, ensuring high-quality teaching also requires programs to have systems in place to effectively teach all children, with specific attention to children with special needs and dual language learners.

The Head Start Early Learning Outcomes Framework (ELOF) Effective Practice Guides provide information about domain-specific teaching practices that support children’s development. The guides show what these practices look like in early learning settings. The guides focus on five learning domains: approaches to learning social and emotional development; language and literacy; cognition; and perceptual, motor, and physical development. For each domain, the guides list best practices to promote learning effectively. Some examples of best-teaching practices for each of these domains are listed below:

- Approaches to learning—Involve the children in setting a few simple rules stated in positive terms so children know what to do; use positive guidance strategies to help children learn appropriate behaviors.



- Social and emotional development—Invite children to express their feelings and to consider what others might be feeling. Acknowledge and accept children’s feelings while helping them express those feelings in appropriate ways.
- Language and literacy—Provide numerous opportunities for children to use language with adults and each other. Ask families to share books, songs, and rhymes in home languages, tribal languages, and in English, and use them often so children can master them.
- Cognition—Teach children how to use the scientific method to answer their own questions. Comment and ask questions that encourage children’s thinking and learning.
- Perceptual, motor, and physical development—Engage children in games and activities that support perceptual and gross motor development.

The most commonly used observational measures of early childhood education (ECE) classroom quality, including the quality of the classroom environment and quality of teacher–child interactions are the Classroom Assessment Scoring System (CLASS) and the Early Childhood Environmental Rating Scale (ECERS; Pianta et al., 2008). CLASS, however, is more commonly used when specifically assessing teaching practices and interactions. The tool assesses three main domains: emotional support, classroom organization, and instructional support.

The HQT Element has two types of indicators: infrastructure and implementation. Equitable infrastructure indicators focus on state systems, policies, and practices that support high-quality pre-K. The infrastructure indicators appear at the beginning of the Element and are labeled as policy (e.g., established in policy and statewide standards), supports (e.g., dedicated resources), and data (e.g., data collection standards and protocols and data use). Equitable implementation indicators focus on the degree to which high-quality pre-K practices occur at the program level and who is benefitting. These indicators require active data collection based upon a representative sample to ensure that all subpopulations are progressing and experiencing the benefits of improvement efforts. Below we list the infrastructure and implementation indicators that make up the High-Quality Teaching Element.

HQT1. Core Competency Contents

State has adopted clear, research-based core competencies for pre-K teachers that include the following components:

- Early childhood development and pedagogy specific to pre-K (adequate to teach to the early learning and development standards)
- Knowledge of strategies for assessment of learning and development for preschoolers
- Cultural competence, knowledge of dual language development and strategies that support the development of children who are dual language learners
- Knowledge of strategies that support the learning and development of children with developmental delays and disabilities in inclusive settings
- Family engagement and partnerships (e.g., creating formal structures for communicating around child progress, incorporating children's cultures and home languages in instruction and classroom activities, and collaborating with families to encourage children's use of their home languages at school to support multilingual and multicultural development).



HQT.2 High-Quality Program Structures and Monitoring

State has policies and clear guidelines on the structural features of HQT such as teacher–child ratio, group size, number of hours for teaching dosage (e.g., children have access to year-round, high quality pre-K teaching at least six hours per day). The state monitors and collects data to ensure programs are implemented within these guidelines. It uses data to identify and understand inequities in access to high quality programs to provide resources and support to programs.

HQT3. Learning and Development Standards

State has comprehensive early learning and development guidelines for pre-K that include the following components.

- Approaches to learning and executive functioning
- Social and emotional development
- Language and literacy
- Cognition
- Perceptual, motor, and physical development
- Guidelines to incorporate considerations for DLLs
- Guidelines to incorporate considerations for children with developmental delays and disabilities across all domains

HQT4. ECE Credit Standards

State licensure/ECE credit standards for early childhood teachers require the following components.

- alignment with core competencies
- supervised early learning field experience
- competency-based assessment

HQT 5. HQT Data

State collects HQT data (e.g., on-site observations) at the program level with a valid and reliable classroom observation tool. State verifies that programs are using the data to inform improvement plans and track progress, and state uses the data to guide resource allocation and technical assistance to local programs and for continuous quality improvement.

HQT6. HQT Supports

State provides effective and adequate resources (e.g., funding, written guidance, and training) to support teachers in the implementation of HQT. All resources are equitably distributed, meaning resources are allocated at a higher level, as appropriate, to educators based on their needs and the demographics and socioeconomic status of the populations they serve. For example, writing guidance is available in multiple languages and is Section 508 compliant, training is distributed regionally in various mediums, is accessible, and is available in multiple languages that represent the field.

HQT7. HQT Resources

State provides equitable, accessible, and effective written guidance and resource materials to support or deliver



training that addresses the following range of topics to support lead and assistant teachers in the implementation of HQT.

- Learning environments and materials
- Emotionally supportive and responsive interactions
- Positive behavior guidance
- Classroom schedules and effective use of time
- Instructional supports to promote understanding vs. rote learning, to guide learning through play, and to use questions, conversations, and feedback to extend learning
- Instructional strategies for specific content areas (e.g., social and emotional learning, math, science, literacy)
- Culturally responsive practices
- Supports for DLLs
- Supports for children with developmental delays and disabilities
- Partnering with families to create meaningful and effective learning opportunities at home and at school including incorporating children's cultures and home languages in instruction and classroom activities.

HQT 8. HQT Data Collection for Equity Goals

With regard to state policies and practices around HQT, such as adopting core research-based teaching competencies and providing resources and support to teachers to implement HQT, the state collects data and disaggregates available data to understand equity issues. The state's efforts to understand and address inequity with regard to HQT include ongoing data collection, disaggregation of data, active discussions, data-driven decision-making, action planning, implementing, assessing implementation, and refining as needed. The state specifically collects data to understand and address the following components:

- Variation in instructional quality across the state, by collecting program quality data on all pre-K programs and disaggregating by location
- Access to high-quality programs, and the barriers to attaining access, by collecting demographic data on children, including targeted populations
- Equitable distribution of resources that support implementation of HQT (e.g., funding, training, PD, personnel).

HQT9. Classroom Quality

Classroom quality is assessed using a research-based reliable and valid tool and classroom data collection protocols are standardized across the state. State can link data to gauge whether children identified as part of the most vulnerable populations (identified subgroups) are enrolled in the highest-quality programs, and use these data for resource allocation, training, and other improvement measures.

HQT10. HQT and Home Language

Teachers incorporate children's cultures and home languages in instruction and classroom activities and collaborate with families to encourage children's use of their home languages at school to support multilingual and multicultural development.





II.HQT Literature Process Overview and Summary

To understand the existing literature support and identify the literature gaps and limitations for each of the IDM indicators, we conducted a systematic literature search and checked with experts for relevant sources to support the various indicators of HQT. More details of the general review process conducted across all elements can be found in the [IDM Evidence Review Document](#). For the HQT Element, 10 key phrases were identified and explored. Out of these initial phrases, eight key phrases retrieved relevant results. The list of all sources that yielded relevant results based on the eight key phrases and expert recommendations, along with two key phrases that did not yield relevant results, can be found in Appendix A.

Once the literature search for the HQT Element was completed, we reviewed the quantity and rigor of the literature supporting each indicator and computed what we termed the literature support index (LSI). The LSI is calculated for each indicator based on seven components:

1. at least three peer-reviewed articles;
2. at least one study with no more than two limitations;
3. at least one study at national or state level;
4. at least one study that uses experimental or quasi-experimental design;
5. at least two studies that use representative sampling;
6. support from at least one national research organization; and
7. support from at least one national policy organization.

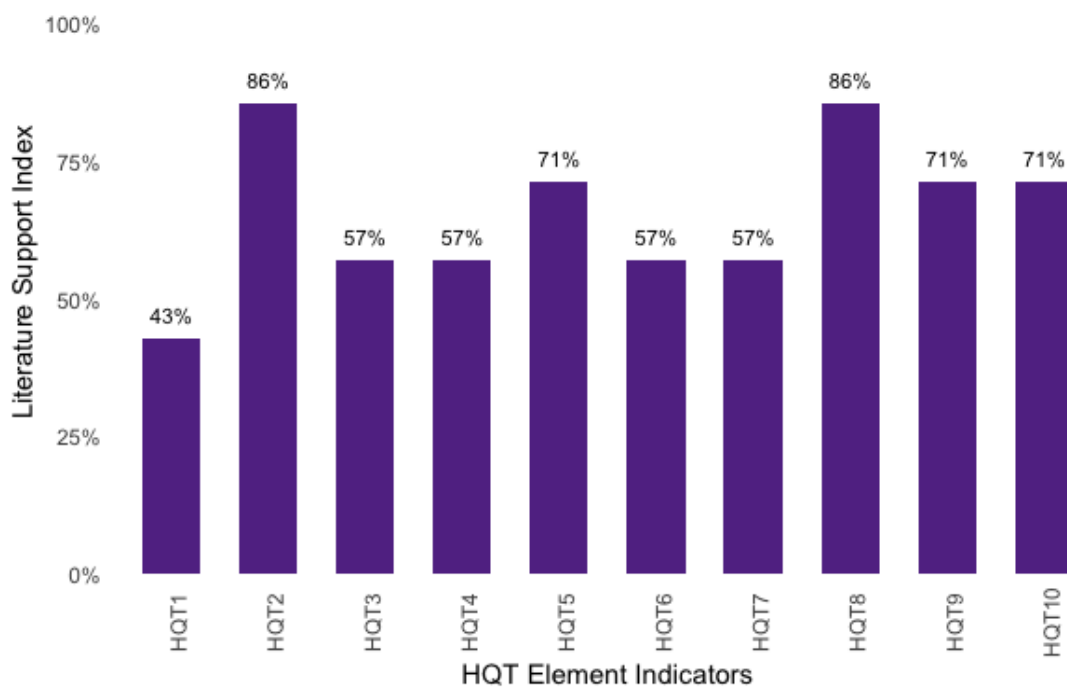
The LSI is expressed as a percentage of the above seven criteria that are satisfied for a particular indicator. More information about the rationale for the LSI and how it is calculated can be found in the [IDM Evidence Review Document](#).

Figure 1 summarizes the LSI for the HQT Element indicators and shows the best performing indicators are HQT2 and HQT8, satisfying 86% of the above criteria. All indicators satisfy at least 40% of the criteria.



Figure 1

Overall Summary of HQT Literature Support Index

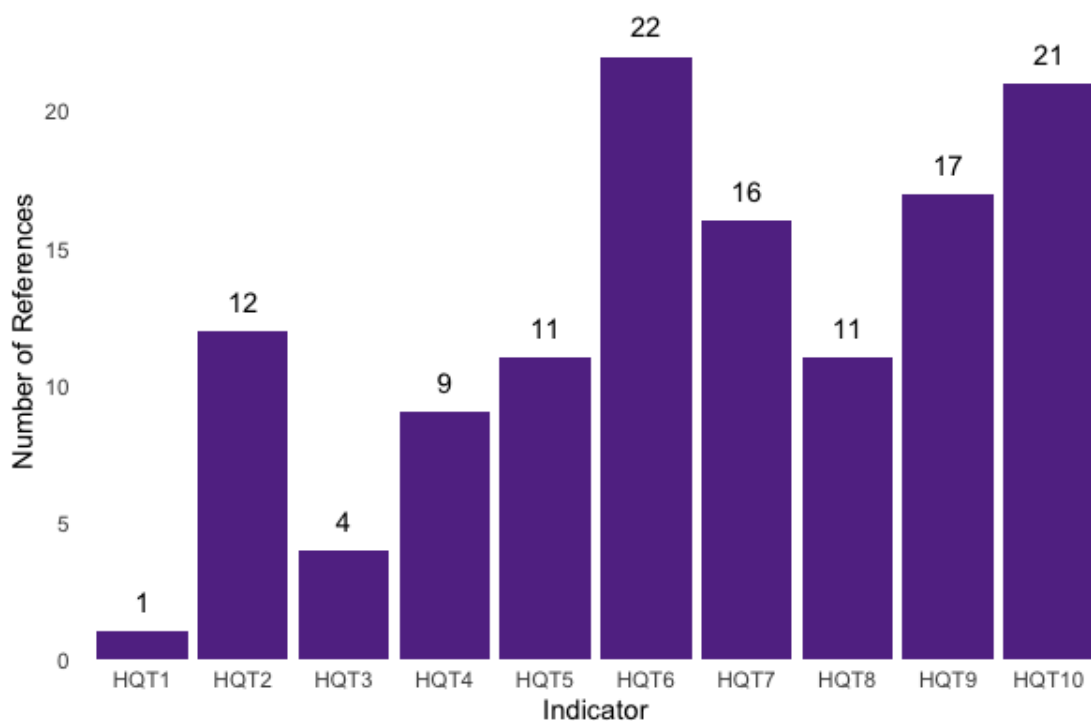




While Figure 1 combines aspects of both rigor of the literature as well as quantity supporting each indicator, Figure 2 presents solely the quantity of evidence for each indicator. Figure 2 shows that HQT indicators 6 and 10 are supported by a larger number of sources than the rest of the indicators. We hope this type of analysis can help state teams understand where there are gaps in research and potential directions for future studies.

Figure 2

HQT Quantity of Evidence by Indicators

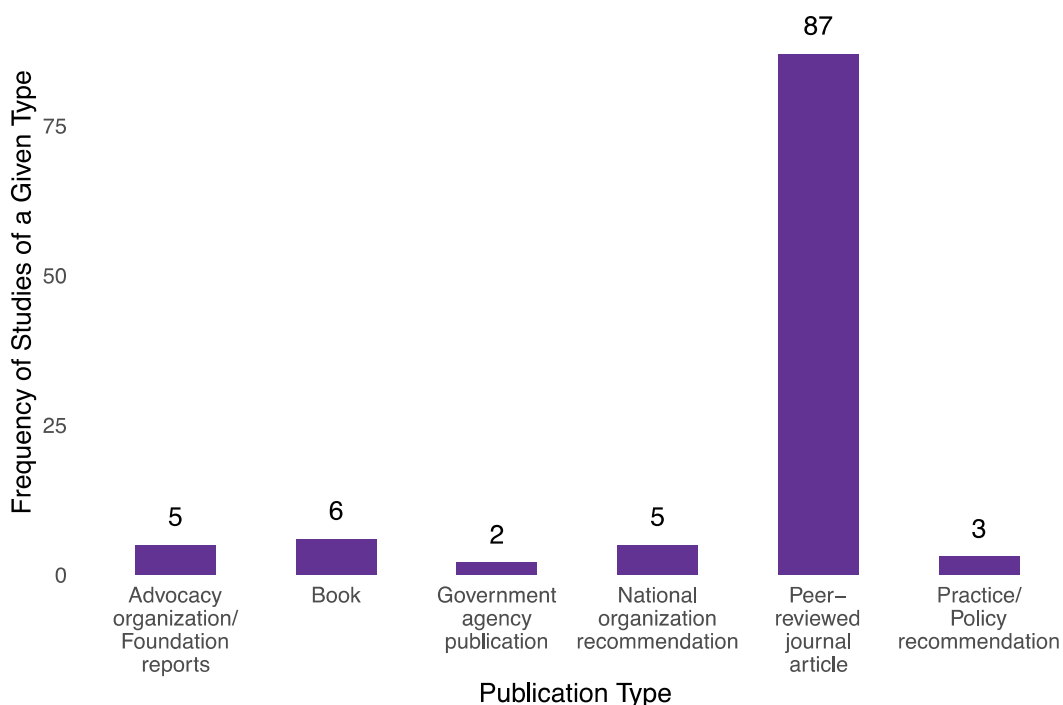




To understand more about the nature of the literature that supports the Element, Figure 3 lists the types of publications used as evidence for the indicators of the HQT Element; the vast majority of the sources are articles from peer-reviewed journals (87). This is important because peer review is a guarantee of accountability and minimum standards for methodology and analysis.

Figure 3

HQT Evidence by Publication Type



To provide more context on these metrics, we also examined other information related to the relevant article, such as the number of citations, impact factor, publishers behind articles, amount of supporting literature by year published, methodological limitations of studies used as supportive evidence for the HQT indicators, and the scale at which the studies supporting IDM HQT indicators operated. For example, there is increasing literature on implementation science that effect size (a measure of the magnitude of the effect of an intervention) has a tendency to decrease as an intervention is scaled from a pilot to statewide/national policy. In this context, it is of interest to look at the scale of the studies used for the literature review underpinning the validity of the HQT indicators. Further analysis shows that more than half of the HQT sources are either on a national scale or state-specific studies, which is helpful because policymakers can extrapolate results into day-to-day practice.

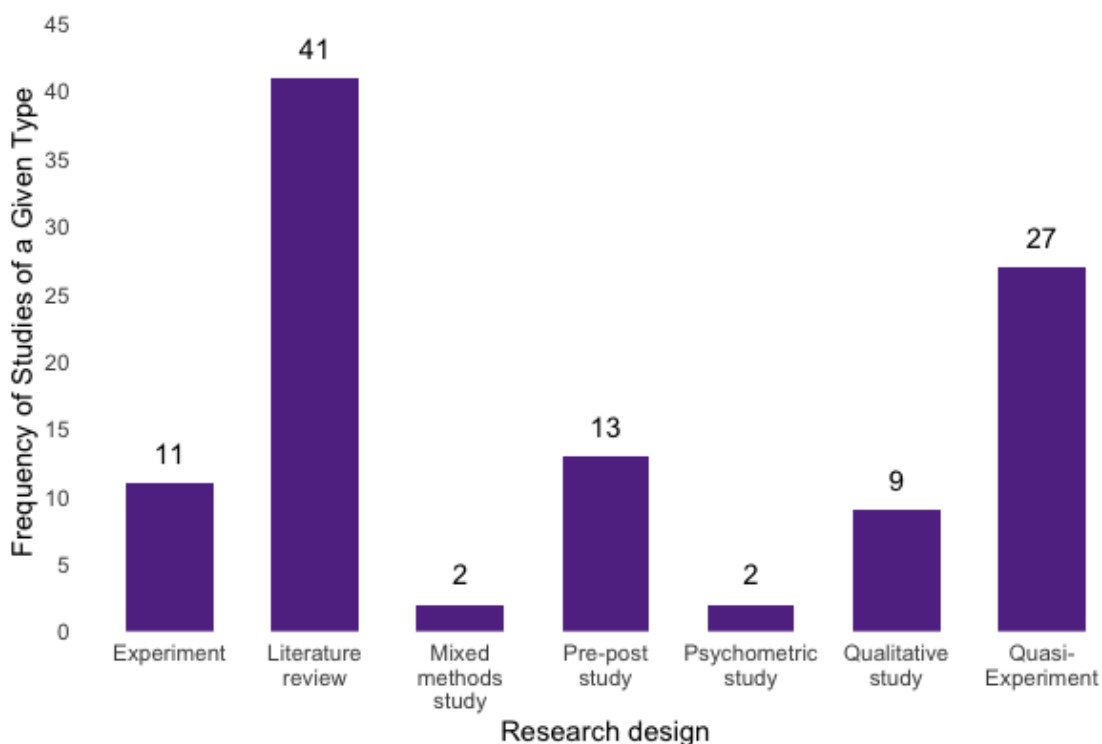




In addition to types of publications, Figure 4 summarizes the research design used in the sources supporting the HQT Element. The most common type of research designs represented from our literature review were literature synthesis or researchers providing insight and recommendations about various topics related to HQT (41). Other common study design approaches were quasi-experimental studies (27), pre-post studies (13), and experiments (11). There are very few proper experiments conducted in the early learning industry, and quasi-experimental methodology is the next best thing. So, it is encouraging to see it well-represented among the sources underpinning the HQT indicators.

Figure 4

HQT Summary of Research Design





III. Summary of HQT Literature Supporting Indicators: Current Practices and Challenges

This section provides a summary of the literature supporting each indicator, including current practices and challenges. Because some of the infrastructure and implementation indicators cover the same topics but at the state and program level, we have grouped our summary to reflect the overlap in the literature for these indicators.

High-Quality Teaching Infrastructure Indicators (state level)

HQT1. Core Competency Contents

State has adopted clear, research-based core competencies for pre-K teachers that include the following components:

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At the national level, many organizations have stated professional standards and core competencies for care and educational professionals in the early learning field based on research and experts in the field. Four of these entities with their respective standards include:

- The National Association for the Education of Young Children (NAEYC) has developed the “Professional Standards and Competencies for Early Childhood Educators” (NAEYC, 2019).
- The National Board for Professional Teaching Standards (NBPTS) has created standards for teachers of students ages 3 through 8 in the “Early Childhood Generalist Standards” (NBPTS, 2012).
- The Interstate Teacher Assessment and Support Consortium (InTASC) of the Council of Chief State School Officers (CCSSO) has a set named “Model Core Teaching Standards” for K-12 teachers (CCSSO, 2011).
- The Division for Early Childhood (DEC) of the Council for Exceptional Children offers “Recommended Practice in Early Intervention/Early Childhood Special Education” (DEC, 2014).





Although each of these documents is unique, there is a lot of overlap among them. In other words, there is some consensus at the national level about early learning teacher competencies. These competencies are: 1) knowledge of subject matter and early childhood learning principles and practices; 2) ability to engage in these practices that support children’s learning; 3) ability to work with diverse populations of children; 4) ability to develop and use partnerships with families, coworkers, and other early childhood professionals; and 5) continuous improvement of the quality of teaching practice through professional development (Institute of Medicine & National Research Council [IOM & NRC], 2015; Joseph et al., 2020). In sum, the literature and experts suggest that adopting clear and research-based core competencies contributes to better child outcomes through high-quality teaching expectations.

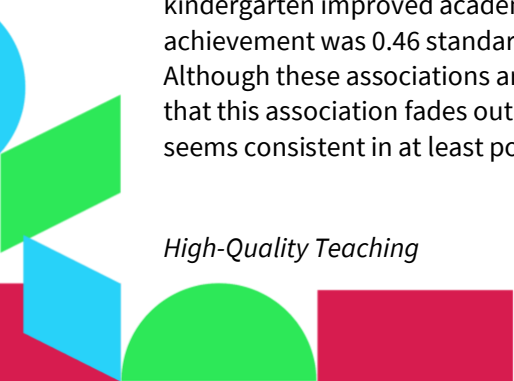
High-Quality Teaching Infrastructure Indicators (state level)

HQT2. High-Quality Program Structures and Monitoring

State has policies and clear guidelines on the structural features of HQT such as teacher–child ratio, group size, number of hours for teaching dosage (e.g., children have access to year-round, high quality pre-K teaching at least six hours per day). The state monitors and collects data to ensure programs are implemented within these guidelines. It uses data to identify and understand inequities in access to high quality programs to provide resources and support to programs.

Although process quality—as opposed to structural quality—is typically found to be more closely associated with child outcomes (Pianta et al., 2016), some studies have found that strong structural features provide supporting foundation to other dimensions of quality (Connors, 2016; Tseng & Seidman, 2007). For example, one study found that associations of both teacher qualifications and staff–child ratio with child outcomes are mediated by the quality of teacher–child interactions (National Institute of Child Health & Human Development Early Child Care Research Network [NICHD ECCRN], 2002a). The majority of states with pre-K initiatives set class size and ratio requirements that are consistent with standards developed jointly by the American Public Health Association (APHA) and the American Academy of Pediatrics (AAP) and with the recommendations of the National Association for the Education of Young Children (NAEYC) for 3- and 4-year-olds. These recommendations promote class sizes of no more than 20 children and ratios of no more than 10 students per teacher. Although there is some inconsistency in the literature about the impact of class sizes or teacher–child ratios on child outcomes, many experimental and quasi-experimental studies have found clear associations between reduced class sizes and positive child outcomes, especially for minority students (Finn, 2003; Ruopp et al., 1979).

Regarding dosage, or how long children spend in early learning programs, full-day programs (6 hours) are associated with greater learning benefits as opposed to half-day programs (3 hours) (Canon et al., 2006; Cooper et al., 2010; Hahn, 2014; Lee et al., 2006; Wasik et al., 2013). For example, in a meta-analysis on the effects of full-day kindergarten versus half-day kindergarten among U.S. children, Hahn et al. (2014) found that full-day kindergarten improved academic achievement by an average of 0.35 standard deviations. The effect on verbal achievement was 0.46 standard deviations, and that on math achievement was 0.24 standard deviations. Although these associations are usually found at the end of the program, in the long run, the literature suggests that this association fades out by third grade (Cannon et al., 2006; Cooper et al., 2010). Overall, the literature seems consistent in at least positive short-term outcomes for students who attend smaller and longer classes.



High-Quality Teaching Infrastructure Indicators (state level)

HQT3. Learning and Development Standards

State has comprehensive early learning and development guidelines for pre-K that include the following components.

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- Social and emotional development
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The Head Start Early Learning Outcomes Framework: Ages Birth to Five (ELOF) is composed of five broad areas of early learning, referred to as central domains. These domains are: approaches to learning; social and emotional development; language and literacy; cognition; and perceptual, motor, and physical development. Overall, the framework is designed to show the continuum of learning for infants, toddlers, and preschoolers. It is grounded in comprehensive research around what young children should know and be able to do during their early years.

Each of the five central domains have sub-domains with developmental milestones listed. For example, the approach to learning domain has four sub-domains (emotional and behavioral self-regulation, cognitive self-regulation, initiative and curiosity, and creativity). Each of these sub-domains includes specific developmental milestones or goals. For example, under the emotional and behavioral self-regulation sub-domain, there are four milestones. These include: 1) Child manages emotions with increasing independence; 2) Child follows classroom rules and routines with increasing independence; 3) Child appropriately handles and takes care of classroom materials; and 4) Child manages actions, words, and behavior with increasing independence. The standards listed in the framework overlap with the tool most states use to assess child outcomes—Teaching Strategies Gold (Quality Compendium, 2020). Beyond the general framework, Head Start acknowledges that children who are dual language learners (DLLs) and children with disabilities need intentional support for their development. In response, they provide many tools and resources aligned to the framework to help guide educators in implementing best practices for these two groups. Although the Head Start Early Learning Outcomes Framework is recognized nationally, each state has its own adaptation of early learning and development standards. All in all, formally articulated, research-based learning and developmental standards are important because they create a unified vision of the learning outcomes expected from children and help guide best-teaching practices.

High-Quality Teaching Infrastructure Indicators (state level)

HQT4. Early Childhood Education (ECE) Credit Standards

State licensure/ECE credit standards for early childhood teachers require the following components.

- alignment with core competencies
- supervised early learning field experience
- competency-based assessment

Higher education accreditation for early childhood associate, bachelor's, and master's degree programs occurs at the national level through the National Association for the Education of Young Children (NAEYC). The Commission on the Accreditation of Early Childhood Higher Education Programs uses *NAEYC's 2010 Standards for Initial and Advanced Early Childhood Professional Preparation Programs* as the basis for the accreditation of associate, bachelor's, and initial-license master's degree programs. These standards describe what early childhood professionals are expected to know and do, defining essential learning outcomes for professional preparation programs. However, requirements for pre-K lead and assistant teachers are currently determined by states. As of 2019, the National Institute for Early Education Research (NIEER) reports that out of 62 state-funded pre-K initiatives, 37 require lead teachers to have a bachelor's degree, and 51 require teachers to have some specialized training. For assistant teachers, 17 initiatives require teachers to hold a child development associate credential (CDA) or equivalent. The child development associate credential is the most widely recognized credential in early childhood education and is a key stepping stone on the path of career advancement in ECE. Moreover, it is directly aligned with NAEYC's standards (National Association for the Education of Young Children and Council for Professional Recognition, 2012). Overall, these requirements vary greatly on a state-by-state basis. On one end of the spectrum, there are states like Rhode Island that require lead teachers to have a bachelor's degree with an early learning teaching certificate. Assistant teachers are required to have a high school degree plus 12 ECE/child development credits. In contrast, Connecticut's School Readiness initiative requires lead teachers to hold a CDA plus 12 early childhood credits; assistant teachers are only required to hold a high school diploma.

The literature about teacher education/credentialing and its relation to classroom quality and child outcomes is inconsistent. Some studies have found positive associations between teacher's education, major, and credentials with classroom quality and children's academic gains (e.g., Chatterji, 2006; Early et al., 2006; Han & Neuhauser-Pritchett, 2010; Hooper, 2018; Kim et al., 2011; Pianta et al., 2005; Son et al., 2013). In contrast, other studies suggest that education, training, and credentialing are not consistently related to teaching quality and that the focus should be more on the accountability for student achievement (Early et al., 2007; Podgursky, 2005; Xu & Golosino, 2006). Moreover, the fact that raising the bar for teacher licensing may have the perverse effect of lowering average teacher quality—particularly for high-poverty or rural districts that already face thin applicant pools—is also touched on in the literature (Podgursky, 2005). The mixed literature, in addition to the fact that requiring degrees requires additional funds and results in barriers to access, makes policy makers hesitant about requiring degrees for teachers.



Overall, having licensure standards for early childhood teachers that align with core competencies is positively associated with classroom quality and child outcomes. However, based on contradicting literature, states may need to assess how high they want to set standards to avoid diminishing the applicant pool, and as a result, the quality of teaching.

High-Quality Teaching Infrastructure Indicators (state level)	High-Quality Teaching Implementation Indicators (classroom and program level)
<p>HQT 5. Data</p> <p>State collects HQT data (e.g., on-site observations) at the program level with a valid and reliable classroom observation tool. State verifies that programs are using the data to inform improvement plans and track progress, and state uses the data to guide resource allocation and technical assistance to local programs and for continuous quality improvement.</p>	<p>HQT9. Classroom Quality</p> <p>Classroom quality is assessed using a research-based reliable and valid tool and classroom data collection protocols are standardized across the state. State can link data to gauge whether children identified as part of the most vulnerable populations (identified subgroups) are enrolled in the highest-quality programs, and use these data for resource allocation, training, and other improvement measures.</p>

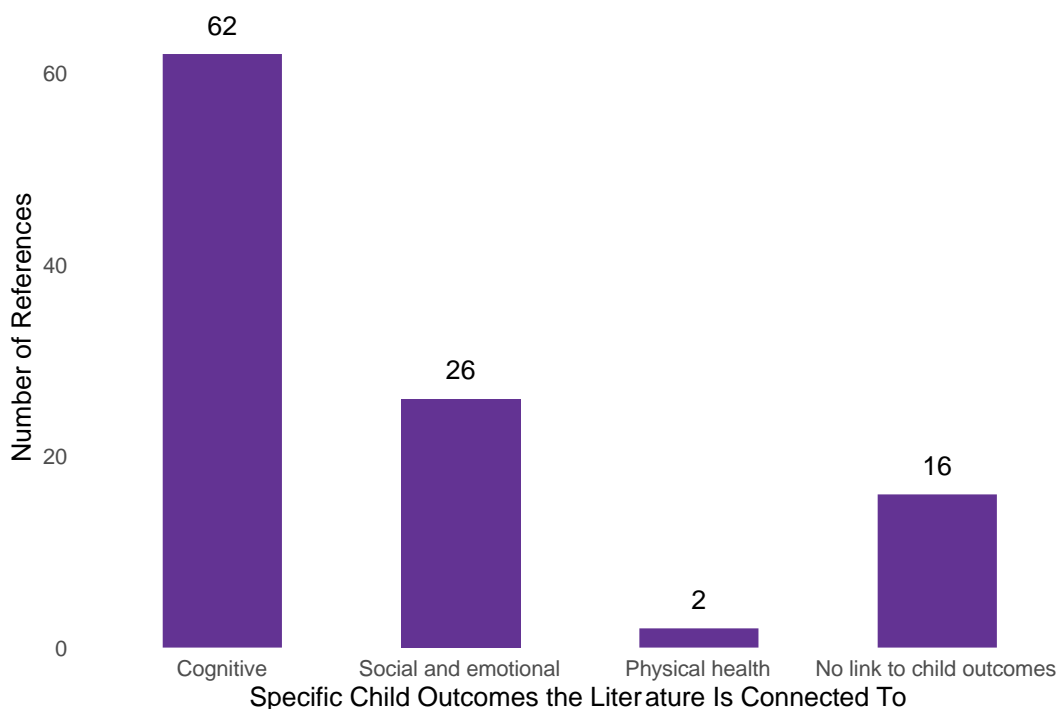
Outcomes are the ultimate litmus test of any policy, approach, or action taken in the early learning field. If we ultimately fail to move child outcomes, then it has all been for naught. With that in mind, we kept a strong focus on literature that links aspects of quality represented in the HQT indicators to child outcomes. There are in fact a variety of outcomes the literature pays attention to and considers to be potentially within the realm of influence of early learning—cognitive, social, emotional, and physical health. Figure 5 shows the majority of the literature (62) focuses on cognitive outcomes (hence most of the recommendations associated with the HQT indicators would affect those as well), while social and emotional outcomes also command significant attention (26).





Figure 5

HQT Child Outcomes Studies Examined



High-quality classrooms have been shown to be associated with positive child outcomes (Anderson & Phillips, 2017; Bulotsky-Shearer et al., 2020; Burchinal et al., 2018; Perlman et al., 2016; Schmitt et al., 2018; Swain et al., 2015). Moreover, the literature shows that children from disadvantaged backgrounds experience the greatest benefits from high-quality, standards-based preschool but are nevertheless less likely to receive it (Burchinal et al., 2010; Garcia & Weiss, 2015; Heckman et al., 2010; LoCasale-Crouch et al., 2007). For example, Valentino (2018) found significant "quality gaps" in public pre-K between low-income students of color and non-low-income White students, ranging from 0.3 to 0.7 standard deviations on a range of classroom observational measures (ECERS-R, CLASS, and the emerging academics). Moreover, she found a lot of between-state variation in gap magnitudes, and that state-level quality gaps are related to state-level residential segregation.

The assessment of quality has grown in importance over the years, with only three Quality Rating and Improvement Systems (QRIS) in the nation in 1999 to 44 in 2019 (Quality Compendium, 2020). With this rapid expansion, the use of observational tools to monitor preschool quality is also growing. The most prominent tools are ECERS-3 and CLASS Pre-K (Quality Compendium, 2020). A validation study done for ECERS-3 found that almost all correlations among ECERS-3 total score, ECERS-3 subscales, and CLASS Pre-K domains were significant and moderate (Early et al., 2018). Similarly, past studies looking at the relationship between ECERS-R and CLASS Pre-K have also found significant correlations between ECERS-R total score and CLASS subscales, suggesting the two tools significantly overlap with one another (Denny et al., 2012; Hestenes et al., 2015; La Paro et al., 2004; Washington Research-Practice Partnership, 2020).



Although these tools have been validated across homogenous and diverse populations (Curby & Chavez, 2013; Downer et al., 2012), associations between tools and positive child outcomes are often weak (Brunsek et al., 2017; Keys et al., 2014; Sabol et al., 2015). For example, in a systematic review and meta-analysis of the relationship between ECERS-R and child outcomes, Brunsek et al. (2017) found some evidence to support a positive relationship between the ECERS/ECERS-R and child outcomes. However, the associations were small in magnitude, suggesting that the ECERS/ECERS-R captures some aspects of the environment that are important to child development but not others. Moreover, there are concerns about the reliability of data collection by states (Vitiello et al., 2018) as well as the association between QRIS composite scores and child outcomes. In fact, Sabol et al. (2013) found that the association among composite ratings and child outcomes were about half the size of that for the single indicator of teacher–child interactions, while Soderberg et al. (2016) found slightly more associations of child outcomes with QRIS rating than with CLASS/ECERS. Because states' QRISs have composite score thresholds that are highly consequential for programs, this discrepancy is concerning and suggests that the use of CLASS and/or ECERS-3 may be more appropriate.

Regarding quality thresholds in the observational tools being used to assess classroom quality, there does not seem to be a clear consensus on a cut-off related to bettering child outcomes. For example, although Hatfield et al. (2016) did not recommend specific thresholds, they did find that “features of classroom experience, such as qualities of teacher–child interactions, are more strongly associated with higher levels of children’s school readiness skills when the nature of those experiences (i.e., interactions) are in the upper ranges of the distribution” (p. 561). In other words, higher classroom quality scores are linked to higher levels of positive child outcomes. Similarly, Burchinal et al. (2010) found that “quality of instruction was related to language, reading, and math skills more strongly in higher quality than in lower quality classrooms” (p. 166). When Burchinal et al. (2014) examined whether a minimum level of preschool quality (threshold) is needed in order for a relationship to exist between preschool quality and children’s outcomes, they found evidence for a cut-point linked to children’s behavioral outcomes, but no threshold effects for language, literacy, and working memory.

In sum, the importance of data collection arises from the fact that it allows states to measure classroom quality and assess areas for improvement—gaps in quality between disadvantaged and privileged children in particular. Although the literature suggests that the tools being used to assess classroom quality are not perfect, there is literature linking some of the domains with children’s learning outcomes. These associations between features of classroom quality and learning outcomes are particularly stronger for classrooms with higher levels of quality, reinforcing the need for higher quality classrooms.

High-Quality Teaching Infrastructure Indicators (state level)

HQT6. HQT Supports

State provides effective and adequate resources (e.g., funding, written guidance, and training) to support teachers in the implementation of HQT. All resources are equitably distributed, meaning resources are allocated at a higher level, as appropriate, to educators based on their needs and the demographics and socioeconomic status of the populations they serve. For example, writing guidance is available in multiple languages and is Section 508 compliant, training is distributed regionally in various mediums, is accessible, and is available in multiple languages that represent the field.

HQT7. HQT Resources

State provides equitable, accessible, and effective written guidance and resource materials to support or deliver training that addresses the following range of topics to support lead and assistant teachers in the implementation of HQT.

- Learning environments and materials
- Emotionally supportive and responsive interactions
- Positive behavior guidance
- Classroom schedules and effective use of time
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- Supports for children with developmental delays and disabilities
- Partnering with families to create meaningful and effective learning opportunities at home and at school including incorporating children's cultures and home languages in instruction and classroom activities.

Professional development is a continuum of learning and activities designed to prepare individuals for work with and on behalf of young children and their families, as well as ongoing experiences to enhance this work. These opportunities lead to improvements in the knowledge, skills, practices, and dispositions of early childhood professionals (NAEYC, 2020). Resources and supports offered to teachers in implementing evidence-based practices have been found to be essential in promoting change in teaching quality. Many studies have found that supports for implementing evidence-based practices (e.g., ongoing job-embedded PD, coaching, peer support communities, etc.) influence teaching quality, which ultimately positively affects child outcomes (Algozzine et al., 2011; Ansari & Pianta, 2018; Brock & Baemin-Diglia, 2018; Conroy et al., 2014; Laundry et al., 2017; Lee et al., 2012; Pianta et al., 2016; Piasta et al., 2020; Wasik & Hindman, 2011; Wasik & Hindman 2020; Whitebook et al., 2009). These findings were also seen in studies focusing on interventions to improve the developmental outcomes of dual language learners (DLLs) and at-risk populations (Buysee et al., 2014; Landry et al., 2009; Mendes et al., 2015; Wilson et al., 2013).



As of 2019, NIEER reports that, although 57 of the 62 state pre-K initiatives they studied meet their curriculum supports benchmark, only 13 (21%) of them meet their staff professional development benchmark. Per NIEER's document, "to meet this benchmark both teachers and assistant teachers must be required to have at least 15 hours of annual in-service training. In addition, some professional development must be provided through coaching or similar ongoing classroom-embedded support. Lead and assistant teachers are also required to have annual written individualized professional development plans" (NIEER, 2019, p. 44). These requirements were accompanied with a reference citation. Biancarosa et al. (2010) was the source for the importance of regular, ongoing support. For individualized professional development as opposed to general PD, Pianta et al. (2016) was cited. Finally, for some evidence of the 15-hour threshold, Bowman et al. (2001) and Frede (1998) were cited.

Below are some interventions and/or resources that have been proven to lead to increases in teaching quality and positive child outcomes.

Positive Behavior Guidance

The Good Behavior Game (GBG) and Behavioral, Emotional, and Social Training: Competent Learners Achieving School Success (BEST in CLASS) are two interventions successfully implemented by teachers in classroom settings and resulting in a decrease in children's challenging behavior (Coleman et al., 2020; Conroy et al., 2014).

To ensure fidelity of implementation and achieve positive student outcomes, professional development and additional support for teachers are often needed. In summarizing the research literature regarding suspension in response to nonviolent and subjective offenses for students of color, Fenning and Jenkins (2018) also highlight the need for additional support for teachers in the areas of implicit bias and empathy training.

Coaching with modeling and teacher feedback is a promising form of teacher support that can help teachers implement effective behavior management strategies to address challenging behaviors (Brock & Baemin-Diglia, 2018).

Instructional Supports for Language and Literacy

Professional development focused on language and literacy instructional strategies have resulted in improved outcomes for preschool children on various measures of vocabulary and phonological sensitivity compared to children in a comparison group. Types of professional development in these studies included intensive, ongoing professional development compared to "business as usual" (Wasik & Hindman, 2011), online video demonstrations of questioning techniques and workshop activities (Lee et al., 2018), and Story Talk, a book-reading intervention designed to increase children's vocabulary and language development using supportive materials and strategic individualized coaching (Wasik & Hindman, 2020).

Emotionally Supportive and Responsive Interactions

MyTeachingPartner (MTP) is a professional development coaching intervention focused on improving teacher-student interactions, including teacher instructional support. MTP coaching was effective in improving children's expressive vocabulary, literacy skills, and inhibitory control, particularly in classrooms that served primarily 4-year-olds (Ansari & Pianta, 2016).





Supports for DLLs

Wilson et al. (2013) examined the effectiveness of an Early Reading First pre-K program that included material support, coaching, professional development, and the use of a language- and literacy-focused curriculum. The study focused on the language and literacy development of low-SES 4-year-old children from diverse language backgrounds. Results showed that children were able to enter kindergarten with literacy skills at or near national norms, including children who were DLLs who performed nearly as well or better than non-DLLs.

Bilingual instruction for children who are DLLs results in better language outcomes compared to English-only instruction. A study by Mendes et al. (2010) showed that Latino DLL preschoolers who received instruction in Spanish and English had significantly higher post-test scores than those receiving English-only instruction on both Spanish and English vocabulary.

Partnering with Families

Studies of parent involvement interventions in Head Start programs showed positive changes in parent behaviors including increased cognitive stimulation and decreased spanking (Ansari & Gershoff, 2016), as well as language and literacy facilitation strategies and responsiveness to their children (Landry et al., 2017). Changes in parent behaviors were associated with children's gains in some social, language, and literacy skills.

Overall, these studies highlight the importance of providing quality resources and support for the improvement of teaching implementation and, consequently, child learning. Moreover, they indicate that specific, targeted supports can be an effective way to improve a particular challenge in teaching implementation.

High-Quality Teaching Infrastructure Indicators (state level)

HQT 8. HQT Data Collection for Equity Goals

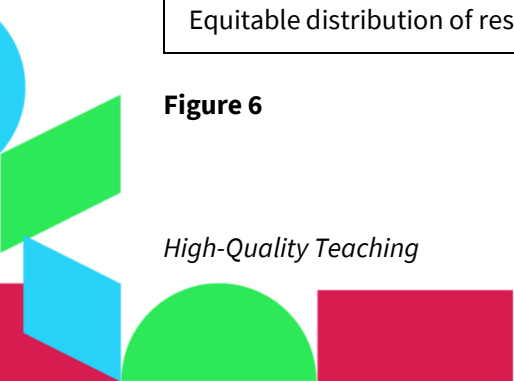
With regard to state policies and practices around HQT, such as adopting core research-based teaching competencies and providing resources and support to teachers to implement HQT, the state collects data and disaggregates available data to understand equity issues. The state's efforts to understand and address inequity with regard to HQT include ongoing data collection, disaggregation of data, active discussions, data-driven decision-making, action planning, implementing, assessing implementation, and refining as needed. The state specifically collects data to understand and address the following components:

Variation in instructional quality across the state, by collecting program quality data on all pre-K programs and disaggregating by location

Access to high-quality programs, and the barriers to attaining access, by collecting demographic data on children, including targeted populations

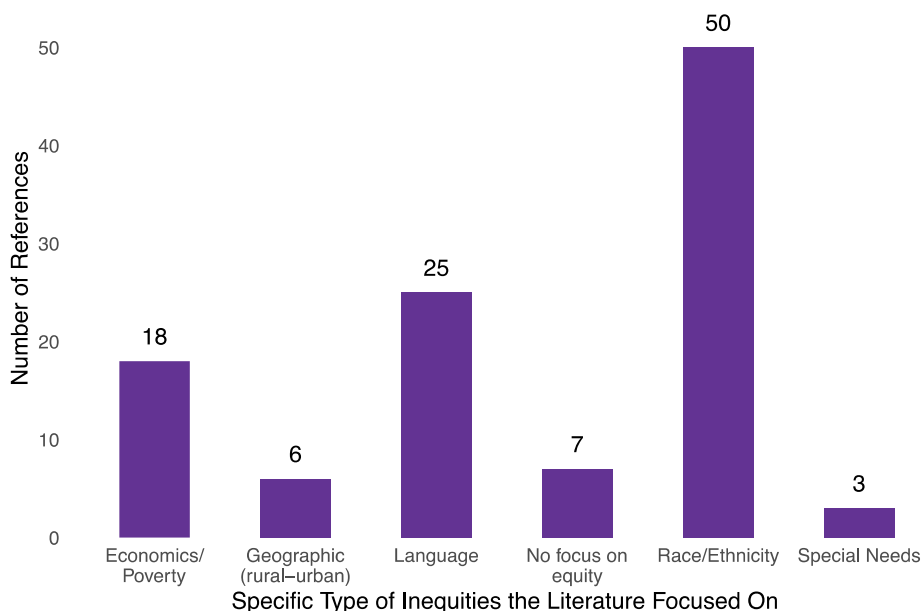
Equitable distribution of resources that support implementation of HQT (e.g., funding, training, PD, personnel).

Figure 6





HQT Inequities of Focus in the Literature



In line with the framework of targeted universalism (Powell et al., 2019) used to guide the development of the IDM, equity indicators in each Element highlight the importance of ongoing data collection, the disaggregation of data, and the use of data for decision-making, action planning, and assessing implementation. This supports the five steps of targeted universalism (Powell et al., 2019), where once a universal goal is established (Step 1), and there is information about the performance of the general population relative to the universal goal (Step 2), the performance of different groups can be identified (Step 3), further analysis can be done to understand the structures that support or impede each group from achieving the universal goal (Step 4), and targeted strategies for each group can be developed and implemented to reach the universal goal (Step 5). For this indicator, the main goal is ensuring that all children receive high-quality education. This is in fact one of NAEYC’s policy recommendations for advancing equity. They state that there needs to be “sufficient resources to make high-quality early education universally accessible” (NAEYC, 2020, para. 2).

As seen in Figure 6, based on the literature, the most common types of inequities studied were related to race or ethnicity (50), with many studies measuring the implementation of child assessment and its relationship with child outcomes across various racial and ethnic groups. The next most common type of inequity examined related to language (25), followed by economics/income level (18).

In the current early learning landscape, the literature shows that there is inequitable access to process quality (teacher–child interaction and instruction) based on income and race (Magnuson & Waldfogel, 2005; Morgan et al., 2013). For example, a study of public preschools in Georgia indicated that a greater percentage of schools in low-income and non-white communities are classified as low in process quality programs according to CLASS, whereas higher-income and white communities have a greater proportion of high process quality preschools (Bassok & Galdo, 2016). These inequities persist despite greater access to public preschool in low-income communities, demonstrating that merely securing access to a program is insufficient to guarantee quality and



equity. These inequities are paramount because research shows that process quality has a greater influence on children’s developmental achievement than structural quality (class size, duration, etc.) (Pianta et al., 2016). Moreover, they find that the cognitive and social outcomes of disadvantaged children are especially sensitive to differences in process quality (Espinosa, 2002). As such, expanding access to early education and care that is high in process quality is crucial to achieving equity and reducing the achievement gaps we see among children based on race and socioeconomic status.

A way to increase process quality in classrooms with diverse children is through culturally responsive teaching. In September 2020, New America published *Culturally Responsive Teaching: A Reflection Guide* to help facilitate self-appraisal, goal setting, and critical conversations across the core culturally responsive teaching competencies. The eight competencies they highlight are: reflect one’s personal lens; recognize and redress bias in the system; draw on students’ culture to share curriculum and instruction; bring real-world issues into the classroom; model high expectations for all students; promote respect for students’ differences; collaborate with families and the local community; and communicate in linguistically and culturally responsive ways (New America, 2020). Although all states embed some combination of these competencies into their standards, some competencies are more widely addressed than others. Beyond state standards, the disparity in process quality results in part from the inequitable distribution of experienced and qualified teachers who are more likely to apply these competencies. These teachers are attracted to positive work environments and higher salaries and are less likely to work in schools serving non-White, low-income, low-performing, and urban students (Jackson, 2009; Lankford et al., 2002). Thus, a more equitable distribution of qualified teachers across non-white and low-income schools could help create more equitable learning environments and reduce learning gaps between advantaged and disadvantaged students.

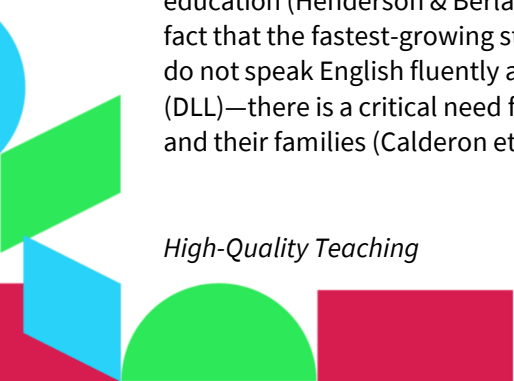
In sum, this indicator emphasizes the importance of using data as a way to combat inequitable access to high process quality education. Through data collection and disaggregation, states would be able to identify programs of low process quality, the demographics of the children being served, as well as teacher experience. Once the state knows the landscape, they would be able to target resources as well as policy for the improvement of equitable access to high-quality programs in their state.

High-Quality Teaching Implementation Indicators (classroom and program level)

HQT10. High-Quality Teaching and Home Language

Teachers incorporate children's cultures and home languages in instruction and classroom activities, and collaborate with families to encourage children's use of their home languages at school to support multilingual and multicultural development.

The importance of developing strong partnerships with families is recognized widely in the field of early education (Henderson & Berla, 1994; Marcon, 1999; Miedel & Reynolds, 1999; Xu & Gulosino, 2006). Due to the fact that the fastest-growing student population in U.S. schools today is children of immigrants—half of whom do not speak English fluently and are thus labeled English language learners (ELL) or dual language learners (DLL)—there is a critical need for early childhood educators to understand how to best serve ELL/DLL children and their families (Calderon et al., 2011). Educators have increasingly recognized that although general





elements of high-quality early childhood education programs, such as high-quality instruction and teacher–child interactions, can serve as the foundation for learning for all young children, less is known about whether these elements serve to foster school success for DLLs. Using DLLs’ home language for instruction has been a common way educators have shown they are being responsive to the cultures and languages of the families served. Although there is no consensus on the form of language instruction that is most effective for ELLs or DLLs (e.g., English immersion or bilingual education; Barrow & Markman-Pithers, 2016), there is evidence that DLLs who attend Spanish–English dual language programs in kindergarten show growth in their Spanish language development without any loss to their English language learning, compared to DLLs who attend English immersion programs (Tazi, 2014). Latinx DLLs who attended Head Start programs where English was the primary language of instruction and the use of home language was encouraged found that teachers’ Spanish use, together with emotionally supportive teacher–child interactions, were positively linked with DLLs’ approaches to learning skills (Limlingan et al., 2020). In addition, studies have shown that cultural responsiveness, in the form of family engagement or parent involvement, had associations with higher teaching quality and positive child outcomes for DLLs (Baker, 2018; Duran et al., 2000; Jeynes, 2003). For example, Baker (2018) found that exemplary teachers hold asset-oriented beliefs about bilingualism and diversity, viewing DLL children and families as knowledgeable resources to the community. With these beliefs as a foundation, teachers enact a wide repertoire of practices tailored for DLL children, including: fostering relationships and belonging through embedding home languages and cultural practices in the classroom; emphasizing guided play, co-constructed curriculum, and ongoing observational assessment; and scaffolding and teaching the English language. In sum, the literature suggests that collaborating with families of ELLs for children’s multicultural development results in an overall increase of teaching quality and subsequent child outcomes for this subgroup.

IV. Future Directions and Limitations

Currently, all states have adopted a set of research-based competencies and standards that serve to define essential learning outcomes for professional preparation programs (National Center on Early Childhood Quality Assurance, 2019). While there is general agreement on broad competencies and standards to ensure preschool professionals provide high-quality teaching to young children, there is less clarity on specific practices and policies and how they relate to positive child outcomes. States vary greatly in requirements for teacher credentialing, ranging from associate and bachelor’s degrees to initial-license master’s degree programs. To complicate matters, there is a lack of consensus in the literature about the relationship between teacher education and classroom quality and child outcomes. Some studies have found positive associations between teacher’s education, major, and credentials with classroom quality and children’s academic gains (Chatterji, 2006; Early et al., 2006; Han & Neuharth-Pritchett, 2010; Hooper, 2018; Kim et al., 2011; Pianta et al., 2005; Son et al., 2013). In contrast, other studies suggest that education, training, and credentialing are not consistently related to teaching quality and that the focus should be more on accountability for student achievement (Early et al., 2007; Podgursky, 2005; Xu & Golosino, 2006). In addition, there is some concern that raising the bar for teacher licensing may have a negative impact for high-poverty or rural districts that already face thin applicant pools (Podgursky, 2005). More attention is needed to building the capacity of ECE teacher preparation programs, building reliable career pathways that reward accomplished teachers for their expertise, and



implementing a sustained research agenda on features most likely to foster improved teacher practice (Obama & Biden, 2009; Whitebook et al., 2009).

There are strong recommendations for collecting and using data for continuous quality improvement (e.g., NAEYC's Early Childhood Curriculum, Assessment, and Program Evaluation position statement, 2003). However, evidence on the effect of using data about high-quality teaching to improve teacher practices and child outcomes is limited and with mixed effects (De Bruin-Parecki & Slutzky, 2016; Marsh, 2012). This suggests the need for more research and attention to examine specific ways data can be used to impact quality teaching, and best practices of using data to support professional development. Observational tools for measuring classroom quality, which often include measures of teaching quality, such as the ECERS/ECERS-R and CLASS, have been validated across homogenous and diverse populations (Curby & Chavez, 2013; Downer et al., 2012), but associations between tools and positive child outcomes are often weak (Brunsek et al., 2017; Keys et al., 2014; Sabol et al., 2015), suggesting that the tools may not capture all aspects of the environment that are important to child development. Also, there does not seem to be a clear consensus on a threshold in rating related to improving child outcomes (Burchinal et al., 2010, Burchinal et al., 2014; Hatfield et al., 2016). Despite these limitations, evidence points to positive relationships between high classroom quality and child outcomes, suggesting that continuing to invest in the development of measures that accurately assess children's experiences in ECE classrooms is warranted (Brunsek et al., 2017).

Finally, more research is needed on best practices for serving children who are DLLs and their families (Calderon et al., 2011). No one form of instruction appears to be most effective for DLLs (e.g., English immersion or bilingual education; Barrow & Markman-Pithers, 2016; Vigdor, 2013). Existing research has been conducted mostly with Spanish-speaking children. Findings from these studies may not necessarily apply to children and families from other cultural and linguistic backgrounds. Strong partnerships with families are important features of a high-quality early education program (Henderson & Berla, 1994; Marcon, 1999; Miedel & Reynolds, 1999; Xu & Gulosino, 2006), and there is evidence that suggests that family engagement and teacher-parent interaction are associated with positive child outcomes (Xu & Gulosino, 2006) particularly for children who are DLLs (Baker, 2018; Duran et al., 2000; Mendez, 2010).

In conclusion, there seems to be extensive research on the implementation of high-quality teaching. However, due to the broad spectrum of the topic and changing contexts over time, there is still much to be learned about how to best define quality and support teachers in the implementation of quality teaching. Overall, these limitations need to be addressed with the hope that future studies will provide more insight into how state policies and practices can best utilize these findings to further support their efforts in improving teaching quality.



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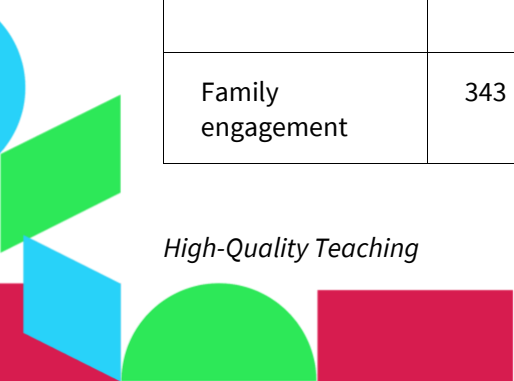


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Appendix A

High-Quality Teaching Literature Scan Summary of Relevant Articles

Key word or phrase	# Articles for initial review based on inclusion criteria (abstract)	# Articles for 2nd review with link to exclusion criteria (abstract)	# Articles passed final review and included in the matrix (full article)	Article citation
Culturally responsive	90	14	2	Ruan, 2003 (HQT10); Souto-Manning & Mitchell, 2010 (HQT10)
Data-driven decision-making	55	18	5	De Bruin-Pareck & Slutzky, 2016 (HQT3); Piety, 2019 (HQT5); Swain et al., 2015 (HQT5); Valentino, 2018 (HQT5); Vitiello et al., 2018 (HQT5, 9)
Family engagement	343	9	8	Ansari & Gershoff, 2016 (HQT7); Baker, 2019 (HQT10);





Key word or phrase	# Articles for initial review based on inclusion criteria (abstract)	# Articles for 2nd review with link to exclusion criteria (abstract)	# Articles passed final review and included in the matrix (full article)	Article citation
				Buhs et al., 2011 (HQT10); Castro et al., 2011 (HQT10); Durán et al., 2016 (HQT10); McWayne et al., 2018 (HQT10); Mendez, 2010 (HQT7); Sawyer et al., 2017 (HQT10)
Classroom quality assessment	381	16	14	Anderson & Phillips, 2017 (HQT9); Bulotsky-Shearer et al., 2020 (HQT9); Burchinal, 2018 (HQT9); Burchinal et al., 2010 (HQT9); Burchinal et al., 2014 (HQT9); Denny et al., 2012 (HQT9); Downer et al., 2012 (HQT9); Early et al., 2018 (HQT9); Hatfield et al., 2016 (HQT9); Perlman et al., 2016 (HQT9); Pianta et al., 2005 (HQT4); Rochester et al., 2019 (HQT7, 9); Sabol et al., 2013 (HQT9); Schmitt et al., 2018 (HQT5, 9)
Continuous quality improvement	20	16	1	Piasta et al., 2020 (HQT6, 7)
Teacher core competencies	20	8	3	Johnson et al., 2020 (HQT4); Xu & Gulosino, 2006 (HQT1); Young et al., 2018 (HQT7)
Teacher credential	126	11	7	Chatterji, 2006 (HQT4); Early et al., 2006 (HQT4); Early et al., 2007 (HQT4); Gillentine, 2010



Key word or phrase	# Articles for initial review based on inclusion criteria (abstract)	# Articles for 2nd review with link to exclusion criteria (abstract)	# Articles passed final review and included in the matrix (full article)	Article citation
				(HQT4); Han & Neuharth-Pritchett, 2010 (HQT4); Kim et al., 2011 (HQT4); Son et al., 2013 (HQT4, 6)
Teacher supports	159	21	15	Algozzine et al., 2011 (HQT6, 7); Ansari & Pianta, 2018 (HQT6, 7); Brock & Beaman-Diglia, 2018 (HQT6, 7); Buysse et al., 2014 (HQT6); Coleman et al., 2020 (HQT6, 7); Conroy et al., 2014 (HQT6, 7); Fenning & Jenkins, 2018 (HQT6, 7); Landry et al., 2017 (HQT6, 7); Lee et al., 2012 (HQT7); Mendez et al., 2018 (HQT10); Pianta et al., 2016 (HQT6); Vo et al., 2012 (HQT6); Wasik & Hindman, 2011 (HQT6, 7); Wasik & Hindman, 2020 (HQT6, 7); Wilson et al., 2013 (HQT6, 7)
Expert recommendation	NA	NA	53	Beneke et al., 2019 (HQT8); Paris & Alim, 2014 (HQT8); Powell et al., 2019 (HQT 8); NAEYC Recommendations for Public Policymakers (HQT8); Bassok & Galdo, 2016 (HQT8); Espinosa, 2002 (HQT8); Jackson, 2009 (HQT8); Lankford et al., 2002 (HQT8); Magnuson & Waldfogel, 2005





Key word or phrase	# Articles for initial review based on inclusion criteria (abstract)	# Articles for 2nd review with link to exclusion criteria (abstract)	# Articles passed final review and included in the matrix (full article)	Article citation
				(HQT8); Morgan et al., 2012 (HQT8); Muñiz (HQT8); Barrow & Markman-Pithers, 2016 (HQT10); Calderón et al., 2011 (HQT10), Dajani et al., 2019 (HQT10); Hyland, 2010 (HQT10); Larson et al., 2020 (HQT10); Naqvi et al., 2013 (HQT10); Souto-Manning, 2013 (HQT10); NAEYC, 2009 (HQT3); National Early Literacy Panel, 2008 (HQT3); National Research Council, 2001 (HQT3); National Research Council, 2008 (HQT5); Gomez et al., 2015 (HQT6); Gupta & Daniels, 2012 (HQT6); Landry et al., 2009 (HQT6); Sheridan et al., 2009 (HQT6); Whitebook et al., 2009 (HQT6); Zaslow et al., 2010 (HQT6); Maier et al., 2020 (HQT2); Minervino, 2014 (HQT2); Sabol & Pianta, 2015 (HQT5, 9); Keys et al., 2013 (HQT5); Hestenes et al., 2015 (HQT5); Curby & Chavez, 2013 (HQT5); Brunsek et al., 2017 (HQT5); LoCasale-Crouch et al., 2007 (HQT9); Cannon et al., 2006 (HQT2); Connors, 2016 (HQT2); Cooper, 2010 (HQT2); Finn et al., 2003 (HQT2); Hahn et al., 2014 (HQT2); Lee et al.,



Key word or phrase	# Articles for initial review based on inclusion criteria (abstract)	# Articles for 2nd review with link to exclusion criteria (abstract)	# Articles passed final review and included in the matrix (full article)	Article citation
				2006 (HQT2); NICHD ECCRN, 2002 (HQT2); Ruopp et al., 1979 (HQT2); Tseng & Seidman, 2007 (HQT2); Wasik et al., 2013 (HQT2); Barnett et al., 2007 (HQT10); Farver et al., 2009 (HQT10); Harris, 2015 (HQT10); Méndez et al., 2018 (HQT10); Tigert, 2020 (HQT10)
Data analysis	30	0	0	
Information utilization	30	0	0	
Total		74	108	





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