



RESEARCH-BASED CURRICULUM LITERATURE SUPPORT SUMMARY

I. Definition, Description, and Example of Element

A research-based early childhood curriculum is aligned with current research studies and best practices on how children develop and learn (Early Childhood Learning and Knowledge Center [ECLKC], 2018). Research-based curriculums (RBC) are anchored in domain-specific, developmentally appropriate contents and skills (National Center on Early Childhood Development [NCECTL], 2017; National Center on Quality Teaching and Learning [NCQTL], 2015) that invite children to think deeply about content that interests them, build on their prior knowledge and experiences, and sequences learning experiences commensurate with children's developmental progressions (ECLKC, 2018; NCECTL, 2017). Research-based curricula are supported by descriptive research or evaluation reflecting evidence of positive outcomes for children; however, they may lack the evidence from randomized control studies (NCECTL, 2017). Early learning researchers have emphasized the implementation of a research-based curriculum as it promotes domain-specific instructional practices (Beecher et al., 2017; Burchinal et al., 2002; Clements et al., 2011; Domitrovich et al., 2007; Duncan et al., 2020; Hamre et al., 2010; Joseph & Strain, 2003; Schenke et al., 2020; Schmitt et al., 2018; Weiland et al., 2018; Weiland & Yoshikawa, 2013) that are effective in supporting positive child-level outcomes in a classroom setting (NCECTL, 2017).

The National Center on Parent, Family, and Community Engagement makes distinctions between curriculums and the types of evidence available for each (The IRIS Center, n.d.; National Center for Parent, Family and Community Engagement, 2018). A curriculum is considered *research-based* if it has a descriptive evaluation of the curriculum that includes a formal report that may or may not be published in a peer-reviewed journal. On the other hand, a curriculum is considered *evidence-based* if it includes a descriptive evaluation and formal report, like a research-based curriculum, and also has more than one strong, quasi-experimental or random assignment study published in a peer-reviewed journal. The current literature review consists of studies about curriculum considered *evidence-based*, as these studies are more likely to be published in peer-reviewed journals because of their research design. Nonetheless, the Implementation Development Map (IDM) has intentionally used research-based curricula to acknowledge that programs implement various curricula that may not have a randomized control study as evidence but still have evidence of effectiveness in the form of descriptive evaluations or a formal report about how the curriculum has influenced children's development, learning, and well-being or parental experience, attitude, and practices.

Implementing either an evidence-based curriculum or a research-based curriculum is considered ideal practice because these types of curricula have a track record of demonstrating links to child-level outcomes that can be shown through randomized control trials (Children's Bureau, n.d.; The IRIS Center, n.d.). In addition, implementing a research-based curriculum will help children build a sequence of learning (ECLKC, 2018). Another key aspect for states implementing curriculum is to avoid prescribing a curriculum but to provide holistic support around curricula implementation, which includes monitoring support, coaching support, and continuous professional development opportunities.





When states do not consider the research supporting a practice via implementing a research-based curriculum, it is more likely that the time and resources put into the practice may not yield desired child outcomes (Nebraska Department of Education, 2018). Thus, it is important that a state provides guidance to programs on curriculum choice and direction that encourages programs to reflect on the cultural and linguistic backgrounds of the children they serve (ECLKC, 2018; Goffin & Wilson, 2001; NCEDTL, 2017; Offorma, 2016; Rogoff, 2003; Tyler, 1971).

The Research-Based Curriculum (RBC) Element of the IDM measures state-level infrastructure indicators as well as classroom- and program-level implementation indicators. 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 RBC Element.

RBC1. Curriculum Policy

There is policy in place that requires all publicly, state-funded prekindergarten programs to implement a research-based curriculum that aligns with state early learning guidelines, and includes the following five characteristics:

- Research-based
- Aligned with state early learning guidelines
- Culturally and linguistically responsive content
- Supportive of individualized instruction for children with a range of abilities
- Allows for actively engaging families to connect and extend learning opportunities across home and school, e.g., families have the opportunity to learn about and provide feedback on selected curricula and instructional materials used in classrooms

RBC2. Curriculum Resources

State provides resources (funding, written guidance, training, and materials) to support teachers in research-based curriculum implementation.

Resources are distributed equitably (e.g., writing guidance is available in multiple languages, and is Section 508 compliant, training is accessible and available in multiple languages that represent the field or in various mediums and is equitably distributed regionally).

RBC3. Curriculum Training

State requires teachers to be trained in the research-based curriculum they are implementing and for programs to provide ongoing, practice-based implementation supports (e.g., technical assistance and ongoing coaching, modelling, or mentoring in research-based curriculum with opportunities for self- and peer-reflection.) Training also includes ways to modify the curriculum for children with special needs and for dual language learners (DLLs).



RBC4. Curriculum Fidelity Training

State requires programs to train their early childhood educators in how to use a research-based curriculum implementation fidelity tool and to employ this tool to ensure that curricula are being used as intended. State requires programs to assess curriculum implementation fidelity at least twice a year, and State requires programs to use curriculum fidelity data to provide ongoing feedback to early childhood educators.

RBC5. Curriculum Data

To understand fidelity of implementation and for continuous quality improvement, the state monitors and verifies classroom-level data collection on the fidelity of research-based curriculum implementation. This monitoring includes cultural and linguistic responsiveness, and individualization for children with a range of abilities through on-site observation with a fidelity tool at least once a year. State requires programs to use implementation fidelity data and other sources of data to inform improvement plans and track progress and uses the data to make decisions that guide the provision of technical assistance and resources to local programs.

RBC6. RBC Data Collection and Use for Equity Goals

With regard to state policies and practices around pre-K curriculum such as selection of a research-based curriculum, curriculum implementation training for teachers, and resource allocation, the state monitors implementation and outcomes through data collection, and uses data to make equitable decisions that ensure all teachers are able to implement curriculum with fidelity and in ways that are linguistically and developmentally appropriate for all children. The state's efforts to understand and address inequity regarding curriculum include ongoing data collection and analysis, disaggregation of data, active discussions, data-driven decision-making, action planning, implementing, assessing implementation, and refining as needed. The state specifically collects and uses data to understand and address the following five components:

- Programs adopt curriculum that is research-based, culturally and linguistically affirming, and supportive of individualized instruction for children with a range of abilities.
- Programs engage with families in their home languages to connect and extend learning opportunities across home and school (e.g., families have the opportunity to learn about and provide feedback on selected curricula and instructional materials used in classrooms).
- Programs and teachers have access to curriculum fidelity implementation training. Access includes training available in multiple languages, in multiple mediums, and locations.
- Resources are distributed equitably (e.g., writing guidance is available in multiple languages, and is 508 compliant, funding is targeted toward those most in need of support).
- Teachers are trained in the research-based curriculum and on how to modify the curriculum to meet the needs of children at varying stages both linguistically and developmentally.

RBC7. Curriculum Implementation

Classrooms implement a research-based curriculum, and inclusive practices that align with state standards. The curriculum includes the following five characteristics:

- Research-based
- Aligned with state standards that are based on early learning guidelines
- Culturally and linguistically responsive content
- Supportive of individualized instruction for children with a range of abilities



Allows for actively engaging families to connect and extend learning opportunities across home and school (e.g., families have the opportunity to learn about and provide feedback on selected curricula and instructional materials used in classrooms).

RBC8. Curriculum Training

Classrooms have trained lead teachers in the research-based curriculum they are implementing including ways to modify the curriculum to meet a range of abilities for all children in the program including children with developmental delays and disabilities, and DLLs.

RBC9. Implementation of Curriculum Training

Programs train their early childhood educators on the use of a research-based curriculum fidelity tool.

RBC10. Assess Curriculum Fidelity Implementation

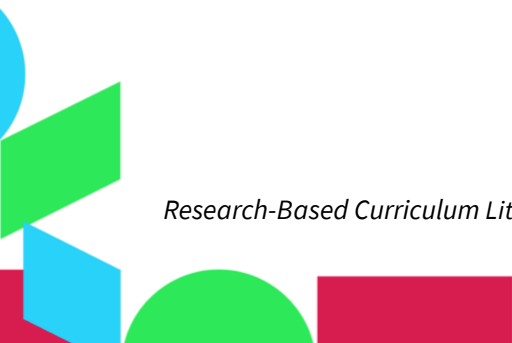
Programs assess the research-based curriculum implementation fidelity.

RBC11. Curriculum Data Use

Programs use annual data obtained from the research-based curriculum fidelity tool for continuous program quality improvement.

RBC12. Curriculum Feedback

Families have the opportunity to learn about and provide feedback on selected research-based curricula and instructional materials used in classrooms.





II. RBC 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 RBC. More details of the general review process conducted across all elements can be found in the [IDM Evidence Review Document](#). For the RBC element, seven key phrases were identified and explored. Out of these initial phrases, five key phrases retrieved relevant results. The list of all sources that yielded relevant results based on the seven 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 RBC 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 tracks seven criteria:

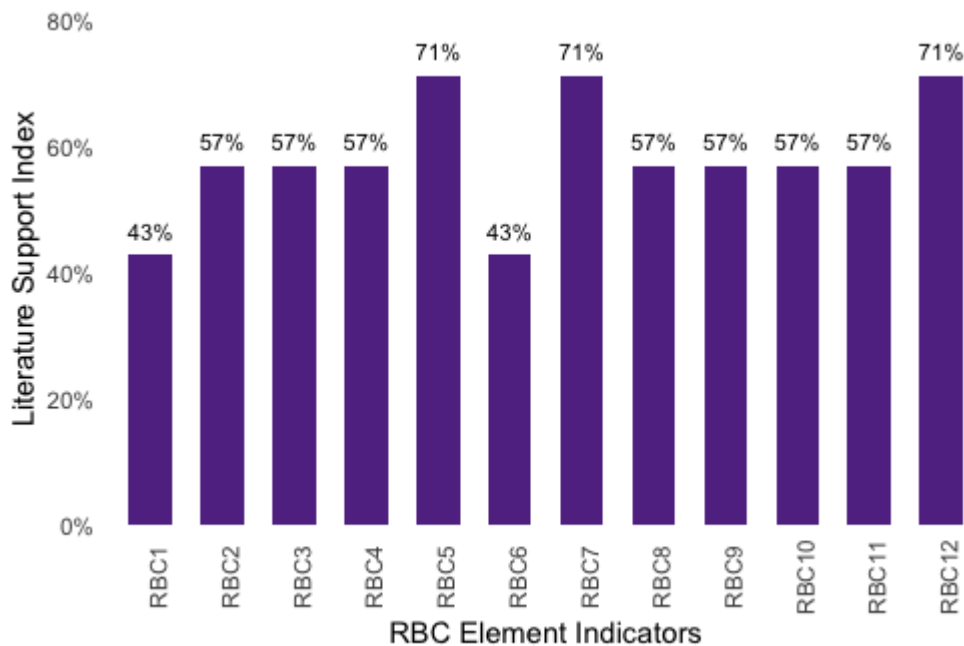
1. at least three peer-reviewed articles;
2. at least one study with no more than two limitations;
3. at least one study at national or state level;
4. at least one study that uses experimental or quasi-experimental design;
5. at least two studies that use representative sampling;
6. support from at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



Figure 1

Overall Summary of RBC Literature Support Index



From Figure 1, we see how the research community’s attention and funding dollars often flow in specific directions more than others. We see that indicators RBC5, RBC7, and RBC12 satisfy 71% of the above criteria. All indicators satisfy at least 43% of the criteria.

Aspects of quality summarized in the LSI are also shown independently in the figures of this section. Note that not all charts represent all the sources, as not all aspects of this analysis are applicable to all sources. For example, Figure 3 shows the breakdown by publication type, and Figure 4 illustrates the breakdown of the sources by research design. We can glean some high-level takeaways from these figures—the most common source used was a literature review (19), followed by an experimental methodology (12). There are very few randomized controlled studies conducted in the early learning field, so it is encouraging that several are included among the sources underpinning the RBC indicators. Most of the sources are peer-reviewed studies, which is important because peer review is a guarantee of accountability and minimum standards for methodology and analysis (see Figure 3). The sampling methodology used in most of the studies is convenience sampling (32). While convenience sampling is the most common sampling approach in the literature, it is the least desirable from a generalizability of findings standpoint. A better sampling strategy that offers stronger generalizability of findings—representative sampling—has been used in only five of the studies. We encourage state teams to defy this trend and focus relentlessly on representative sampling in all analyses, since non-representative sampling can easily lead to the marginalization of communities.



Additionally, Figure 2 shows the raw number of studies undergirding each indicator. We are pleased to note four or more studies underpin several of the RBC indicators, which bodes well for their validity. The lowest number of studies undergirding an indicator is three (RBC9 and RBC10).

Figure 2

RBC Quantity of Evidence by Indicator

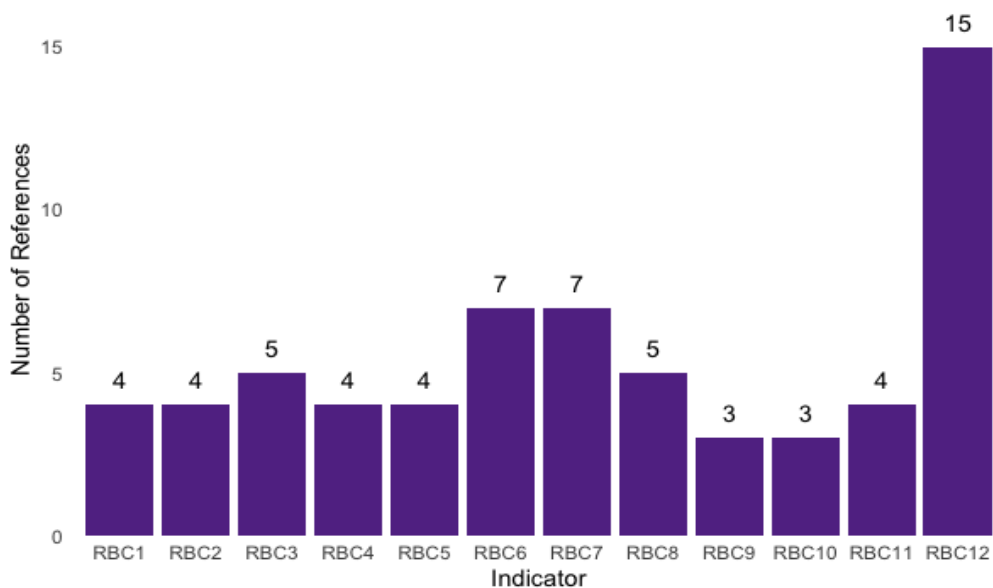




Figure 3

RBC Evidence by Publication Type

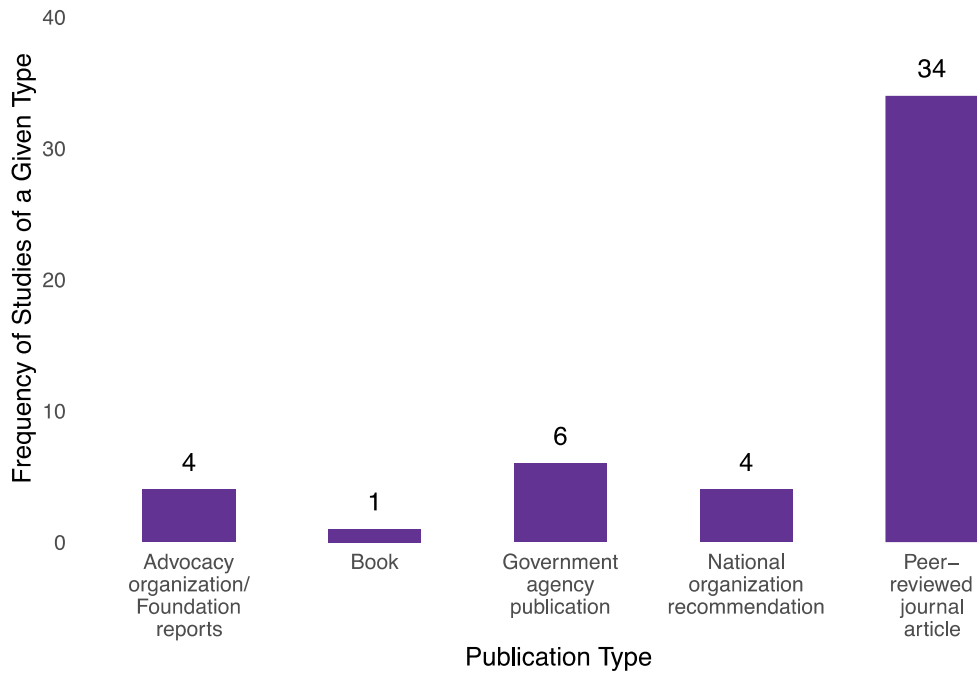
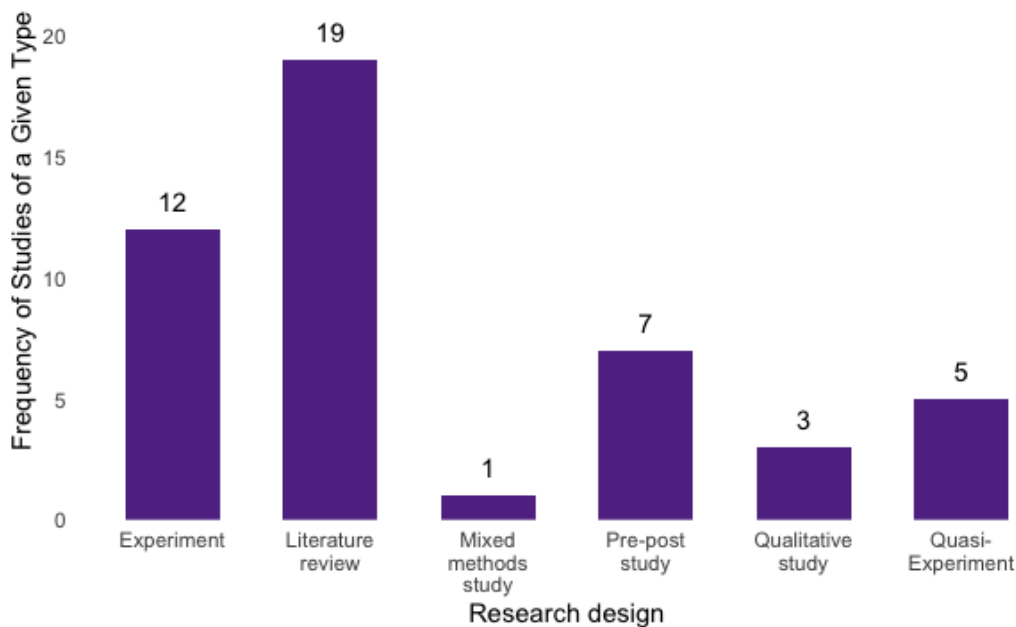




Figure 4

RBC Summary of Research Design



In addition to the *quality* feature we addressed earlier, other features of interest illustrated by the figures in this section include *outcomes*, *scale*, and *quantity*. 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 RBC indicators to child outcomes. The literature pays special attention to a variety of outcomes considered to be potentially within the realm of influence of early learning—cognitive, social, emotional, and physical health. Figure 5 shows that most of the literature (24) focuses on cognitive outcomes; hence, most of the recommendations associated with the RBC indicators would affect cognitive outcomes as well. Social and emotional outcomes also command significant attention (13). Many studies did not involve primary data collection (meta-analyses of previously published research journal articles); we label those as having *no link to child outcomes*.

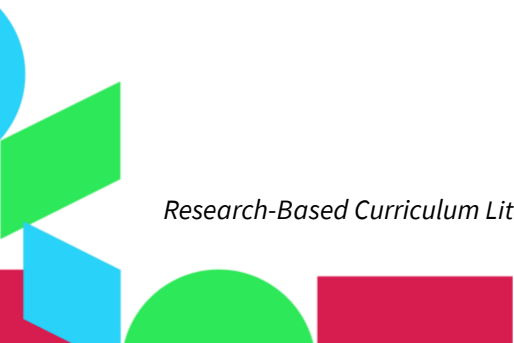
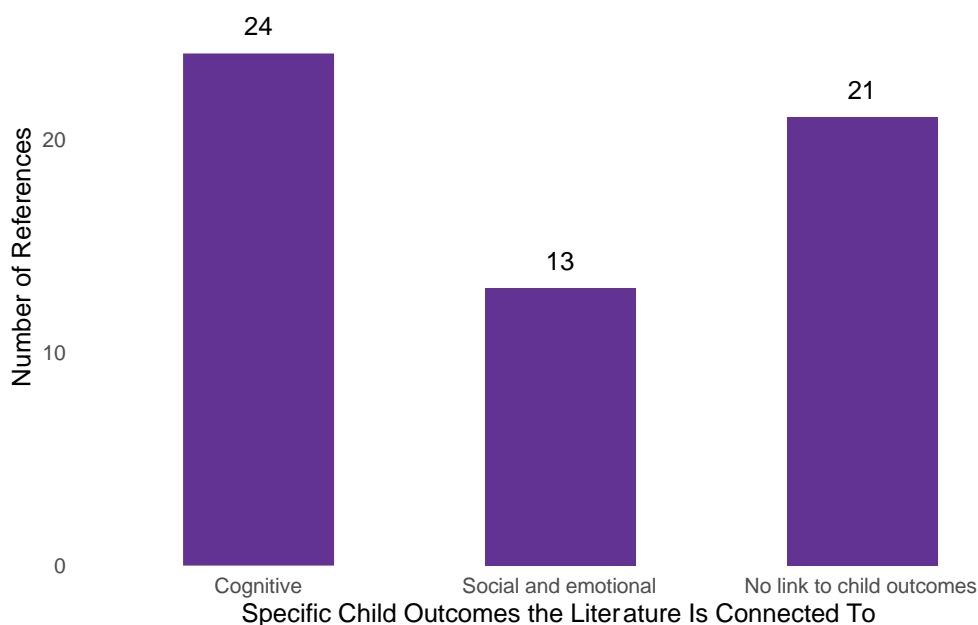


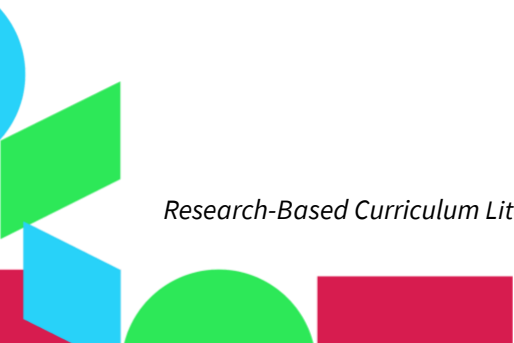


Figure 5

RBC Child Outcomes Studies Examined



Increasingly, literature on implementation science and what we have learned from it so far is 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 and 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 RBC indicators. We are quite pleased that several of the studies had a national scale (8), which implies that policymakers can expect the same magnitude of success as the original studies. The largest category in the chart is statewide studies (11), which likewise bodes well for the generalization of those results into day-to-day practice.





III. Summary of Supporting RBC Literature: Current Practices and Challenges

This section provides a summary of the literature supporting each indicator, including current implementation practices and challenges. Some of the infrastructure and implementation indicators cover the same topics at both the state and program levels. In these instances, summaries are combined to reflect the overlap in the literature for these indicators.

Research-Based Curriculum Infrastructure Indicators (state level)	Research-Based Curriculum Implementation Indicators (classroom and program level)
<p>RBC1. Curriculum Policy</p> <p>There is policy in place that requires all publicly, state-funded prekindergarten programs to implement a research-based curriculum that aligns with state early learning guidelines, and includes the following five characteristics:</p> <ul style="list-style-type: none"> ● Research-based ● Aligned with state early learning guidelines ● Culturally and linguistically responsive content ● Supportive of individualized instruction for children with a range of abilities ● Allows for actively engaging families to connect and extend learning opportunities across home and school, e.g., families have the opportunity to learn about and provide feedback on selected curricula and instructional materials used in classrooms. 	<p>RBC7. Curriculum Implementation</p> <p>Classrooms implement a research-based curriculum, and inclusive practices that align with state standards. The curriculum includes the following five characteristics:</p> <ul style="list-style-type: none"> ● Research-based ● Aligned with state standards that are based on early learning guidelines ● Culturally and linguistically responsive content ● Supportive of individualized instruction for children with a range of abilities <p>Allows for actively engaging families to connect and extend learning opportunities across home and school (e.g., families have the opportunity to learn about and provide feedback on selected curricula and instructional materials used in classrooms).</p>

A large body of research demonstrates both the importance of implementing a research-based curriculum and links to positive child outcomes for children engaged in these curricula. One supporting study explored curricular approaches designed to enhance preschool early literacy skills (Fischel et al., 2007). Fischel et al. found that children engaged with the literacy curriculum intervention demonstrated significantly stronger outcomes in emergent writing, book and print knowledge, and general reading readiness skills. These findings demonstrate important child outcomes based on implementing a research-based curriculum. Another study explored the impact of a mindfulness curriculum on pre-K students' self-regulation, prosocial behavior, and academic skills (Thierry et al., 2018). Findings revealed that students engaged in the mindfulness curriculum showed greater improvements in executive functions than students in the control group. Thierry's study





provides additional support for the importance of implementing a research-based curriculum and the positive effects on child outcomes. Additionally, Domitrovich et al., (2007) found significant results from studying one research-based curriculum, the Promoting Alternative Thinking Strategies (PATHS) curriculum. Children engaged in PATHS had higher emotion knowledge skills, were rated by parents and teachers as more socially competent as compared to their peers, and were less socially withdrawn at the end of the intervention. Fantuzzo (2011) studied an integrated Head Start curriculum called the Evidence-Based Program for Integrated Curricula (EPIC) that focuses on comprehensive mathematics, language, and literacy skills. This study revealed significant main effects and growth rates in mathematics and listening comprehension favoring EPIC. Another study (Sasser et al., 2017) explored the effects of the Head Start Research-Based, Developmentally Informed (REDI) preschool intervention on growth in children's executive-function skills from preschool through third grade. The study found that children who received the intervention demonstrated improved executive-function skills and better academic outcomes in third grade than children who did not receive the intervention. Implementing a research-based curriculum in Head Start programs can reduce early deficits and facilitate school success. The findings from these studies demonstrate the import of effects on child outcomes from implementing research-based curriculum in early education (Domitrovich et al., 2007; Fantuzzo et al., 2011; Fischel et al., 2007; Sasser et al., 2017; Thierry et al., 2018).

State standards, including the Head Start policy and regulations around curriculum outlined by the Early Childhood Learning and Knowledge Center (ECLKC) specify (1302.32 Curricula., n.d):

The *Curricula*. Center-based and family child care programs must implement developmentally appropriate research-based early childhood curricula, including additional curricular enhancements, as appropriate that:

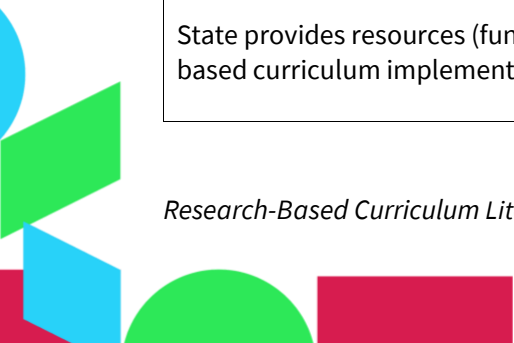
- (i) Are based on scientifically valid research and have standardized training procedures and curriculum materials to support implementation;
- (ii) Are aligned with the *Head Start Early Learning Outcomes Framework: Ages Birth to Five* and, as appropriate, state early learning and development standards; and are sufficiently content-rich to promote measurable progress toward development and learning outlined in the Framework; and,
- (iii) Have an organized developmental scope and sequence that include plans and materials for learning experiences based on developmental progressions and how children learn.

Curriculum policy and curriculum implementation indicators help ensure that state-funded pre-K programs implement research-based curriculum and inclusive practices that align with state standards.

Research-Based Curriculum Infrastructure Indicators (state level)

RBC2. Curriculum Resources

State provides resources (funding, written guidance, training, and materials) to support teachers in research-based curriculum implementation.



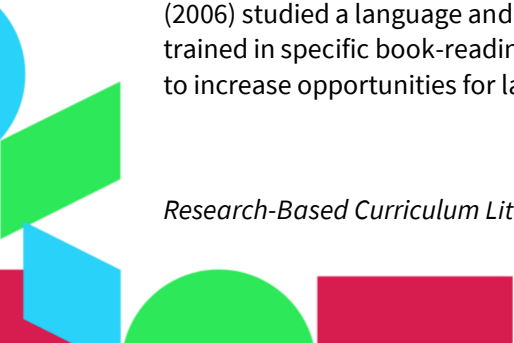


The curriculum resources indicator helps ensure teachers in state-funded pre-K programs have the resources they need to implement research-based curriculum. A study conducted by Weiland et al. (2018) examined shared features of curricula, training, and coaching in high-quality curriculum implementation, and also examined common supports that were critical in attaining good curriculum fidelity. Weiland’s study yielded six features of the strongest model for improving curriculum implementation in large-scale public preschool programs: specific instructional content, inclusion of highly detailed scripts, incorporation of teacher voice, time for planning, use of real-time data, and early childhood training for administrators. Another study by Weiland and Yoshikawa (2013) examined the effects on school readiness and executive functioning in a pre-K program that implemented a coaching system and consistent literacy, language, and mathematics curricula. This study revealed that the program had moderate-to-large impacts on children’s language, literacy, numeracy, and mathematics skills, and small impacts on children’s executive functioning and emotion recognition. These results confirm that implementing a coaching system and consistent resources in pre-K programs improved meaningful outcomes for children. Landry et al. (2006) evaluated a statewide intervention focused on preschool teachers improving children’s language and early literacy. This study found that the presence of a research-based early literacy curriculum, higher levels of teacher education, and full-day versus half-day programs were significant moderators of intervention effectiveness. Providing resources and education to support teachers in implementing a research-based curriculum is paramount to effective positive outcomes for children. This study also revealed challenges of implementing a statewide initiative across programs that varied in their readiness to implement a cognitively rich experience for preschool children.

Research-Based Curriculum Infrastructure Indicators (state level)	Research-Based Curriculum Implementation Indicators (classroom and program level)
<p>RBC3. Curriculum Training</p> <p>State requires teachers to be trained in the research-based curriculum they are implementing and for programs to provide ongoing, practice-based implementation supports (e.g., technical assistance and ongoing coaching, modelling, or mentoring in research-based curriculum with opportunities for self- and peer-reflection.) Training also includes ways to modify the curriculum for children with special needs and for dual language learners (DLLs).</p>	<p>RBC8. Curriculum Training</p> <p>Classrooms have trained lead teachers in the research-based curriculum they are implementing including ways to modify the curriculum to meet a range of abilities for all children in the program including children with developmental delays and disabilities, and DLLs.</p>

The curriculum training indicators help ensure that teachers are trained in the research-based curriculum they are implementing, and programs provide ongoing supports for implementation.

Multiple studies demonstrate the importance of research-based curriculum training for teachers. Wasik et al. (2006) studied a language and literacy intervention implemented in Head Start classrooms where teachers were trained in specific book-reading and conversation strategies. The intervention aimed to train teachers on how to increase opportunities for language and vocabulary development in preschool children. At the end of the

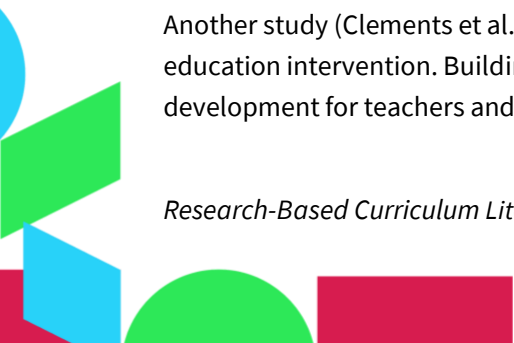




study, children in the intervention classrooms performed significantly better than children in the control classrooms on multiple vocabulary measures. Also, teachers in the intervention classrooms used strategies that promoted language development during book reading and other classroom activities. This research demonstrates that Head Start teachers can be trained to implement classroom strategies that positively affect children's language and literacy development. Additionally, Webster-Stratton et al. (2004) conducted a study exploring intervention outcomes for parent, child, and teacher trainings aimed at treating children with early-onset conduct problems. Treatment groups in this study included parent training; parent plus teacher training; child training; child plus teacher training; and parent, child, plus teacher training; or a waiting list control. Findings from this study showed that all treatments resulted in significantly fewer child conduct problems with mothers, teachers, and peers compared to the control group. Adding teacher training to parent training or child training improved treatment outcomes in teacher behavior management in the classroom and reports of behavior problems. Webster-Stratton et al. clearly illustrated that providing teacher training in early education classrooms positively affects child outcomes.

Research-Based Curriculum Infrastructure Indicators (state level)	Research-Based Curriculum Implementation Indicators (classroom and program level)
<p>RBC4. Curriculum Fidelity Training</p> <p>State requires programs to train their early childhood educators in how to use a research-based curriculum implementation fidelity tool and to employ this tool to ensure that curricula are being used as intended. State requires programs to assess curriculum implementation fidelity at least twice a year, and State requires programs to use curriculum fidelity data to provide ongoing feedback to early childhood educators.</p>	<p>RBC9. Implementation of Curriculum Training</p> <p>Programs train their early childhood educators on the use of a research-based curriculum fidelity tool.</p>

The curriculum fidelity indicators help ensure that programs train their staff in a research-based curriculum implementation fidelity tool. Multiple studies reveal the importance of curriculum implementation fidelity. A 2011 study (Webster-Stratton et al.) focuses on the Incredible Years Teacher Classroom Management (IYTCM) intervention, which is an example of an evidence-based program that incorporates fidelity and adaptation. This study aimed to clarify the underlying principles and supports needed for group leaders to effectively disseminate the IYTCM to teachers with diverse backgrounds and skills who work with students with varying needs. Webster-Stratton found that only dynamic interventions with identifiable and measurable elements will be broadly disseminated with high fidelity to meet the needs of diverse teacher and student populations. Another study (Clements et al., 2011) evaluated the effectiveness of Building Blocks, a preschool mathematics education intervention. Building Blocks is structured around research-based learning and professional development for teachers and includes project mentors who provide support for teachers and complete



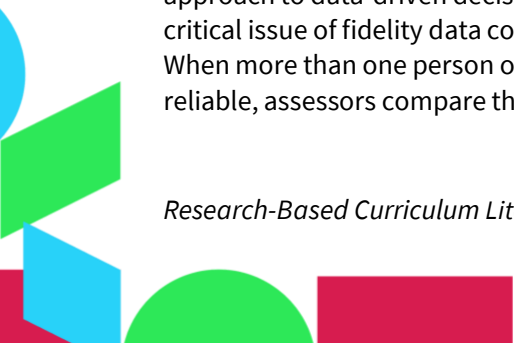


implementation fidelity evaluations. Clements' study revealed that children in the Building Blocks intervention group learned more mathematics than children in the control group.

Landry et al. (2006) also measured teacher behaviors, teacher orientations to instruction, and perceptions of the intervention's impact on children's social behavior as measures of program implementation fidelity. Monthly liaison meetings and site-conducted classroom visits were important elements of ensuring program implementation fidelity. An article by Pianta et al. (2009) describes how multiple measures of procedural fidelity can be used to ensure the curriculum is implemented as intended. In educational settings, procedural fidelity measures are increasingly used to determine whether teachers are using adopted programs as intended, especially in implementing research-based curriculum where program fidelity is a key component in affecting child outcomes. Pianta also makes the important distinction that demonstrating fidelity to a curriculum is not always associated with the quality of instruction, yet measuring fidelity of implementation is an important component of research-based curricula.

Research-Based Curriculum Infrastructure Indicators (state level)	Research-Based Curriculum Implementation Indicators (classroom and program level)
<p>RBC5. Curriculum Data</p> <p>To understand fidelity of implementation and for continuous quality improvement, the state monitors and verifies classroom-level data collection on the fidelity of research-based curriculum implementation. This monitoring includes cultural and linguistic responsiveness, and individualization for children with a range of abilities through on-site observation with a fidelity tool at least once a year. State requires programs to use implementation fidelity data and other sources of data to inform improvement plans and track progress and uses the data to make decisions that guide the provision of technical assistance and resources to local programs</p>	<p>RBC10. Assess Curriculum Fidelity Implementation</p> <p>Programs assess the research-based curriculum implementation fidelity.</p> <p>RBC11. Curriculum Data Use</p> <p>Programs use annual data obtained from the research-based curriculum fidelity tool for continuous program quality improvement.</p>

The curriculum fidelity data and assessment indicators help ensure that programs collect data on classroom-level research-based curriculum fidelity, and programs use this data to understand fidelity of implementation and determine program improvement goals. Abbott et al. (2017) conducted a study focused on a team approach to data-driven decision-making in literacy instruction in preschool classrooms. Abbott raises the critical issue of fidelity data consistency: program implementation fidelity needs to be consistently measured. When more than one person or coach is measuring fidelity, these assessors need to become reliable. To become reliable, assessors compare the percentage agreement from the fidelity totals, and the percentage agreement





should be 90% or greater. Additionally, the fidelity of curriculum implementation is used to document that the intervention is being implemented properly, as well as used to provide suggestions about how instruction could be strengthened or modified (Abbot et al., 2017). State-funded preschool programs can use fidelity data to understand fidelity of curriculum implementation and lead continuous quality improvement efforts. Another study (Hamre et al., 2010) examined the degree of variability of implementation fidelity and whether implementation fidelity was associated with preschool children's growth in language and literacy skills across the school year. Hamre's study used three common indicators of fidelity of implementation: *dosage*, *adherence*, and *quality* of delivery. Results from this study found that the fidelity indicator most associated with gains in children's literacy skills was quality of delivery. These findings suggest the importance of conceptualizing implementation fidelity using multiple indicators of fidelity and separating more procedural aspects of fidelity (dosage and adherence) from quality of delivery. This study also found that the *teachers' delivery of activities* measure of fidelity was consistently related to children's growth in emergent literacy and language skills. And finally, the Hamre et al. study showed that multiple indicators can be used to measure curriculum implementation fidelity, all of which prove meaningful for tracking implementation fidelity and program improvement.

Research-Based Curriculum Infrastructure Indicators (state level)

RBC6. RBC Data Collection and Use for Equity Goals

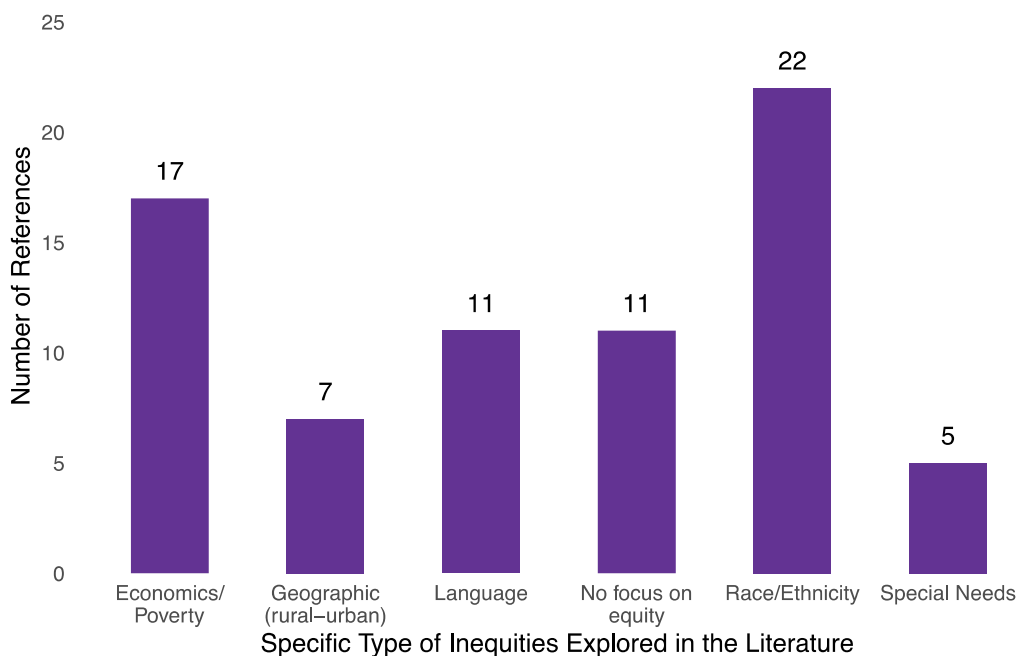
With regard to state policies and practices around pre-K curriculum such as selection of a research-based curriculum, curriculum implementation training for teachers, and resource allocation, the state monitors implementation and outcomes through data collection, and uses data to make equitable decisions that ensure all teachers are able to implement curriculum with fidelity and in ways that are linguistically and developmentally appropriate for all children. The state's efforts to understand and address inequity regarding curriculum include ongoing data collection and analysis, disaggregation of data, active discussions, data-driven decision-making, action planning, implementing, assessing implementation, and refining as needed. The state specifically collects and uses data to understand and address the following five components:

- Programs adopt curriculum that is research-based, culturally and linguistically affirming, and supportive of individualized instruction for children with a range of abilities.
- Programs engage with families in their home languages to connect and extend learning opportunities across home and school (e.g., families have the opportunity to learn about and provide feedback on selected curricula and instructional materials used in classrooms).
- Programs and teachers have access to curriculum fidelity implementation training. Access includes training available in multiple languages, in multiple mediums, and locations.
- Resources are distributed equitably (e.g., writing guidance is available in multiple languages, and is 508 compliant, funding is targeted toward those most in need of support).
- Teachers are trained in the research-based curriculum and on how to modify the curriculum to meet the needs of children at varying stages both linguistically and developmentally.



Figure 6

RBC 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. These efforts undergird 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 for achieving the universal goal (Step 4), and targeted strategies for each group can be developed and implemented to reach the universal goal (Step 5).

In the 2020 position statement on equity for early childhood educators, NAEYC encourages that the curriculum used in early childhood programs positively reflects the children served by the program and their daily experiences with their families and community. Part of the responsibility of educators is to guide children as they become more aware of identity markers such as ability, race, language, and gender, and how to interpret messages they receive from society about themselves and others in relation to these identity markers, as these have often been viewed from a deficit lens (Beneke & Park, 2019). For example, the majority of preschoolers of color continue to be disproportionately suspended as compared to their white peers (U.S. Department of Education & U.S. Department of Health and Human Services, 2014). Students with disabilities often receive special education services in segregated environments (U.S. Department of Education & U.S. Department of Health and Human Services, 2015), and English continues to be prioritized as the language of instruction, without fully supporting children's home language in sustainable ways, despite a growing number of young



children who identify as dual language learners (Baker, 2019). Such findings make it critical for educators to use social justice approaches to curriculum, such as anti-bias education and critical praxis, to help children build their awareness and comfort in exploring their identities and differences, as well as have positive and accurate representations of themselves through curriculum (Kuh et al., 2016).

Research-Based Curriculum Implementation Indicators (program level)

RBC12. Curriculum Feedback

Families have the opportunity to learn about and provide feedback on selected research-based curricula and instructional materials used in classrooms.

Early education professional organizations and experts have embraced the practice of involving families as equal partners in making educational decisions about their child (Division for Early Childhood, 2014; HHS/ACF/OHS/NCPFCE, 2018; NAEYC, 2009; NAEYC 2019). Strong partnerships with families are seen as essential to students' success (Bryk et al., 2010; Henderson & Mapp, 2002; Jaynes, 2016). Studies in preschool settings have found positive associations between family involvement in the educational process with teachers and children's social-emotional and academic outcomes (Powell et al., 2010; Sheridan et al., 2011; Starkey & Klein, 2000).

There are few published studies that specifically examine collaboration with families in learning about and providing feedback on curricula and teaching practices. Studies conducted in preschool programs gathered information about family involvement across a broad range of activities using family and teacher interviews (Fantuzzo et al., 2004; Powell et al., 2010). Other studies focused on parent involvement interventions that trained parents to use strategies to support their child's learning at home (Sheridan et al., 2011; Starkey & Klein, 2000).

Most studies of family involvement in preschool programs have been conducted in Head Start. Head Start offers a range of family engagement opportunities that are not common in other preschool programs, including family and community participation in formal decision-making policy councils and the development of an individualized plan with each family to ensure access to social, health, and education services (Powell et al., 2010). However, in a survey of Head Start teachers and family members, Aikens et al. (2017) found that few parents participate in decision-making activities such as advisory councils or committee memberships despite strong encouragement to do so by staff members. Instead, parents are most likely to be involved in activities in which they are given information during parent/teacher conferences, discussing daily routines and lesson plans, observing or volunteering in their child's classroom, and attending social events and parent education meetings.

Effective research-based preschool curricula include a family engagement component. These components typically provide guidance for communicating with parents, using parent volunteers, and suggestions for weekly newsletters and activities parents can do at home to extend their child's learning (HHS/ACF/OHS/NCQTL, 2015). These types of involvement activities reflect a view of parents in a supporting role, with family engagement seen as an add-on rather than an integral part of a curriculum (Fantuzzo et al., 2004; Ishimaru, 2017). Programs need to create formal policies and practices that build the capacities of both



staff and families to engage in partnerships and reposition families as sources of information and fellow experts in the education of their children (Mapp & Kuttner, 2013).

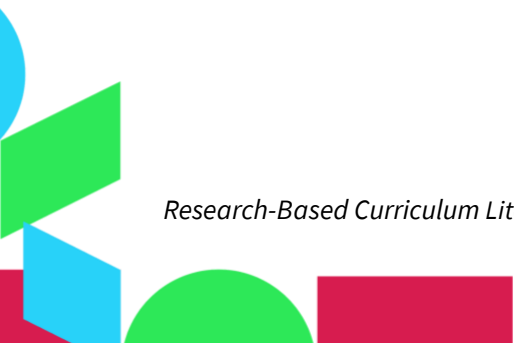
IV. Future Directions and Limitations

The current body of research around curriculum reveals limitations and future directions. Landry et al. (2006) revealed challenges of implementing a statewide initiative across early childhood education programs that varied in their readiness to implement a cognitively rich experience for preschool children. A small sample size in the research proves to be a limitation as well (Hamre et al., 2010; Pence et al., 2008).

Future research, especially for studies involving curriculum effectiveness, is needed to examine implementation fidelity in larger sample sizes and efforts to replicate previous findings. More specifically, “when teacher outcomes are of relevance, sample sizes must be determined based on the number of classrooms instead of the number of children” (Pence et al., 2008, p. 338). A clearer picture of curriculum implementation fidelity would be captured by observing fidelity more frequently than once or twice throughout the school year. Regarding future directions, Pence concludes that “results of this study point to the importance of providing ongoing support to teachers as they implement new instructional approaches, as implementation appears to be a dynamic and ongoing process” (Pence et al., 2008, p. 338). Also, the findings from this study support speech-language pathologists to focus their improvement efforts on helping preschool teachers promote their language-learning interactions with children rather than assisting them to implement specific activity contexts in their classrooms.

Hamre et al. (2010) suggest that previous research on research-based curriculum implementation fidelity used relatively small samplings of teacher behavior. One focus for future work may be to more systematically address the issues related to implementation fidelity. One implication mentioned in the Hamre et al. study concerns how researchers define and measure implementation fidelity in previous studies of curriculum interventions. Findings suggest that assessing the quality of delivery of teaching practices may be important in indicating effective curricular intervention and that measures of classroom quality (such as CLASS) can provide reliable assessments of these teaching practices. However, “the field would learn more about effective teaching practices if there were greater consistency in measurement of this aspect of implementation of curricula” (Hamre et al. 2010, p. 343).

Overwhelmingly, existing research-based curriculum studies elucidate that continued research within this realm serves to support better child outcomes. Furthermore, our review of the literature reveals that current research provides a meaningful guide for future examination of research-based curricula.





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Appendix A

Research-Based Curriculum Literature Scan Summary of Relevant Articles

Key word or phrase	# Articles for initial abstract review based on inclusion criteria)	# Articles for 2nd abstract review with exclusion criteria	# Articles passed full article review	Article Citation
Data-driven decision-making	55	18	1	Abbott et al., 2017 (RBC11)
Curriculum	1,000	46	14	Beecher et al., 2017 (RBC5); Bodrova & Leong, 2018 (RBC7); Clements et al., 2011 (RBC4, 9); Dixon et al., 2017 (RBC1); Domitrovich et al., 2007 (RBC3, 7); Farran et al., 2017 (RBC5); Landry et al., 2006 (RBC2, 3, 4, 8, & 9); Luze & Peterson, 2004 (RBC11); Odom et al., 2010 (RBC2); Sasser et al., 2017 (RBC7); Thierry et al., 2018 (RBC7); Wasik et al., 2006 (RBC3, 8);



Key word or phrase	# Articles for initial abstract review based on inclusion criteria)	# Articles for 2nd abstract review with exclusion criteria	# Articles passed full article review	Article Citation
				Webster-Stratton et al., 2011 (RBC4, 9); Weiland et al., 2018 (RBC2, 5, & 7)
HighScope	59	5	1	Fischel et al., 2007 (RBC1)
Formative assessment	145	13	1	Fantuzzo et al., 2011 (RBC7)
Teacher qualifications	15	5	1	Pianta et al., 2009 (RBC4)
Expert recommendation	NA	NA	32	Clements & Sarama, 2007 (RBC11); Domitrovich et al., 2009 (RBC3, 7, 8, & 10); Duncan et al., 2015 (RBC3, 8); Hamre et al., 2010 (RBC11); Pence et al., 2008 (RBC10); Webster-Stratton et al., 2004 (RBC3, 8); Weiland & Yoshikawa, 2013 (RBC2); Preschool Curriculum Evaluation Research Consortium, 2008 (RBC5, 7, & 10); Washington State Department of Children, Youth, and Families, n.d. (RBC1); ECLKC, n.d. (RBC1); Aikens et al., 2017 (RBC12); Bryk et al., 2010 (RBC12); Division for Early Childhood, 2014 (RBC12); Fantuzzo et al., 2004 (RBC12); HHS/ACF/OHS/NCQTL, 2015 (RBC12); HHS/ACF/OHS/NCPFCE, 2018 (RBC12); Henderson & Mapp, 2002 (RBC12); Ishimaru, 2017 (RBC12); Jeynes, 2016 (RBC12); NAEYC, 2009 (RBC12); NAEYC, 2019 (RBC12); Powell et al. 2010 (RBC12); Sheridan et al., 2011 (RBC12); Starkey & Klein, 2000 (RBC12); Espinosa, 2002



Key word or phrase	# Articles for initial abstract review based on inclusion criteria)	# Articles for 2nd abstract review with exclusion criteria	# Articles passed full article review	Article Citation
				(RBC6); Paris & Alim, 2014 (RBC6); Beneke et al., 2019 (RBC6); Powell et al., 2019 (RBC6); Beneke & Park, 2019 (RBC6); Baker, 2019 (RBC6); Kuh et al., 2016 (RBC6); Mapp & Kuttner, 2013 (RBC12)
Data analysis	30	0	0	NA
Information utilization	30	0	0	NA
Total			50	

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