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Implementation Evaluation of the STREAMin³ Curriculum Model

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Acknowledgments

The STREAMin$^{3(1)}$ curriculum model was developed at The Center for Advanced Study of Teaching and Learning (CASTL) at the University of Virginia's School of Education and Human Development, in collaboration with and funding from Elevate Early Education (E3). E3 developed a model demonstration preschool called The New E3 School in Norfolk, VA and requested an integrated and comprehensive birth through preschool curriculum and professional development model that could be used within The New E3 School and be replicated and scaled across a variety of early childhood education programs. E3 has been a strong advocate for the STREAMin^3 Curriculum Model including advocating for funding to conduct this implementation pilot evaluation.

Internal funding was also provided from the School of Education and Human Development to support the iterative development of STREAMin^3.

Additional funding for this implementation pilot comes from a variety of sources. Funding from the Virginia Department of Social Services (VDSS) from November 2018 to May 2020 supported the implementation pilot in a total of 51 classrooms. When funding from VDSS concluded in May 2020, 19 of the original 51 classrooms received funding from other sources to continue the implementation pilot, including the Obici Healthcare Foundation and the Alleghany Foundation. Funding from Obici Healthcare Foundation spanning from November 2018 to the time of this report supported the implementation pilot in 62 classrooms. Funding from the Alleghany Foundation supported the implementation pilot in 19 classrooms from August 2019 to the present. (These totals include classrooms originally funded by the VDSS.) ReadyKids Charlottesville provided recruitment support and an early learning specialist with expertise in curriculum to serve as a STREAMin^3 coach to one of the programs for the full length of the pilot.

The opinions expressed are those of the authors and do not represent the views of any of the funders.

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The authors declare that they have no conflict of interest.

[1] The STREAMin^3 Curriculum Model is trademarked by the Center for Advanced Study of Teaching and Learning within the School of Education and Human Development at the University of Virginia.

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2020 before becoming a STREAMin^3 coach to support curriculum implementation the following year. Marissa had no role in the development of the curriculum.

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Implementation Evaluation of the STREAMin³ Curriculum Model

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Executive Summary

Children's development from birth to age five sets the stage for their later social, emotional, physical, and cognitive potential. High-quality early childhood care and education experiences, including experiences within programs serving infants, toddlers, and/or preschoolers in private, faith-based, public and family day home settings, nurture children through fostering relationships and helping children develop the skills they need to thrive.

Providing early childhood education (ECE[2]) leaders and teachers with a comprehensive and high-quality curriculum package — one that can be used seamlessly across infant, toddler, and preschool classrooms and embeds aligned professional development (PD) and coaching for all program staff to support implementation — holds significant potential to improve the early learning experiences of our youngest citizens.

In this report, we present information about a newly developed, comprehensive, and integrated curriculum, STREAMin³, and findings from a pilot evaluation of this curriculum. STREAMin³ was designed for educators' use in group-based settings serving children from birth to age five.

Two research questions guided this pilot evaluation:

1. How well was STREAMin³ implemented? To answer this question, we tracked the exposure of teachers and children to multiple aspects of STREAMin³, the quality of curriculum implementation, and participants' responsiveness to the curriculum.

2. Was STREAMin³ implementation associated with improvements in teaching practices? We used teacher surveys at the start and end of each implementation phase to determine whether and how STREAMin³ was associated with changes in perceived teaching practices and teacher-child interactions.

Highlights of the Streamin³ Curriculum

Daily activities, routines, and games that maximize the moment-to-moment teacher-child and peer interactions

Individualized coaching and professional development aligned to the curriculum

Observation tools & assessments to inform teaching and increase implementation quality

[2] Early childhood education (ECE), early care and education (ECCE), early childhood care and education (ECE), and early childhood education and care (ECEC) are terms that are often used synonymously. In this report, we define early childhood education (ECE) inclusive of early childhood programs that provide care and education to young children from birth through preschool in private, faith-based, public, and family day home settings.

The STREAMin^3 Curriculum Model

STREAMin^3 fosters integrated, intentional interactions (in^3) between teachers and children to promote children's development of five Core Skills (Relate, Regulate, Think, Communicate, and Move) and six STREAM Skills (Science, Technology, Reading, Engineering, Art, and Math). The curriculum includes daily activities and book readings, guidance for classroom setup, routines, games that support social and cognitive skills, and quick activities that can be used during transitions or other parts of the day.

It is a great hands-on and fun curriculum that really focuses on what children need to be ready for kindergarten. The teachers find it easy to follow, and the model gives them loads of support in implementing it.

- School Administrator

A key innovation of STREAMin^3 is that it includes an aligned and fully embedded coaching and professional development system for teachers and programs leaders. Coaches partner with teachers to help them understand the Core Skills and STREAM skills and to use research-based Intentional Teaching Practices (ITPs) aligned to each skill in their interactions with children. The coaches conduct regular observation and feedback sessions with teachers and support teachers in the use of formative and progress monitoring assessments. On a regular basis, program leaders meet with coaches and attend professional development sessions. Over time, leaders gain the skills they need to become implementation support specialists: they themselves conduct observations, provide teachers with feedback, lead professional development sessions, and provide in-the-moment scaffolds to teachers related to STREAMin^3.

The STREAMin^3 Implementation Pilot

We implemented the STREAMin^3 curriculum in 121 public, private, and faith-based early childhood classrooms from the winter of 2018-2019 through spring 2021 across two phases (Phase 1, December 2018 through June 2020, Phase 2, July 2020 through June 2021). The participants included teachers and classrooms serving infants (8 classrooms), toddlers (25 classrooms), and preschoolers (88 classrooms).

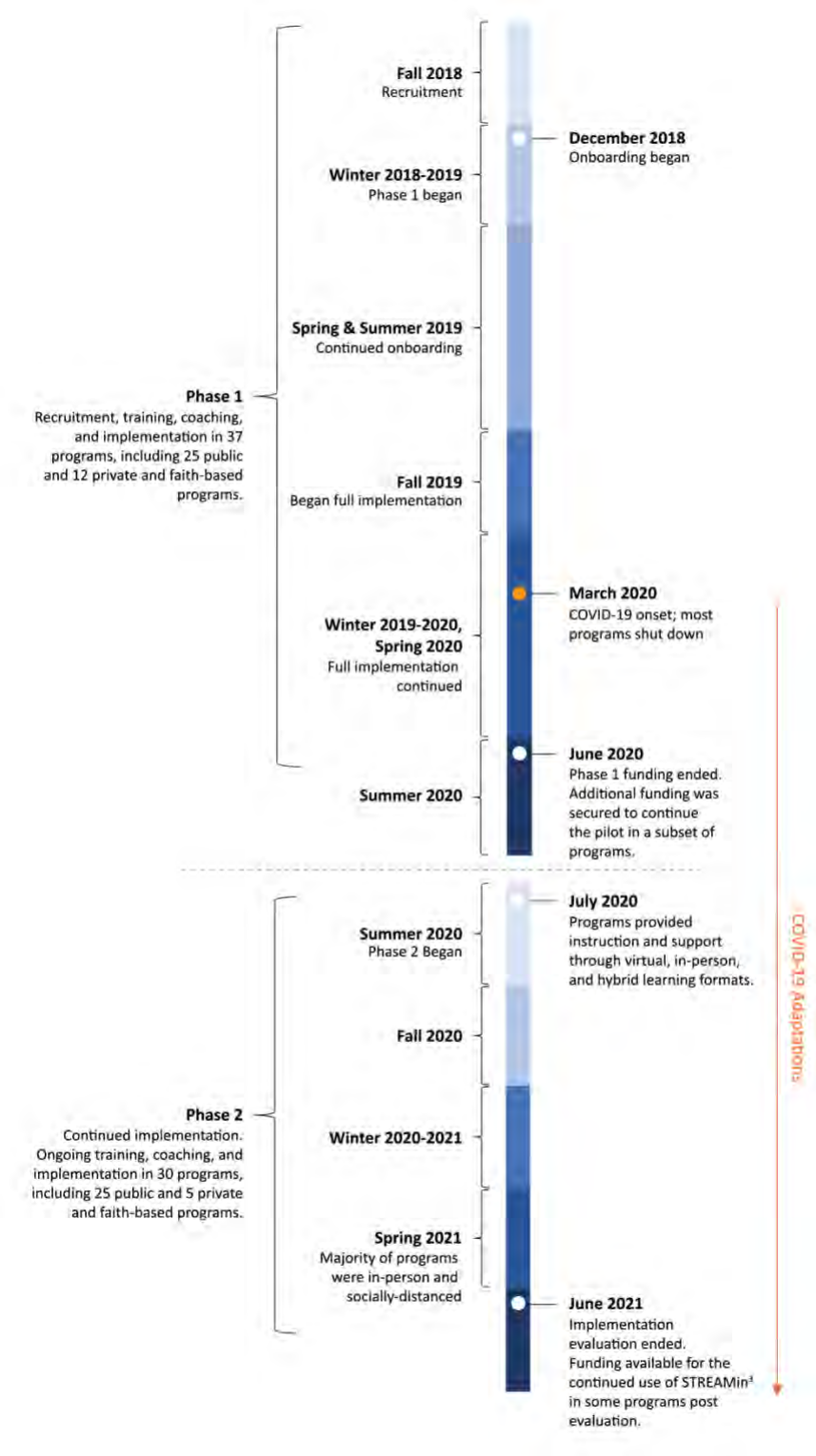
Some programs participated through spring 2020, when funding from the Virginia Department of Social Services concluded. Others continued through spring 2021 with ongoing funding or instrumental support from Elevate Early Education (E3), the Obici Healthcare Foundation, the Alleghany Foundation, and ReadyKids Charlottesville.

COVID-19 Adjustments. The onset of COVID-19 caused significant disruptions to children's learning and required us to adjust the implementation of the curriculum and the collection of evaluation data. All programs experienced temporary, or in some cases, permanent closures. Public classrooms shifted to remote instruction in the spring of 2020 and returned to varying levels of in-person and virtual instruction over the 2020-21 school year. Most private programs provided in-person instruction throughout the pandemic with some temporary closures. Coaches and teachers worked together to adapt the curriculum to these changing circumstances.

Key adaptations included:

- Reworking STREAMin[3] activities for remote instruction
- Conducting observations, coaching, and PD sessions virtually
- Developing curriculum-based, family guides with home learning activities
- Shifting coaching and professional development activities to focus on children's social-emotional well-being

Implementation Pilot Evaluation Phases



Teachers and program leaders continued to complete survey data, but some planned data, including observations of teacher-child interactions and assessments of preschool children's school readiness skills, were not collected.

High Rates of Teacher and Leader Turnover

We had strong engagement at the program level, with neither program leaders nor teachers formally withdrawing from the evaluation during the pilot. However, teacher and leader turnover was high before and after the onset of the pandemic. In the first phase of implementation, 63% of classrooms experienced turnover in staff members, including teachers and/or assistant teachers. After the onset of the pandemic, 83% experienced turnover. To understand and evaluate implementation over time, we limited most analyses to the 86 teachers who participated throughout the first phase (December 2018 through June 2020) and the 58 teachers who participated throughout the second phase (July 2020 through June 2021).

Sources of Information

The data used for this evaluation pilot were collected by various informants and through a variety of methods. Throughout the pilot, teachers and leaders completed surveys about curriculum implementation, their engagement in coaching and PD, perceptions of how instruction changed over time, and satisfaction with the curriculum. Coaches recorded each contact they had with a leader or teacher and conducted frequent classroom observations. We planned to collect spring 2020 and fall 2020 observations of teacher-child interactions and assessments of children's school readiness skills from preschool children. However, we were unable to fully complete these aspects of data collection due to the pandemic.

Key Findings

Teachers and coaches used the CLASS® observation tool to understand the quality of teacher-child interactions and the Virginia Kindergarten Readiness Program (VKRP) to understand preschool children's school readiness skills.

- COVID-19 disruptions prevented coaches and teachers from conducting CLASS® observation and VKRP assessments at some timepoints (spring 2020, fall 2020).
- The observed quality of teacher-child interactions increased from baseline (spring 2019) to the beginning of full implementation (fall 2019). CLASS data remained consistent from fall 2019 through spring 2021 scores, despite the disruptions associated with the pandemic. CLASS® data from the fall of 2019 and the spring of 2021 showed that the quality of teacher-child interactions was above the recommended threshold indicators for high quality (5 for Emotional Support and Classroom Organization; 3.25 for Instructional Support). This evaluation was not designed to test the impact of STREAMin^{3}on CLASS®. However, these data illustrate the effort teachers put forth to provide children with warm, safe, and stimulating teacher-child interactions before and during COVID-19.
- Teachers completed VKRP assessments as expected in the fall of 2019 and spring of 2021. This evaluation was not designed to test the impact of STREAMin^{3}on VKRP. However, children made gains in their school readiness skills from the fall of 2020 to the spring of 2021. We do not know whether these gains were diminished due to COVID-19 disruptions.
- Coaches successfully completed CLASS® observations, and teachers successfully completed VKRP assessments when possible. These tools were successfully integrated into the STREAMin^3 model, and they align with VDOE expectations that ECE programs use a standardized tool to understand teacher-child interaction quality (CLASS®) and children's development of school readiness skills (VKRP).

Key Findings (continued)

Prior to COVID-19, teachers were very successful at using STREAMin³.

- Teachers attended ~85% of the expected coaching sessions. On average, each teacher engaged in ~15 sessions with their coach.
- Teachers attended 88% of the expected group PD sessions. On average, each teacher engaged in ~7 group PD sessions.
- Coaches observed teachers' implementation as being of moderate to high quality. Average observation ratings were above 2.5 on a scale of 1 (not observed) to 3 (observed with high fidelity).
- Teachers reported implementing 62% of the STREAMin³ curricular components. They reported the strongest implementation for STREAM Stories, Core Skill Routines, and STREAM Group Activities which we consider to be major components of the curriculum.

Teachers stayed engaged through a difficult year during the COVID-19 Pandemic.

- In Phase 2 (July 2020 through June 2021, after the onset of COVID-19) teachers attended coaching sessions 91% of the time. In this phase, coaching sessions were scheduled monthly rather than bi-weekly, and teachers were not expected to engage in coaching if their classrooms were placed in quarantine for most of the month. This resulted in teachers attending an average of ~7 coaching sessions across the year, most of which were virtual.

Teachers and leaders reported both positive experiences and challenges to implementing STREAMin³.

- Prior to COVID-19, 54% of teachers said they enjoyed using STREAMin³, 30% were neutral, and 16% reported not enjoying the curriculum. Teacher enjoyment improved during the pandemic with 62% reporting enjoying STREAMin³, 28% being neutral, and 10% not enjoying. By the spring of 2021, most teachers said they would recommend the curriculum (64% recommend, 26% neutral, 10% not recommend).
- Leaders reported consistently high enjoyment of STREAMin³. Prior to COVID-19, 85% of teachers said they enjoyed using STREAMin³, 15% were neutral, and 0% reported not enjoying the curriculum. During the pandemic with 70% reporting enjoying STREAMin³, 30% were neutral, and 0% reported not enjoying. The vast majority of leaders would recommend the curriculum (87% recommend, 13% neutral, 0% not recommend). By the spring of 2021, 75% of leaders felt comfortable supporting their teachers to implement the STREAMin³ model.
- Comments from teachers and leaders during the second phase of implementation, during COVID-19, reflected benefits but also substantial challenges to implementing the curriculum virtually.

Conclusions and Next Steps

Despite the substantial undertaking of adopting a new, comprehensive curriculum – and the extraordinary challenges that programs experienced due to COVID-19 – teachers and leaders successfully implemented the STREAMin³ curriculum model. Although program and teacher turnover were high, no leaders or teachers withdrew from the STREAMin³ evaluation. Teachers and leaders reported greatly valuing and being highly satisfied with the embedded professional development system.

The onset and limitations resulting from COVID-19 prompted the UVA-CASTL team to partner with programs to develop online supports and asynchronous training opportunities, pushing us to better understand how these can work for early learning programs. We

gathered valuable feedback from teachers, leaders, and coaches that has led to refinements of the STREAMin^3 program.

Building on this pilot, future research should rigorously test the impact of STREAMin^3 to improve the quality of teacher-child interactions and children's school readiness skills and to continue to understand how professional development supports and coaching can be used to increase the fidelity of implementation in ways that feasible and practical at scale. This pilot did not include teachers and leaders who serve children through family day homes. It will also be important that future research is inclusive of ECE programs across all sectors (public, private, family day homes), as well as educators serving infants, toddlers, and preschoolers that are representative of the diverse ECE communities in Virginia.

Access the full report.

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Introduction

A child's developmental and educational experiences in the first five years of life are key determinants of their current and future social, emotional, cognitive, and physical development[i]. Children who enter kindergarten with foundational academic and social emotional skills have higher achievement later in school[ii]. However, many children enter kindergarten without the early education experiences needed to develop foundational social, emotional, and early academic skills[iii]. In Virginia, in the fall of 2019, 44% of children began kindergarten not yet demonstrating foundational school readiness skills in one or more key areas. For children from low-income backgrounds, 56% entered kindergarten needing support to develop school readiness skills that are foundational for early learning[iv].

High-quality ECE experiences are a key mechanism to improve children's school readiness[v]. A significant number of America's youngest children attend private, center-based early learning and care programs, including large number of infants and toddlers[vi]. Opportunity gaps for high-quality early educational experiences, due to systemic racism and classism, perpetuate educational inequities for students before and after kindergarten. Access to high-quality early care and learning opportunities from birth through preschool is inequitable[vii]. Children who are from historically marginalized racial backgrounds, those who are Black or African American, Hispanic/Latino of any race, American Indian, or Alaska native, are less likely to be provided with opportunities to experience high-quality early childhood education compared to their White peers. Similarly, children who come from low-income backgrounds, who are more likely to be children who are Black or African American, Indigenous, and people of color (BIPOC), are less likely to have access to high-quality early childhood education compared to their economically advantaged peers.

Despite the promise of high-quality curricula, simply providing a curriculum…is not enough to ensure its adoption. An evidence-based curriculum will only lead to intended outcomes for children when implemented with high fidelity.

High fidelity of implementation…of a new curriculum requires sustained training and support.

The elements of high-quality ECE — inclusive of private child care and public preschool settings and extending from birth through preschool — include warm, caring, and supportive caregivers; culturally relevant classroom experiences; developmentally appropriate expectations and learning opportunities; strong family engagement; and caregiver training and mentorship[viii]. Curricula are an essential tool to provide young children with the best possible early learning experiences[ix]. A curriculum formally describes the scope and sequence of a classroom's learning activities and defines the knowledge and skills that children are expected to have gained after a defined exposure period[x]. Curricula give structure to early learning programs by formalizing a program's philosophy, providing guidance on classroom set-up and materials, and helping teachers identify appropriate activities to support children's learning.

Despite the promise of high-quality curricula, simply providing a curriculum to a program is not enough to ensure its adoption. An evidence-based curriculum will only lead to intended outcomes for children when implemented with high fidelity[xi]. High fidelity of implementation (using a program, strategy, or curriculum as it was designed to be used) of a new curriculum requires sustained training and support[xii]. Sustained teacher training that is closely linked to practice is effective in transferring new strategies into

teachers' daily interactions[xiii]. Practice-based coaching is an approach through which coaches iteratively guide teachers to set goals, plan, and work toward improving their teaching practice by incorporating observation, reflection, and feedback[xiv]. It is a key mechanism to improving implementation fidelity and, ultimately, intervention outcomes.

Initial Development of STREAMin^3

The STREAMin^3 curriculum model was developed by a team at the University of Virginia's Center for Advanced Study of Teaching and Learning (CASTL) in partnership with Elevate Early Education (E3), a Virginia early childhood advocacy group. The UVA-CASTL team sought to answer the call from the field to provide a single curriculum that supports children's development from birth through preschool and across learning domains, is responsive to children's diverse cultural backgrounds and individual needs, and includes aligned supports for strong implementation. E3 wanted a model demonstration ECE program to illustrate to policymakers and other stakeholders what affordable, feasible, and scalable high-quality early learning might look like in Virginia. The UVA-CASTL team designed STREAMin^3 to combine best practices for early childhood teaching and interactions together with aligned professional development and coaching support. It was initially developed from 2015 to 2018, with funding from E3, using an interactive design process in collaboration with a racially diverse group of teachers and leaders, serving children from diverse cultural and socio-economic backgrounds at their model demonstration school. Public (Virginia Department of Social Services from 2018-2020) and private funding (Obici Healthcare Foundation and Alleghany Foundation from 2018 to the present) supported the STREAMin^3 pilot described in this report. The STREAMin^3 model includes the use of progress monitoring tools to understand children's school readiness development and teacher-child interaction quality. STREAMin^3 uses the Virginia Kindergarten Readiness Program (VKRP) assessment system to measure children's school readiness skills and the Classroom Assessment Scoring System (CLASS®) to measure the quality of teacher-child interactions.

Measuring School Readiness & Teacher-Child Interactions

- The Virginia Kindergarten Readiness Project (VKRP) is Virginia's statewide school readiness assessment system. Initial piloting of VKRP in preschool programs was conducted through the STREAMin^3 implementation pilot. Through VKRP, teachers assess children's math, self-regulation, social skills, and literacy skills in the fall and spring. VKRP provides actionable information to teachers, leaders, policymakers, and others to support children's success in school. (See Appendix B for a crosswalk between STREAMin^3 and VKRP.)
- The Classroom Assessment Scoring System (CLASS®) measures the quality of teacher-child interactions across teaching domains that link to student achievement and development. (See Appendix C for a crosswalk between STREAMin^3 and the CLASS®.) STREAMin^3 coaches use the CLASS® to target feedback and support to teachers and leaders. VDOE's birth to 5 uniform quality measurement and improvement system (VQB5) uses the CLASS® to ensure that teachers and leaders across Virginia are providing children with high-quality preschool experiences in all state-funded ECE programs.

The STREAMin^3 Curriculum

The STREAMin^3 curriculum is an innovative set of practices, activities, and routines that promote responsive, instructionally supportive, and culturally sensitive interactions in classrooms serving children from birth through preschool. It is designed to be used in private, public, and multi-age early childhood classroom settings. STREAMin^3 includes professional development (PD) supports that equip teachers with the tools needed to support young children's learning across a range of important developmental domains.

STREAMin^3 includes:

Daily activities, routines, and games that maximize the moment-to-moment teacher-child and peer interactions

Individualized coaching and professional development aligned to the curriculum

Observation tools & assessments to inform teaching and increase implementation quality

STREAMin^3 Skills

Curriculum Components

STREAMin^3 supports integrated, intentional, interactions (in^3) as well as children's development of five Core Skills (Relate, Regulate, Think, Communicate, and Move) and six STREAM Skills (Science, Technology, Reading, Engineering, Art, Math). STREAMin^3 supports teachers to shape children's experiences throughout the day to promote their development of Core and STREAM Skills.

On the next page, we describe the major components of the curriculum. Through these components, the model seamlessly blends support for academic and social-emotional learning in authentic, integrated experiences.

Table 1

Components of the STREAMin³ Curriculum Model

Resource	Description
Curriculum Guide	An overview of the model and crosswalks showing connections to other commonly used standards and measures, as well as sections about Supporting Every Learner by providing inclusive and equitable opportunities.
Daily Activities	36 weeks of daily STREAM Group and Story activities and weekly provocations. Daily practices for observing and supporting Core Skills and ongoing adaptations to provide additional support and challenge to children.
Setting the Stage Guide	Guidance for room set-up, making the most of each part of the day, and classroom routines to support development.
Core Skill Guides	Multiple, detailed summaries of each Core Skill (Relate, Regulate, Communicate, Think, Move). Describes how skills develop and teaching practices to support children's development.
Activity Cards	Short, easy activities to support the Core Skills across the day.
STREAM Games	Games for preschoolers to support STREAM skills, including literacy and math.
Print Packets	Print materials for the curriculum activities (e.g., Feelings Chart, Letter BINGO).
Family Engagement Materials	Weekly letters for families (in Spanish and English), activity cards to share, quarterly reports, and best practices for collaborating with families.
Formative Assessments	Weekly formative assessments, developmental progressions, and implementation fidelity tools. Guidance for observing and analyzing children's development in order to inform teaching and provide children individualized support.
Materials Guide	Tools for finding, modifying, and preparing materials.
Family Day Home and Mixed-Age Guide	Guidance for using the curriculum in mixed-aged, home-based classrooms.

All components of the model are designed to be flexible and adaptable to meet the individual needs of each child and classroom. This design supports our commitment to creating and facilitating interactions and opportunities that are inclusive and equitable for each child. In addition to written guidance woven into all pieces of the model, coaches explicitly highlight these issues so teachers can analyze their practice and interactions and adapt curricula materials to support every child in their classroom.

Professional Development Systems

Teachers and leaders adopt the entire STREAMin³ curriculum package that includes ongoing professional development and a practice-based coaching model where teachers partner with a coach to use evidence-based practices within their classroom context.

STREAMin³ coaches engage with teachers through in-person meetings, classroom observations, action plans, informal check-ins, and monthly professional development sessions. Coaches observe classroom interactions using an implementation fidelity tool and provide feedback to teachers. To improve

implementation, fidelity, and sustainability, the coaches partner with leaders to provide updates, training, and plans for monthly professional development sessions.

COVID-19 Challenges and Adaptations

It is difficult to underestimate the traumatic impact that COVID-19 has had on children's, family members' and teachers' lives. Children lost connections to their teachers and peers through program closures, remote learning, high teacher turnover, and families disenrolling from programs and schools. Parents and caregivers lost or had to quit their jobs, and some children lost loved ones. These disruptions to children's everyday experiences impacted their academic and social-emotional development. COVID-19 disruptions negatively impacted STREAMin^3 implementation and evaluation activities in the following ways:

- We were unable to observe the quality of teacher-child interactions (CLASS® observations; spring 2020, fall 2020) or assess children's readiness skills (VKRP; spring 2020, fall 2020).
- Shifts in learning formats meant that the curriculum activities and interactions could often not be implemented as intended. Teachers used portions of the curriculum, adapting for socially distanced, in-person, or virtual learning, and/or sending home newly developed weekly family guides.
- Leaders focused on managing an education crisis. They were not able to engage with the UVA-CASTL team at levels needed to support a full transition to local leadership.
- STREAMin^3 coaches adapted their support to meet the needs of participants. They continued to observe and meet regularly with teachers, including monthly group professional development sessions and individual coaching.
- Due to the stress, confusion, and isolation caused by a global pandemic, coaching and professional development content focused on children's social-emotional development. Coaches used CASTL-VDOE's new online ECE Resource Hub, to promote equity, trauma-informed care, and support families.

COVID-19 Instructional Adaptations

- Adapting STREAM-Group activities for virtual (e.g., adapting a patterning activity to work with the materials children already have at home).
- Reading and discussing STREAM-Story book activities in Zoom meetings.
- Making virtual versions of classroom routines (e.g., making virtual feelings charts to use in Zoom meetings and to share with families).
- Using Canvas Learning Management System to upload and share STREAMin3 activities to be used at home.
- Videotaping a STREAM activity to share (e.g., coordinator filmed herself going on a nature walk, collecting items, and then sorting and comparing).
- Adapting STREAM games to work on a screen during a Zoom meeting.
- Selecting Activity Cards that promote movement and transfer easily to home.
- Modifying for safety while keeping children involved (e.g., adapting a cooking activity so each child has separate tools/cups to avoid sharing).

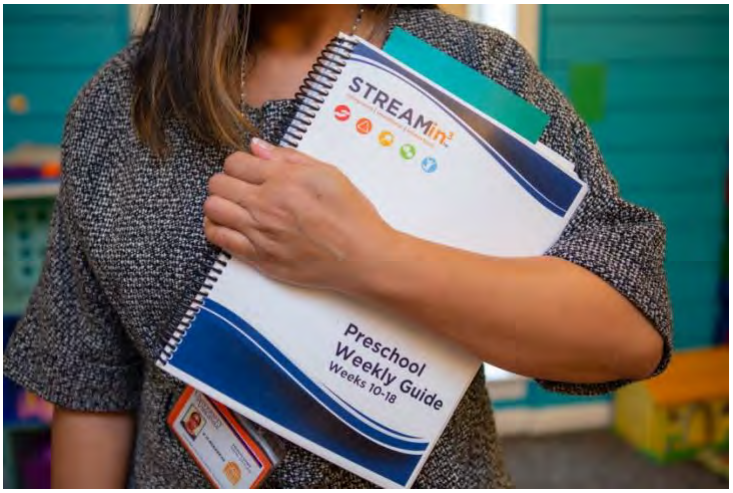
Implementation Pilot Evaluation

The remainder of this report describes results from the implementation of STREAMin^3 in 121 early childhood classrooms in Virginia from the winter of 2018/2019 through the spring of 2021. These classrooms served children from birth to age five and included private, faith-based, and public child care programs.

Two research questions guided our evaluation:

1. How well was STREAMin^3 implemented? To answer this question, we tracked teachers' and children's exposure to multiple aspects of STREAMin^3, the quality of curriculum implementation, and participants' responsiveness to the curriculum.

2. Was STREAMin^3 implementation associated with improvements in teaching practices? We used teacher surveys at the start and end of each implementation phase to determine whether and how STREAMin^3 was associated with changes in perceived teaching practices.



Originally, we intended to examine the associations between implementation, teachers' observed quality of teacher-child interactions (via CLASS®), and assessments of preschool children's school readiness skills (via VKRP). COVID-19 prevented our team from collecting this data as intended, and comparisons between pre-COVID (fall 2019) and post-COVID (spring 2020, fall 2020, spring 2021) cannot be made. However, we present the CLASS® observation and VKRP assessment data that was collected descriptively, as it shows teacher engagement in the full curriculum model which includes these progress monitoring assessments.

The implementation pilot evaluation occurred in two phases:

- Phase 1 (19 months, from December 2018 through June 2020)
    - Phase 1 included recruitment, training, coaching, and implementation in 37 programs, including 25 public and 12 private and faith-based programs. It was disrupted by the onset of COVID-19 in March 2020.
    - At the end of Phase 1, funding to support the private and faith-based programs ended. Five private and faith-based programs continued with funding from other sources, and 7 programs ceased formal participation at this time.
- Phase 2 (12 months, from July 2020 through June 2021).
    - Phase 2 included ongoing training, coaching, and implementation in 30 programs, including 25 public and 5 private and faith-based programs.
    - Programs resumed after shutdowns through virtual, in-person, and hybrid learning formats.

Participants

Classroom Information

A total of 285 teachers (202 lead and 183 assistant teachers) and 73 leaders (including principals, program directors, and assistants) representing 121 classrooms within 38 programs participated in the pilot across 2.5 years, including 8 infant, 25 toddler, and 88 preschool classrooms. Programs included Virginia's pre-k program, Virginia Preschool Initiative (VPI; 45%), private (23%), faith-based (21%), Head Start or Early Head Start (8%), and Inclusive Placement Opportunities for Preschoolers (IPOP; 3%), a state-funded inclusion initiative. Table 2 details the distribution of participating classrooms by age and division across Phases 1 and 2 of the implementation pilot evaluation.

The funding from the Virginia Department of Social Services (VDSS) that allowed for the pilot of STREAMin^3 in 46 private and faith-based classrooms ended in the summer of 2020 (i.e., at the end of Phase 1). When classrooms resumed instruction in the fall of 2020 (i.e., the start of Phase 2), implementation in 19 classrooms from 5 of these programs continued through different funding sources, including the Obici Healthcare Foundation, Alleghany Foundation, The New E3 School, and a partnership between ReadyKids Charlottesville and UVA-CASTL. An additional 7 public classrooms closed during Phase 2 due to staffing shortages and low enrollment related to the pandemic. Thus, STREAMin^3 implementation continued in a total of 72 classrooms during Phase 2.

Lead teachers were mostly female (99%) and were White (67%) Black/African American (27%), multiracial (4%), Asian (3%), and Hispanic/Latinx (<1%). The majority had a bachelor's degree (36%), master's degree (27%), or some college (including two-year degrees; 24%). Teachers reported an average of 15 years' experience teaching. Assistant teachers were also mostly female (98%) and were White (60%), Black/African American (32%), multiracial (6%), Asian (1%), and Hispanic/Latinx (1%). They had less education than lead teachers (25% Bachelor's degree, 2% master's degree, 59% some college (including two-year degrees)) and averaged 18 years of teaching experience. Leaders were 89% female and 73% had a master's degree or doctorate. The majority were White (61%) followed by Black/African American (26%), Asian (7%) and other ethnicities (6%). Leaders averaged 18 years of experience in education.

Although the number of classrooms involved in the pilot at any point was 121, the numbers in Table 2 do not sum to 121 across Phases 1 and 2 because some classrooms worked with us through both phases, others only during Phase 1, and some classrooms and programs closed altogether during the course of the pilot.

Most classrooms provided virtual-only instruction in fall 2020. By the spring of 2021, most programs had re-introduced in-person or hybrid instruction (a blend of in-person and virtual). Figure 2 depicts the distribution of instructional formats used across the sample during Phase 2 of the pilot evaluation.

Table 2

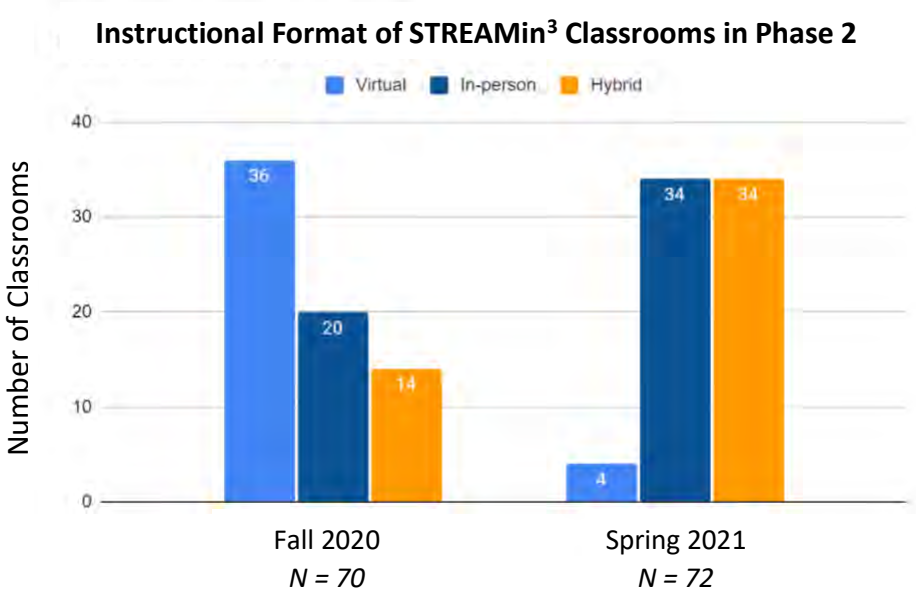
Classrooms Participating in the STREAMin^3 Pilot

Classroom Totals	Public Classrooms (State or Federal)	Private/ Faith-based Classrooms	Total Classrooms
Phase 1 (December 2018 - June 2020)			
Infant	1	6	**7**
Toddler	2	17	**19**
Preschool	57	23	**80**
Classroom Total	**60**	**46**	**106**
Distribution	57%	43%	

Classroom Totals	Public Classrooms (State or Federal)	Private/ Faith-based Classrooms	Total Classrooms
Phase 2 (July 2020-June 2021)			
Infant	1	4	**5**
Toddler	3	6	**9**
Preschool	49	9	**58**
Classroom Total	**53**	**19**	**72**
Distribution	74%	26%	

Figure 2

Instructional Format of Classrooms Participating in STREAMin³ During Phase 2



Note. The fall 2020 sample included 53 public and 17 private/faith-based classrooms. The spring 2021 sample included 53 public and 19 private/faith-based classrooms.

Length of Participation, Mobility, and Attrition

No program leaders or teachers actively withdrew from the evaluation due to concerns about STREAMin³. However, the length of time that leaders and teachers participated in the evaluation varied, due to different program start dates across funding sources, participants' mobility within programs, and attrition from participating programs (teachers or leaders leaving the program, sometimes due to classroom closures). During Phase 1 (December 2018-June 2020), out of

High Turnover of Teaching Staff in Private and Faith-based Programs

Private and faith-based classrooms experienced higher rates of staff turnover than publicly funded classrooms during both phases of the pilot. Coaches noted many challenges in classrooms with high turnover and related staffing shortages, including difficulty scheduling consistent coaching sessions and forming and implementing action plans with frequently changing teaching teams.

106 classrooms, 53% experienced turnover[3] in staff members at least once. During Phase 2 (July 2020-June 2021), out of 72 classrooms, 71% experienced turnover in staff members at least once, which was higher than the rate of staff turnover in Phase 1. In both phases of the pilot, staff turnover was most prevalent among assistant teachers: 34% of classrooms had one or more assistant teachers leave their program during Phase 1, and 49% of classrooms had at least one assistant teacher leave their program during Phase 2. Coaches reported teacher mobility and attrition as a key barrier to implementing a new curriculum in these programs.

Leaders also noted the challenges that high turnover caused, especially after the onset of COVID-19. One leader provided the following comment in a survey, “We have lost several teachers, so staffing has been a concern. Due to lack of staff, teachers are doing dual roles in some areas. We have had to adjust materials and procedures to accommodate the mandates while still providing quality care. Coaches have had to adjust doing observations to ensure distancing."

Analytic Sample and Analysis Decisions

To understand how STREAMin[3] functioned among teachers who completed at least one year of implementation, we focus on results from teachers who completed at least the fall and spring surveys in each phase. In Phase 1 (December 2018-June 2020), 86 teachers participated for the full evaluation period (starting in August of 2019 or earlier and staying through March of 2020) and completed both intake and end-of-year surveys. These 86 teachers reported having significantly higher education levels and rated children’s classroom behavior as slightly better compared to teachers who left their program during this time. There were no differences among teachers who did and did not leave in their perceptions of STREAMin[3] based on fall 2019 ratings, when most had been participating for several months.

In Phase 2 (July 2020-June 2021), 58 teachers participated throughout the year and completed both fall and spring surveys. There were no significant differences between teachers who completed the fall survey only versus teachers who completed both surveys on key factors (e.g., education; perceptions of support from program leaders, peers, and coaches; perceptions of classroom behavior), with one exception: the teachers who participated at both time points reported significantly more years of teaching experience compared to teachers who left their programs.

Implementation of STREAMin[3]

Coaching Hiring and Training

Eleven coaches supported teachers to implement STREAMin[3(4)]. Coaches identified as females, were on average 53 years of age, had between 3 and 15 years of prior coaching experience, all had prior teaching experience and most had a master’s degree. Fifty percent reported their race as Black, 38% White, and others did not report. Coaches participated in extensive training before working with programs, including an online course and a one-day, in-person workshop. Coaches also participated in group meetings and individual meetings with a project manager or lead coach, which began during the training period and continued throughout implementation. In addition, coaches were trained to reliability on the

[3] A classroom was flagged as experiencing turnover if the teacher or assistant teacher permanently left the classroom due to reassignment or leaving the program or had an extended leave of absence at any point during each implementation phase. The percentage of classrooms that experienced turnover in staff members during phases 1 and 2 of the pilot were calculated according to these criteria and do not account for changes related to new teachers or assistant teachers who joined classrooms during the pilot.

[4] One of the coaches was already in a coaching position for a local agency and remained in that position, although she was provided training and support to work with one program of her caseload on implementing STREAMin[3] for the duration of the project.

Classroom Assessment Scoring System[xv] (CLASS®), completing Infant, Toddler, and/or Pre-K CLASS® trainings according to the age levels of the classrooms they were coaching.

Through these trainings, coaches learned about the curriculum, the research and theory underlying the STREAMin^3 approach, effective coaching practices, how to observe and give feedback related to STREAMin^3, and other skills related to coaching. The focus of ongoing support across the length of the project included increasing effectiveness of their work with teachers and leaders, troubleshooting, and planning to use data to inform coaching. Additionally, coaches engaged in ongoing reflection and collaboration meetings focused on issues of diversity, equity, and inclusion.

Roll-out of the Curriculum

Phase 1 (December 2018-June 2020)

Programs were recruited in the fall of 2018 through information sessions. Programs signed up if they were interested in participating; there was more interest than could be accommodated by the original 50 classroom slots funded by VDSS. The Obici Healthcare Foundation expanded funding to include an additional 50 public classrooms that were ineligible for the VDSS funding in the Western Tidewater area of Virginia. Later, 12 more public classrooms were added in the Alleghany Highlands of Virginia through support from the Alleghany Foundation.

In December 2018, program leaders attended an in-person training to learn about the curriculum and how to support teachers. Starting in January 2019, coaches met with and observed teachers in their caseloads to begin building relationships, learn more about existing classroom practices, and provide an initial introduction to the curriculum model. Coaches began bi-weekly coaching cycles and monthly group meetings in February. Lead teachers, co-teachers, and assistant teachers were included in all aspects of curriculum uptake, and coaching was targeted to classroom teams rather than to individual teachers. Leaders were also provided with bi-weekly coaching and were asked to attend monthly group PD sessions. This initial onboarding period focused on instilling the foundational pieces of the curriculum, including a systematic introduction to the Core Skills, routines, assessments, and corresponding curricular resources.

Over the summer of 2019, each classroom received the remaining STREAMin^3 curricular materials. This included the books, manipulatives, materials, games, and tools needed to complete all readings and activities called for in the curriculum. In the fall of 2019, participating teachers began implementing the full curriculum with the addition of these weekly sets of stories, activities, and games aligned with the foundational elements of STREAMin^3.

Phase 2 (July 2020-June 2021)

A majority of the early childhood programs participating in the implementation pilot closed on or around March 15, 2020, due to the COVID-19 pandemic. The pandemic continued through the 2020-2021 school year, leading to virtual or hybrid learning and repeated program closures. Coaches continued to offer support and professional development to leaders and teachers during the pandemic via technology-mediated formats: teleconferencing, sharing videos, facilitating virtual group meetings with leaders across programs, phone calls, emails, and text messages. Coaching sessions occurred monthly. The focus of these sessions was on modifying the curriculum and supporting the social and emotional needs of children. When requested, the UVA-CASTL team supported the facilitation of home-based learning for families of participating programs by offering access to curriculum-aligned techniques and supports. Specifically, all programs were provided with a set of STREAMin^3 family resources and were offered support to determine a plan to meet each program's needs.

Overview of Data Collection

Data were collected from teachers, leaders, and coaches to understand how programs implemented the STREAMin^3 curriculum; how they engaged in professional development and coaching; how they responded to the curriculum components; and how STREAMin^3 may be linked to positive outcomes for teachers and students. COVID-19 limited our ability to gather teacher observation and child outcome data. See Appendix A for more information about the data collection measures used during the implementation pilot evaluation.

Elements of Data Collection

Phase 1 (December 2018 – June 2020)

- **Intake surveys** completed by all participants, including questions about demographic characteristics, work experience, education level, school climate, and attitudes toward the STREAMin^3 curriculum.
- **Activity tracking** carried out by coaches who recorded the amount of contact they had with program staff, including teacher participation in bi-weekly coaching sessions and attendance at group PD sessions.
- **Engagement ratings** completed by coaches after each coaching session to describe the teachers' level of preparation and their understanding of, and active engagement with, STREAMin^3.
- **Fidelity observations** conducted by coaches to observe teachers' fidelity of implementation of STREAMin^3 activities or parts of the school day.
- **Implementation surveys** completed by teachers in November and January to indicate which components of the STREAMin^3 curriculum they had implemented the previous week, and their satisfaction with those components.
- **End-of-year surveys** completed by teachers and leaders to provide feedback on the curriculum, coaching experiences, school climate, and adequacy of support. Teachers were also asked to rate their skills as they perceived them *prior* to using STREAMin^3 and *currently*, after one year of implementation.
- **Coach ratings** of teachers' implementation, engagement, and progress across the year.
- **Focus groups** to elicit feedback about STREAMin^3.

Phase 2 (December 2018 – June 2020)

- **Fall surveys** completed by all participants, which included demographic information, stress, and COVID-specific information.
- **Activity tracking** reported by coaches about monthly coaching sessions and attendance at group professional development sessions.
- **Engagement ratings** completed by coaches after each coaching session to describe the teachers' levels of preparation and their understanding of, and engagement with, STREAMin^3.
- **Fidelity observations**, conducted by program leaders or by coaches via videoconference.
- **End-of-year surveys**, sent to all participants, to solicit feedback and satisfaction data.

Results

How well was STREAMin^3 implemented in classrooms?

The first research question asked to what degree STREAMin^3 was implemented in classrooms as intended. We followed Dane & Schneider's[xvi] definitions of implementation fidelity to track multiple aspects of implementation. These included:

- Dosage (or exposure): The "number of sessions" or "frequency with which program techniques were implemented."[xvii] Teacher dosage was measured using the number of professional development sessions and coaching sessions educators attended. Child dosage of the curriculum was measured using teacher reported implementation of STREAMin^3 components.
- Adherence/quality of delivery: The "extent to which specified program components were delivered as prescribed in program manuals."[xviii] This was assessed using the coach fidelity observations and coach ratings of teachers' engagement in the coaching process.
- Participant responsiveness: "Levels of participation and enthusiasm"[xix] assessed using ratings of satisfaction with the program and likelihood of recommending it to a colleague.

Teachers and leaders also provided comments about their experiences implementing STREAMin^3, drawn from open-ended responses on the Phase 1 (December 2018-June 2020) and Phase 2 (July 2020-June 2021) end-of-year surveys as well as teacher focus groups that were conducted in the summer of 2020.

Teacher and Child Dosage/Exposure to STREAMin^3

Teachers received a high level of dosage/exposure to STREAMin^3 coaching and training. During Phase 1 (December 2018-June 2020), the 86 teachers who remained in the evaluation and completed intake and end-of-year surveys participated in an average of 14.9 bi-weekly coaching sessions (*SD* = 6.7, Min-Max = 4-34) and 10.2 group PD sessions (*SD* = 2.5, Min-Max = 3-13). In other words, teachers had about 1.2 coaching sessions per month and attended just under one PD session per month. Taking holidays and closures into account, **this corresponds to teachers attending about 85% of the expected coaching sessions and 88% of expected PD sessions.** Although teacher engagement was high, some found the frequent meetings overwhelming. One teacher commented, "There are too many professional development, observation, and one-on-one meetings."

For Phase 2 (July 2020-June 2021), COVID-19 disruptions to learning formats required us to change the way we tracked dosage/exposure to focus on the classroom rather than individual teachers. Classrooms received an average of 6.6 (*SD* = 3.3) coaching sessions, with a minimum of 0 and a maximum of 17. Approximately 82% of these were conducted virtually. Accounting for holidays and closures, which, in Phase 2, included classrooms quarantining due to COVID-19, **classrooms on average completed 91% of expected coaching meetings; 24% of classrooms exceeded maximum expectations.**

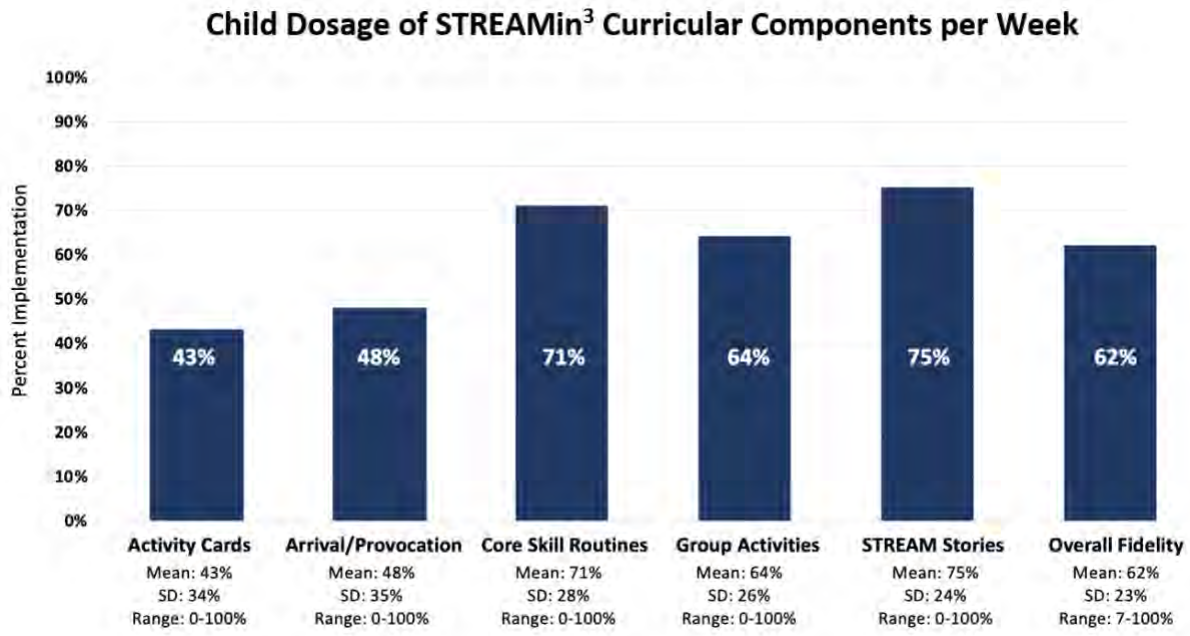
Once again, a small number of teachers told us that expectations for meetings were too high. As one assistant teacher commented, "I have liked some of the ideas and activities as well as supplies and resources given us by STREAMin^3. The only negative to me was the monthly meetings outside of school hours...I didn't think we needed to meet as often as we did especially since this was year 2 for us."

Teachers reported that they provided children with moderate levels of curriculum dosage during Phase 1. On average, classrooms reported implementing 62% of the curriculum, which corresponds to approximately three days of full implementation per week. Teachers' curriculum delivery varied across classrooms, with an overall percent implementation ranging from 7% to 100%. Dosage also varied across different components of the curriculum, with classrooms reporting the most consistent delivery of STREAM Stories, Core Skill Routines, and STREAM Group Activities which we consider to be main curriculum activities. Teachers reported the least consistent delivery of Activity Cards and Provocations.

Activity cards are designed to be used flexibly across different parts of the day and provocations are a morning routine to help engage children with what is happening during the week or day. It's possible that these parts of the curriculum were newer for teachers and were harder to incorporate into their practice. Teacher-reported curriculum dosage was not collected during Phase 2 as many classrooms were still remote and there was large variation in how classrooms were structured at this time.

Figure 3

Teacher Reported Child Dosage of STREAMin[3] Curricular Components per Week



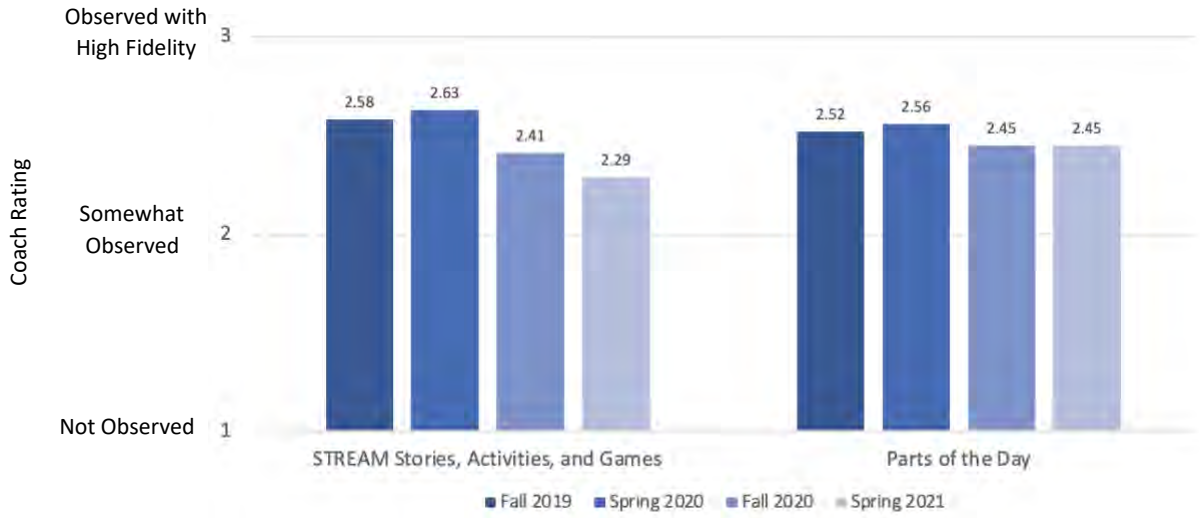
Adherence/Quality of Implementation

Coaches completed implementation checklists during monthly classroom observations to measure teachers' quality of STREAMin[3] implementation. Checklist 1 included five items and was used when observing STREAMin[3] curricular activities (stories, group activities, and games). Checklist 2 included four items and was used when observing STREAMin[3] practices during other parts of the day (e.g., arrival, choice/center time, transitions) and included observing teachers' support for the five Core Skills. Each checklist item was scored as Not Observed (1), Somewhat Observed (2), or Observed with High Fidelity (3). Averages across time for each checklist are depicted in Figure 4. Note that scores are not directly comparable over time due to changes in teacher and classroom participants and changes in classroom format resulting from COVID-19.

Coaches reported that teachers implemented the curriculum with moderately high levels of quality across all four time points in Phases 1 and 2. Quality of implementation appeared to be slightly lower during Phase 2 (July 2020-June 2021), especially for implementation of STREAM stories, activities, and games. This may be because many classrooms were meeting virtually or using a hybrid instructional model during Phase 2, and many of the observations were conducted remotely via videoconferencing.

Figure 4

Average Coach Observation Ratings of Quality of Implementation



In our Phase 2 end-of-year survey, we asked teachers about their experiences using STREAMin[3] during COVID-19. Some teachers responded by describing general difficulties they encountered during the year such as, "It was difficult being able to keep a routine down because I couldn't keep a constant teaching assistant in my room with me, and having to switch from in-person to virtual learning when the center had to shut down for COVID." Others noted challenges that were specific to STREAMin3: "I have been teaching virtually. STREAMin[3] is meant to be done in person. I have had to change and manipulate the STREAMin[3] curriculum to become more friendly for parents."

Teacher and Leader Engagement

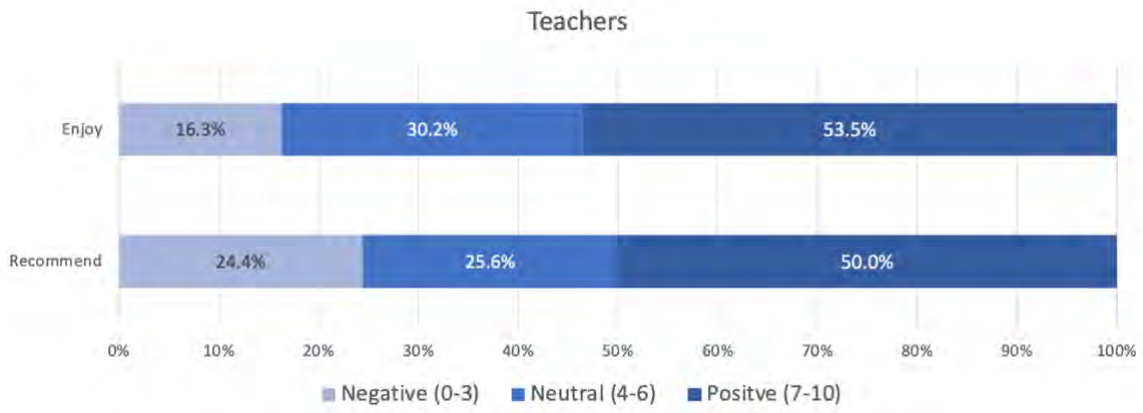
Teacher and leader engagement was collected through teacher mid-year surveys and end-of-year surveys from teachers and leaders.

Phase 1 (December 2018-June 2020):

At the end of the year, teachers were asked to rate their general reactions to STREAMin[3] (*How much do you enjoy participating in STREAMin[3]? How likely are you to recommend STREAMin[3] to a colleague?*) on a scale of 0 to 10. **Most teachers reported positive reactions to the program** (Figure 5).

Figure 5

Phase 1 Teachers' Reactions to STREAMin[3]



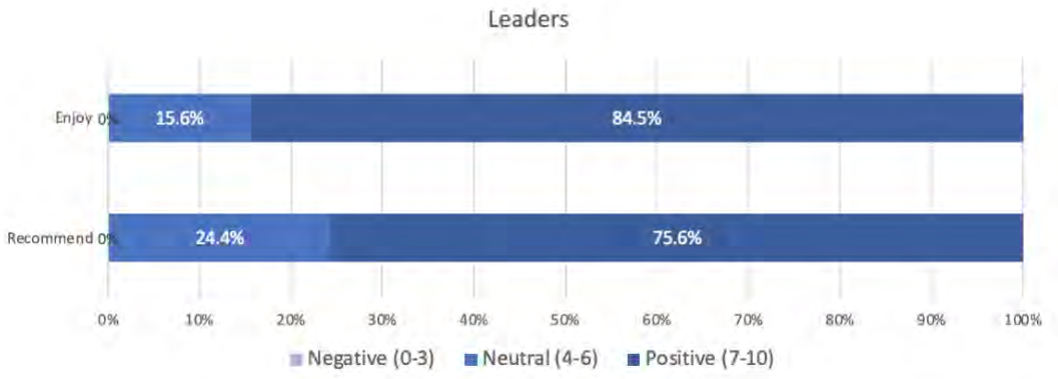
Teachers were also asked to respond to specific questions about their experiences with STREAMin[3] on a scale of 0 to 10, including positive aspects (e.g., *I have learned techniques that enhance my teaching practice as part of my participation in STREAMin[3]*) and negative aspects (e.g., *Participating in STREAMin[3] has been stressful for me*). Teachers reported relatively high positives (*M* = 6.6 out of 10, *SD* = 2.6) and high negatives (mean = 5.4 out of 10, *SD* = 3.1), suggesting that **teachers saw benefits but also burdens or drawbacks to the curriculum.** One teacher commented, "In implementation, please consider that we must [also] adhere to the expectations of the district," suggesting that it was difficult to balance the STREAMin[3] curriculum with district expectations.

Teachers rated the support they received from coaches and program leaders to implement STREAMin[3] very positively, with a mean of 8.8 out of 10 (*SD* = 1.7) for support from coaches and 7.8 out of 10 (*SD* = 2.5) for support from leaders. Teachers' comments about coaching were very positive. One teacher commented, "I enjoyed using the new [STREAMin[3]] curriculum. I also loved having a coach to support and answer any questions about the curriculum. She was always available anytime and responded quickly."

Leaders reported more positive general reactions to STREAMin[3] relative to teachers, with all ratings falling in the neutral or positive ranges (Figure 6).

Figure 6

Phase 1 Leaders' Reactions to STREAMin[3]



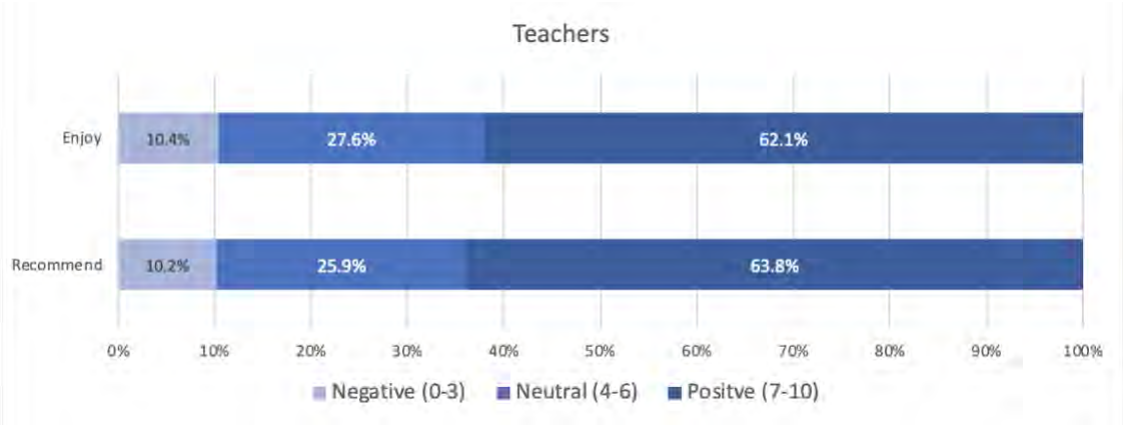
Relative to teachers, leaders rated their experiences with STREAMin[3] as higher on the positive aspects (*M* = 7.7 out of 10, *SD* = 1.7) and lower on the negative aspects (*M* = 4.7 out of 10, *SD* = 2.7). This suggests that **leaders may have viewed the benefits of STREAMin[3] as outweighing the burdens of implementing a new, comprehensive curriculum.** They also viewed STREAMin[3] as being closely aligned with their programs' professional development and coaching needs *(M* = 8.0 out of 10, *SD* = 1.6).

Phase 2 (July 2020-June 2021)

Phase 2 teachers reported highly positive general attitudes toward STREAMin[3], despite the challenges associated with the pandemic (Figure 7). They also highly rated the support they received from coaches (*M* = 8.9 out of 10, *SD* = 1.5), reported having strong connections with their STREAMin[3] coaches (*M* = 8.7 out of 10, *SD* = 1.7), and said that they were able to meet with their coaches as often as needed (*M* = 9.0 out of 10, *SD* = 1.4). As one teacher put it, "[Virtual coaching] was a wonderful experience. We continued to have the support we needed, just as we did in person."

Figure 7

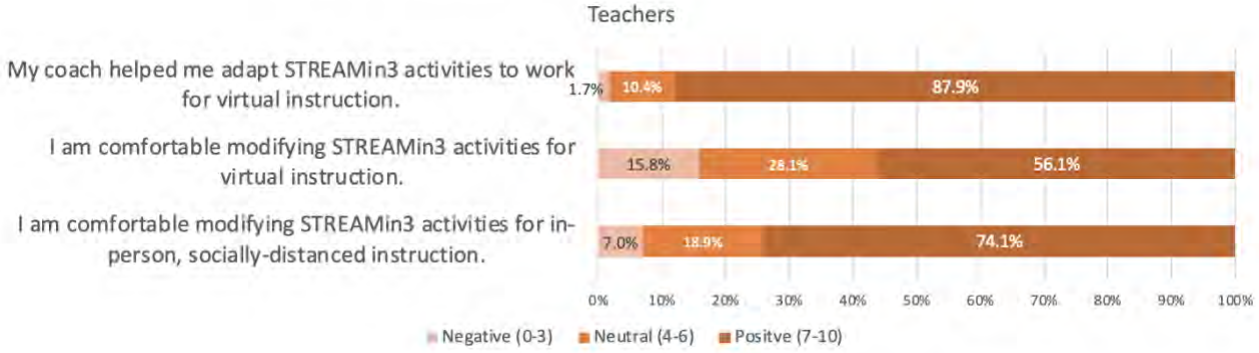
Phase 2 Teachers' Reactions to STREAMin[3]



One focus of coaching during Phase 2 was supporting teachers to adapt STREAMin[3] activities for virtual and socially distanced instruction. Teachers reported moderate to high levels of satisfaction with this aspect of coaching, although their comfort with modifying STREAMin[3] activities for virtual instruction was rated lower (Figure 8). A pre-k teacher told us, "Trying to implement STREAMin[3] during a pandemic while trying to teach virtually (and having numerous teacher changes) was extremely frustrating. My coach helped out tremendously. I don't know how I would have made it without her constant support."

Figure 8

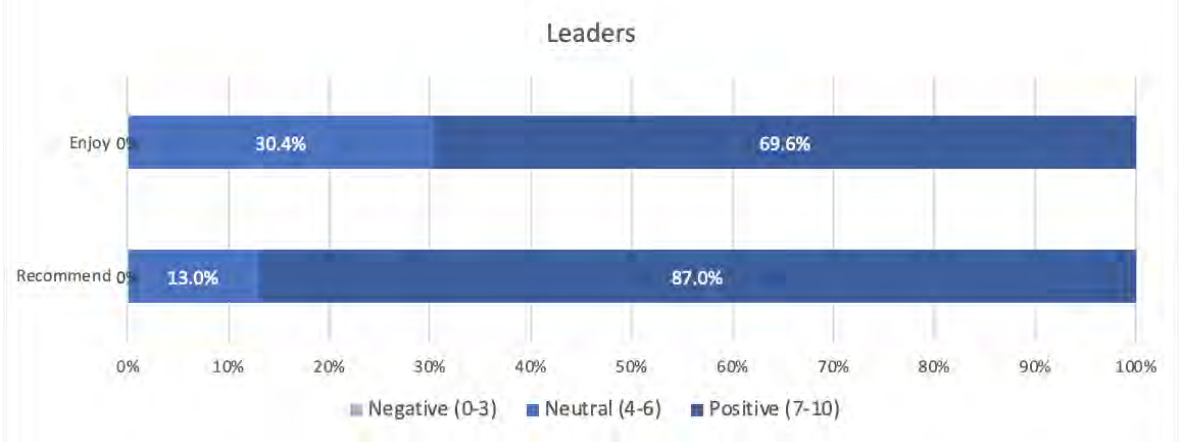
Phase 2 Teachers' Satisfaction with COVID-19 Coaching Focus



As in Phase 1, leaders provided very positive ratings of their overall experiences with STREAMin[3], with all ratings in the positive or neutral ranges.

Figure 9

Phase 2 Leaders' Reactions to STREAMin³

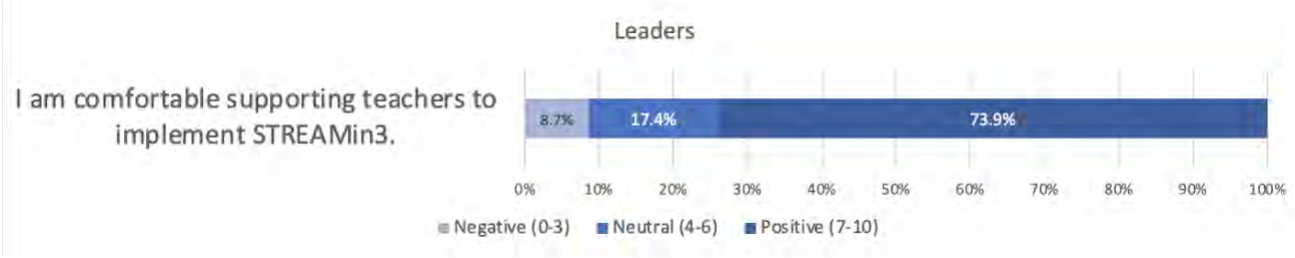


Leaders also reported moderate to high levels of satisfaction with the support they received from coaches (*M* = 7.6 out of 10, *SD* = 2.0). One leader noted, "Although [this year] has been challenging, it has allowed me and my district to dive deeper into the [STREAMin³] curriculum and its components. The assistance of the coaches has been fantastic, and they have helped us greatly through this school year."

A key goal of Phase 2 leader coaching was to enable program leaders to continue supporting STREAMin³ after UVA-CASTL's involvement ended. Leaders reported feeling moderately to highly confident in their ability to do this (Figure 10).

Figure 10

Phase 2 Leaders' Comfort Supporting Teachers' Implementation of STREAMin³



Of course, coaching could not alleviate all of the stresses associated with operating a child care program during COVID-19. As one leader put it, "We have really struggled with staffing. Because of lack of staffing, we have been unable to re-open all of our classrooms. Supervisors have not been able to get into the classrooms to model and coach. Parents have not been allowed on site or in our classrooms. Many of our children have remained virtual all year and we feel very disconnected from our families." Leaders spoke of challenges with staffing, opening and closing classrooms repeatedly due to COVID-19 cases, and difficulties with engaging children when instruction was virtual.

"Trying to implement STREAMin³ during a pandemic while trying to teach virtually (and having numerous teacher changes) was extremely frustrating. My coach helped out tremendously. I don't know how I would have made it without her constant support."

–Pre-k Teacher

Summary: Fidelity of Implementation

In sum, fidelity of implementation data indicated that the **coaches and pilot participants implemented the STREAMin³ curriculum with a high degree of consistency and quality.** Teachers largely attended the

expected coaching and professional development sessions. In Phase 1 (December 2018-June 2020), teachers reported implementing the majority of curriculum components with children, with STREAM Stories implemented most consistently. Through monthly observations, coaches reported that teachers implemented the activities and parts of the day with a high degree of quality. End-of-year survey data suggest that teachers and leaders were mostly satisfied with the program and were especially satisfied with the coaching they received.

Implementation was more challenging during Phase 2 (July 2020-June 2021), as programs struggled with COVID-19 closures and restrictions. This was most clearly reflected in the comments that teachers and leaders wrote in the end-of-year survey. Teachers averaged 6.6 coaching sessions, which were intended to be monthly throughout Phase 2, and coaches rated observed quality of implementation as slightly lower than it was during Phase 1. However, overall, fidelity of implementation remained strong through a challenging year.

Was STREAMin^3 implementation associated with improvements in teaching practices?

Phase 1: Teacher- and Coach-Reported Changes in Teaching Practice

Teachers and coaches reported improvements in teachers' instructional practices as a result of their engagement with STREAMin^3. Teachers perceived significant positive changes in their skills and practices from the start of implementation to the end of the year during Phase 1[5].

Table 3

Phase 1 Teachers' Perceptions of Skill Gains

Domain	Initial Rating Mean (SD)	Final Rating Mean (SD)	Mean Difference (Final- Initial)	*p*-value
Supporting the Five Core Skills				
Relate	7.38 (1.84)	8.35 (1.30)	.97	<.001
Regulate	6.91 (1.74)	8.26 (1.34)	1.35	<.001
Think	6.69 (1.82)	7.99 (1.47)	1.30	<.001
Communicate	7.19 (1.77)	8.23 (1.51)	1.05	<.001
Move	7.55 (1.78)	8.45 (1.38)	.91	<.001
Teaching STEM topics	6.47 (1.88)	7.94 (1.64)	1.48	<.001
Teaching with intentionality	6.65 (1.92)	8.13 (1.52)	1.23	<.001
Making the most of all parts of the day	6.95 (1.82)	8.19 (1.62)	.92	<.001
Supporting children's autonomy	7.72 (1.79)	8.64 (1.35)	.92	<.001
Scaffolding children's learning	7.56 (1.81)	8.64 (1.37)	1.08	<.001

Note. Analyses are paired-samples *t*-tests.

[5] These analyses draw from a retrospective pre-post survey completed at the end of the year. In the spring of 2020, teachers were asked to reflect upon and rate their skills prior to engaging in the STREAMin^3 program, and then to rate their current skill levels.

Teachers reported large and significant improvements in their teaching practices, in supporting the five Core Skills, and in integrating meaningful activities into all parts of the school day. Teachers' largest perceived improvements were in supporting children's development of science, technology, engineering, and mathematics (STEM) understanding, supporting children's self-regulation (Regulate), and supporting children's cognitive development (Think). Teachers' positive perceptions of their own teaching were also clear through comments and focus group conversations. One teacher noted, "The STREAMin^3 curriculum is an amazing tool that can be used by educators to better shape their daily interactions with children. It's made me much more conscious of how I speak with, play with, and instruct my students and that has made me more confident in the classroom." Another teacher commented, "My teaching has changed in that I am now more intentional about everything that I say and do with the children. Every part of the day has become a learning experience. STREAMin^3 has really taught me how to make the most out of every part of the day to maximize learning time."

Coach ratings corroborated the teachers' self-reports. Coaches rated teachers as having improved significantly in all areas from the start to the end of the year. Coaches rated teachers, on average, lower than teachers rated themselves at the beginning of the project (the mean initial rating averaged across items was 4.6 out of 10 (*SD* = 1.7)), but they also reported greater improvements than the teachers, with a mean final rating of 7.0 out of 10 (*SD* = 1.5). This average of a 2.4 difference from fall to spring was larger than the differences perceived by teachers.

Quality of Teaching Practices

Warm, supportive, well-organized, and stimulating interactions between teachers and children are a key component of high-quality child care programs and a central goal of STREAMin^3 coaching and professional development.

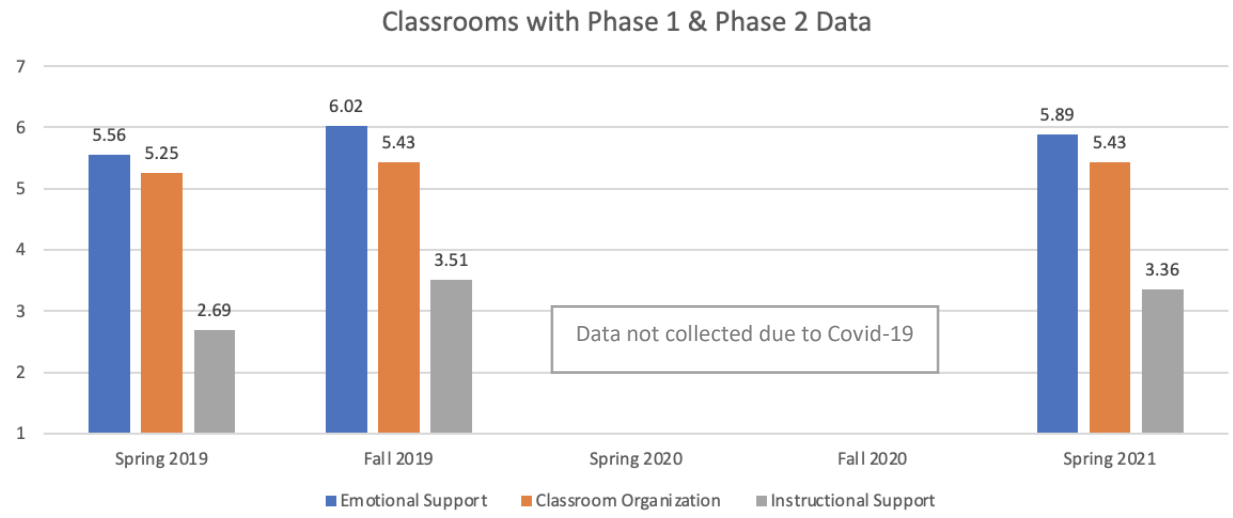
The STREAMin^3 model used the Classroom Assessment Scoring System (CLASS®) as a standard measure of the quality of teacher-child interactions across Emotional Support, Classroom Organization, and Instructional Support — key domains that are associated with children's development and learning[xx]. STREAMin^3 coaches conducted CLASS® observations each fall and spring and used the data to inform coaching, professional development, and to assist leaders in program-level planning.

For this evaluation, we intended to use CLASS® to track whether fidelity of STREAMin^3 implementation was associated with increases in classroom quality. Due to COVID-19 disruptions and teacher turnover, we were unable to use the CLASS® data in this way. Instead, we present data for descriptive purposes only.

We first present data from 29 pre-k classrooms and teachers who were observed in both phases of the pilot (Figure 11). The data show that the observed quality of teacher-child interactions was significantly higher on emotional and instructional quality at the beginning of full implementation (fall 2019) compared to baseline (spring 2019). Data from fall of 2019 to spring 2021 indicate that teachers maintained the levels of interaction quality initially observed: there were no significant differences between fall 2019 and spring 2021 scores, despite COVID-19 disruptions. Additionally, in both the fall of 2019 and the spring of 2021, the average quality of teacher-child interactions was above the recommended thresholds for high quality (5 for Emotional Support and Classroom Organization; 3.25 for Instructional Support[xxi]). Although we cannot draw specific conclusions from these observations, they illustrate the effort teachers put forth to provide children with warm, safe, and stimulating teacher-child interactions during COVID-19.

Figure 11

CLASS® Scores for Classrooms with Phase 1 and Phase 2 Observations (n = 29 classrooms)



Below, in Table 4, are presented CLASS® scores averaged across all participating classrooms at each time point. The results from observation to observation are not directly comparable because the classrooms and teachers participating in the implementation pilot were not consistent over time, and COVID-19 changed the delivery of ECE. As above, these results suggest that classrooms maintained similar levels of quality over time.

Table 4

CLASS® Averages Across Observations

Pre-K	Spring 2019 Mean (SD)	Fall 2019 Mean (SD)	Spring 2021 Mean (SD)
Number of Preschool Classrooms Observed	63	78	42
Emotional Support Average	5.65 (.85)	5.88 (.54)	5.85 (.75)
Classroom Organization Average	5.29 (1.09)	5.38 (.64)	5.23 (1.03)
Instructional Support Average	2.80 (.99)	3.48 (1.04)	3.33 (.96)

Toddler	Spring 2019 Mean (SD)	Fall 2019 Mean (SD)	Spring 2021 Mean (SD)
Number of Toddler Classrooms Observed	19	19	9
Emotional and Behavioral Support Average	5.53 (.68)	5.82 (.60)	5.79 (.66)
Engaged Support for Learning Average	3.52 (1.13)	4.59 (1.40)	4.02 (1.11)

Infant	Spring 2019 Mean (SD)	Fall 2019 Mean (SD)	Spring 2021 Mean (SD)
Number of Infant Classrooms Observed	5	7	5
Responsive Caregiving	4.84 (1.22)	4.96 (.69)	4.88 (.92)

Phase 2 Teaching Practices

At the end of Phase 2, teachers were asked "In what ways has your teaching changed as a result of STREAMin³?"

Teachers described increases in the intentionality with which they taught, in learning how to help children regulate their emotions and behaviors, and in improvements to their interactions with children. One teacher noted how her own ability to regulate her emotions translated into her teaching: "I have learned to take 3 deep breaths before I approach a student who is having a problem. I need to be centered and handle the situation in an appropriate manner. Being upset and yelling at the child will not solve the problem." Another teacher stated, "I feel I pay more attention to the fine details of why we do what we do and how to adjust things to meet individual needs throughout the year. I feel I value children and their thoughts more than I previously did."

Some teachers told us that they had tried new activities or practices that they had not tried before. Teachers described seeing improvements in children's interactions with each other and noted that children demonstrated a greater ability to talk about and regulate their emotions. One teacher told us, "The students are more independent and more focused. The classroom is smooth and enjoyable."

Regarding critiques, several teachers thought that STREAMin³ made their teaching too scripted and prevented them from addressing academic topics, such as pre-literacy skills. A few teachers reported that it was too challenging of a year to determine whether teaching had changed, especially with extended periods of virtual and hybrid teaching.

"I helped teachers understand that CLASS®/VKRP data was a snapshot of what was happening in their classroom...The more information/data we had, the clearer the picture would be and the more equipped we felt to plan for more support and challenges. I also drew their attention to connections between the data and STREAMin³'s Core Skills and Intentional Teaching Practices. This helped show teachers that using STREAMin³'s structure and guidance would support their goals."

–STREAMin³ Coach

Descriptive Examination of VKRP Scores

STREAMin³ used the Virginia Kindergarten Readiness Program's (VKRP) suite of assessments to assess children's development toward school readiness and help teachers plan instruction to meet children's needs. VKRP includes a teacher rating of children's self-regulation and social skills, the Child Behavior Rating Scale (CBRS); a direct assessment of children's mathematics skills, the Early Mathematics Assessment System (EMAS); and the Phonological Awareness Literacy Screening (PALS), which assesses multiple aspects of children's emergent literacy. As with the CLASS®, data are presented for descriptive purposes only.

Coaches Support Teachers to Integrate Data Use Into Teaching

Coaches reported using assessment data (e.g., VKRP, PALS, CLASS®) to target their coaching support, determine the focus of group professional development sessions with programs, and create action plans with teachers and leaders through identifying the strengths and weaknesses of each classroom. Coaches also supported teachers to interpret classroom and student data to inform and individualize their instruction.

Assessments were conducted with two different cohorts of preschoolers (4-year-olds), one assessed only in the fall of 2019, and a different cohort of children assessed in fall 2020 and spring 2021. Data on the EMAS mathematics assessment was limited in the fall of 2020 because a remote version of the

assessment was not yet available; a remote version was developed and disseminated in time for the spring 2021 assessment time point. The following table (Table 5) provides completion rates for each assessment by the assessment time point, demonstrating that under both typical and very challenging circumstances, teachers were largely able to complete these assessments for preschoolers.

Table 5

Completion Rates for VKRP

	Fall 2019	Spring 2020	Fall 2020	Spring 2021
Self-Regulation and Social Skills	**100%**	**-** No data due to COVID-19	**96%**	**100%**
EMAS Mathematics	**99%**	**-** No data due to COVID-19	**27%** Low completion due to COVID-19*	**82%** (22% remote)
PALS Literacy	**93%**	**-** No data due to COVID-19	**99%** (57% remote)	**97%** (19% remote)

Note. *A remote version of the EMAS was not available in Fall 2020, and in-person assessments were very limited. A remote version was made available by spring 2021.

Table 6, on the next page, provides children's scores on the VKRP assessments in fall 2019, fall 2020, and spring 2021. Most assessment scores followed a similar pattern: children entering pre-k in 2019 and 2020 had similar skills, although there was a tendency for the 2020 cohort to have slightly lower scores in some domains (e.g., Letter Sounds, Print Word Awareness, Nursery Rhyme Awareness). Children made substantial gains from fall 2020 to spring 2021 despite disruptions to classroom formats that required adaptations on the part of teachers and children. Overall, the data indicate that children in the 2020-2021 pre-K cohort improved their self-regulation, social skills, mathematics, and literacy skills over the course of the school year.

Summary: Changes to Teaching Practices

In summary, this implementation evaluation pilot was not designed to test the causal impact of STREAMin^3 on the quality of teacher child interactions or children's school readiness skills. Additionally, disruptions in data collection and instructional practices due to COVID-19 did not allow us to examine the links between STREAMin^3 implementation and the observed quality of teacher-child interactions or children's school readiness outcomes. However, at the end of Phase 1 (December 2018-June 2020), teachers and coaches consistently reported improvements in multiple aspects of teaching. At the end of Phase 2 (July 2020-June 2021), teachers again reported improvements to their intentionality and skill at supporting children's regulation and knowledge of emotions. Program leader and teacher engagement in CLASS® observations and VKRP assessments demonstrate educator engagement in the full curriculum model, which includes use of these progress monitoring assessments.

Table 6

VKRP Scores Across Time Points

	Fall 2019	Fall 2020	Spring 2021
Number of Children Assessed*	976-993	167-647	439-678
	Mean (SD)	**Mean (SD)**	**Mean (SD)**
VKRP Assessments			
EMAS Mathematics	513 (82)	508 (87)	628 (78)
CBRS Self-Regulation	3.39 (.84)	3.41 (.81)	3.80 (.81)
CBRS Social Skills	3.18 (.79)	3.65 (.85)	4.19 (.63)
PALS Name Writing	4.0 (2.1)	4.3 (2.3)	6.0 (1.7)
PALS Uppercase Alphabet	11.0 (9.6)	10.8 (9.5)	17.2 (9.0)
	Mean (SD)	**Mean (SD)**	**Mean (SD)**
VKRP Assessments (continued)			
PALS Lowercase Alphabet	11.8 (9.3)	11.5 (9.4)	16.2 (9.0)
PALS Letter Sounds	6.8 (7.4)	5.5 (7.3)	11.6 (8.4)
PALS Beginning Sound Awareness	4.6 (3.7)	4.4 (3.4)	7.5 (3.2)
PALS Print Word Awareness	5.3 (2.7)	2.2 (3.2)	3.7 (4.0)
PALS Rhyme Awareness	4.7 (2.6)	4.2 (2.8)	6.7 (2.9)
PALS Nursery Rhyme Awareness	5.1 (2.6)	1.9 (2.8)	4.7 (3.8)

Note. *Not all students completed all assessments at each time point.
Fall 2019, fall 2020, and spring 2021 data are not directly comparable due to changes in the student population.

Limitations

There are several important limitations to this implementation pilot. First, this is a non-experimental pilot that does not allow us to draw conclusions about whether the use of STREAMin^3 results in improvements in the quality of teacher-child interactions or increases in children's school readiness. Currently, there is a significant research-practice gap, as the most widely used, readily available, comprehensive curricula (e.g., Creative Curriculum, Big Day for PreK, Frog Street), have not been rigorously tested to examine whether their use contributes to positive causal impacts on child learning relative to a comparison[xxii]. Future research should rigorously examine whether the STREAMin^3 model is effective in improving the quality of teacher-child interactions and children's school readiness skills. In addition, disruptions in curriculum implementation and data collection prevented us from deeply exploring whether variability in STREAMin^3 implementation is linked with teacher and child outcomes. This should also be a focus of future research. And, future research should continue to understand how professional development supports and coaching can be used to increase the fidelity of implementation in ways that feasible and practical at scale.

Second, our sample included mostly teachers serving preschool aged children, with a smaller percentage of educators serving infants and toddlers. STREAMin^3 is unique in that it offers programs a single, comprehensive, and integrated curriculum package that embeds aligned professional development (PD) and coaching for all program staff serving children from infancy through preschool. Future research should include more representation of infant and toddler educators.

Third, our sample included a variety of programs and included teachers and leaders from state-funded, Head Start, and private programs. Private, center-based programs are not typically represented in ECE research, which goes in stark contrast with their increased prevalence. Indeed, private, center-based programs — run by for-profit companies, non-profit community organizations, faith-based organizations, or individual owners — are serving young children and their families more than ever before[xxiii]. However, this pilot did not include teachers and leaders who serve children through family day homes. The STREAMin^3 curriculum resources have now been adapted for use in family day home settings, and future research should be inclusive of this important early learning setting.

Conclusion

Providing early childhood leaders and teachers with a comprehensive and integrated curriculum package — one that can be used seamlessly across infant, toddler, and preschool classrooms and that embeds aligned PD and coaching for all program staff to support implementation — holds significant potential to improve the early learning experiences of our youngest citizens.

This pilot evaluation examined the feasibility of implementing STREAMin^3 in public, private, and faith-based child care programs serving infants, toddlers, and preschoolers. Although the evaluation was disrupted by COVID-19, results from Phase 1 (December 2018 – June 2020) prior to the pandemic indicated that most program leaders and teachers implemented the curriculum as planned, attending most of the coaching and PD sessions, implementing activities and components of the curriculum with relatively high-quality, and reporting positive responses to STREAMin^3 and to their coaches. Additionally, teachers and coaches reported improvements in teaching practices and in their ability to support children's development of school readiness skills.

Phase 2, (July 2020-June 2021; occurring during the COVID-19 pandemic), saw slightly lower levels of teacher engagement in monthly coaching sessions, and coaches rated implementation quality as slightly lower. These lower levels of engagement were likely due to COVID-19, and we consider them reasonable and relatively minor given the extraordinary disruptions that teachers and leaders experienced. However, teachers and leaders continued to report both relatively high satisfaction with STREAMin^3 and with the support they received from coaches.

The results from this implementation pilot suggest the STREAMin^3 curriculum model can be adopted by private as well as state and federally funded programs, and by educators and leaders serving infants, toddlers, and preschoolers. In addition, the data shows that the training and support system was widely accepted, used, and valued. Teachers and leaders overwhelmingly engaged with the coaching and the group PD components of the curriculum model.

The results from this implementation pilot suggest that full implementation of a comprehensive curriculum model can be challenging even with high levels of support. Reasons for lower levels of implementation included overloaded schedules or positions (e.g., a program leader who serves as the instructional coach and also teaches), lack of coverage or consistency, high rates of staff turnover, lack of teacher or leader understanding of curriculum components, low interest, or low buy in. Inadequate staffing and high rates of educator turnover were particularly challenging in private and faith-based programs where there is often little in the way of systemic resources that are present in state or federally funded preschool programs (e.g., availability of substitute teachers, professional development days, full benefits, planning time). This led to difficulties in planning and executing coaching and professional development, especially as leaders and teachers were pulled in to lead or cover classrooms. Our coaches reported the constant turnover as one of the most significant barriers for full implementation. With each turnover came the

Providing early childhood leaders and teachers with a comprehensive and integrated curriculum package — one that can be used seamlessly across infant, toddler, and preschool classrooms and that embeds aligned PD and coaching for all program staff to support implementation — holds significant potential to improve the early learning experiences of our youngest citizens.

need to onboard a new educator in the model, which began a new learning process for the coach and program leader. STREAMin^3 is designed so that a substitute or new teacher can easily pick it up and implement the curriculum components without extensive training. But, for a deep understanding of the activities and practices, there must be efficient and scalable resources for onboarding new staff.

"The STREAMin^3 curriculum is an amazing tool that can be used by educators to better shape their daily interactions with children. It's made me much more conscious of how I speak with, play with, and instruct my students, and that has made me more confident in the classroom."

-Preschool Teacher

The COVID-19 pandemic propelled our support team to create virtual and asynchronous training opportunities that will be useful as we continue to provide the curriculum to the ECE field. For example, individual coaching or group professional development delivered virtually can be as powerful and helpful as those delivered live, which leads to an increase in efficiency (e.g., removes drive time, reaches more teachers).

We are grateful to the educators who participated in this pilot evaluation, allowed coaches into their classrooms, and provided the evaluation team with data and honest feedback many times. Their adaptability and patience through the pandemic were an inspiration to our team. We are using their feedback to inform revisions to the model that will improve the inclusivity, feasibility, and positive impact of the curriculum.

Appendix A

Description of Data Collection Measures

Teacher & Leader Intake Surveys

Data were collected during phases 1 and 2 of the pilot evaluation to describe the implementation of STREAMin^3 and to determine the feasibility of the curriculum in private, faith-based, and public child care programs.

New and returning teachers, assistant teachers, and program leaders completed an intake survey for every year that they participated in the pilot. These surveys included items about participants' education and professional experience, prior use of curricula, and attitudes toward engaging with a new curriculum. Items on the survey varied slightly each year (e.g., the fall 2020 intake survey included items about classroom instruction during COVID-19, whereas the fall 2019 intake survey did not). The intake survey included the following items:

Teacher, Leader, and Classroom Demographic Information

Teachers, assistant teachers, and program leaders were first asked how much they enjoyed participating in STREAMin^3 (0 = "not at all" and 10 = "very much") and how likely they were to recommend STREAMin^3 to a colleague (0 = "not at all likely" and 10 = "very likely"). Participants were then asked to provide personal demographic information, as well as information about their role, educational and professional experience, the prior curriculum used by their program, and their attitude towards the STREAMin^3 curriculum in relation to their previous curriculum. Teachers and assistant teachers also provided demographic information about their classroom (e.g., classroom age level and enrollment), rated the current behavior of their class, and indicated their instructional frequency and coverage for specific academic areas (e.g., reading and language arts, science, math, music, etc.).

School Climate

In addition to collecting demographic and professional information about teachers, assistant teachers, program leaders, and classrooms involved in the pilot, the intake survey also assessed participants' feelings about their school climate using measures designed to capture professional teacher behavior, collegial leadership, and team psychological safety. To assess professional teacher behavior, teachers, assistant teachers, and leaders were presented with five items adapted from the Organizational Climate Index for High Schools and asked to rate the frequency with which they observed high quality teacher interactions within their school on a scale of 0 ("Never") to 100 ("Frequently"; e.g., "Teachers provide strong social support for colleagues")[6]. Using five collegial leadership items adapted from the same index and response scale, teachers were also asked to rate the frequency with which they observed high-quality leadership behaviors displayed by the leader of their program[7]. As a final measure of school climate, teachers and assistant teachers indicated their level of agreement with seven items designed to evaluate team psychological safety on a scale of 0 ("Completely Disagree") to 100 ("Completely Agree"). This measure was adapted from the Team Psychological Safety Survey and included items such as, "Teachers at this program feel it is safe to take a risk (e.g., trying

[6] Hoy, W. K., Smith, P. A., & Sweetland, S. R. (2002). The development of the organizational climate index for high schools: Its measure and relationship to faculty trust. *The High School Journal*, *86*(2), 38-49.
[7] Hoy et al. (2002).

something new in the classroom)" and "If you make a mistake at this program, it is often held against you"[8].

Beliefs About Teaching

The teacher intake survey also evaluated teachers' and assistant teachers' beliefs about teaching using twelve items from the Teacher Sense of Efficacy Scale[9]. For these items, teachers were asked to indicate the level of influence they felt they had over classroom management, instructional support, and student engagement on a scale of 0 ("No influence") to 100 ("A great deal of influence").

Teacher-Leader Communication

To evaluate communication between program leaders, teachers, and assistant teachers, leaders answered seven questions that asked them to rate how frequently they communicated with the teachers and assistant teachers at their program about different elements of teaching (e.g., "Managing challenging behaviors," "Understanding classroom observation data") on a six-point Likert scale from 0 ("Less than once a month") to 5 ("4-5 times per week"). Teachers, assistant teachers, and leaders also answered five questions on a five-point Likert scale about how frequently they communicated with children's families about developmental updates (e.g., "Basic needs and routines checklist [toileting, feeding, naps]," "Developmental milestones").

Work Stress

Teachers, assistant teachers, and leaders also responded to work stress items adapted from the Teacher Stress Inventory on a 0 ("No stress") to 100 ("Highly stressful/extremely noticeable") scale[10]. These work stress items evaluated themes of professional investment (e.g., "I lack opportunities for professional improvement"), discipline and motivation (e.g., "I feel frustrated attempting to teach students who are poorly motivated"), and work-related stressors (e.g., "There is too much administrative paperwork in my job").

STREAMin^3 Feedback

Teachers, assistant teachers, and leaders were asked to provide feedback about their experiences working with the STREAMin^3 curriculum by answering one open-ended and ten scaled-response questions on a scale of 0 ("Completely Disagree") to 100 ("Completely Agree"). These feedback questions explored various elements of implementation, including how manageable, worthwhile, informative, and helpful they found implementing STREAMin^3 to be for their classrooms and programs.

COVID-19 Items

Starting in the fall of 2020, additional items were added to the teacher and leader intake surveys to capture changes taking place to the instructional format of participating classrooms (i.e., whether classrooms were using virtual, in-person, or hybrid learning formats to implement STREAMin^3). If teachers or assistant teachers indicated that their classroom used a virtual or hybrid instructional format, they were also asked to describe what their asynchronous instruction involved and the number of instructional hours spent in asynchronous learning each

[8] Edmondson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative science quarterly*, *44*(2), 350-383.

[9] Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and teacher education*, *17*(7), 783-805.

[10] Fimian, M. J., & Fastenau, P. S. (1990). The validity and reliability of the Teacher Stress Inventory: A re-analysis of aggregate data. *Journal of Organizational Behavior*, 151-157.

week. Finally, participants were given the option to respond to a more global question that asked, "How has teaching been going for you this year?"

Teacher & Leader End-of-Year Surveys

Teachers, assistant teachers, and program leaders completed a survey at the end of each year that they participated in the pilot. These surveys asked participants to provide feedback about the STREAMin^3 curriculum and the implementation pilot as a whole. Teachers and assistant teachers completed ratings of their satisfaction with and enjoyment of STREAMin^3 and whether they would recommend it to a colleague. Following these ratings, teachers and assistant teachers were asked to respond to the same school climate, support network, frequency of instructional coverage, family communication, and STREAMin^3 feedback questions that appeared on the intake survey. They were also asked to respond to new support network and retrospective pre- and post- implementation questions, detailed below. Teachers, assistant teachers, and leaders who were not present at intake were prompted to provide the same demographic information collected from the rest of the teacher and leader sample at intake.

Retrospective Pre-Post Self-Assessment

The pandemic limited the STREAMin^3 evaluation team's ability to collect classroom observations and child outcome data following the spring of 2020. Instead, teachers and assistant teachers were asked to reflect on changes to their teaching practice using a set of retrospective pre-post questions[11]. Two sets of six items asked teachers to rate their skills prior to adopting STREAMin^3, and then to rate their skills currently (i.e., at the time of the survey). Items addressed teachers' perceptions of improvements in their ability to support children's development of the Core Skills; children's science, technology, engineering, and math skills; intentional teaching; making the most of each part of the day; supporting children's autonomy; and ability to individualize interactions to meet children's needs. Items were rated on a scale of 0 to 10 with 0 indicating "Not very skilled" and 10 indicating "Extremely skilled". There are drawbacks to this approach, most notably that participants may be motivated to inflate program effects, but these items provide insights into teachers' perceptions of changes to their practice, and therefore provide an important perspective on program effects[12].

Implementation Support

In addition to the existing support network questions, teachers and assistant teachers also answered seven new support network questions designed to evaluate the level of support they received from their coach, colleagues, and program leaders to implement STREAMin^3 well and help children with challenging behaviors. Six of the questions asked teachers and assistant teachers to indicate their level of agreement about the support they received (e.g., "I received enough support to implement STREAMin^3 well from my STREAMin^3 coach") on a scale of 0 ("Completely disagree") to 10 ("Completely agree"), and the final question requested their open-ended feedback about how to better support teachers' implementation of STREAMin^3.

Additional STREAMin^3 Feedback Items for Leaders

Lastly, leaders were asked additional questions not included on the intake survey to further evaluate their implementation of STREAMin^3, relationship with their coach, feedback on monthly Group PD sessions, and overall STREAMin^3 feedback. Three Likert-style questions asked leaders to indicate how frequently they supported STREAMin^3 implementation over the past year at their program on a scale of 0 ("Less than once a month") to 5 ("4-5 times per week") (e.g., "How often did you provide support to a teacher related to STREAMin^3?"). Leaders then

[11] Geldhof, G. J., Warner, D. A., Finders, J. K., Thogmartin, A. A., Clark, A., & Longway, K. A. (2018). Revisiting the utility of retrospective pre-post designs: the need for mixed-method pilot data. *Evaluation and program planning*, *70*, 83-89.
[12] Geldhof et al. (2018).

answered five questions where they were asked to indicate their level of agreement with statements about their coach's responsiveness, adaptiveness, helpfulness, and supportiveness on a scale of 0 ("Completely Disagree") to 10 ("Completely Agree"). If leaders indicated that they had attended at least one of the STREAMin^3 monthly Group PD sessions, then they were also presented with four questions asking them to indicate their level of agreement with statements about how worthwhile, relevant, engaging, and helpful they found Group PD sessions on a scale of 0 ("Completely Disagree") to 10 ("Completely Agree") (e.g., "The Group PD sessions are engaging and interactive"). Finally, leaders were given the option to provide open-ended feedback about the changes they observed to teaching practice at their program and to their own practice as a result of implementing STREAMin^3 and general feedback about their experience with STREAMin^3 (e.g., "Are there other ways your practice as a leader has changed as a result of STREAMin^3?").

Coach End-of-Year Survey

In the spring of 2020, coaches completed a survey to evaluate the progression they observed in teachers' and assistant teachers' individual teaching practices related to their participation in STREAMin^3. To evaluate this, coaches were presented with retrospective pre-post items identical to those answered by teachers and assistant teachers on the End of Year Teacher Survey[13]. Coupling the teacher self-report with the coach report allowed for a more comprehensive assessment of teacher progress. Coaches also rated individual teachers' and assistant teachers' overall quality of implementation, identified factors that inhibited or contributed most to teachers' and assistant teachers' progression of teaching practice, and provided insights into the amount of coaching support they allocated to helping teachers and assistant teachers manage challenging behaviors. To conclude the survey, coaches evaluated individual leaders' levels of support and engagement with STREAMin^3.

Retrospective Pre-Post Assessment of Teachers

The framing of the retrospective pre-post questions was adapted to fit the context of coaches' evaluations of teachers and assistant teachers. For example, when the survey asked coaches to rate teachers' and assistant teachers' skills prior to adopting STREAMin^3, a set of ten questions began with, "Think about when you first started working with [teacher's name]... How skilled was [teacher's name] at supporting children's relationships with teachers and peers? (Relate)" And, when evaluating their current skills, a second set of ten questions began with, "Think about this teacher now, AFTER doing STREAMin^3 this year... How skilled is [teacher's name] at supporting children's relationships with teachers and peers? (Relate)". Coaches completed 20 pre-post questions for each teacher and assistant teacher in their caseload by evaluating the individual's skill level for each item on a scale of 0 ("Not very skilled") to 10 ("Extremely skilled").

Barriers and Supports to Implementation of STREAMin^3

To identify factors that inhibited or contributed to individual teachers' and assistant teachers' progression of teaching practice, coaches first rated eight items that represented potential barriers to progress on a scale of 0 ("Not at all") to 10 ("Very much") (e.g., "How much did the following barrier hinder [teacher's name]'s progress?: Lack of support from leadership").

Coaches then rated four more items that represented potential sources of support on a scale of 0 ("Not at all") to 10 ("Very much") (e.g., "How much did the following support help [teacher's name]'s progress?: Strong communication and trust between staff at this program"). Coaches also rated individual teachers' and assistant teachers' overall quality of implementation on a scale of 0 ("Implemented very little or with very poor quality") to 10 ("Implemented consistently and with high

[13] Geldhof, G. J., Warner, D. A., Finders, J. K., Thogmartin, A. A., Clark, A., & Longway, K. A. (2018). Revisiting the utility of retrospective pre-post designs: the need for mixed-method pilot data. *Evaluation and program planning*, *70*, 83-89.

quality").

Next, coaches rated the extent to which their coaching sessions with teachers and assistant teachers were spent planning and providing strategies for managing challenging behaviors on a scale of 0 ("Not at all – my work with this teacher did not include strategizing for behavioral challenges") to 10 ("A great deal – I frequently worked with this teacher to strategize for behavioral challenges"). Before concluding the survey, coaches answered three items for each program leader in their caseload. These items were designed to evaluate leaders' support and engagement with STREAMin^3 on a scale of 0 ("Not at all true") to 10 ("Very true") (e.g., "This leader actively and enthusiastically supported teachers' implementation of STREAMin^3").

Implementation Surveys

At two time points during the 2019-2020 and the 2020-2021 school years, teachers and assistant teachers completed a survey indicating which components of the STREAMin^3 curriculum they had implemented the previous week. For each component of the curriculum, teachers and assistant teachers were asked to rate their level of satisfaction with the component on a scale of 0 ("Not at all") to 100 ("A lot"). Using the same scale, participants were also asked to rate how much the children in their class enjoyed the component and how much they felt the children in their class learned from the component. For some items, participants were asked to rate how much they valued the curriculum component on a scale of 0 ("Not at all valuable") to 10 ("Very valuable"). Teaching staff also had an opportunity to provide additional written feedback about each component of the curriculum. The format of this survey was modified during the 2020-2021 school year to capture information about implementing STREAMin^3 during the pandemic (e.g., "Have you needed to make modifications due to COVID-19?").

STREAMin^3 Dosage and Participant Engagement

STREAMin^3 dosage was measured by coaches' documentation of all their interactions with program staff – teachers, assistant teachers, and leaders – each week. Tracked activities included bi-weekly (Phase 1) or monthly (Phase 2) coaching sessions, check-ins (i.e., email and text exchanges, phone calls, in-person visits to programs), and teachers', assistant teachers', and leaders' attendance at group professional development sessions. Throughout the pilot, coaches documented the date, topic of discussion, and action plan for each coaching session they held with the teaching teams and leaders in their caseload. After each coaching session, coaches rated each teaching team's and/or leader's level of preparation, understanding of, and active engagement with STREAMin^3 that week.

Coach Observations and Ratings

Coaches conducted observations of teachers' implementation of STREAMin^3 on a bi-weekly (Phase 1) or monthly (Phase 2) schedule. Observations alternated between focusing on a specific part of the day or on a STREAM group/STREAM story activity. Coaches observed in each classroom for approximately 30 minutes and rated five aspects of the teacher's implementation on a scale of 1 to 3, with 1 indicating incomplete or low-quality implementation and 3 indicating full, high-quality implementation. The items captured teachers' preparation, use of curriculum practices (e.g., ITPs, Core Skill Routines), and child engagement.

Coaches also completed a six-item rating scale after each coaching session. Items addressed participant engagement in the coaching process and understanding of the STREAMin^3 curriculum. Coaches reported their level of agreement on each item using a 1 to 5 scale, with 1 being "strongly disagree" and 5 being "strongly agree."

Classroom and Participant Turnover

Participant Turnover

Changes to program leadership and the active status of teaching staff in classrooms were documented throughout the pilot evaluation. Coaches and the UVA-CASTL team tracked any time new leaders, teachers, or assistant teachers joined a participating classroom and/or program; leaders, teachers, or assistant teachers left a participating classroom and/or program; leaders, teachers, or assistant teachers took leaves of absence; and when teachers and assistant teachers experienced changes to their position (including reassignment to a different classroom).

Classroom Turnover

Changes to the structure, format, and status of classrooms participating in STREAMin^3 were documented throughout the pilot evaluation. Coaches and the UVA-CASTL team tracked classroom closures and re-openings (including temporary quarantine periods), relocations, new classroom openings, and changes to instructional format (i.e., hybrid, virtual, in-person), funding source, classroom type, and participation in other VDOE initiatives.

Appendix B

Alignment of the STREAMin^3 Preschool Curriculum to the Virginia Kindergarten Readiness Program (VKRP) PreK Assessment

The Virginia Kindergarten Readiness Program (VKRP) is a partnership between the University of Virginia, the Virginia Department of Education, and school divisions across the Commonwealth. VKRP expands the assessments of children entering kindergarten beyond literacy (PALS) to include school readiness domains of math, social skills, and self-regulation. This data provides school divisions with a more comprehensive understanding of how kindergarten students are entering elementary school in terms of key readiness skills.

The VKRP assessment suite includes the following assessments:

- **Phonological Awareness Literacy Screening (PALS):** Measures children's literacy skills.[14]
- **Early Mathematics Assessment System (EMAS):** Measures children's mathematical skills, including numeracy, computation, patterning, and geometry skills.[15]
- **Child Behavior Rating Scale (CBRS):** Measures teachers' perceptions of students' behaviors, interactions, and engagement with materials and tasks in the classroom.[16]

The STREAMin^3 model covers the four school readiness domains that VKRP assesses. Table 1 aligns the VKRP domains and subdomains to the STREAMin^3 Core Skills and Sub-skills. Each week, teachers are provided with four STREAM-Group and four STREAM-Story activities. The focus of these activities rotates through the Core Skills Subskills (identified on the next page) so there is significant overlap and coverage for the VKRP domains and subdomains within these activities. Additionally, examples of STREAMin^3 Games, Core Skill Routines, Activity Cards, and Parts of the Day are provided for most VKRP subdomains. The table is meant to illustrate the significant overlap in the content taught in the STREAMin^3 model and assessed by VKRP. Many of the STREAMin^3 Games, Routines, Activity Cards, and Parts of the Day support a variety of children's skills beyond what is listed in the table. The goal is that programs can begin to make connections between VKRP and the STREAMin^3 preschool curriculum.

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[16] Virginia Kindergarten Readiness Project (2021). Teacher Reports on Self-Regulation and Social Skills (CBRS). *Retrieved from* https://vkrponline.org/virginia-kindergarten-readiness-program-2/how-it-works/the-assessments/social-skills-and-self-regulation-cbrs/

Table 1

Alignment of the STREAMin³ Preschool Curriculum to the Virginia Kindergarten Readiness Program (VKRP) PreK Assessment

VKRP School Readiness Domain	VKRP School Readiness Sub-Domain	STREAMin³ Core Skills and Subskills[a]	Examples of STREAMin³ Games (G), Routines (R), Activity Cards (AC), and Parts of the Day (PD)
To crosswalk the Core Skills and Sub-skills with specific activities in the curriculum, reference the STREAMin³ Preschool Skills-at-a-Glance for STREAM Group and STREAM Story activities. Think Relate Regulate Communicate Move			
Literacy (PALS)	Alphabet Knowledge	Print Knowledge	Letter Name Bingo (G) Letters in the Sand (G) Letters in My Name (G) Go Fish – Letters (G) Letter Names (AC) Basket of Letters (AC) Name Game (AC) Letter Hunt (AC)
	Phonological Awareness	Phonological Awareness	Letter Sound Bingo (G) Beginning Sound Match (G) Rhyming Word Sort (G) Rhyming Songs & Poems (AC)
	Print and Word Awareness	Print Knowledge	
	Name Writing	Early Writing	Name Writing (R) Journals (R) Writing Center (R) Write That Letter! (AC)
Math	Subitizing	Numeracy	
	Counting and Cardinality	Numeracy	Roll and Count (G) Tweezer Sort (G) Color Sorting Train (G) Counting Games (AC) Counting Songs (AC)
	Recognizing and Writing Numerals	Numeracy	Number Bingo (G)
	Describing Changes in Sets	Operations	Word Problems (AC)
	Shape Matching and Identification	Geometry & Spatial Sense	Shape Bingo (G) Shape Scavenger Hunt (AC)
	Shape Properties	Geometry & Spatial Sense	Sorting Shapes (AC)
	Recognizing Patterns	Patterning	
	Reproducing Patterns	Patterning	Roll a Pattern (G)
	Extending Patterns	Patterning	Roll a Pattern (G)

	Addition & Subtraction	Operations	Counting Games (AC) Word Problems (AC) Addition & Subtraction Songs (AC)
Social Skills	N/A	Teacher-Child Relationships	Child Time (R) Conversation Starters (AC)
		Peer Relationships	Peer Pairing (R) Super Friend (R) Unity Songs (AC) Aloha, Friend! (AC) Partner Talk (AC)
		Problem-Solving with Others	Solution Kit (R) Telephone (AC)
		Empathy	How Do They Feel (AC)
		Manage Emotions	Feelings Chart (R) Feel-ometer (R) Turtle Technique (R)
Self-Regulation	N/A	Manage Behavior	Talking Stick (Communicate R) Morning & Closing Circle (PD) Meals (PD) Move-Regulate AC
		Focus and Attention	Move-Regulate AC
		Working Memory	Move-Regulate AC

Appendix C

Alignment of the Streamin^3 Preschool Curriculum to the CLASS® PreK Observation Measure

The big idea that drives the STREAMin^3 Curriculum is that high-quality teacher child interactions are what matter most for children's learning and development. When teachers focus less on what the activity is and more on *why* the activity matters and *how* to structure and scaffold children's engagement in the activity, children develop the foundational skills that set them up for success in kindergarten and beyond. The Intentional Teaching Practices (ITPs) are the primary structure in the STREAMin^3 curriculum that supports teachers to provide intentional, integrated interactions (in^3). They are woven throughout the curriculum, including in the Core Skill Focus of the Week, Parts of the Day, STREAM Story and Group Activities, Activity Cards, and STREAM Games.

Table 8 aligns the CLASS® PreK dimensions to the ITPs, Core Skill Routines, and other components of the STREAMin^3 preschool curriculum. It is meant to illustrate the significant overlap in effective teaching practices outlined by both the CLASS® tool and the curriculum. Content-specific ITPs (e.g., those focused specifically on literacy and math) are not included in the table, though many would likely fit into Concept Development. Additionally, many ITPs can fit in multiple CLASS® dimensions. The goal is that programs can begin to make connections between CLASS® and the STREAMin^3 preschool curriculum.

Table 1

Alignment of the STREAMin^3 Preschool Curriculum to CLASS® PreK

	Intentional Teaching Practices	**Core Skill Routines & Other Curricular Components**
	Think ♦ Relate ♦ Regulate ♦ Communicate ♦ Move	
Positive Climate	○ Help Children See You as a Resource ♦ ○ Engage in Social Conversations ♦ ○ Acknowledge Positive Peer Interactions ♦ ○ Join in the Play ♦ ○ Provides Support During Teamwork ♦ ○ Embrace Similarities and Differences ♦ ○ Connect to Children ♦	○ Peer Pairing ♦ ○ Super Friend ♦ ○ Child Time ♦
Teacher Sensitivity	○ Help Children See You as a Resource ♦ ○ Provide Support During Teamwork ♦ ○ Narrate Problems and Solutions ♦ ○ Reflect the Problem ♦ ○ Prompt Children to Find/Accept a Solution ♦ ○ Label Emotions ♦ ○ Prompt Children to Label Their Emotions ♦ ○ Acknowledge and Accept Strong Emotions ♦ ○ Use Calm-Down Strategies ♦ ○ Connect to Children ♦	○ Solutions Kit ♦ ○ Feelings Chart ♦ ○ Feel-ometer ♦ ○ Turtle Technique ♦ ○ Adapt section of STREAM Group activities

Regard for Child Perspectives	○ Promote Child Autonomy (show genuine interest in their ideas, interests, and activities; value their interests, ideas, and opinions) ○ Provide Support During Teamwork ○ Label Interests and Characteristics ○ Narrate and Label Empathy ○ Prompt Children to Provide Care for Others ○ Prompt Children to Consider the Needs/Feelings of Others ○ Prompt Children to Consider "Why" Someone May be Feeling a Certain Way ○ Narrate Self-Confidence ○ Narrate Using Self-Help Skills	○ Peer Pairing ○ Super Friend
Behavior Management	○ Acknowledge Positive Behaviors ○ Promote Autonomy (choice) ○ Use Cues and Visuals ○ Give Effective Commands ○ Engage Children in Alternative, Appropriate Behaviors ○ Link Behaviors with Outcomes ○ Narrate Use of Working Memory ○ Narrate Cognitive Flexibility	○ Talking Stick ○ Solutions Kit ○ Feelings Chart ○ Feel-ometer ○ Turtle Technique ○ Move/Regulate Activity Cards
Productivity	○ Use Cues and Visuals ○ Give Effective Commands	○ Move/Regulate, Think, Communicate, and Relate Activity Cards when used during transitions
Instructional Learning Formats	○ Suggest Roles ○ Encourage Use of Props ○ Narrate Curiosity and Exploration ○ Use Comments and Questions to Promote Exploration ○ Promote Child Autonomy (Active Exploration) ○ Narrate and Encourage In-the-Moment Observations ○ Explain Objectives/What Will Happen ○ Promote Active Engagement ○ Join in the Play ○ Encourage Children to Imitate Movement ○ Encourage Children to Try New Tools or Grips ○ Use Visuals and Songs ○ Present All Foods as Attractive, Enjoyable Options ○ Use Gestures or Visuals to Encourage Listening	○ Core Skill objectives in STREAM Group and Story activities ○ Materials List in STREAM Group and Story activities
Concept Development	○ Promote Predictions ○ Prompt Children to Compare, Contrast, and Categorize ○ Narrate Reasoning ○ Ask Open-Ended Questions ○ Prompt Children's Explanations ○ Narrate Imitation and Representation and Label Symbols ○ Ask Children to Summarize or Retell Information ○ Prompt Children to Shift Their Thinking ○ Adapt the Activity to Encourage Cognitive Flexibility	○ Adapt section of STREAM Group activities

Quality of Feedback	○ Acknowledge Effort ♦♦ ○ Prompt Children's Explanations ♦ ○ Repeat and Elaborate on What Children Say ♦ ○ Acknowledge Positive Peer Interactions ♦		○ Adapt section of STREAM Group activities
Language Modeling	○ Narrate Your Own Actions, Children's Actions, or Comment on Characters in a Book ♦ ○ Repeat and Elaborate on What Children Say ♦ ○ Maintain 3-5 Back and Forth Exchanges ♦ ○ Engage in Talk that Goes Beyond the "Here and Now" ♦ ○ Ask and Answer Questions ♦ ○ Intentionally Teach Selected Vocabulary Words ♦ ○ Provide Child-Friendly Definitions ♦ ○ Repeat Words Often ♦ ○ Draw Explicit Attention to the Relation Among Words ♦ ○ Engage in Social Conversations ♦ ○ Narrate Problems and Solutions ♦ ○ Narrate and Label Empathy ♦ ○ Label Interests and Characteristics ♦ ○ Narrate Self-Confidence ♦	○ Label Emotions ♦ ○ Prompt Children to Label Their Emotions ♦ ○ Narrate Use of Working Memory ♦ ○ Narrate Cognitive Flexibility ♦ ○ Narrate Imitation and Representation and Label Symbols ♦ ○ Narrate Curiosity and Exploration ♦ ○ Narrate and Encourage In-the-Moment Observations ♦ ○ Narrate Reasoning ♦ ○ Ask Open-Ended Questions ♦ ○ Narrate Gross Motor Movements ♦ ○ Narrate or Label Use of Fine Motor Skills ♦ ○ Narrate Using Self-Help Skills ♦ ○ Model and Narrate Healthy Food Choices ♦	○ Feelings Chart ♦ ○ Feel-ometer ♦ ○ Talking Stick ♦

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