Seeds to STEM Implementation Team Survey Findings

Report Purpose

This report addresses Aim 1 of the Seeds to STEM (S2S) program: Design, pilot, and iteratively evaluate a bilingual nutrition curriculum for 3-5-year-olds and related professional development for pre-K educators that is appropriate for early childhood education centers and home-based childcare providers in low-income urban areas (in Philadelphia, PA and Los Angeles, CA). Two educator S2S outcomes align with this aim: 1) Increased self-efficacies and 2) Implementation of nutrition, health, STEM, numeracy, and literacy content. S2S facilitators were asked questions related to their observations of participating preschool teachers integrated (Literacy, Math, Science, Nutrition) instructional practices.

Instrumentation and Sample

Two facilitators from PHL participated in a 45-minute virtual **Facilitator Interview** in December 2023. Interviews were individual, conducted on Zoom, and recorded for transcription. To be responsive to scheduling, two facilitators from LA completed an online **Facilitator Survey** in February 2024. *S2S* facilitators were asked to describe their observations related to five areas:

- 1. Ways S2S impacted the integrated instructional practices of participating preschool teachers;
- 2. Strengths of the *S2S* program;
- 3. Challenges participating preschool teachers experienced integrating instructional practices;
- 4. Ways the S2S program helped to address any teacher-reported challenges; and
- 5. Potential improvements for the S2S program.

Data Analysis

Prior to analysis, interview and survey responses were organized in Excel by each of the five aforementioned areas above. Thematic analysis (Saldaña, 2021) was conducted by an evaluator using the facilitator interview transcripts and written survey responses following Braun and Clarke's (2006) six step process: (a) familiarize with transcripts/written responses, (b) define initial codes, (c) formulate initial themes, (d) refine themes by collapsing/expanding, (e) define/describe themes, and (f) identify representative quotes to illustrate each theme.

Multiple common strategies were used throughout the analysis and reporting phases for increasing trustworthiness (Lincoln & Guba, 1985). These strategies included creating an audit trail, engaging a second evaluator to peer-review coding and theme descriptions, use of *in vivo* coding (use of facilitators' words as codes, where appropriate), and linking facilitators' quotes to themes as supporting evidence. Single or multiple quotes were shared in reporting to illustrate the range or depth of a theme or category.

Findings

Impact of S2S on Integrated Instructional Practices

All four facilitators (100%) described positive impacts of the S2S program on the participating preschool teachers integrated instructional practices. These positive impacts clustered under the theme that S2S led to observed improvements in teachers' knowledge, skills, confidence, and use of integrated instructional practices through modeling effective instruction. The facilitators described how effective

instruction was modeled through sharing resources for instruction, methods for integrating nutrition with other content areas (literacy, math, and science), and imparting new knowledge for teachers to integrate into their lessons, particularly related to nutrition:

- "The teachers are really pleased by the amount of material items they get and the amount of intervention that they get." (Sharing resources)
- "...we really wanted to be able to combine some of the stem programming that we already did, and the Literacy pieces, and with a gardening and nutrition aspect to the program as well..." (Integrating nutrition with other content areas)
- "Why do calories matter?"...it's not something that we focus on with little kids, but being able to give them a really good foundation of, you know, this is where your food is grown. This is, it's local, the pollinators that are able to make this food possible and have all of those broader connections make a big difference for the kids." (New knowledge related to nutrition)

Two facilitators from Philadelphia elaborated how they observed teachers who *implemented the modeled integrated instructional practices* into the classroom unprompted, as this facilitator described:

One of the things that I noticed was we did a tasting activity with a chart in our PD, and that was something that we had said, "You know, I'm gonna be bringing this into your classroom for your first visit. We're gonna be doing that." And then when I went in for the first day, the teacher actually had created her own chart and it was up on the board, and they had been tasting. They had all of their novel fruits and vegetables that they were trying already up on the board. And so that's something that was really cool. Because...they went ahead and did it themselves like right away...

A facilitator from each site also shared how they observed modeling of integrated instructional practices *led to increased teacher knowledge of STEM and nutrition concepts and skills to integrate those concepts* into their practice:

It has enhanced STEM knowledge and confidence. Teachers have gained a deep understanding of STEM concepts and become more confident in integrating them into their teaching practices. Also, interdisciplinary approaches. Teachers have developed skills to integrate STEM subjects with other areas like literacy, arts, and social studies, promoting amore holistic approach.

Strengths of the S2S Program

All four facilitators (100%) described strengths of the *S2S* program. Program effectiveness was attributed to mainly three qualities of the professional development: Use of a hands-on approach to the teacher professional development, responsiveness to existing individual classroom needs and routines, and small-scale programming (see Table 1).

Strengths	Facilitator Quotes
Use of a hands- on approach to the professional development	 "the professional development is a very hands-on way for the teachers to get to experience some of the lessons" "The hands-on PD model empowers teachers with the knowledge, skills, and confidence to integrate STEM, literacy, and nutrition in the classroom."
Responsiveness to existing individual classroom needs and routines	 "We really strive to work with the teachers. But it's not always going to be the same for every class, just because our classroom themselves are different." "I feel like the teachers were really appreciative of the idea that the program itself could just slip into wherever they were doing the work. Not necessarily like, here's a brand new gardening/nutrition/literacy program bookInstead, we, we built it so it could slide seamlessly into snack timelunchtime."
Small-scale programming	"if it was [a] city wide thingyou might not be able to be that individualized"

Table 1 – S2S Facilitator Identified Strengths of the S2S Program

Challenges Integrating Instructional Practices

Two of the facilitators (50%) at one site reported no challenges that they knew of that preschool teachers experienced integrating instructional practices in their classrooms. The other two facilitators from the second site described multiple challenges that were more specific to barriers preschool teachers face in integrating nutrition into the curriculum. These barriers clustered around three levels: child/guardian-based barriers, teacher-based barriers, and institution-based barriers (see Table 2).

Level of Barrier	Barriers	Facilitator Quotes
Child/guardian -based barriers	"Picky" eaters	"They just happen to have kids are really picky."
	Aversion to trying new things	"Some teachers say that they have kids that you know. They don't think maybe their kids eat any fruits or vegetables at home, because their children aren't really willing to taste things."
	Access to healthy food at home	"I do know that some of the hardships that they face are healthy food at home, that families a lot of times are relying on."
	Limited support for healthy eating at home	"Some of the familieswouldn't fill out the forms like just to let the kids taste the food. And so what we just did was show up at pick up time and with healthy stacks for everybody"

Table 2 – Teacher-Reported C	Challenge as Described	by two S2S Facilitators
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Level of Barrier	Barriers	Facilitator Quotes
Teacher-based barriers	Willingness to try new things	 "They follow the guidelines of what is." "Sometimes it'seither real or perceived willingness for the kids to try new things."
	Sticking to a routine	"It's easy to just fall into a routine, especially when the teachers don't haveI don't wanna say authority, but maybe authority over like the menus that they're kids are getting, because that happens a lot."
	Limited knowledge/ buy-in	"I think the bigger piece for us isHelping to change the mindset ofthe teachers, even the, the center directors. By seeing the impact that it makes hopefully"
	Transparent communication and trust	 "They sometimes have a hard time separating or saying things that maybe they are like aren't as happy with." "Sometimes I think that teachers, especially new teachers, that you've never worked with beforeThey might not always be that open. They're just like, 'Thank you for coming.' And they might be a little bit nervous about coming to suggestions or problems so really trying to open that up."
	Range of early childhood standards to teach	"I think that the amount of work that teachers have thrown at them in the early childhood level is like ungodlyBecause you're not only teaching the children like, you know we teach you about your healthy foods, but let me also teach you how to tie your shoesand, you know, hear the alphabet, and learn to read and learn your colors, and like learn the whole world."
Institutional- based barriers	Wide range of ages to feed	"We have center-based and home-based classrooms. So, some of our classes have maybe only 2 Pre-K age kids But they also will have like infants and younger kids as well. So, feeding them is very different than feeding, just a Pre-K for classroom."
	Lack of autonomy in selecting food options	 "If they're in a bigger, more corporate kind of center, their menu is given to them. And so that's not something that we can change." "Menu is a big dealI'll be there sometimes in the morning I'll go at breakfast time, is not a big deal. There's always fruit, cereal, you know, milk. But lunchtimeIt's like, here's this giant industrial can of green beans, right? That that is like full of sodium, and has been sitting on the shelf, you know, comes from the government."
	Less time and opportunities to certain centers	"[PHL has] so many locations, whereas this year [LA has] 4, 5 max and all of their classrooms are at that place, so they do kind of more lessons and are able to have a little bit more hands on in the day to day."

These two facilitators elaborated on how they addressed these teacher-reported barriers through the *S2S* program, particularly barriers to nutrition instruction. Method used centered around designing and providing **supplemental and sustainable resources** and implementing **relational communication** over time with new and experienced teachers to the *S2S* program address their classroom and instructional needs (see Table 3). Ways that the facilitators described working alongside teachers to address challenges and individual teacher or classroom needs highlighted additional strengths of the *S2S* program.

Methods	Ways	Facilitator Quotes
	Addressed	
Providing supplemental and sustainable resources	Designed resources to encourage trying new foods	 "One of the things thatwe implemented this year was our new tasting charts to try to encourage new foods."
	Supplemented fruits and vegetables	 "But what we can do is bring in fruits and vegetables and supplement that [unhealthy nutrition], right?"
	Responding to individual site needs	 "There's a family connector piece for every lesson, and so sending that home, I think, helps bridge that little gap that we do know exists as far as the nutrition and it's also expensive to buy healthy food." "They ask, 'Can you come back this year and help us do that?" Thankfully, we were able to take our early childhood educator that worked with us first year and move him to the community horticulture position."
	Connecting to resources to sustain nutrition education	 "We also provide them with things like play food, basketsWe're not just like, bringing them in and taking them out. So it becomes a part of their actual class which is something that they could hopefully have for a long time." "Connecting them to health and wellness organizations that are in the area already these are the connections that you should also be making in the community, and we'll make them first for them."
Communication	Open communication and acting alongside teachers to navigate classroom needs or problems	 "I think, really talking to the teachers themselves, and just trying to meet them where they are, because a lot of teachers have kind of individual needs." "Some of the things that we might come across we might not be able to solve, but being able to be there and have them have access to us is the way that we kind of navigate those problems." "There might be some thingsI can't do anything about, but just knowing that if, if they have an issue to try to come and, and we'll try to solve them ishas been really helpful"
	methods for integration	But my other teachers, some of them are making crazy exotic dishes, and they're doing so much tasting, but they really want some of the like literature, or they want you know, a more scientific lesson from us. They're like, 'I can handle it tasting, but I would, like some of the science behind it.'"
	Making and sustaining connections	"Always show up. Be there, be consistent, connect early and often"

Table 3 – S2S Program Methods Used to Address Common Teacher-Reported Challenges

Potential Improvements for the S2S Program

Challenges with teachers writing their student initials on the evaluation survey was described by one facilitator as an improvement needing to be addressed: "Surveys have been a challenge with teachers,

specifically the 'initials' part. Often the teacher is confused and will write the student initials." A second facilitator elaborated on the need to **start planning to sustain** the accessibility and *S2S* practices:

I think that if there's one piece that we probably missed with this is that sustainability piece for long term, right? Because we're gonna do this as long as we get funded by NIH. But we all know how funding works, and how in 5 years, which is a generous amount, 3 years, if we don't get a refill on this...

This facilitator offered **potential actions to sustain** *S2S* efforts such as connecting teachers to organizations and the broader community:

So, I think one of the pieces we probably missed and could reconsider doing is connecting them to health and wellness organizations that are in the area already. We're leaning heavier in this community learning department with all of this impact. But I think that if there's a piece that we probably could redo, or maybe we'll add to the upcoming year is broader connections to the community at large. Drexel has great health and wellness and wellbeing programs...the Dornsife Center offers family dinners on every Tuesday, and I think making sure that those pieces are accessible to everybody, because that that's really what will help this be successful, right? You can help everybody by giving them this information, teaching the teachers doing all that. But if we disappear, when we disappear, hopefully, this easily layered curriculum will continue to exist for them, but also help.

If there's a way that we can add to our outcomes...these are the connections that you should also be making in the community, and we'll make them first for them...If there's ways that we can connect them to the broader community at large with wealth or health and nutrition. I think it would be a better final impact for the teachers, as we...they go forward.

No additional improvements were identified for the *S2S* program in relation to how the program can better support participating preschool teachers integrated instructional practices.

Summary of Findings and Limitations

Overall, S2S facilitators' responses from across LA and PHL provided evidence how the S2S program is influencing participating preschool teachers' integration instructional practices across the four content areas (Literacy, Math, Science, and Nutrition) into their classrooms. Facilitators described an observed increase in teachers' knowledge, skills, and confidence in teaching STEM concepts, as well as increased use of hands-on integrated STEM activities in their classroom. These outcomes align with program aims and outcomes (e.g., increased self-efficacy). S2S leadership team will utilize the evaluation findings to discuss sustainability actions recommended. Evaluators for S2S will collaborate with the implementation team to improve the clarity of directions related to writing their initials on the survey.

References

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