Monograph Matters

SRCD Society for Research in Child Development

Lowrie, T. (2021). *Contemplating Goals and Strategies of Prekindergarten Programs across Nations and Programs.* [Peer commentary on the article "Effects of prekindergarten curricula: *Tools of the Mind* as a case study" by K. T. Nesbitt and D. C. Farran]. *Monograph Matters*. Retrieved from https://monographmatters.srcd.org/2021/02/16/commentary-lowrie-86-1/

Contemplating Goals and Strategies of Prekindergarten Programs across Nations and Programs

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Nesbitt and Farran (2021) undertook an ambitious task to develop and assess preschool learning and engagement in their monograph, *Effects of Prekindergarten Curricula: Tools of the Mind as a Case Study*. The academic field of early childhood education walks a delicate line between supporting children's development in a play-based way while at the same time providing educators with guidelines for implementing curricula that support skills and understandings deemed important for school readiness. The authors of this monograph have walked this line by comprehensively detailing the *Tools of the Mind* program and by assessing the impact of the program on both learning and engagement.

In my commentary I will focus on three important challenges that become especially salient when the work of Nesbitt and Farran is considered in the context of prekindergarten programs of other nations and educational traditions. I will draw many of my examples from my experiences with young children's education in Australia, much focused on STEM (Science, Technology, Engineering, and Mathematics). The first challenge I consider is related to establishing the goals of early childhood education, with a spotlight on tensions between emphasizing children's general social-emotional and intellectual development versus more specific school-relevant skills. The second challenge emerges from the first, and it concerns how to design educational practices that set the stage for later school success, but in ways that complement rather than overpower or undermine children's social-emotional development and self-motivated engagement in learning. The third challenge is to find ways to establish collaborative partnerships among program developers, researchers, teachers, and other educators. The aim cannot simply be to develop programs that teachers must adopt; rather we should strive to provide frameworks that teachers can use to draw on their knowledge of their children, build their own efficacy, and encourage student engagement.

Goals of early childhood education research

Early in the monograph, Nesbitt and Farran argue (rightly in my view) that the goal of early childhood education is to contribute to positive social-emotional, self-regulation, and achievement outcomes for children. In fact, the authors frame a number of their hypotheses around engagement, in the form of interpersonal interactions and learning behaviors. These

elements of classroom engagement are critical but continue to focus on the children as a collective, rather than exploring children's individual progression as a result of the program (Clements & Sarama, 2009). At the same time, early childhood educators are faced with implicit, and increasingly explicit, requirements to have children "school ready". There is a tendency to equate readiness with more formal learning, although this is more the case in North America than in countries such as Australia or Sweden. Nevertheless, the rationale for "pushing down" formal learning and curriculum into prior-to-school settings does not abate, presumably based on perceived economic benefits rather than how on how young children learn best. Unsurprisingly, the movement away from play-based pedagogies has been met by frustration by educators (Broström, 2017).

Play-based pedagogies should not be viewed as a hybrid of free play and direct instruction (Pyle & Danniels, 2017), because such representations do not capture the nuances of children as active agents in their own learning. The rhetoric of accountability favors formal learning and the use of performance assessments that are easily administered. Such assessments may lead to the diminishment (or even the demise) of play-based pedagogies. One way to preserve the learning that is fostered by play-based pedagogies in prior-to-school learning settings is *to avoid* framing learning goals around specific content and traditional school disciplines. The use of play-motivated methods increases the power and impact of student agency and helps educators resist the temptation to start school *before* school. It appears that it is this type of learning that Nesbitt and Farran were striving to measure in their quest to determine the effectiveness of the *Tools of the Mind* program.

As a contrast, I draw examples from the Early Learning STEM Australia (ELSA) program. This program, developed by the STEM Education Research Centre (SERC) I lead, encourages children to engage in learning though play-based experiences that are aligned to their own interests and learning readiness. (See https://elsa.edu.au for a comprehensive description of the program.) Rather than focus on discipline integration (Becker & Park, 2011; English, 2017) or generalized models of intelligence (Wai et al., 2009), the ELSA program takes a STEM Practices approach to learning (Lowrie et al., 2018). The Practices approach emphasizes the ideas, methods and values shared across disciplines, such as finding and validating evidence, thinking critically, and teamwork. STEM Practices are context bound, which enables learning to be focused on a learner's context, cultural needs, and surroundings. In a similar vein, the authors of the Next Generation Science Standards (National Research Council, 2013) identify crosscutting concepts important for the application on content. Rather than focusing on, for example, specific science or mathematics content in particular, the Practice model embeds learning in professional practices—so the children assume the role of a horticulturalist or industrial designer or park ranger as they encounter the ideas, methods or values exhibited by STEM professionals. Children discover the plants that grow in their local area, build their own playground, or help a park ranger solve problems that arise in a nearby national park. Teacher agency and children's familiar learning contexts become the foundational pillars of this architecture. Participation and engagement in experiences and observations drive learning, rather than pre-described content commonly aligned to traditional curricula.

Aligning assessment to learning goals

A significant challenge for Nesbitt and Farran—and, indeed, a challenge for all of us who investigate curriculum in the early years—is the issue of assessing program efficacy while not relying on standardized assessment tools. All programs and systems require accountability; however, the testing of isolated content or facts should be avoided wherever possible. To address this challenge in our recent work on the ELSA project, we designed a sophisticated suite of learning analytics that records children's individual learning progressions seamlessly. These data are captured as the children engage with, and play in, the program's learning structure. Learning and engagement are both captured by the software instantaneously, formatively and diagnostically, and in nuanced ways not possible with a battery of tests. In using only test instruments which focus on metrics-based learning outcomes, Nesbitt and Farran may have overlooked growth in other learning which resulted from children's collaboration and engagement with the *Tools of the Mind* program. The collective (rather than individual) collation of engagement data will likely not have captured the nuanced progression of each individual's learning. In my view, learning in early years should always be play-based and child-led and be supported by thoughtful interventions by educators.

Accentuating the school-readiness context can be stifling for innovative early years learning. As such, educators and researchers need to be flexible in their approach to assessing learning by aligning outcomes to children's natural progressions. In the Australian context, early education is guided by the Early Years Learning Framework (EYLF), which focuses on enriching children's learning and supporting their transition to school (Australian Government, 2009). The EYLF emphasizes the importance of play-based engagement and intentional teaching, positioned within the child's world of *Being*, *Belonging* and *Becoming*. The EYLF aligns well to the *Tools of the Mind* program, especially the focus on children's use of language and the promotion of classroom interactions.

The evaluation of the *Tools of the Mind* program revealed some increases in classroom interactions, but overall there was no difference in the use of language for either students or teachers across the conditions. It is possible that the focus on time-based measures, rather than on quality of discourse, failed to detect impacts that the program may have had on the nature of the communication. In terms of student interaction, their data showed that large group and cooperative interactions were greater in the *Tools of the Mind* condition than in the control, a finding which suggests that the program provided a greater degree of collective engagement. It is noteworthy that the *Tools of the Mind* program did not have a noticeable impact on children's learning outcomes. It may be the case that in order to examine true engagement, measures need to be aligned to pedagogical frameworks or instruction, not just focused on tools per se. Such an approach provides a feedback loop for educators, allowing them to notice changes in children's ways of engaging with materials. Children are highly individualistic in their engagement with new materials. Consequently, providing educators with the tools to notice and engage children, rather than dictate the content, is critical for ongoing engagement and development (Copple, 2004).

Collaborating with teachers to empower them to adopt AND adapt

Nesbitt and Farran make a strong case for teacher-ownership of the curriculum. Encouraging teachers to adapt programs for their students and individual contexts can foster sustainability of programs. It is easy to become focused on the particular test battery and randomised-control trials (RCT) reported in the monograph, but Nesbitt and Farran have provided us with a valuable opportunity to reflect on our field and what it means to have success in early education programs. The idea of teacher ownership of curricula is critical to the successful implementation of any education program.

Teacher ownership was a foundational principle in the ELSA Program, which explicitly acknowledges that educators play the critical role in finding well-suited ways to guide and scaffold learning of particular students in particular classroom contexts. One example of situating children's real-world experiences into their learning is through the Experience-Represent-Apply (ERA) pedagogical framework and heuristic (Lowrie & Larkin, 2020). The pedagogical framework or heuristic provides teachers with the know-how to integrate digital technologies (including those specifically designed for ELSA) within authentic learning contexts. In the *Experience* phase, children are exposed to foundational concepts through play-based engagement. In the *Represent* phase, these concepts are reinforced as the children engage with the digital tools of the ELSA program. In the *Apply* phase, children demonstrate their heightened understandings by engaging in entirely new, off-app (i.e., real-world) experiences. The ERA framework and heuristic help the educator to coordinate the overall learning experience by scaffolding intentional teaching that underpins the learning experience, rather than just directing the use of materials or tools (Lowrie et al., 2019).

The following is an example of an ERA loop used in the ELSA program, which supports the development of spatial reasoning in our Location and Arrangement App. The *Experience* began with educators reading *Map Makers,* a picture book written by members of our team (Simoncini, Logan, & Kawka, 2018; see Figure 1). The book promotes spatial language with a STEM Practice lens that involves children developing ideas (designing and building), methods (decoding and encoding information), and values (creativity, teamwork) through the lenses of a STEM practitioner (in this case, an architect). The *Represent* activities include on-app experiences requiring children to solve perspective-taking challenges (see Figure 2). One educator was able to use the STEM Practices Framework and ERA heuristic to generate an authentic and contextually rich *Apply* activity that sustained children's engagement with these STEM understandings even when the children were no longer using the app. In developing this *Apply* activity*,* this educator designed and constructed a story book that featured all the spatial language and representations the children had encountered throughout the term. It is also noteworthy that the story book had a strong STEM Practices theme involving challenges of figuring out where a Kookaburra was hiding within the learning centre (see Figure 3). For a more comprehensive account of an Experience, Represent and Apply Cycle, including demonstrations of the activities illustrated in the figures, see Lowrie and Larkin (2020) and Lowrie et al. (2019).

Figure 1. Experience Activity - ELSA Map Makers Book

Figure 2. Represent "On App" Activity

Figure 3. Apply Activity - Child Generated Book

An obvious limitation of many apps that have been produced for young children is that the apps often have little or no opportunity for children to connect their own experiences to the app. This limitation results in children being largely passive consumers of content. We resolved this dilemma in the ELSA program by ensuring that the young children playing our activities can use many of the affordances of the devices – microphones, cameras, touch screen interfaces – to create User Generated Content (UGC) which can then be shared with their friends, their families, and their educators.

The ERA framework and heuristic encourages the creation and sharing of UGC through the *Represent* phase of the model and provides a mechanism for children to create their own content and incorporate it into their play. This helps them become engaged and promotes the idea of child-centered, play-based learning. When creating UGC, children use digital tools to capture the world around them and create their own content. This connects their real-world experiences to virtual worlds and ensures screen time is an active experience. Their UGC is then seamlessly integrated into future on-app activities, enabling children to be creators not merely consumers of digital content. The ELSA apps also provide real-time feedback to educators about what content children have created.

In concluding my reflections on the monograph, I begin by underscoring my view that learning in the early years should be situated within play-based experiences that provide opportunities

for children to engage with content that is culturally and contextually related to their needs and surroundings. As Nesbitt and Farran have maintained, it is necessary to provide teachers with curriculum ownership for sustained and effective program development. Technological innovations provide hope here. Affordances that encourage engagement with user-generated experiences are an operational way of enhancing curriculum ownership. Understanding the mechanisms that promote learning in such situations is more challenging because the curriculum is not static. Nesbitt and Farran challenge research teams to create more iterative designs to capture this nuanced learning in ways that go beyond randomised control trials. As a community, we should be able to achieve this outcome as we build platforms with sophisticated backends that can capture student learning with multiple data points.

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