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Editorial

The Silent Path towards Medical Apartheid within STEM Education: An Evolving National Pedagogy of Poverty through the Absenting of STEM-Based Play in Early Childhood

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STEM is notoriously uninviting to wide swaths of the population [1–4]. Women, queer folk, and people of color have been historically excluded from these spaces to such an extent that even our pop culture notions of what it means to be scientist or mathematician garner mental images of white men with wild hair in lab coats [5]. While that may seem to be just an unfortunate inequity of little consequence, there are tangible and significant societal harms that we fail to address in allowing inequity in STEM opportunity and engagement to persist. Inequity in STEM can translate to inequitable development of medications to treat and eradicate diseases. For example, in 2013, the National Institute of Health spent USD 78 million on researching cystic fibrosis, a disease that predominately impacts white people despite the fact that only 30,000 Americans live with this disease. Compare that to the 100,000 cases of sickle cell anemia that affect a predominantly Black population and received only USD 70 million in research funding that same year. Because diseases impact folks of different races and genders differently and because medical researchers often opt to research diseases they have a personal affiliation or experience with [6,7], diversity within the STEM disciplines becomes a life-or-death matter. Interest in STEM is solidified at an early age [8], and so it is incumbent upon early childhood educators to ensure no opportunity gap exists in STEM experiences or education. By not actively combatting existing inequities in STEM education and exposure, we uphold a system of medical apartheid where some populations are disenfranchised from equitable medical care simply by virtue of their race or gender.

It is with this sense of urgency that this Special Issue set out to bring together articles focused on timely issues within early childhood STEM education research. If we can understand the mechanisms and opportunities afforded to young children, we can better design systems and structures to equitably support early STEM interest and engagement. So, what does the research within this Special Issue tell us? Central to the collective works presented, we see play as the vehicle for engaging young children in STEM. This is not surprising given the value and centrality of play in the lives of young children [9]. However, while play is central to children's meaning-making, within schooling contexts, we see play rapidly evaporating from children's worlds. Instead, they quickly become inundated with worksheets, primers, and scripted, standards-based curricula. Nationally, play within early childhood is ever decreasing in favor of traditional academic foci [10]. This decline is indicative of a broad misconception that play is not academic learning. As Mr. Rogers once noted, "Play is often talked about as if it were a relief from serious learning. But for children play is serious learning. Play is really the work of childhood." To divorce play and school-based learning is to prevent young children an authenticity and ownership of the schemas their minds build and use. Worse still, within communities of color, teachers enact pedagogies of poverty that further divorce young children's learning from play and

the needed rich experiences it brings to their schooling [11,12]. Particularly within STEM, where problem solving, critical reasoning, and design are crucial academic skills, play is the natural vehicle through which young children develop these skills in meaningful ways. Thus, within the playful STEM learning environment, the role of the teacher becomes reflexive and dynamic [13].

Within the research shared here, we find the role of teachers to be more effectively STEM facilitator instead of the proverbial sage on the stage. Going further, we can conceptualize teachers engaging not just as facilitators of STEM but playful co-investigators or co-conspirators in open inquiry. When removed from the structure of adult knower and child learner, we see early childhood STEM education move from the rote to a meaningful set of community practices and engagements wherein STEM is engaged in a child-centered space. In this space of STEM co-wonderment, we see play expand the structures and opportunities for reasoning, critical thinking, experimenting, questioning, and designing. These playful spaces and experiences can transcend STEM content and persist into young people's conceptions of who does STEM [14]. The current dynamics of STEM education provide a unique opportunity for educational researchers to reimagine what is possible within the classroom. Deconstructing power dynamics and reconceiving how teachers engage with and model STEM learning for young children may allow us to recenter STEM learning around the essentiality of play.

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