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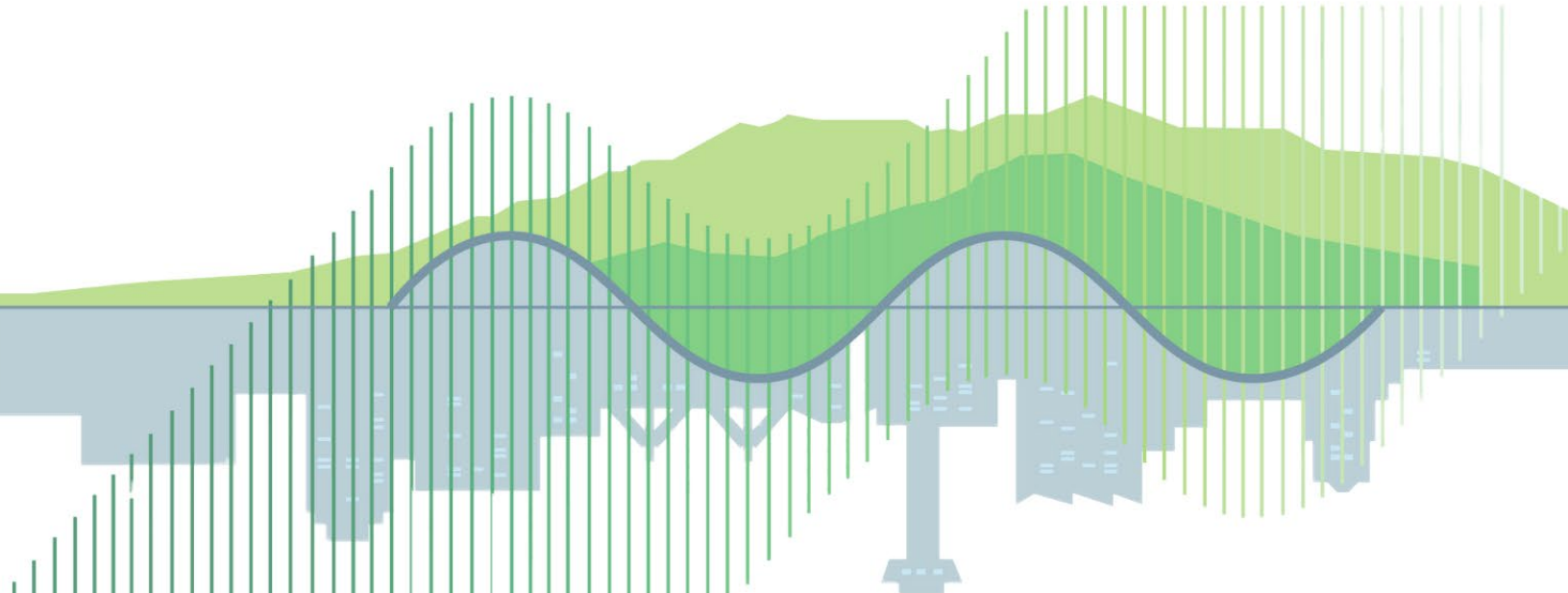

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GIS-Based Mapping: An Analysis of Environmental Affordances and STEAM Learning Behaviors of Preschool Children in Natural Environments

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Nature as a source of learning inspiration in early childhood has gained new attention in research and started a nature-based learning movement with a primary focus on children's spontaneous connections with nature rather than planned or structured activities. But very few studies have investigated how nature influences informal learning in early childhood environments. To prepare children as well-informed citizens for a digital tomorrow, it is important to plant the seeds of STEAM (Science, Technology, Engineering, Arts, and Mathematics) in early childhood. This research hypothesizes that nature-based outdoor learning environments can influence preschool-aged (3-5 years old) children's experiences and STEAM learning behaviors and compares environmental affordances and STEAM learning behaviors of children in a 'low-nature' outdoor environment with a nature-based outdoor using GIS-based Mapping. This research used a novel Environment and Behavior (EB) Mapping protocol (Monsur & Moore, 2019) using the latest GIS technology, which enables users to collect children's locational behavior data. The protocol employed cloud-based platforms like ArcGIS Online, and ArcGIS Field Maps, allowing seamless EB data collection by multiple collectors. EB mapping was focused on various play and learning behaviors of preschool-aged children related to STEAM. For observation and data collection, different coding was used, such as behavior locations, play behavior (play type), STEAM learning behaviors, loose parts play behaviors, social behaviors, sensory play behaviors, sensory explorations and open/descriptive coding for children. It was anticipated that the differences in observed behaviors of children between the 'naturalized' and the 'low natural' sites would reveal insights into the learning behavioral outcomes of a nature-based outdoor learning environment. A nature-oriented outdoor play area that children have regular access to has a significant impact on both their attitude and their perceptions toward nature. Through direct observation of children at work in both sites, their diverse skills were documented in this study. Results showed that the nature-based environment with a higher number and diversity of natural elements provided a greater number and quality of affordances in terms of play, learning, and social behaviors.

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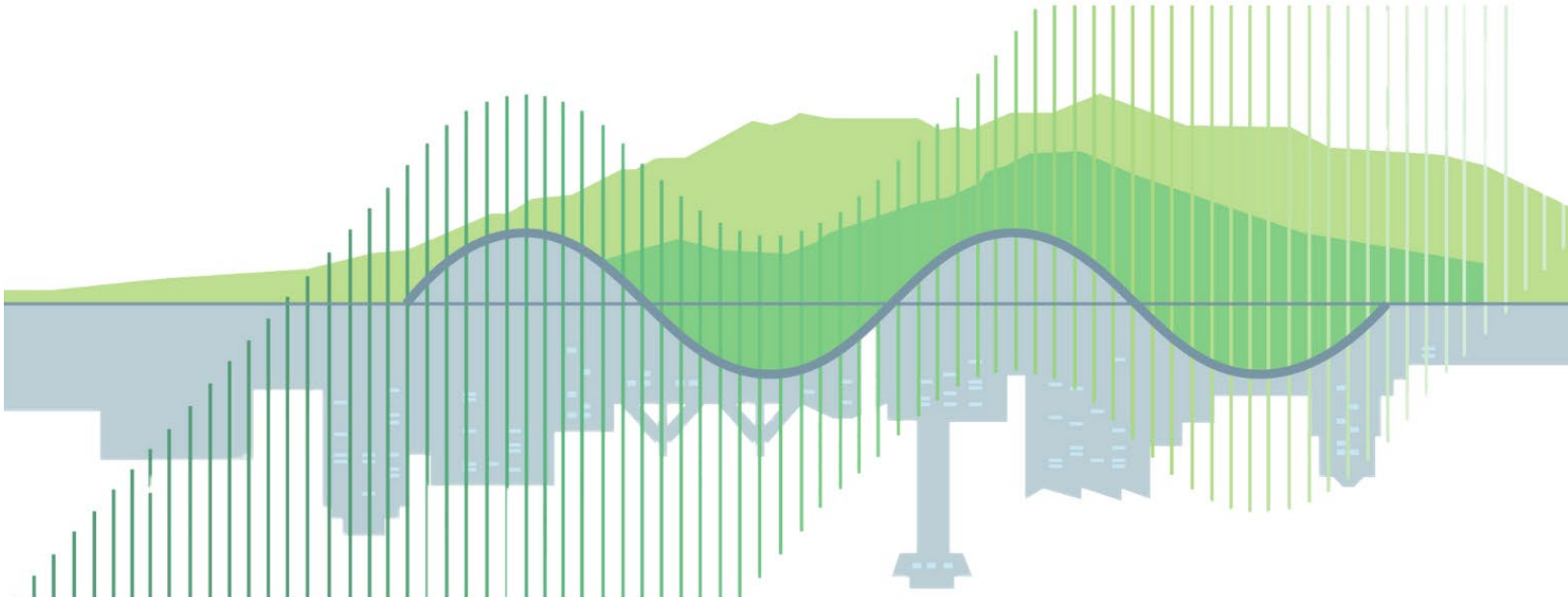
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