How Perceptions of Programming Differ in Children with and without Prior Experience

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The computing and STEM industries face challenges in attracting people to fill expanding needs. The literature shows that computing preconceptions shape interest in and impact decisions of whether or not to enter computing disciplines, especially for women and underrepresented minorities. In this study, our research questions focused on how perceptions of programming in elementary and middle school students varied based on prior programming experience. We examined the programming constructs they found challenging. Our study was in the context of a week-long summer camp dedicated to Scratch-based game development. We conducted semi-structured interviews at the beginning, middle, and end of the weeklong program with 28 students who agreed to participate. During the interviews, we asked students about their perceptions of programming in general and which programming constructs they found easy and/or hard. We found that all students perceived programming as a means of creating artifacts, but that students with prior programming experience went deeper by associating programming with process and function. We also characterize the specific Scratch programming constructs that beginning versus experienced children perceive as easy and/or hard. These findings will help experts and educators better understand how children think about programming and how experience changes these perceptions over time. These findings also have implications on the design of curricula and instructional resources to address difficulties children face while learning to program.

Keywords: Learning programming; game programming; elementary school; middle school; child; Scratch; summer camp; programming experience; computer science education.

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