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Supporting Knowledge Transfer in Programming: Insights from K-12 Computer Science Teachers

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Abstract

Many states now provide access to computer science (CS) courses across multiple grade bands. Younger students are often introduced to block-based programming languages before transitioning to more conventional text-based languages (Kao et al., 2022). However, students often struggle to see connections between previously learned programming languages and novel ones (e.g., transitioning from block-based to text-based programming). To better understand how knowledge transfer occurs in CS classrooms, we interviewed teachers regarding the examples of knowledge transfer they observe in their classrooms, including whether and how their CS curriculum supports such knowledge transfer between programming languages. Qualitative analyses revealed emerging themes related to syntactical affordances and challenges of programming languages, whether and how teachers make direct or indirect comparisons between languages in their instruction, and the types of transfer teachers observe most frequently in their classrooms. Our findings will guide the development of curricular materials that support programming language knowledge transfer.

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