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Dynamical Feedback and Affordances-Constraints in Technology-Mediated Learning and Assessment: An in-Class Experimental Study

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Abstract

How do we assess learning in complex technology-mediated practices? How does the coordination of technological affordances and constraints mediate immediate performance and individual learning? In the technology-mediated practice of programming, the compiler functions as a source of both affordances and constraints to the human cognitive agent. The compiler affords the compilation of executable programs and dynamically informative compiler feedback, while the compiler also constrains acceptable code to a specific syntax. In this in-class experimental study, I investigate the contribution of compiler affordances and constraints to performance and learning in programming. The study results indicate affordances as important facilitators of immediate performance. Conversely, constraints appear important mediators of conceptual learning, which in turn facilitates internalized thinking decoupled from the original technological resource. The findings imply a need for teaching and learning activities that emphasize practicing resource-coordination and for an assessment practice that intelligently combines technology-mediated resource-rich tasks with decoupled resource-poor tasks.