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Tracking the course of algebra learning

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Abstract: An understanding of human cognition can guide the design of algebra instruction. For instance, considerations of the relatively limited capacity of human working memory paired with the relatively limitless capacity of long term memory have influenced educational practices. Our research attempts to provide a theoretical basis for balancing exploration and direction in education. Advocates of discovery learning argue that with discovery comes a substantially richer problem representation. In contrast, advocates of direct instruction argue that discovery learning is incompatible with human cognition, particularly because memory demands imposed by exploration of the problem space hinder students ability to extract meaningful relations from the problem episode. Here, we explore the outcomes associated with varying degrees of guidance. Specifically, we consider how the timing of feedback and the availability of instruction affect college students as they learn to solve isomorphs of algebra problems.