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Spring 2019

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Dubczak, David, "Learning With Failure" (2019). *Creative Components*. 162.
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Learning With Failure

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Abstract

A study performed by Manu Kapur (2008) found that students who perform ill-structured tasks and initially fail are more successful in subsequent tasks than students who were assigned to perform well-structured tasks and succeed. It is possible to be successful and not learn ("Unproductive Success"), and it is possible to fail and learn more ("Productive Failure").

This Capstone Project investigates the reason that failures can be productive, and devises a method for teaching in a way that incorporates failure into the classroom. This method, called "Delayed Guidance," involves a short direct instruction/review stage, followed by an ill-structured task at which it is expected that students will not be successful. Following their failures, students will discuss and review failed solutions and come to correct understandings. This will lead students to being more successful in the final stage, which is a similar task to the first.

Project Link: https://drive.google.com/open?id=18Aju0SYMFCUaK67NEB0rt6Bd1a92JeeW

Summary

Research has not shown knowledge learned in one context (classroom) has the ability to automatically be transferred to another context (real-world). Similarly, Roth and Jornet (2013) remark that "[Research has shown] no or insignificant correlations between number of, and achievement in, school-based mathematics courses and mathematical behavior in the everyday world."

The ability to use a profession's tools and mental processes is not indicative of the ability to apply those tools in real-life contexts. Brown, Collins, and Daguid argue that students need to be able to use a profession's tools in the classroom in a similar way to those field professionals.

Common methods of teaching pupils how to use a profession's tools are Direct Instruction (DI), or the Gradual Release of Responsibility (GRR). These methods teach students a profession's tools in a way that gradually allows the learner to assume the responsibility of using the tools. However, in the classroom, these methods remove a critical aspect of the work of field professionals: failure. In addition to learning the tools of the field, students also need to learn ways to systematically and productively think through challenges, while activating and growing their mental models of the situation. The field of Productive Failure (PF) is an attempt to do just that.

To teach students in a way incorporating failure, this author has developed the "Delayed Guidance" method, which involves four steps: 1) The Teaching Phase, during which a small amount of direct instruction can occur, 2) the Experimentation Phase, during which students are given an ill-structured problem to solve, 3) the Consolidation Phase, where improper and failed solutions are discussed and new understandings are generated, and 4) the Extension Phase, in which students receive a similar task to the Experimentation Phase and should be more successful.