

STUDENT-CONTROLLED FACTORS ENHANCING CREATIVE MATHEMATICAL PROBLEM SOLVING

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A popular notion, which has been entertained by Hollywood filmmakers and creativity researchers alike, is that most people working on complex mathematical problems cannot control or predict when their creative mathematical inspiration will come. One prevailing theoretical model of creative problem solving suggests that the point of creative illumination typically comes after one has ceased to consciously work on the problem (Sapp 1992). However, such a deterministic treatment of creative thinking lacks convincing empirical support, and can discourage students from persevering on challenging mathematical problems. This poster presents an alternative approach to creative mathematical problem solving. It considers how students can actively control their creative mathematical problem solving, by deliberately manipulating three aspects of their immediate learning environment:

Their motivation and engagement patterns

The way they allow their ideas to interact in different kinds of group collaboration

Their development and use of conceptual tools

The ideas presented here are preliminary results from an ongoing research project. The aim of the project is to develop an explanatory model of the creative mathematical problem solving of “ordinary folks”. It adopts a design experiment method (Brown, 1992), whereby the explanatory model being designed undergoes multiple revisions through an iterative cycle of lab design and field-testing with students working on complex mathematical problems. The specific problems used in this study are “Model Eliciting Activities”, which require students to develop their own mathematical models in order to solve a meaningful problematic situation (Lesh, Hoover, Hole, Kelly, & Post, 2000). Excerpts from transcripts of students working on these problems will be used to illustrate how students can manipulate their motivation, group collaboration, and conceptual tools to facilitate creative mathematical problem solving.

References

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