The Need for Exploration and Discovery in Elementary and Middle School Mathematics

Stephen Hegedus
“. . . having verified the theorem in several particular cases, we gathered strong inductive evidence for it. The inductive phase overcame our initial suspicion and gave us a strong confidence in the theorem. Without such confidence we would have scarcely found the courage to undertake the proof which did not look at all a routine job. When you have satisfied yourself the theorem is true, you start proving it.”

—George Polya
“Actually the mathematician does not rely upon rigorous proof to the extent that is normally supposed. His creations have a meaning for him that precedes any formalization, and this meaning gives the creation an existence or reality ipso facto. . . . Great mathematicians know before a logical proof is ever constructed that a theorem must be true. . . .”

—Morris Kline
Return to the Centroid of a Triangle

From Static to Dynamic
Pedagogical Affordances

- Dynamic Construction
- Validity – the nature of the “drag test”
- Building Beliefs
- Constructivist

Cognitive

- Active involvement by students
- Exploration
- Discovery
- Reasoning
- Rationalization
- Realization
- Abstraction
- Proof …