Abstract
This investigation looks at deliberately evoking skills more typically associated with emotions to help first-year engineering students do computational problem solving.

Background
Decision-making sciences indicate the use of amygdala (emotion), not just prefrontal cortex (logic) (Lehrer, 2009)
Computational problem solving may be analogous to problem solving in physics
- In physics, a translation space helps to determine the direction math should take (Root-Bernstein, 1991)

Use of drawing (doodling) has been indicated with use of amygdala (Ablon, et al., 1993)

Method
Incorporate structured doodling into lectures / labs (Winter 2009 ENGR 101, Introduction to Computers and Programming, Section 100) (test)
Comparison with Fall 2007, ENGR 101, Section 100, which had a similar curriculum (control)

Results: Examples
- Successful doodles do abstract various subtasks that are implicit in an algorithm
- Successful doodles do examine an algorithm from more than one aspect (e.g., sketch, list, table, test case, jot)
- Example: Accumulator

Results
- Proficiency of doodles is positively correlated with a proficiency in programming
  - Q9 (doodle) & Q10 (associated program) on second midterm, W09 (N_{2009} = 131 students)

Doodling seems to benefit women
- Median grade gap between men and women narrows considerably (N_{2007} = 146 students)

Conclusions
- Introduction of structured doodling into curriculum indicated an overall beneficial effect on learning
- Women seem to have benefited significantly
- More study needed to adjust for possible confounds

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