Active Learning

What is it, how do we do it, and who does it help?

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What are the Characteristics of the ideal student?

What is active learning?

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CBMS (2016). Active Learning in Post-Secondary Mathematics Education, Conference Board of the Mathematical Sciences, Washington, DC. Posted July 15, 2016 at http://www.cbmsweb.org/Statements/Active_Learning_Statement.pdf.

Freeman, S., Eddy, S.L., McDonough, M., Smith, M.K., Okoroafor, N., Jordt, H., and Wenderoth, M.P. (2014). Active Learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences,* 111(23), 8410-8415.

List as Many beatles songs as you can.

What are the benefits of active learning?

Freeman et al. (2014) says that students who are taught with **any level** of Active Learning:

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The same paper suggests that students in lecture-only classrooms are 1.5 times more likely to fail when compared to students in AL classrooms.

True vs. False: A hot dog is a sandwich.

Which one?
Apple or Android?

How can we implement active learning?

WE JUST DID! All of these activities are suitable to introduce an AL environment on the first day of class!

- Group work based AL:
  - Exploratory exercises to introduce a topic.
  - Problem-solving sessions.
  - Review days
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- Possible Classroom Setups:
  - Circular/Square Tables
  - Individual Desks organized into groups of 3-8.
  - Individual Desks organized facing the front of the room.
  - NO furniture involvement.
  - Fixed desks/tables.
  - Large lecture halls.

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***Note that Freeman et al. (2014) found that small class sizes benefited most from AL, but classes over 50 (or even over 110!!!) still benefited from AL compared to exclusive lecturing.

Places for Ideas

Berkeley Center for Teaching & Learning - Active Learning Strategies

Harvard University - ablconnect

Active Learning in Algebra - Lesson Plan Repository

Additional Resources:

Dweck, C. & Leggett, E. (1988). A Social-Cognitive Approach to Motivation and Personality, *Psychological Review*. 95 (2), 256-273.

Eddy, S.L. & Hogan, K.A. (2014) Getting Under the Hood: How and for Whom Does Increasing Course Structure Work? *CBE Life Sciences Education, 13*(3), 453-468.

Good, C., Rattan, A., & Dweck, C.S. (2012) Why do women opt out? Sense of Belonging and Women's Representation in Mathematics. *Journal of Personality and Social Psychology*, 102(4), 700-717.

Ernst, D. (2015, January 14). Setting the Stage. Retrieved from http://danaernst.com/setting-the-stage/