

Research Based Classroom Practices that Improve Student Learning

SDSU ASEE Best Practices in Engineering
Education Series

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What is your impression?

Pre-survey

- I understand what is meant by research based classroom practices.
- Research based classroom practices are easy to implement.
- Research based classroom practices don't fit in engineering classrooms.
- I use research based classroom practices in the courses I teach.
- Research based classroom practices help my students learn.

Overview

- Define research based classroom practices
- Examples of research based classroom practices
- Discussion of practices, what we have done, what worked, what didn't

What is a research based classroom practice?

- A teaching practice that is based on research in:
 - Cognitive science
 - How our brains acquire and use information
 - Practices of Master teachers
 - Teachers whose classrooms show the highest gains in achievement in controlled environments
 - Cognitive supports to help students learn complex tasks
 - Instructional procedures that aid learning

Examples from Marzano (2000) Ten Effective Research Based Instructional Strategies

Strategy	Description	Measured change in % points
Vocabulary	Focus on specific words	0.95 to 32
Comparing, contrasting, classifying, analogies, and metaphors	Analyze in terms of similarities, differences, relationships	1.61 to 45
Summarizing and note taking	Filling in or translating to a synthesized brief form	1 to 34
Reinforcing effort and giving praise	Added effort is recognized	0.8 to 29
Homework and practice	Practice skills	0.77 to 28
Nonlinguistic representation	Using figures and imagery	0.75 to 27
Cooperative learning	Assigned working together	0.74 to 27
Setting objectives, providing feedback	Goal setting, direction, purpose	0.61 to 23
Generating and testing hypotheses	Deductive thinking, making predictions, checking	0.61 to 23
Cues, questions, advanced organizers	Retrieving what they already know	0.59 to 22

Vocabulary

- Do you implement this?
- How?

Comparing, Contrasting, etc.

- Do you implement this?
- How?

Summarizing, note-taking

- Do you implement this?
- How?

Reinforcing, Praising

- Do you implement this?
- How?

Homework, practice

- Do you implement this?
- How?

Nonlinguistic representation

- Do you implement this?
- How?

Cooperative learning

- Do you implement this?
- How?

Setting Objectives, feedback

- Do you implement this?
- How?

Generating and teaching hypotheses

- Do you implement this?
- How?

Cues, questions, advanced organizers

- Do you implement this?
- How?

What is your impression?

Post-survey

- I understand what is meant by research based classroom practices.
- Research based classroom practices are easy to implement.
- Research based classroom practices don't fit in engineering classrooms.
- I use research based classroom practices in the courses I teach.
- Research based classroom practices help my students learn.

References

- Rosenshine, Barak, (2012) Principles of Instruction, American Educator, Spring 2012, pages 12 -39 (non-contiguous), available on-line at:

<http://www.aft.org/pdfs/americaneducator/spring2012/Rosenshine.pdf>

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- Marzano, Robert J., (2000) Ten Effective Research-Based Instructional Strategies, available on-line at:

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