

## The Power of Self-Assessment as a Catalyst for Growing Students' Understanding and Achievement

Susan Gay and Ingrid Peterson  
University of Kansas



## Self-assessment Tasks

Three themes in these tasks

- Making thinking visible
  - Written rather than oral
  - Focused on content rather than attitude or opinion
- Developing self-awareness of approaches to learning
- Prompting connections between prior and new knowledge

In the writing tasks, there are elements of self-regulated learning, self-monitoring, and metacognition.

## Reflective Thinking and Writing

"Reflective thinking, as a component of metacognition, is the ability to reflect critically on learning experiences and processes in order to inform future progress" (Owen & Vista, 2017, para. 1).

Integrating writing in math enhances and improves students' understanding of math (e.g., Quealy, 2014).

Owen, D., & Vista, A. (2017). Strategies for teaching metacognition in classrooms. Retrieved from <https://www.brookings.edu/blog/.../strategies-for-teaching-metacognition-in-classroom>  
Quealy, C. (2014). The importance of writing in mathematics: Why writing allows for a deeper understanding of the mathematical content. *The Review: A Journal of Undergraduate Student Research* 15, 19-22. Retrieved from <http://fisherpub.sjlc.edu/ur/vol15/iss1/6>

## Beginning College-level Mathematics Courses

### Intermediate Algebra and College Algebra

- Mostly freshmen
- Some students repeat one or both courses
- Focus on developing content knowledge and building success

- At least some content is review.

### Mathematics for Elementary School Teachers I and II

- Sophomores in first two semesters of a teacher preparation program
- College Algebra prerequisite
- Focus on enhancing content knowledge of the mathematics they will teach and building confidence

- At least some content is review.

## Developing Self-awareness of Approaches to Learning

Writing to self-assess mathematical performance

### Examples

- How did you study for the exam? What will you do differently?
- What did you do well on the exam? What do you need to improve?
- Write about your performance on the exam, focusing on mathematics, identifying personal strengths and weaknesses.

## Self-assessment & Self-regulated learning

In these tasks, we are promoting self-assessment related to self-regulated learning strategies which include

- Goal setting (e.g., what will you do differently next time?)
- Organizing and developing schedules and settings (e.g., how did you study for the exam?)
- Reviewing notes or tests (e.g., identify personal strengths and weaknesses)

Self-reflection as part of self-regulation stimulates more focused attention on the behavior and provides opportunities to consider changing behavior if needed to reach goals (Schmitz & Perels, 2011).

Schmitz, B., & Perels, F. (2011). Self-monitoring of self-regulation during math homework behaviour using standardized diaries. *Metacognition and Learning*, 6, 255-273.

### Developing Self-awareness of Approaches to Learning

Writing to self-assess mathematical exam performance

#### Test Reflection Example

Copy the problem and your work as it was done on the exam. Describe the error in your thinking. Then rework the problem correctly.

### Prompting Connections Between Prior & New Knowledge

After reviewing online content intended as mostly review material, future elementary teachers respond to four items to document their participation and provide self-assessment.



### Prompting Connections Between Prior & New Knowledge

- How many different times did you login to access this content?
- Approximately how much time in total did you spend with this material?

These two questions focus on the self-regulated learning strategy called self-monitoring.

The act of recording one's own behaviors could change behaviors (Schmitz & Perels, 2011).

### Prompting Connections Between Prior & New Knowledge

- About how much of the information was review for you? (5 multiple-choice responses that range from "All was review" to "All was new material")
- List topics that were new or unfamiliar to you.

These items are an opportunity for students to evaluate the status of their own knowledge and provide insight to the instructor about gaps in knowledge that one or more students have.

### Prompting Connections Between Prior & New Knowledge

Prior to a unit exam, future elementary teachers answer three items\* to document how their thinking about one concept in the unit has changed.

- I used to think ...
- Now I know ...
- Explanation

\*Adapted from a Visible Thinking Routine from Project Zero at Harvard.



### I used to think... Now I know...

Completing these statements involves students' thinking about their own thinking or metacognition.

- Helps them see where progress in understanding has occurred.
- Helps them recognize how their own understanding changed after instruction.