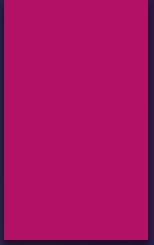


# Welcome to “Inside the Numbers!”

To save time during the talk, please do the following **before** we begin:

1. Read the **top of the green handout** carefully.
2. Familiarize yourself with the layout of the rest of the handout, both front and back pages.

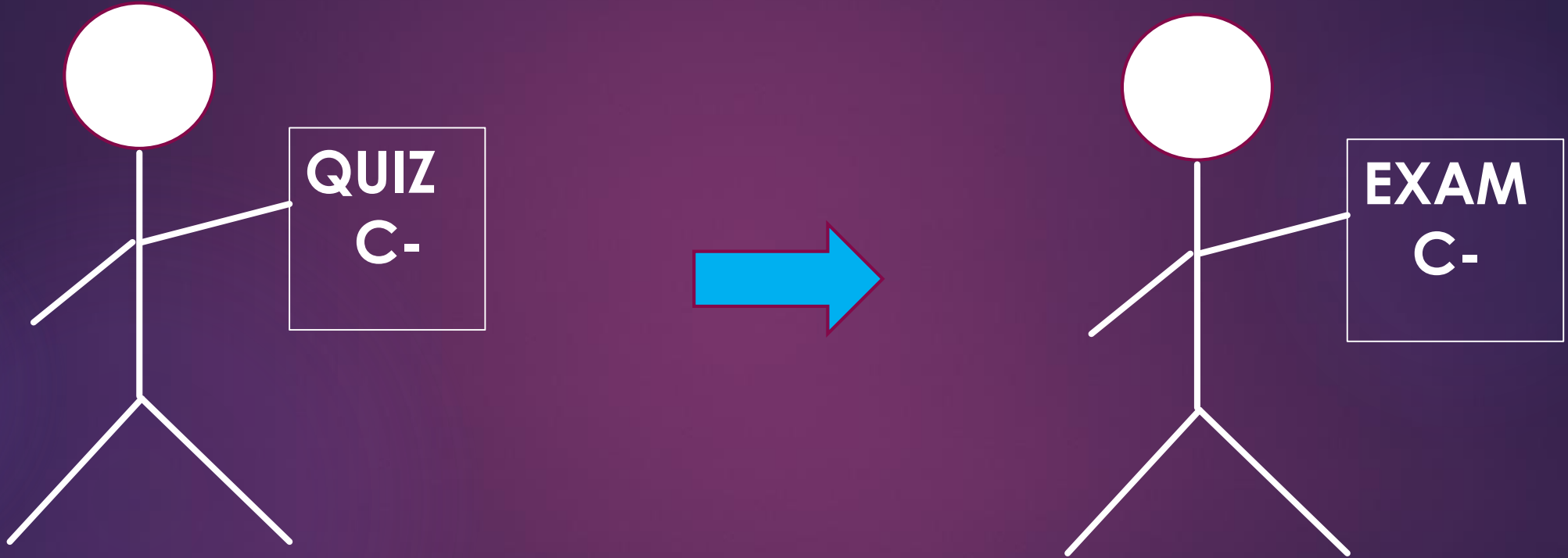
Thank you!



***Inside the Numbers:***  
Motivating Students to  
Use Metacognition Skills and  
Track Their Learning Progress

Stacey A. Cederbloom  
University of Mount Union  
May 19, 2018

# The Problem:



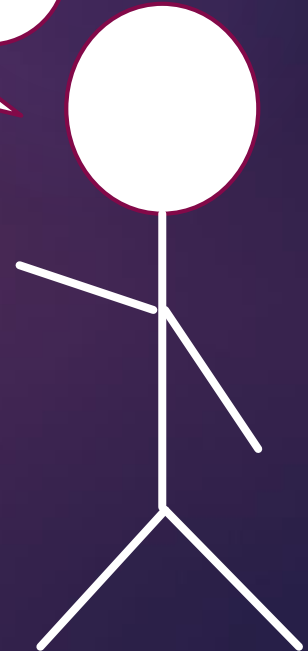
# It was not enough to . . .

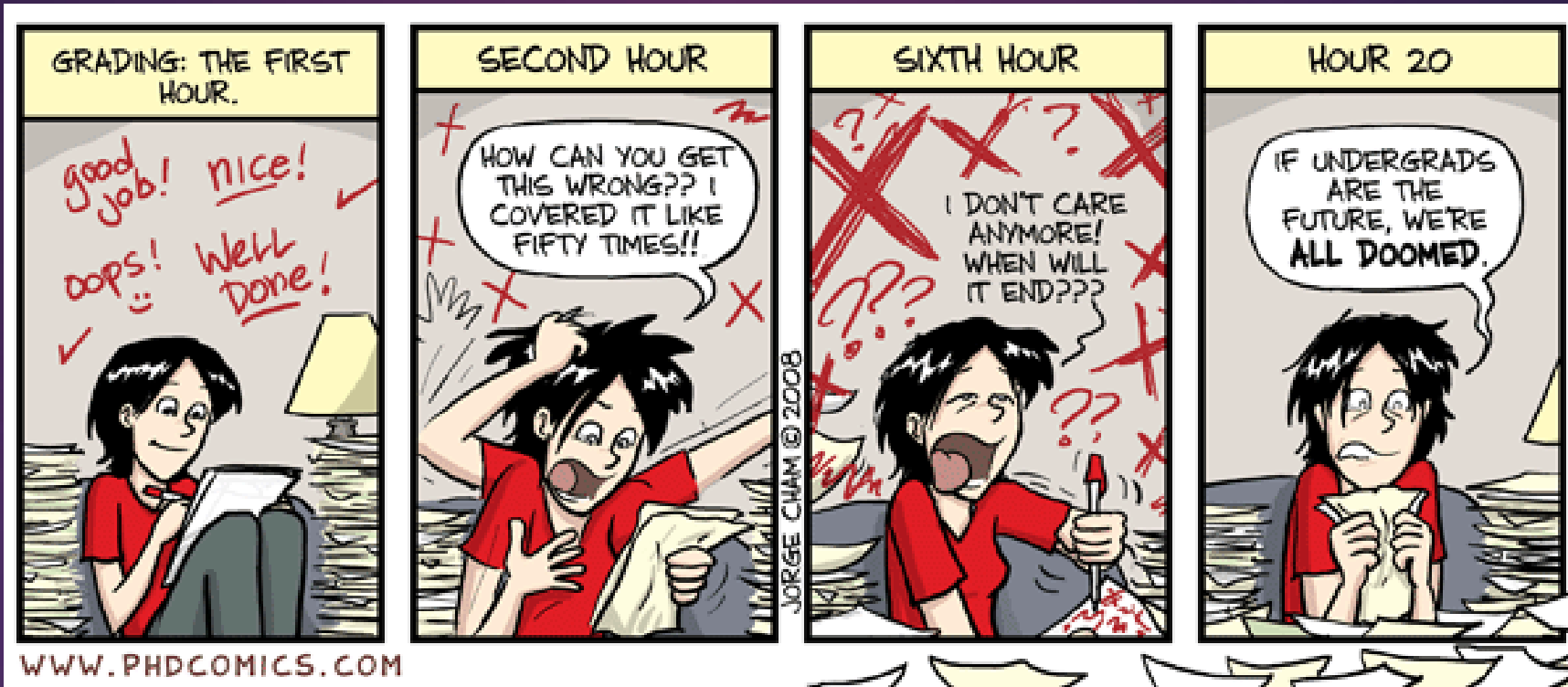


Feedback

**Exam study tip:**

**Redo** (don't just "look over") problems from the **homework and quizzes!**





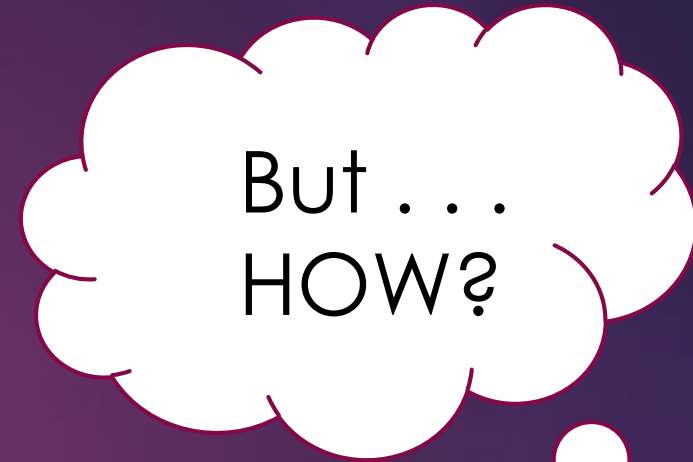
Can you relate?

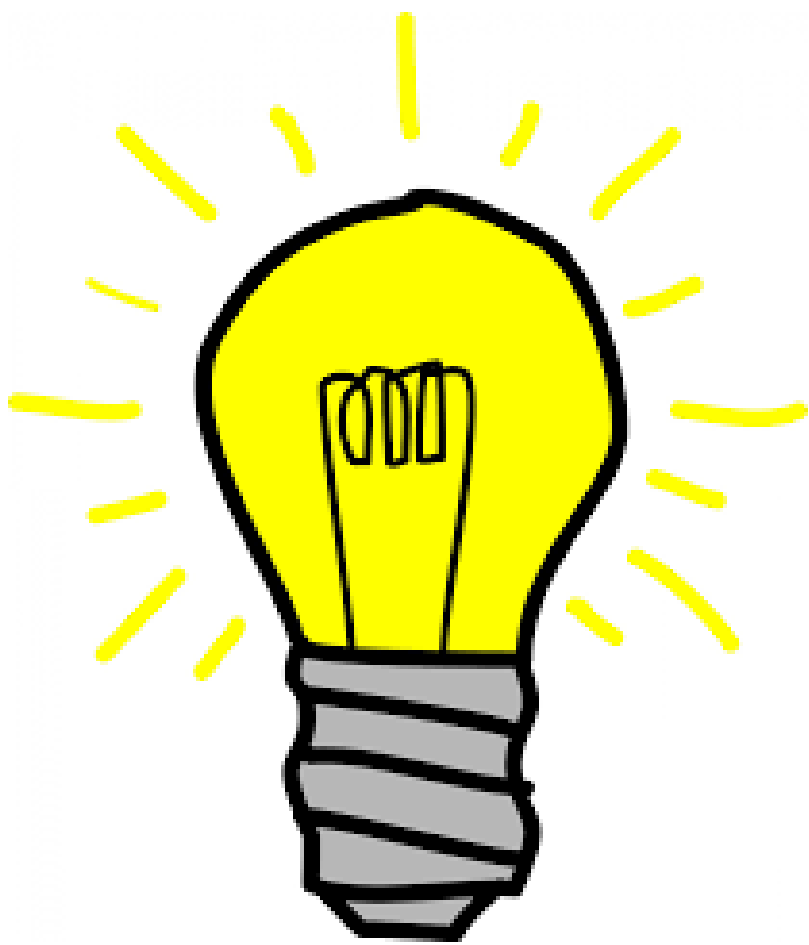
# What I wanted the students to do:

Recognize what they know and don't know.

Articulate that in a more productive way than "I don't get ones like #5 on page 26."

Show a marked improvement from quizzes to exams.





## *Inside the Numbers:*

*A tool to motivate students to use their metacognition skills & track their learning progress.*

# Outline:

- I. A Research-supported Solution
- II. Design and Implementation Details
- III. Results
- IV. Positive By-products
- V. Conclusion and References
- VI. Questions and Discussion



# I. A Research-supported Solution

## Definition of student self-assessment

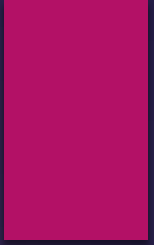
Self-assessment can refer to students grading their own quizzes or exams, and research by Sadler and Good (2006) found that that did positively affect students' scores on exams (as cited in Moss & Brookhart, 2009, p. 80).

# Our definition of self-assessment

However, we are going to look at self-assessment that students do as a part of the learning process before an exam or summative assessment.

In other words, we are going to look at student self-assessment as it relates to formative assessment.

Moss and Brookhart (2009) define student self-assessment as the students' "opportunity to review their work and become more aware of their strengths, their progress, and the gaps in learning that still need to be addressed." (p. 80 )



“Research results repeatedly confirm that when students are required to think about their own learning and articulate what they understand and what they still need to learn, achievement improves” (Black & Wiliam, 1998a; Hattie, 2009, as cited in Chappuis, 2015).



## II. Design & Implementation Details

# Design and Implementation Details

- A. Quiz
- B. Concepts
- C. Corrections
- D. Confidence level
- E. Improvement plan
- F. Record keeping

MTH 105  
"Inside the Numbers" for Unit 1

Name \_\_\_\_\_

*For each concept/skill, determine which one describes you. Remember, it is a continuum!*

**Limited:** You are not sure where to start, OR, when people explain, you still get confused.

**Progressing:** You are successful when looking at an example problem or when people explain the process to you. However, you get confused when you try it on your own.

**Mastery:** You are successful without looking at an example and without anyone helping you. However, you don't feel comfortable explaining to others how to do problems involving these concepts and skills.

**Exemplary:** Not only are you able to do problems involving these concepts and skills, but you are also confident that you could lead others through them without getting lost!

<i>Concept/Skill</i>	<i>L</i>	<i>P</i>	<i>M</i>	<i>E</i>	<i>WQ Problem #'s</i>
<b>Exponents:</b> Mult. and Div. Like Bases	WQ	_____	_____	_____	#'s: <u>1, 2, 3</u>
<b>Exponents:</b> Using Power to a Power	WQ	_____	_____	_____	#'s: <u>1, 2, 3, 4</u>
<b>Exponents:</b> Dealing w/ Neg. Exp.'s	WQ	_____	_____	_____	#'s: <u>1, 2, 3, 4</u>
<b>Polynomials:</b> Adding and Subtracting	WQ	_____	_____	_____	#'s: <u>6, 7</u>
<b>Polynomials:</b> Multiplying	WQ	_____	_____	_____	#'s: <u>6, 7</u>
<b>Polynomials:</b> Dividing	WQ	_____	_____	_____	#'s: <u>7</u>
<b>Factoring:</b> GCF and Grouping	WQ	_____	_____	_____	#'s: _____
<b>Factoring:</b> Trinomials	WQ	_____	_____	_____	#'s: _____
<b>Factoring:</b> Diff. of Perfect Squares	WQ	_____	_____	_____	#'s: _____

For each concept/skill, determine which one describes you. Remember, it is a continuum!

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Concept/Skill	L	P	M	E	WQ Problem #'s
<b>Exponents:</b> Mult. and Div. Like Bases	WQ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#'s: 1, 2, 3
<b>Exponents:</b> Using Power to a Power	WQ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#'s: 1, 2, 3, 4
<b>Exponents:</b> Dealing w/ Neg. Exp.'s	WQ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#'s: 1, 2, 3, 4
<b>Polynomials:</b> Adding and Subtracting	WQ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#'s: 6, 7
<b>Polynomials:</b> Multiplying	WQ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#'s: 6, 7
<b>Polynomials:</b> Dividing	WQ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#'s: 7
<b>Factoring:</b> GCF and Grouping	WQ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#'s: _____
<b>Factoring:</b> Trinomials	WQ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#'s: _____
<b>Factoring:</b> Diff. of Perfect Squares	WQ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#'s: _____

Concept/Skill	L	P	M	E	WQ Problem #'s
<b>Factoring:</b> Sum and Diff. of Cubes	WQ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#'s: _____
<b>Factoring:</b> To Solve Equations	WQ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#'s: _____
<b>Basic Skills:</b> Number Facts	WQ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#'s: _____
<b>Basic Skills:</b> Signed Numbers	WQ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	#'s: _____

#### Methods for Improvement:

On the blanks provided, write down *specific study strategies* that you are going to use to improve in your "trouble" areas. Examples include going to office hours, going to tutoring, re-doing h.w. problems (book), using the study plan on MyMathLab, using Quizlet, meeting with classmates to practice, etc. . . .

<b>Exponents:</b> Multiplying Like Bases	Redo Hw
<b>Exponents:</b> Using Power to a Power	Redo Hw
<b>Exponents:</b> Dealing w/ Neg. Exp.'s	Go to office hours!
<b>Polynomials:</b> Add. and Subt.	-
<b>Polynomials:</b> Multiplying	-
<b>Polynomials:</b> Dividing	Redo Hw just in case
<b>Factoring:</b> GCF and Grouping	_____
<b>Factoring:</b> Trinomials	_____
<b>Factoring:</b> Diff. of Perfect Squares	_____
<b>Factoring:</b> Sum and Diff. of Cubes	_____
<b>Factoring:</b> To Solve Equations	_____
<b>Basic Skills:</b> Number Facts	_____
<b>Basic Skills:</b> Signed Numbers	_____

#### Grades for Unit 1:

Weekly Quizzes:	Inside the #'s:	
WQ #1 14.5 / 20	4 / 4	Guided Notes #1 _____ / 4
WQ #2 _____ / _____	_____ / 4	Guided Notes #2 _____ / 4
Unit 1 Exam _____ / 90		CCSP-MML _____ / 4
MyMathLab C-G %: _____		CCSP-Remind _____ / 2
		CCSP-Quizlet _____ / 2

# Implementation Obstacles



- How can I possibly fit this into my already-crunched time frame for class??
- How will I handle the fact that some students will take far more time to complete this than others?



# Implementation Solution



## Office Hours!!!

*-They will be “required” if a student wants to earn a few points for making corrections and rating his/her confidence level on each skill covered on the quiz.*

*-Office hours need to be held in a room big enough to accommodate several students at one time. Having students sign up ahead of time on the board or via email helps.*

*-The professor needs to have high energy and a “bookkeeping” system!*



# My Bookkeeping System:

1. ***When a student corrects a problem and we discuss it . . .***  
I put a star next to the correction and an “OK” next to the actual quiz problem.
2. ***When a student is done correcting all problems . . .***  
I sign my initials on the corrections AND the quiz.
3. ***When a student is done rating his/her confidence level . . .***  
I sign my initials on his/her “Inside the Numbers” sheet and check it off in my gradebook.

# III. Results

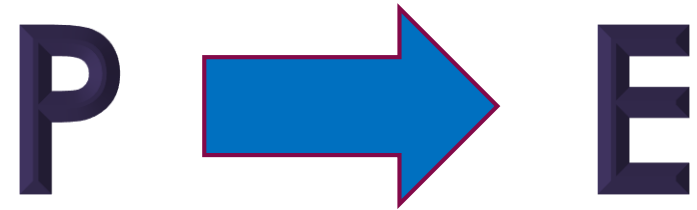
A. Students' verbal remarks

B. Students' written remarks

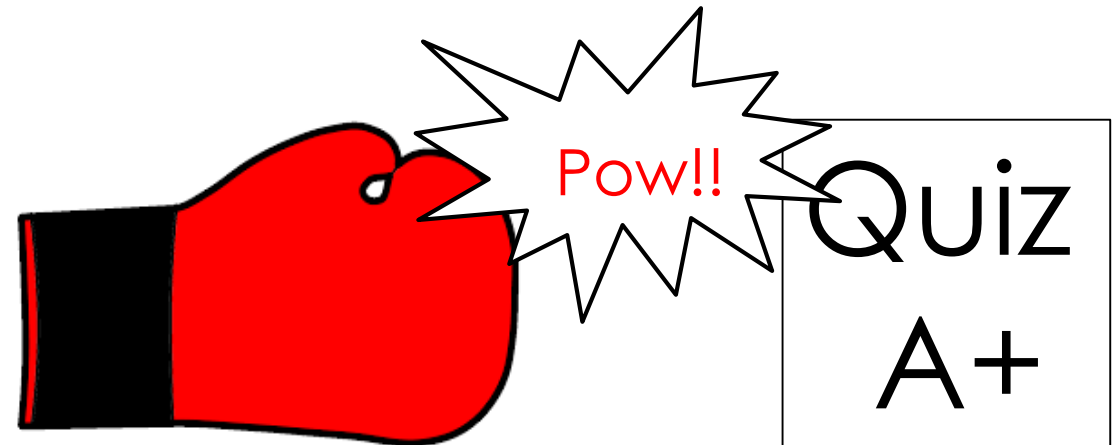
C. My experience grading

# Students' Verbal Remarks

“This is so awesome!  
I came in at a ‘P’ and  
now I’m leaving at an ‘E.’”



“If I could take  
this quiz again,  
I’d CRUSH it!”



# Students' written responses to “What most helped your learning in MTH 105?”

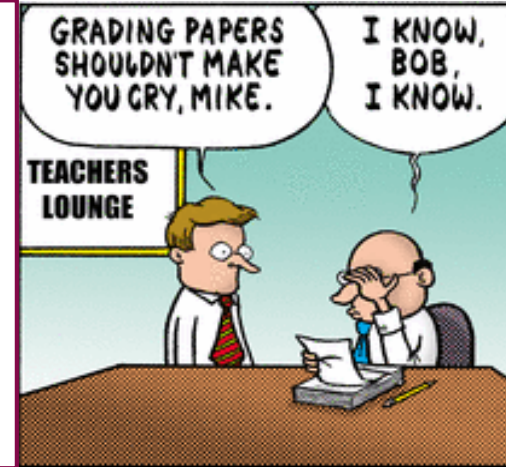
“going back and looking at mistakes and actually completing the problems over again helps. Talking through mistakes helped me to remember the concepts.”

“looking through tests and quizzes and actually taking the time to correct problems instead of just seeing what I did wrong”

“going in to fix my mistakes so I wouldn't make them again”

# My experience grading . . .

Before Implementing  
Inside the Numbers



After Implementing  
Inside the Numbers



# IV. Positive By-products

- A. One-on-one time (or at least small-group) occurs
- B. Persistence pays off
- C. Good habits tend to continue

# A. One-on-one time (or at least small-group) occurs

“According to Therese Huston (2009, p. 196), we need to ‘normalize help-seeking behaviors’ because ‘undergraduates are often uncomfortable revealing their confusion about course material.’” (Felten et al., 2016, p. 32)

1 on 1  
with  
75 of 85

## Message:

I CARE about you as a person **and** your success in my class!

“office hours always helped and especially Inside the Numbers. Being able to sit down with you and actually go over what I did wrong and trying again was helpful.”

## B. Persistence pays off

My sports analogies usually resonate with students . . .

Quizzes = Scrimmages

Exams = Games

Final Exam = Tournament

**“If I ever had any questions they were answered in office hours. It was encouraging knowing that if I messed up bad, I still got some points back.”**



## C. Good habits tend to continue

*“Effective self-assessment is present when students see the value of reflection and begin to do it routinely, whether asked to or not.” (Moss and Brookhart, 2009, p. 91)*

**Spring '17: 11/13**

**Fall '17: 10/11**

**Spring '18: 8/10**

“Holding office hours and making them mandatory for Inside the Numbers because it forced me to start coming in from the beginning and I realized how helpful they were!”

# V. Conclusion

Perhaps the students weren't "blowing me off" as I initially suspected.

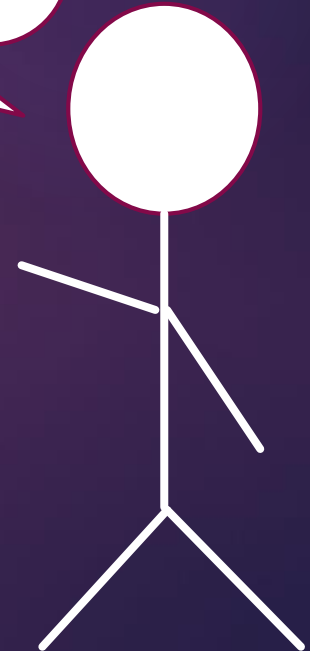
Perhaps they were attempting my suggestions but just getting stuck because . . .

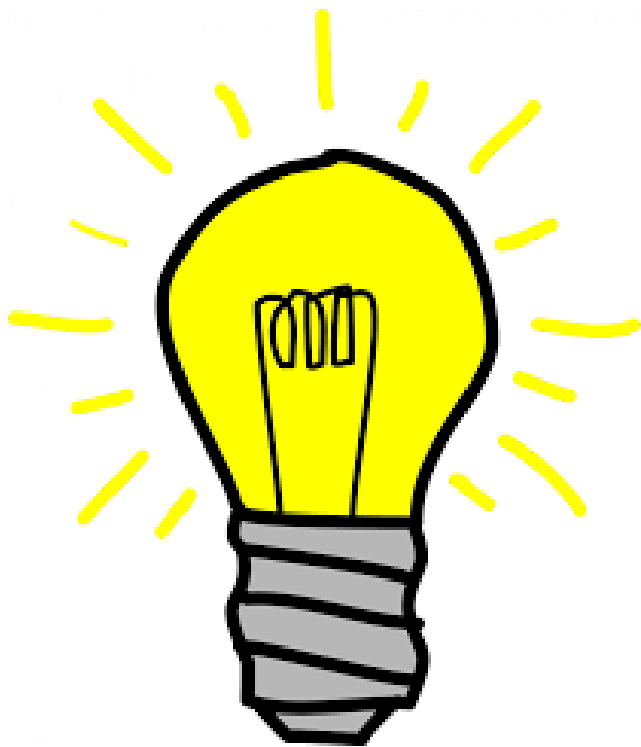
# It was not enough to



Feedback

**Exam study tip:**  
**Redo** (don't just "look over") problems from the **homework and quizzes!**





I needed to give them the opportunity to look beyond their quiz grades and really analyze their learning . . .

I needed to give them the opportunity to truly go **“Inside the Numbers.”**

# References

- ▶ Brookhart, S. M. (2008). How to Give Effective Feedback to Your Students. Alexandria, VA: ASCD.
- ▶ Chappuis, J. (2015). Seven Strategies of Assessment for Learning, 2<sup>nd</sup> ed. New York: Pearson.
- ▶ Felten, P., Gardner, J. N., Schroeder, C. C., Lambert, L. M., & Barefoot, B. O. (2016). The Undergraduate Experience: Focusing Institutions on What Matters Most. San Francisco: Jossey-Bass.
- ▶ Moss, C. M., & Brookhart, S. M. (2009). Advancing Formative Assessment in Every Classroom: A Guide for Instructional Leaders. Alexandria, VA: ASCD.

# VI. Ask Some Questions!

- I. A Research-supported Solution
- II. Design and Implementation Details
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  - C. Corrections
  - D. Confidence level
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  - A. One-on-one time occurs
  - B. Persistence pays off
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Thank you!!

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