

**“It is Easy When You Do It”  
Making Passive Algebra Students  
Active Learners**

Presenter: Kimberly Kinder  
Department of Mathematics and Statistics  
Missouri University of Science and  
Technology – Rolla, MO

# My Background

- High School Teacher for 15 years
- MST/UMR instructor for 11 years
- As a high school teacher presented many workshops for teachers
- At MST worked with 3 week “Hit the Ground Running Program” for 10 years
- At MST worked with Opening Week Problem Solving Workshop for 10 years
- Married with 2 boys – 19 and 16 years old

# MST Background

- Located in south central Missouri
- A STEM intensive university
- 81% of incoming Freshmen have declared a engineering major
- Lowest math class is Intermediate Algebra
- 2 versions of College Algebra
  - 3 credit hour – 9.5 weeks everyday (followed by Trig - 2 credit hour – 5.5 weeks everyday)
  - **5 credit hour – 15 weeks everyday**
- Placement exam used to place students by exam score. (Missouri Mathematics Placement Test)

# The Problem

- Students in Math 2 (5 hour College Algebra) have difficulty succeeding in Math.
- I felt frustrated as an instructor with high failure rates in Math 2 (now Math 1120).
- The Committee on Student Success (formally the Retention Committee) was looking into the low success rate in Math 2.

# Background

- Fall 2012 I taught two Math 2 courses
- Class A: 9 out of 29 had D, F, or WD (31%)
- Class B: 13 out of 34 had D, F, or WD (38%)

# Current Student Profile

- This generation is tech savvy – Facebook, Twitter, Instagram, Snapchat, YouTube
- Instilled with the “everyone’s a winner” and there are no “loser’s”
- They expect to get “do over’s”
- Difficulty failing (tolerating, managing, learning from mistakes, accepting constructive criticism, blaming others or taking victim role)

# Current Student Profile

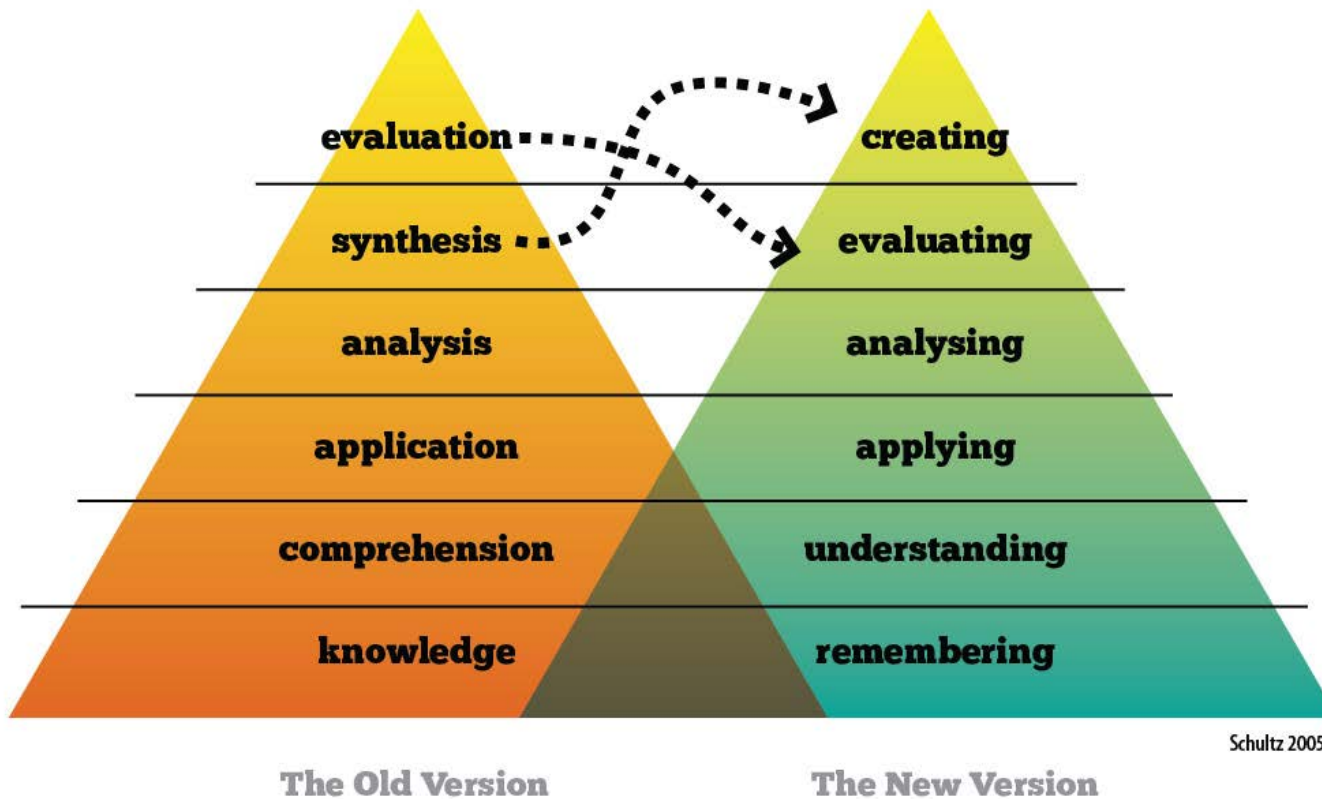
- Lacking self-awareness
- Difficulty recognizing their limitations
- Difficulty taking ownership for decisions and actions
- Inability to focus on the now

# Proposed Solution

- Use some class time for guided group work
- Have student work in groups of 2 or 3
- Circulate among students and provide assistance as needed.



# Bloom's Taxonomy



# Activities Used

- One or two problems as end of lesson to check understanding.
- Full class period on some review days.
- [Review Chapter 6](#)
- [Review Solving Equations](#)

# Activities Used

- Guided discovery lesson—gave students handout and had them begin one class period and finish outside class. Draw conclusions the next class period.
- [Rational Functions Activity](#)

# Results Fall 2013

(average of each section on Exams)

	Exam 1	Exam 2	Exam 3	Exam 4	Exam 5	Exam 6	Final Exam	# Students
<b>Sect A (8 am)</b>	78.2	72.9	66.2	60.4	60.2	56.3	52.8	34
<b>Sect B (11 am)</b>	83.5	75	76.5	75.8	73.4	70.1	58.7	34
<b>Sect C (11 am)</b>	<b>79.7</b>	<b>75.3</b>	<b>85.5</b>	<b>70.1</b>	<b>68.4</b>	<b>74.4</b>	<b>64.6</b>	<b>37</b>
<b>Sect D (2 pm)</b>	<b>84.6</b>	<b>79.8</b>	<b>83.4</b>	<b>79.7</b>	<b>72.9</b>	<b>79.5</b>	<b>71.9</b>	<b>24</b>

Sections A and B taught by other instructors. Sections C & D taught by Mrs. Kinder

# Results Fall 2014

(average of each section on Exams)

	Exam 1	Exam 2	Exam 3	Exam 4	Exam 5	Exam 6	Final Exam	# Students
<b>Sect A (8 am)</b>	72.2	71.5	69.3	76.4	72.3	64.5	61.6	45
<b>Sect B (11 am)</b>	84.5	78.7	82.6	71.9	76.1	73.1	53.8	35
<b>Sect C (11 am)</b>	<b>81.3</b>	<b>74.9</b>	<b>74.3</b>	<b>64.1</b>	<b>71.2</b>	<b>66.1</b>	<b>64.2</b>	<b>33</b>
<b>Sect D (2 pm)</b>	<b>80.3</b>	<b>73.4</b>	<b>77.3</b>	<b>68.7</b>	<b>74.6</b>	<b>65.7</b>	<b>64.3</b>	<b>42</b>

Sections A and B taught by other instructors. Sections C & D taught by Mrs. Kinder

# Comparison 11 AM Class Fall 2013

(11 am average minus average of other section)

	Exam 1	Exam 2	Exam 3	Exam 4	Exam 5	Exam 6	Final Exam
<b>C-A</b>	1.5	2.4	19.3	9.7	8.2	18.1	11.8
<b>C-B</b>	-3.8	0.3	9	-5.7	-5	4.3	5.9
<b>C-D</b>	-4.9	-4.5	2.1	-9.6	-4.5	-5.1	-7.3

A = Other 8 am section of Math 2

B = Other 11 am section of Math 2

C = Mrs. Kinder's 11 am section of Math 2

D = Mrs. Kinder's 2 pm section of Math 2

# Comparison 2 PM Class Fall 2013

(2 pm average minus average of other section)

	Exam 1	Exam 2	Exam 3	Exam 4	Exam 5	Exam 6	Final Exam
<b>D-A</b>	6.4	6.9	17.2	19.3	12.7	23.2	19.1
<b>D-B</b>	1.1	4.8	6.9	3.9	-0.5	9.4	13.2
<b>D-C</b>	4.9	4.5	-2.1	9.6	4.5	5.1	7.3

A = Other 8 am section of Math 2

B = Other 11 am section of Math 2

C = Mrs. Kinder's 11 am section of Math 2

D = Mrs. Kinder's 2 pm section of Math 2

# Comparison 11 AM Class Fall 2014

(11 am average minus average of other section)

	Exam 1	Exam 2	Exam 3	Exam 4	Exam 5	Exam 6	Final Exam
<b>C-A</b>	9.1	3.3	5.0	-12.3	-1.2	1.7	2.5
<b>C-B</b>	-3.1	-3.8	-8.4	-7.8	-5.0	-7.0	10.4
<b>C-D</b>	1.0	1.4	-3.0	-4.6	-3.4	0.4	-0.2

A = Other 8 am section of Math 2

B = Other 11 am section of Math 2

C = Mrs. Kinder's 11 am section of Math 2

D = Mrs. Kinder's 2 pm section of Math 2



# Comparison 2 PM Class Fall 2014

(2 pm average minus average of other section)

	Exam 1	Exam 2	Exam 3	Exam 4	Exam 5	Exam 6	Final Exam
<b>D-A</b>	8.1	1.9	8.0	-7.7	2.2	1.2	2.7
<b>D-B</b>	-4.1	-5.2	-5.3	-3.1	-1.5	-7.4	10.6
<b>D-C</b>	-1.0	-1.4	3.0	4.6	3.4	-0.4	0.2

A = Other 8 am section of Math 2

B = Other 11 am section of Math 2

C = Mrs. Kinder's 11 am section of Math 2

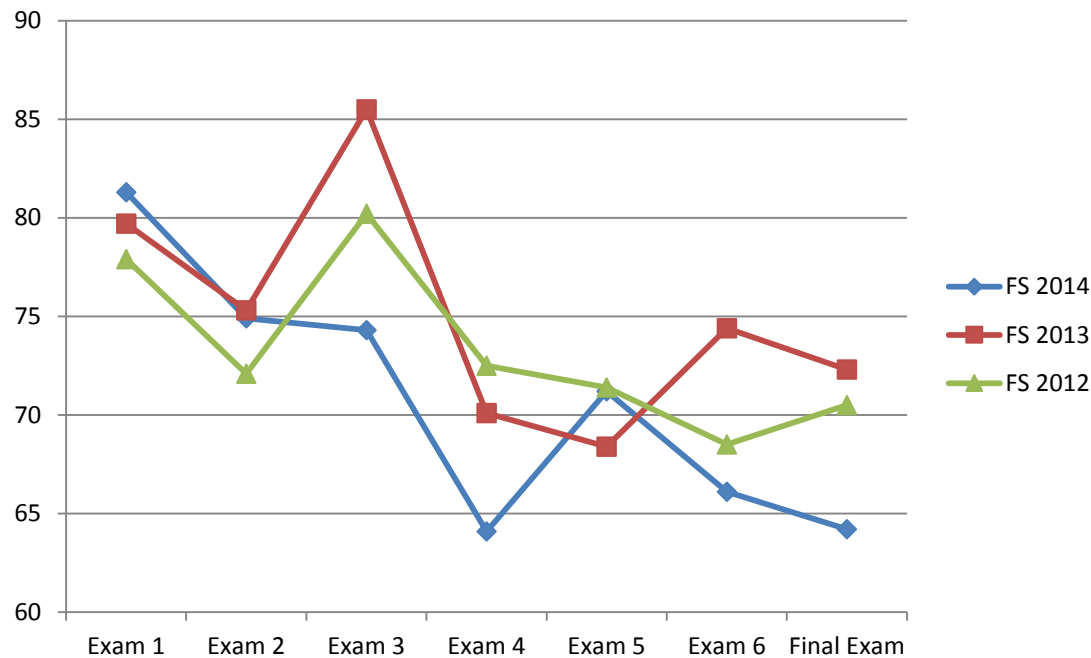
D = Mrs. Kinder's 2 pm section of Math 2

# Comparison to Prior Years

Semester	Time	Exam 1	Exam 2	Exam 3	Exam 4	Exam 5	Exam 6	Final Exam	Class Size
FS 2014	11 AM	81.3	74.9	74.3	64.1	71.2	66.1	64.2	33
FS 2014	2 PM	80.3	73.4	77.3	68.7	74.6	65.7	64.3	42
FS 2013	11 AM	79.7	75.3	85.5	70.1	68.4	74.4	72.3	37
FS 2013	2 PM	84.6	79.8	83.4	79.7	72.9	79.5	72.0	24
FS 2012	11 AM	77.9	72.1	80.2	72.5	71.4	68.5	70.5	29
FS 2012	2 PM	82.2	71.3	76.6	74.7	74.0	70.5	71.5	34
SP 2013	11 AM	75.5	74.3	63.6	66.3	67.3	63.9	57.4	28
SP 2012	11 AM	70.3	72.1	58.6	63.0	64.7	54.1	44.3	33

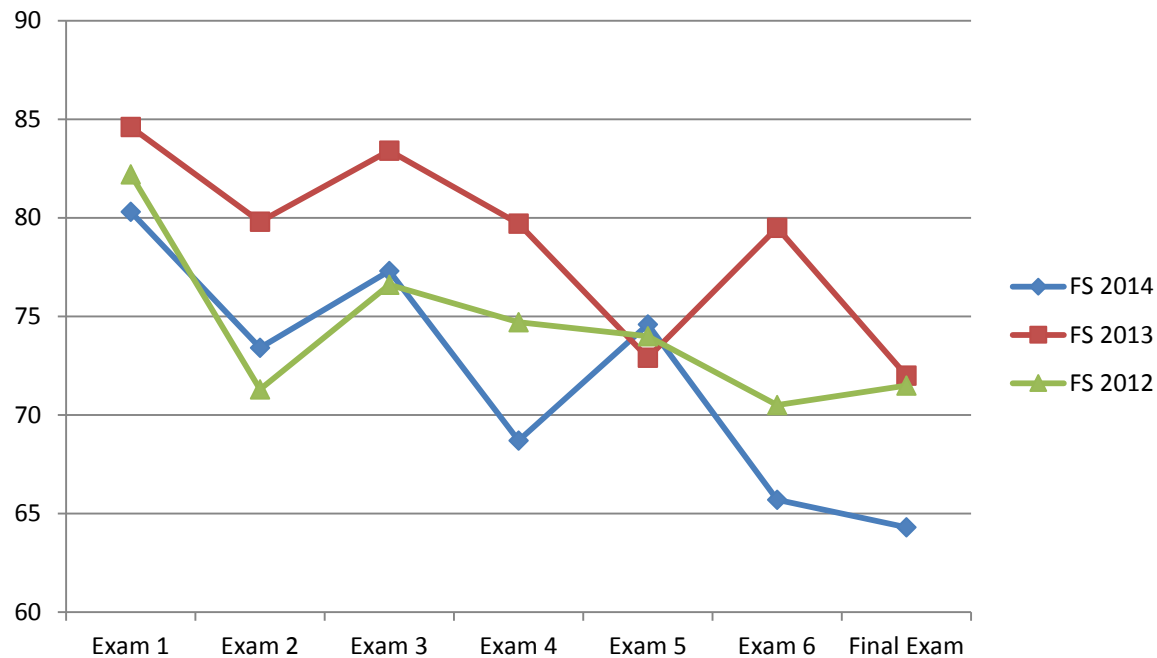
# Comparison to 11 AM

Semester	Time	Exam 1	Exam 2	Exam 3	Exam 4	Exam 5	Exam 6	Final Exam	Class Size
FS 2014	11 AM	81.3	74.9	74.3	64.1	71.2	66.1	64.2	33
FS 2013	11 AM	79.7	75.3	85.5	70.1	68.4	74.4	72.3	37
FS 2012	11 AM	77.9	72.1	80.2	72.5	71.4	68.5	70.5	29



# Comparison to 2 pm

Semester	Time	Exam 1	Exam 2	Exam 3	Exam 4	Exam 5	Exam 6	Final Exam	Class Size
FS 2014	2 PM	80.3	73.4	77.3	68.7	74.6	65.7	64.3	42
FS 2013	2 PM	84.6	79.8	83.4	79.7	72.9	79.5	72.0	24
FS 2012	2 PM	82.2	71.3	76.6	74.7	74.0	70.5	71.5	34



# D, F, & WD Rates

D,F, & WD Rates	8:00 AM	11:00 AM	11:00 AM	2:00 PM
Fall 2012	NA	NA	32% (n=31)	48% (n=40)
Fall 2013	50% (n=36)	43% (n=35)	29% (n=38)	8% (n=25)
Fall 2014	38% (n=45)	44% (n=32)	44% (n=34)	28% (n=46)

**Note:** These students must repeat College Algebra. A grade of C or higher in College Algebra is required as a prerequisite for Trigonometry and/or Calculus I.

# Tips for Educators

1. Don't throw technology into the classroom and hope for good things
2. Cut back on lecturing
3. Empower the students to collaborate
4. Focus on lifelong learning, not teaching to the test
5. Use technology to get to know each student
6. Reinvent yourself as a teacher, professor, or educator

# References

Generations X,Y, Z and the Others, William J. Schroer , The Social Librarian, Issue 11, April 16, 2004, <http://www.socialmarketing.org/newsletter/features/generation3.htm>

Grown Up Digital: How the Net Generation is Changing Your World by Don Tapscott (Nov. 08). *School 2.0 - Seven Tips for Educators p.148*

*New Dimensions to Psychosocial Development in Traditionally Aged College Students*, Blimling, Gregory S.; About Campus, Nov – Dec 2013

*Understanding Students of This Generation*, Powerpoint presentation, Patti J. Fleck, PhD, Director Counseling, Disability Support, and Student Wellness (CDSW) (2014).