

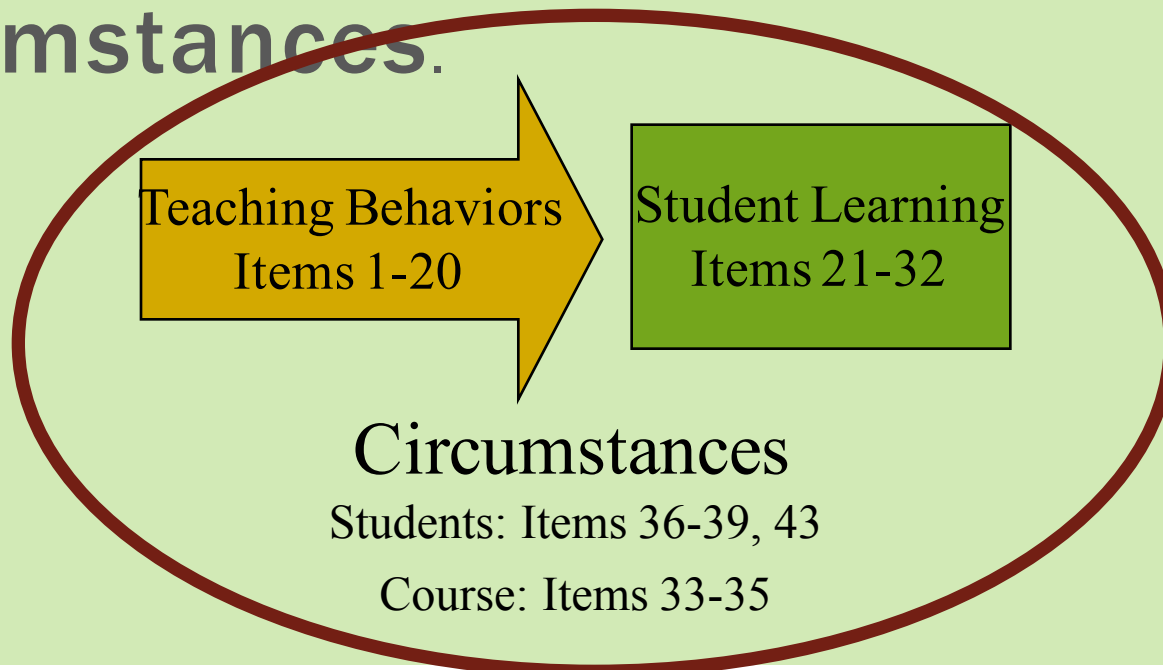
# Student perceptions in lower-level postsecondary STEM classes

Steve Benton, Ph.D.  
Senior Research Officer  
Emeritus Professor, Educational Psychology  
Kansas State University



# IDEA Student Learning Model

- Specific teaching methods influence certain types of student progress (learning) under certain circumstances.



<b>Learning Objective Category</b>	<b>Item Number</b>
<b>Basic Cognitive Background</b>	<b>1, 2</b>
<b>Applications of Learning</b>	<b>3, 4</b>
<b>Expressiveness</b>	<b>6, 8</b>
<b>Intellectual Development</b>	<b>7, 10, 11</b>
<b>Lifelong Learning</b>	<b>9, 12</b>
<b>Team Skills</b>	<b>5</b>

<b>Teaching Style Category</b>	<b>Item Number</b>
<b>Stimulating Student Interest</b>	<b>4, 8, 13, 15</b>
<b>Fostering Student Collaboration</b>	<b>5, 16, 18</b>
<b>Establishing Rapport</b>	<b>1, 2, 7, 20</b>
<b>Encouraging Student Involvement</b>	<b>9, 11, 14, 19</b>
<b>Structuring Classroom Experiences</b>	<b>3, 6, 10, 12, 17</b>

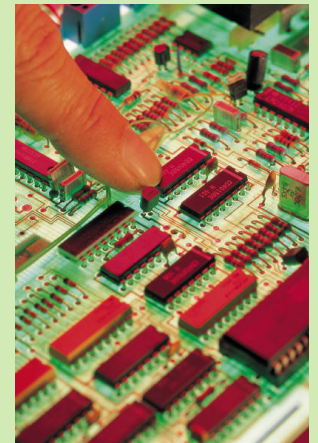
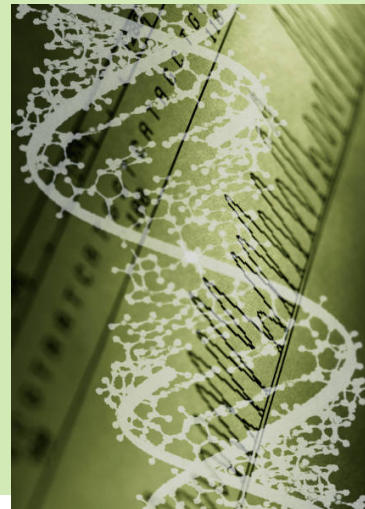
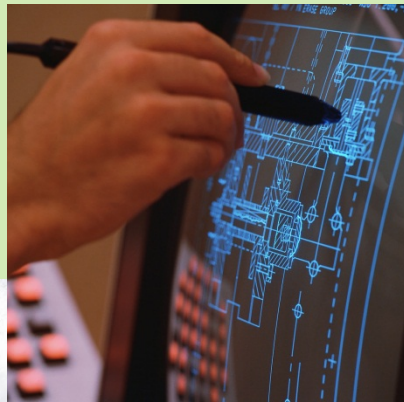
# Description of Sample

- **Classes using IDEA in academic years 2009-2013**
- **STEM Classes - 171,306**
  - Science - 82,200
  - Computer science - 21,188
  - Engineering - 12,444
  - Math - 55,474
- **Non-STEM Classes - 810,277**



# Relevant Learning Objectives in STEM Classes

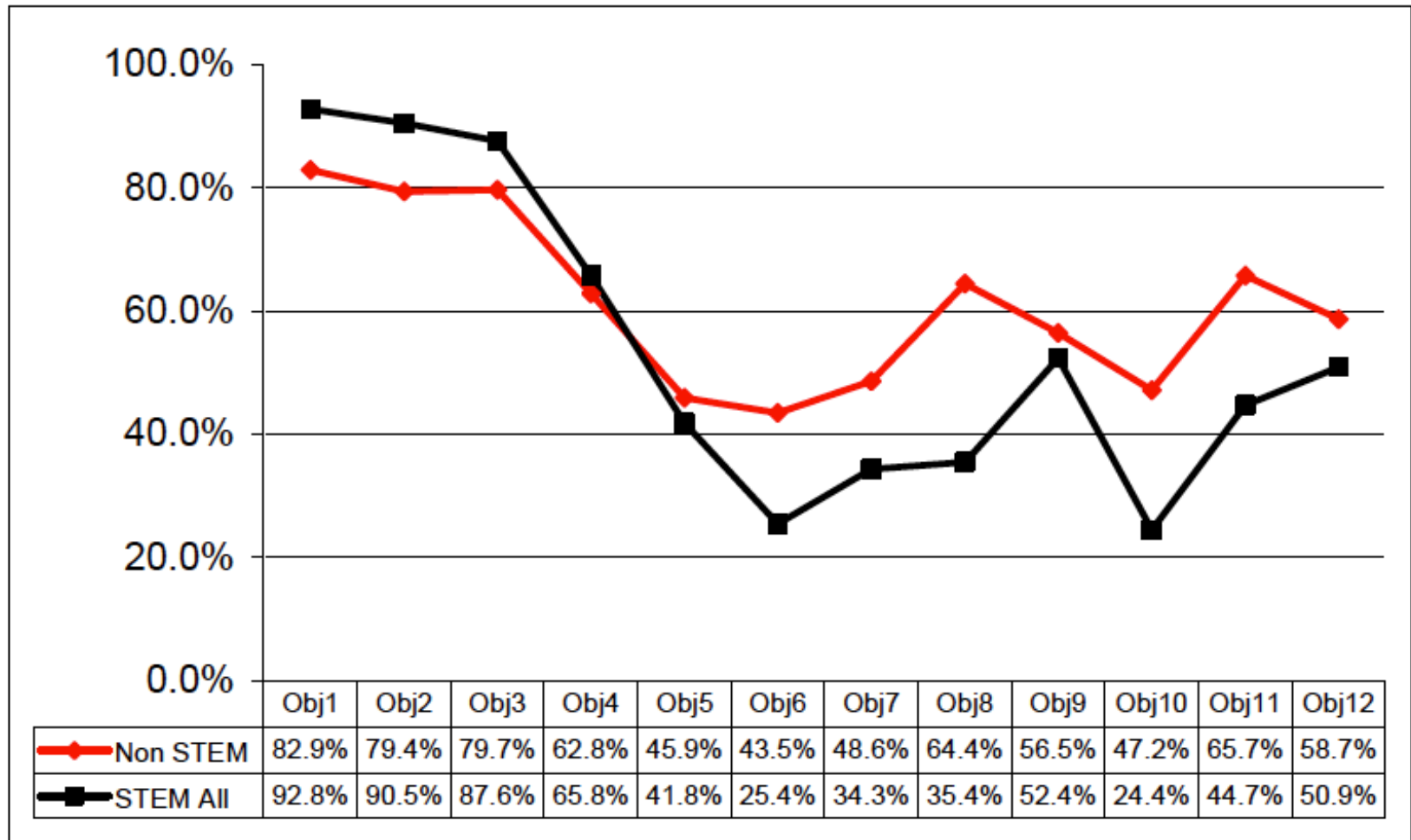
- Of the 12 IDEA Learning Objectives, which ones are most frequently selected by faculty as being Important or Essential in first-year/sophomore STEM and non-STEM courses?



# Learning Objectives Selected in Lower-level STEM versus non-STEM Classes

## Objectives Selected vs. Comparison Groups

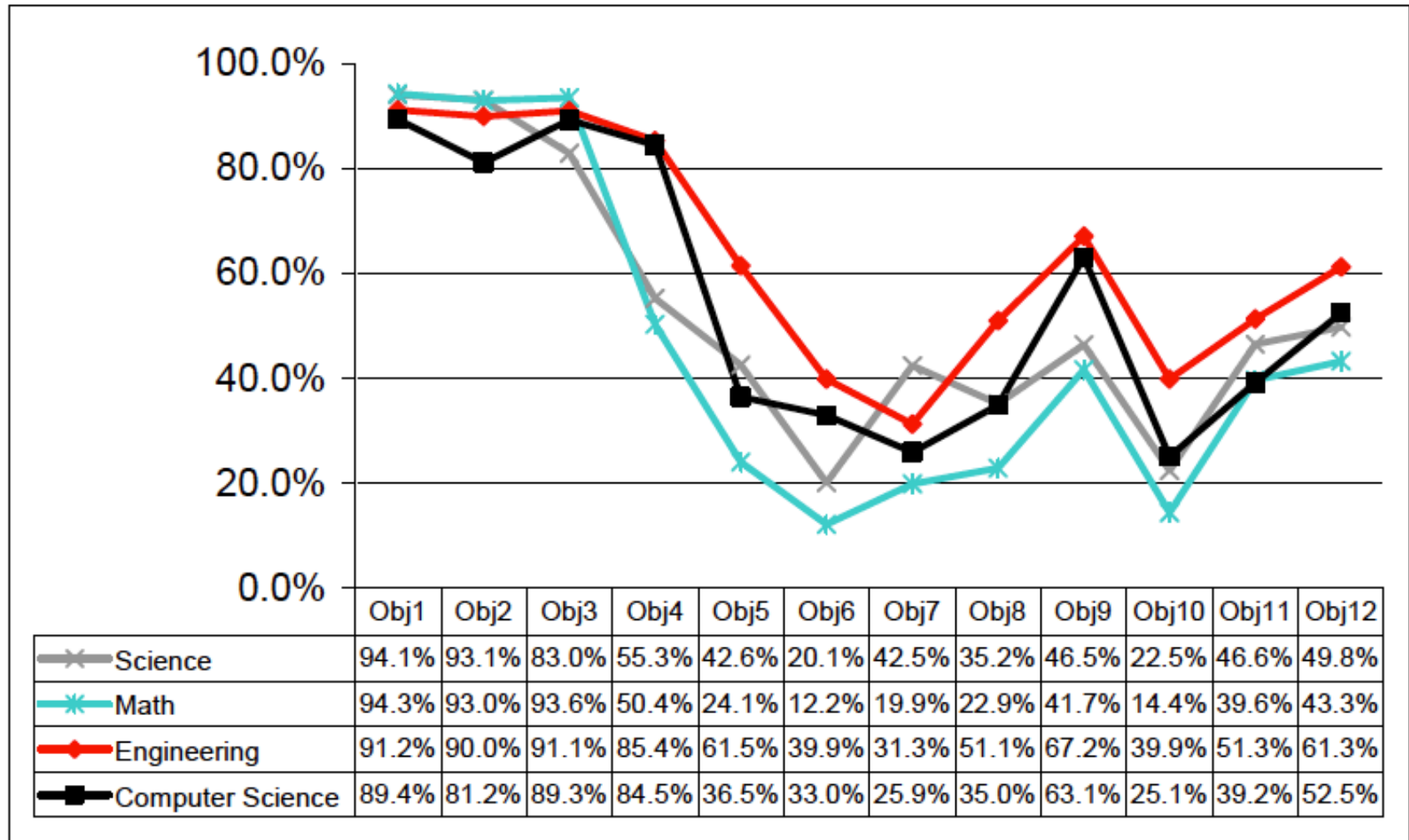
% of total classes where instructor selected objective as "Essential" or "Important"



# Learning Objectives Selected in Lower-level Science, Math, Engineering, and Computer Science Classes

## Objectives Selected vs. Comparison Groups

% of total classes where instructor selected objective as "Essential" or "Important"

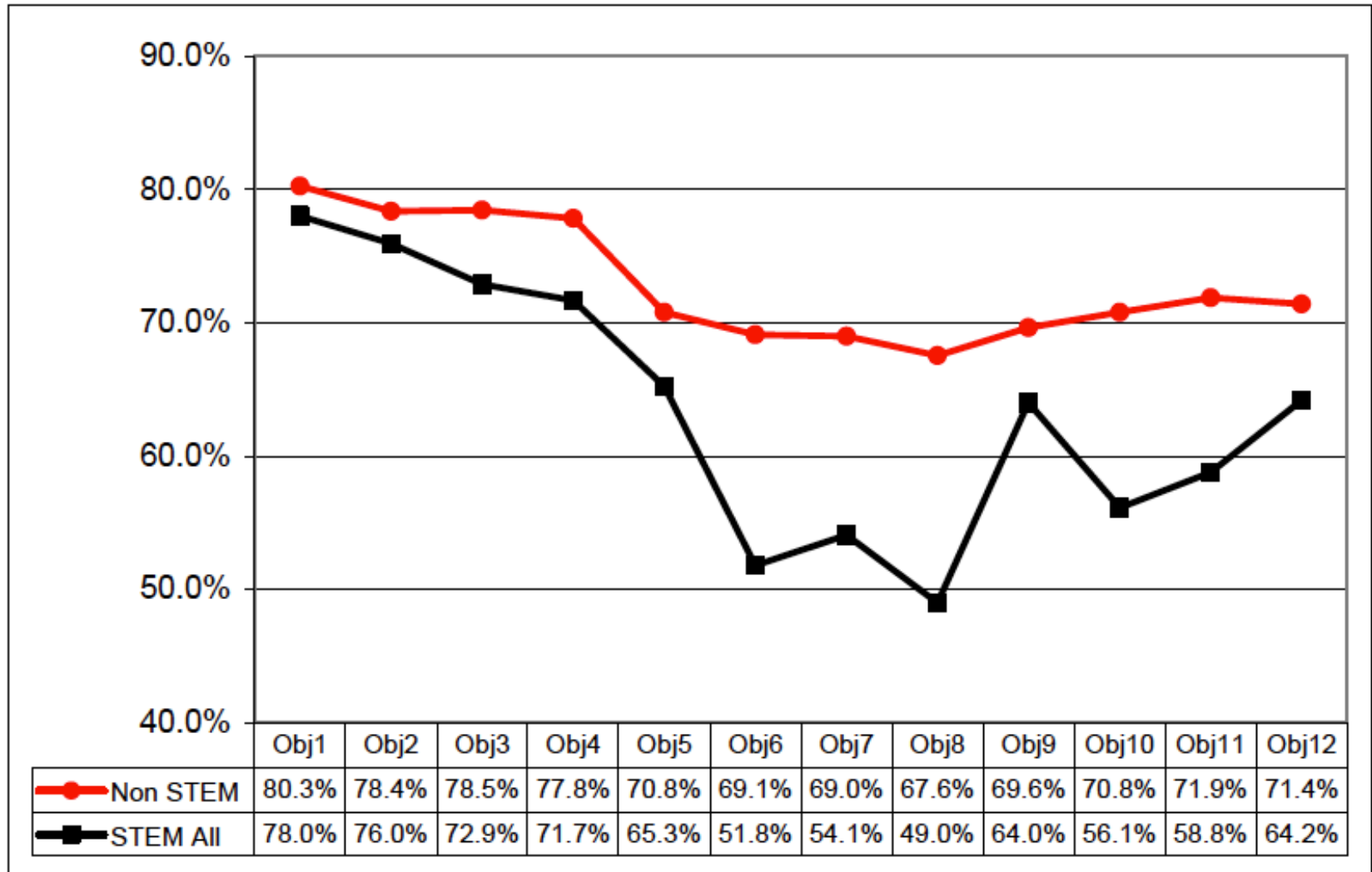




# Student Progress in Lower-level STEM versus non-STEM Classes

## Progress on Relevant Objectives

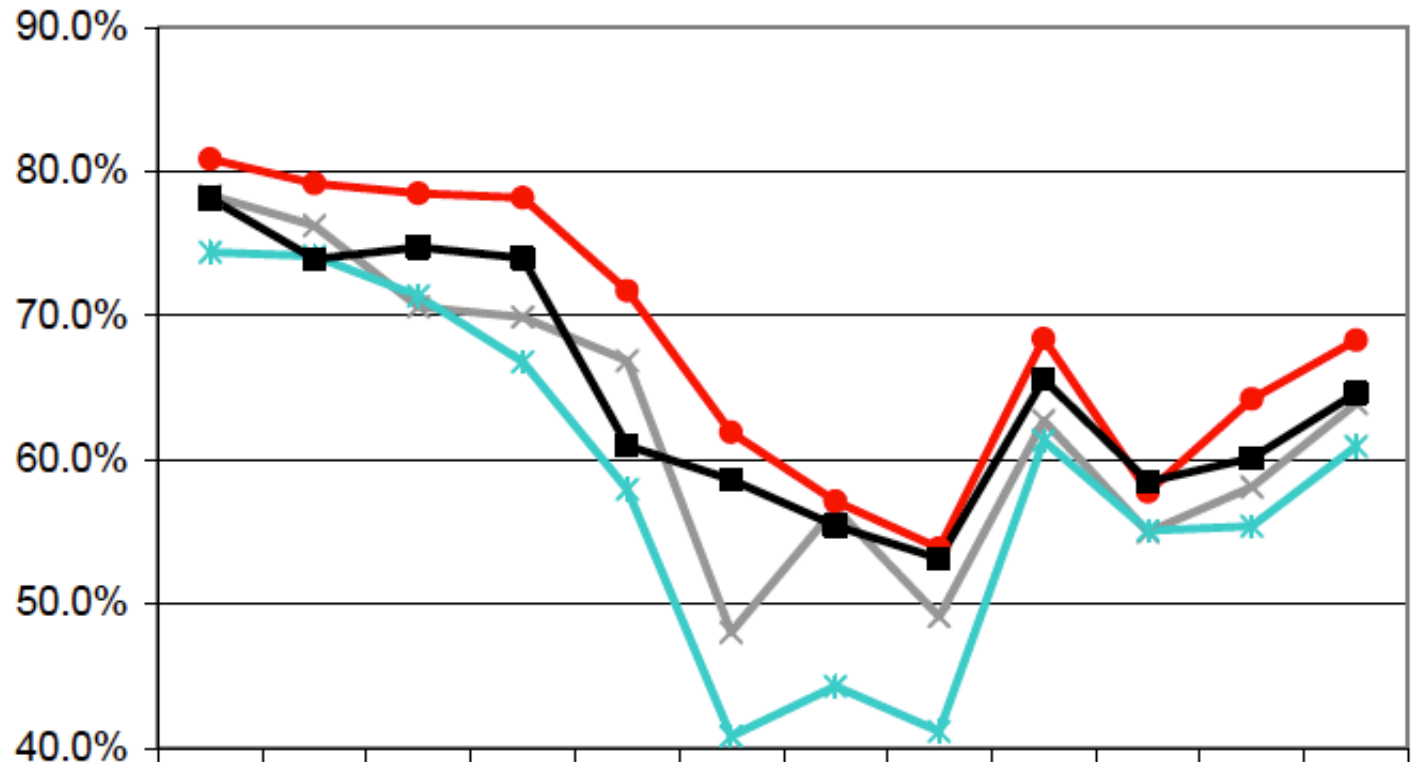
% responding "Exceptional" or "Substantial" progress



# Student Progress in Lower-level Science, Math, Engineering, and Computer Science Classes

## Progress on Relevant Objectives

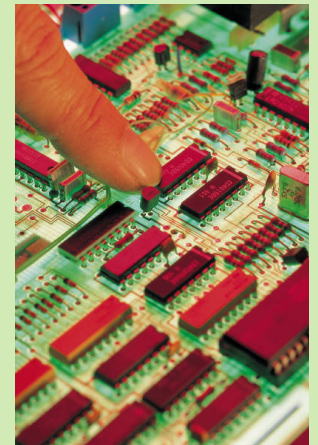
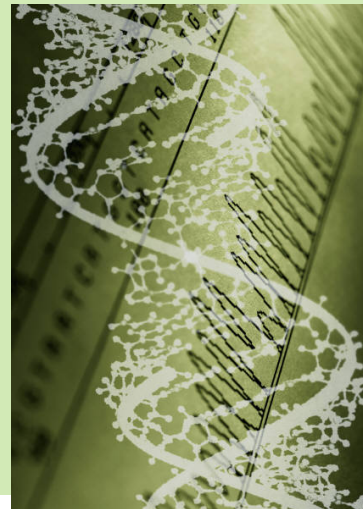
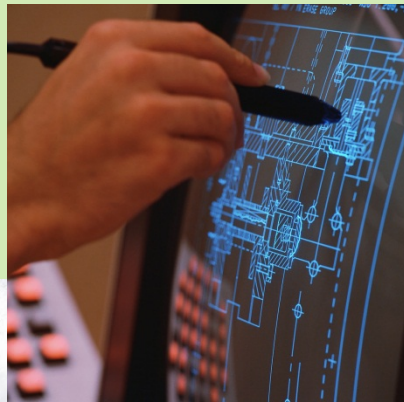
% responding "Exceptional" or "Substantial" progress



	Obj1	Obj2	Obj3	Obj4	Obj5	Obj6	Obj7	Obj8	Obj9	Obj10	Obj11	Obj12
Science	78.4%	76.3%	70.6%	69.9%	66.9%	48.0%	56.7%	49.1%	62.8%	55.0%	58.1%	63.9%
Math	74.4%	74.2%	71.4%	66.8%	58.0%	40.8%	44.3%	41.2%	61.3%	55.1%	55.4%	60.9%
Engineering	80.9%	79.2%	78.5%	78.2%	71.8%	61.9%	57.1%	53.9%	68.4%	57.8%	64.2%	68.3%
Computer Science	78.2%	74.0%	74.8%	74.0%	61.0%	58.6%	55.4%	53.1%	65.6%	58.5%	60.1%	64.6%

# Frequency of Teaching Styles

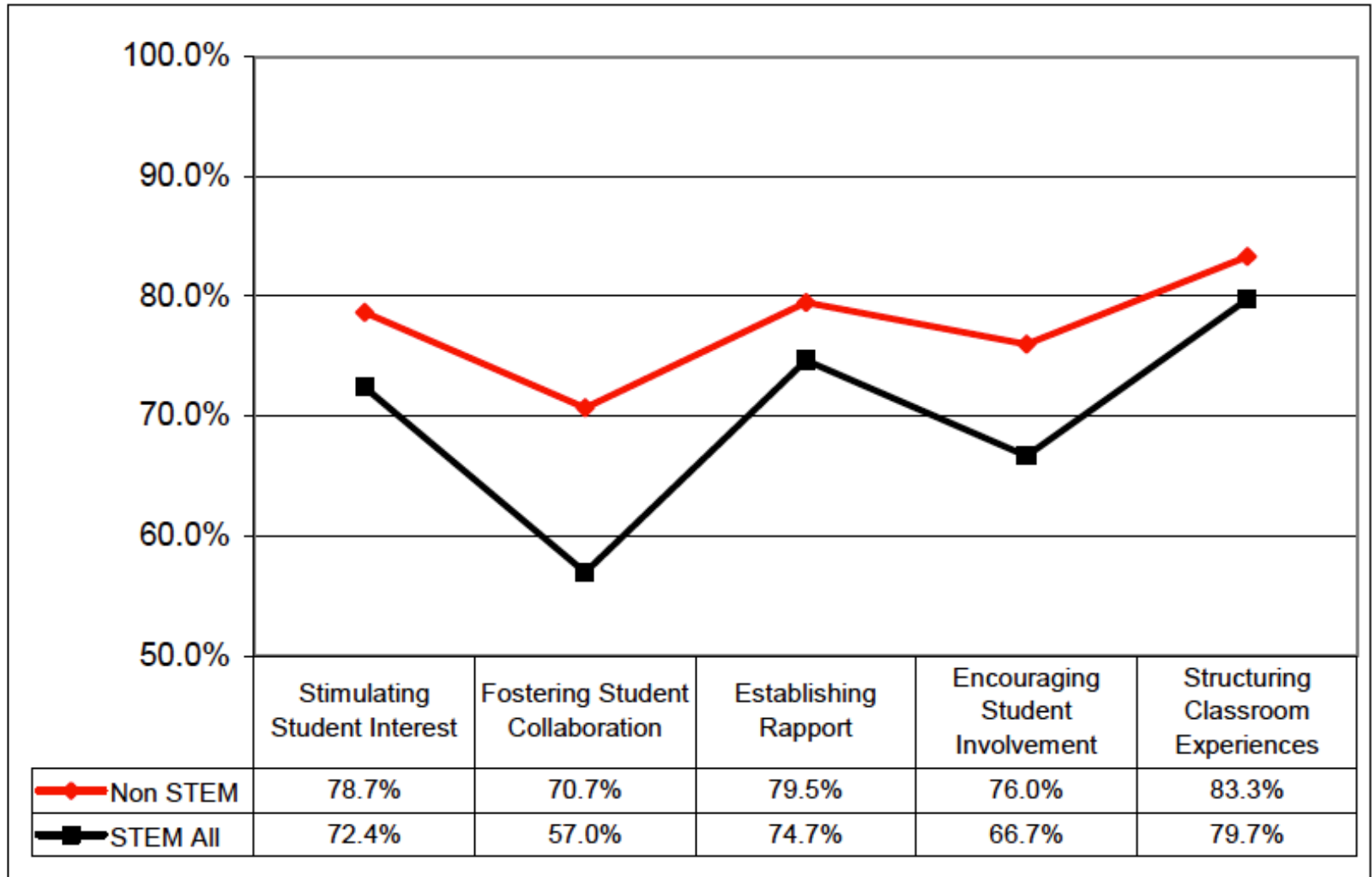
- Of the 5 IDEA Teaching Styles, which ones do students observe most frequently in first-year/sophomore STEM and non-STEM courses?



# Teaching Styles Emphasized in Lower-level STEM and non-STEM Classes

## Teaching Methods and Styles

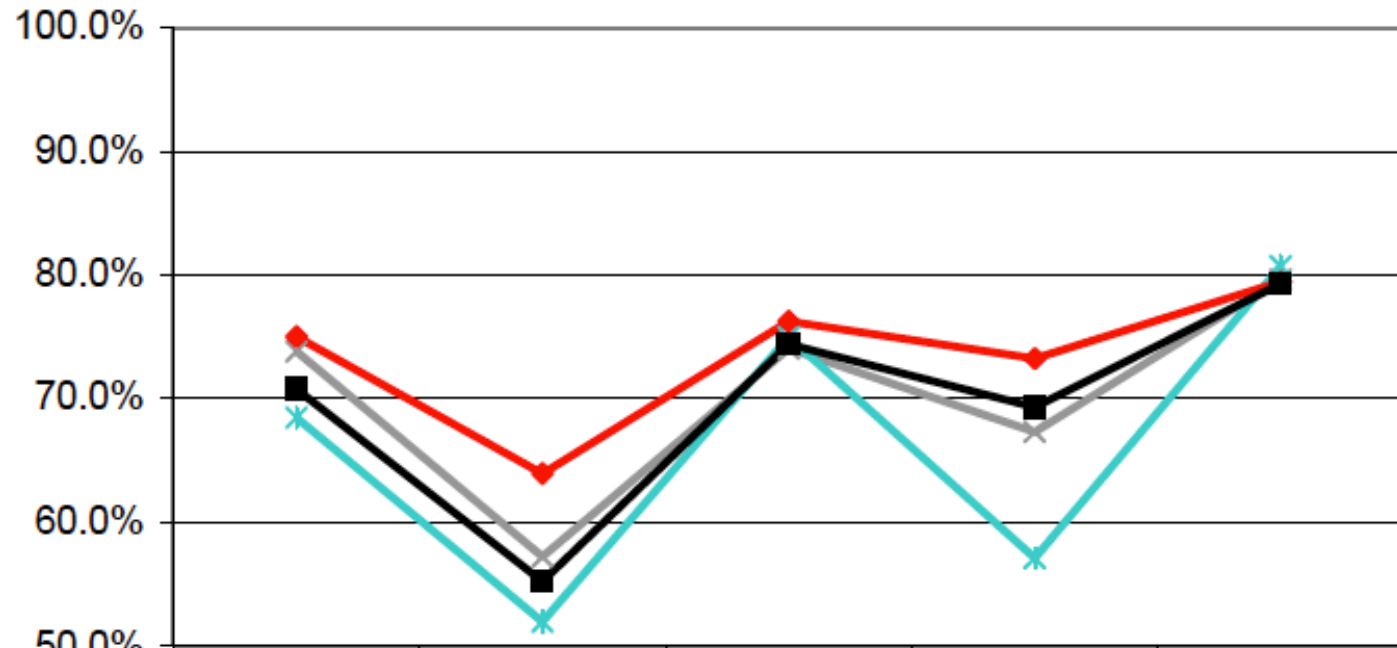
% responding that instructor employed methods "Almost Always" or "Frequently"



# Teaching Styles Emphasized in Lower-level Science, Math, Engineering, and Computer Science Classes

## Teaching Methods and Styles

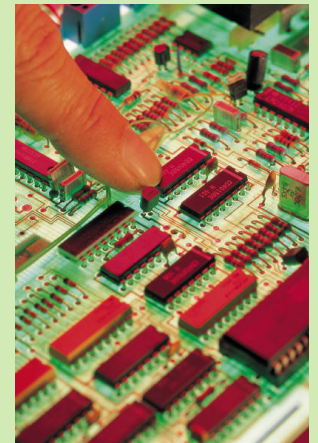
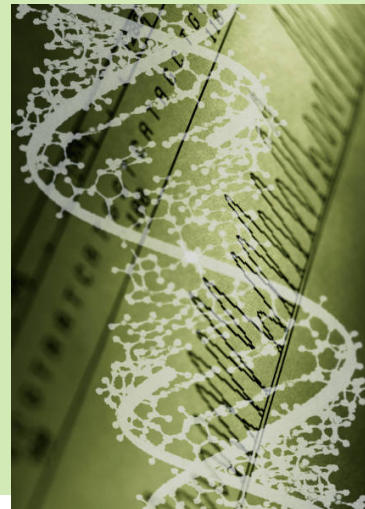
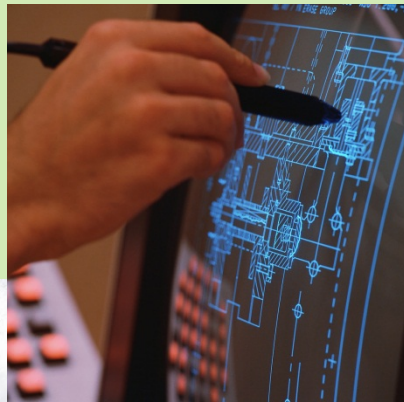
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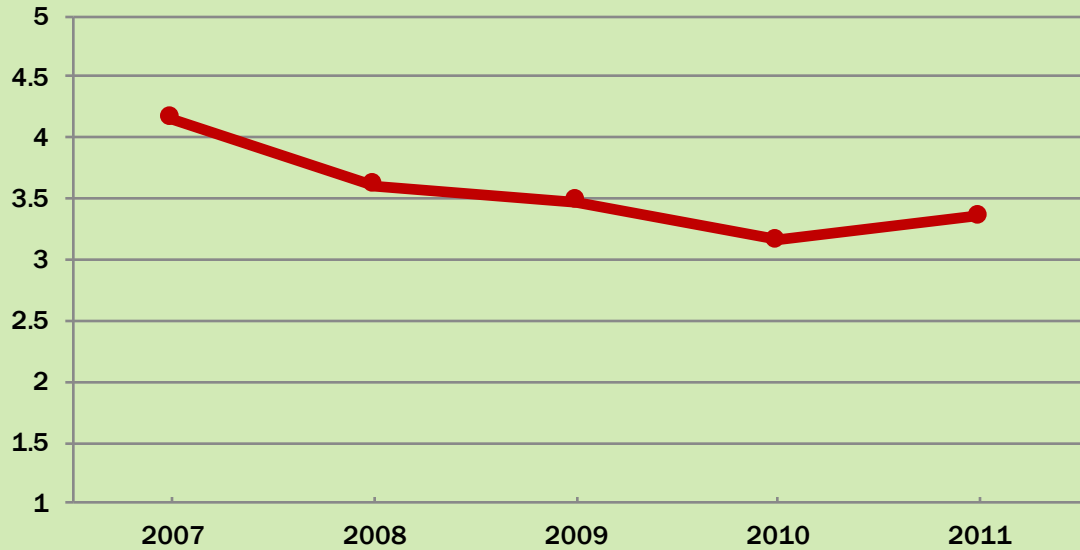
	Stimulating Student Interest	Fostering Student Collaboration	Establishing Rapport	Encouraging Student Involvement	Structuring Classroom Experiences
Science	73.8%	57.2%	74.1%	67.3%	79.6%
Math	68.5%	51.9%	75.0%	57.1%	80.7%
Engineering	75.0%	63.9%	76.3%	73.2%	79.4%
Computer Science	70.8%	55.2%	74.4%	69.3%	79.3%

# Longitudinal Course Analysis

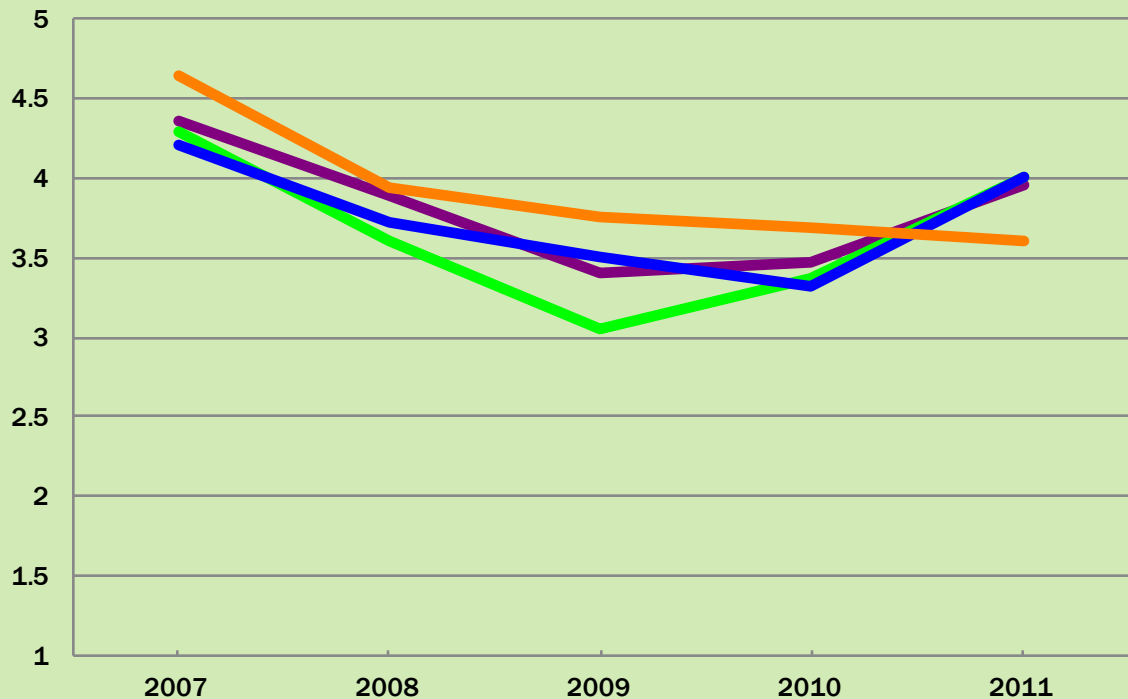
- How can student ratings be used to examine patterns in the same course, same instructor over time?







**No. 3: Learning to apply course material (to improve thinking, problem solving, and decisions)**




**No. 2: Found ways to help students answer their own questions**

**No. 4: Demonstrated the importance and significance of the subject matter**

**No. 6: Made it clear how each topic fit into the course**


**No. 15: Inspired students to set and achieve goals which really challenged them**

# Group Summary Report



IDEA Student Ratings of Instruction

**Group Summary Report**



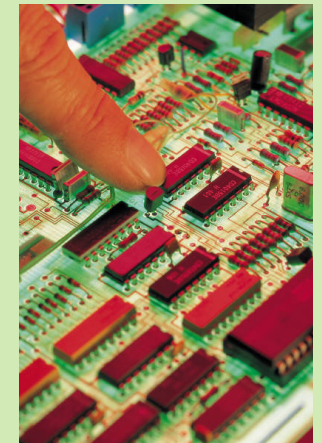
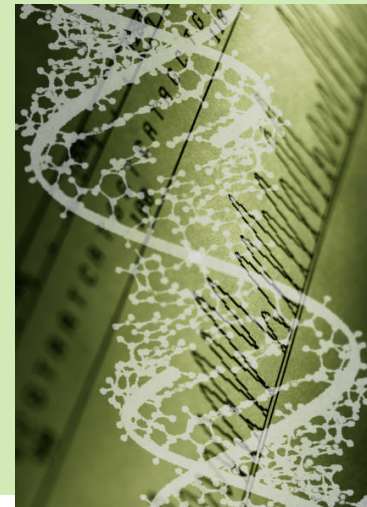
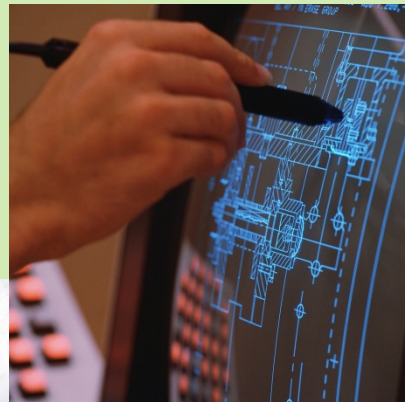
Sample English Department  
IDEA University  
Spring 2007

1. On average, how did this group of students rate their learning?
2. What contextual factors of the group impacted those ratings?
3. How do the average scores of this group compare to: IDEA, discipline, and institution?
4. What might the faculty in this group do to facilitate better learning for my students next time?



# Teaching Methods Associated with Student Progress on Relevant Objectives

- Which teaching methods are most highly associated with relevant learning objectives in lower-level STEM courses?



# Key Teaching Methods in Lower-Level STEM Courses

- **“Found ways to help students answer their own questions”**
  - Objective 4 (professional skills)
- **“Explained course material clearly and concisely”**
  - Objectives 1, 2, 3 (knowledge, application)
- **“Introduced stimulating ideas about the subject”**
  - Objectives 1, 2 (knowledge)
- **“Gave projects, tests, or assignments that required original or creative thinking”**
  - Objective 3 (application)

# Questions?

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Kansas State U

