

Assessing Collaborative Learning Strategies

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NSF Assessment Conference

NSF DUE-0206947

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**How should we assess
LEARNING?**

Traditional answers

Grades

Exams

Student evaluations

Our focus

Standardized assessments

Student evaluations
of their own understanding

Outline

Effect of collaborative strategies using standardized assessments?

How well can students evaluate own learning?

Outline

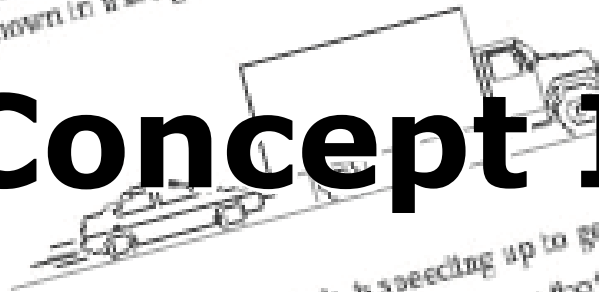
Effect of collaborative strategies
using standardized assessments?

How well can students evaluate
own learning?

Standardized assessments

Force Concept Inventory

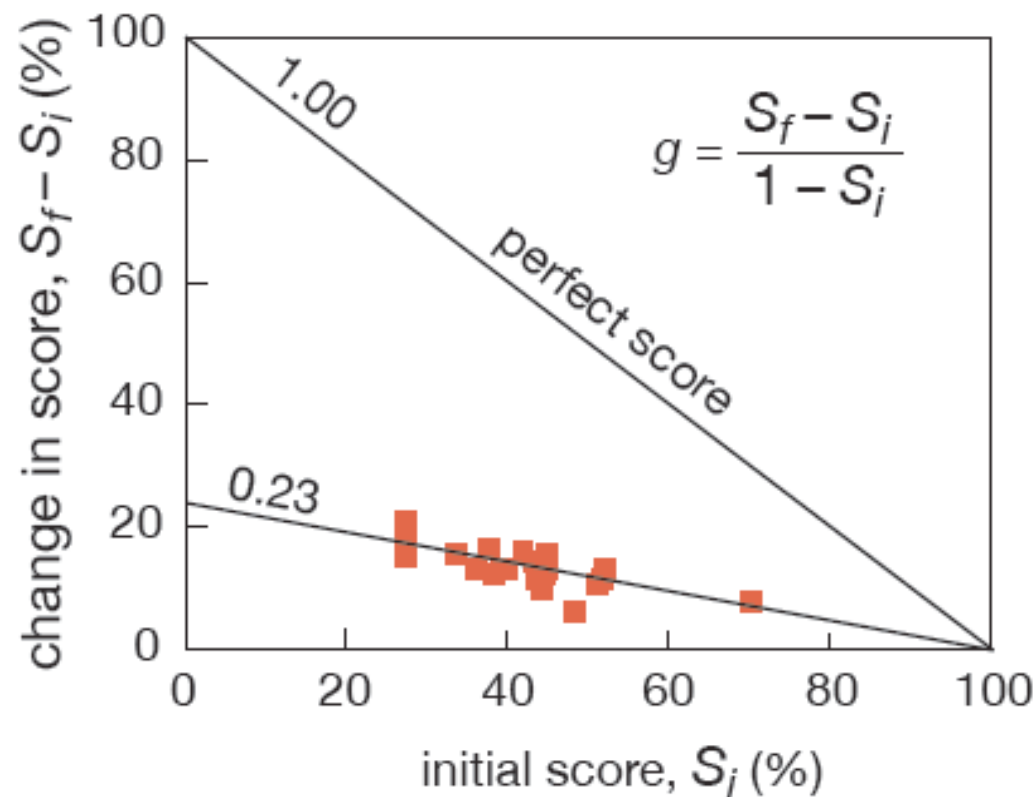
Use the statement and figure below to answer the next two questions.
A large truck breaks down out on the road and receives a push back from a small compact car as shown in the figure below.



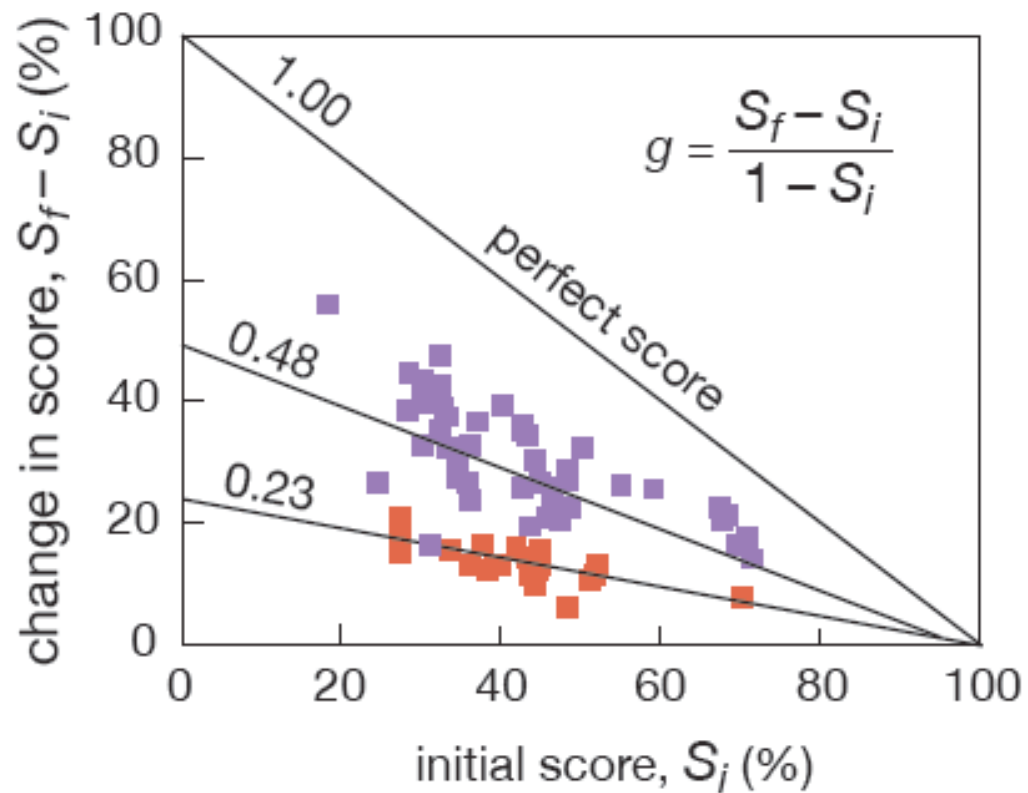
15. While the car, still pushing the truck, is speeding up to get up to cruising speed, which of the following is true?
- ___ 1. the amount of force with which the car pushes on the truck is equal to that with which the truck pushes back on the car.
 - ___ 2. the amount of force with which the car pushes on the truck is smaller than that with which the truck pushes back on the car.
 - ___ 3. the amount of force with which the car pushes on the truck is greater than that with which the truck pushes back on the car.
 - ___ 4. the car's engine is running so the car pushes against the truck, but the truck's engine is not running so the truck cannot push back against the car. The truck is pushed forward simply because it is in the way of the car.
 - ___ 5. neither the car nor the truck exerts any force on the other. The truck is pushed forward simply because it is in the way of the car.
- ___ has the constant cruising speed at which its driver wishes to push
___ pushes on the truck is equal to that with
___ is greater than that

Hestenes et al., 1992

Standardized assessments



Standardized assessments



Standardized assessments

How can we get more instructors to use standardized assessments?

Make it easier to do!

Standardized assessments

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Standardized assessments

Interactive Learning Toolkit

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Easy to implement

Easy to administer

Easy to obtain results

A background image showing a person's torso and arms holding a handheld device. The device's screen displays a 'MyPalm' interface with various icons and text, including 'Communicate', 'Internet', and 'HotNews'. The person is wearing a light blue shirt and a white tie.

Standardized assessments

Physics 1b

February 2006

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started the test at 2006-Feb-04 10:0:23 am and completed it successfully at 2006-Feb-04 10:0:26 am

Key: Correct choice has grey background and student's choice is in bold

did agree with the honesty statement.

1

The figure below shows a boy swinging on a rope, starting at a point higher than *P*. Consider the following distinct forces:

1. A downward force of gravity.
2. A force exerted by the rope pointing from *P* to *O*.
3. A force in the direction of the boy's motion.
4. A force pointing from *O* to *P*.

Which of the above forces is (are) acting on the boy when he is at position *P*?



- A. 1 only.
B. 1 and 2.
C. 1 and 3.
D. **1, 2, and 3.**
E. 1, 3, and 4.



2

An elevator is being lifted up an elevator shaft at a constant speed by a steel cable as shown in the figure below. All frictional effects are negligible. In this situation, forces on the elevator are such that:

- A. **the upward force by the cable is greater than the downward force of gravity.**
B. the upward force by the cable is equal to the downward force of gravity.
C. the upward force by the cable is smaller than the downward force of gravity.

Standardized assessments

Physics 1b

February 2006

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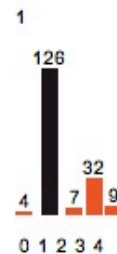
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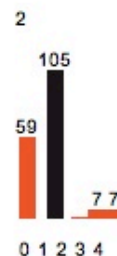
The figure below shows a boy swinging on a rope, starting at a point higher than P . Consider the following distinct forces:

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C. 1 and 3.
D. 1, 2, and 3.
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- A. the upward force by the cable is greater than the downward force of gravity.
B. the upward force by the cable is equal to the downward force of gravity.
C. the upward force by the cable is smaller than the downward force of gravity.
D. the upward force by the cable is greater than the sum of the downward force of gravity and a downward force due to the air.
E. none of the above. (The elevator goes up because the cable is being shortened, not because an upward force is exerted on the elevator by the cable.)

steel
cable

Standardized assessments

www.deas.harvard.edu/ilt

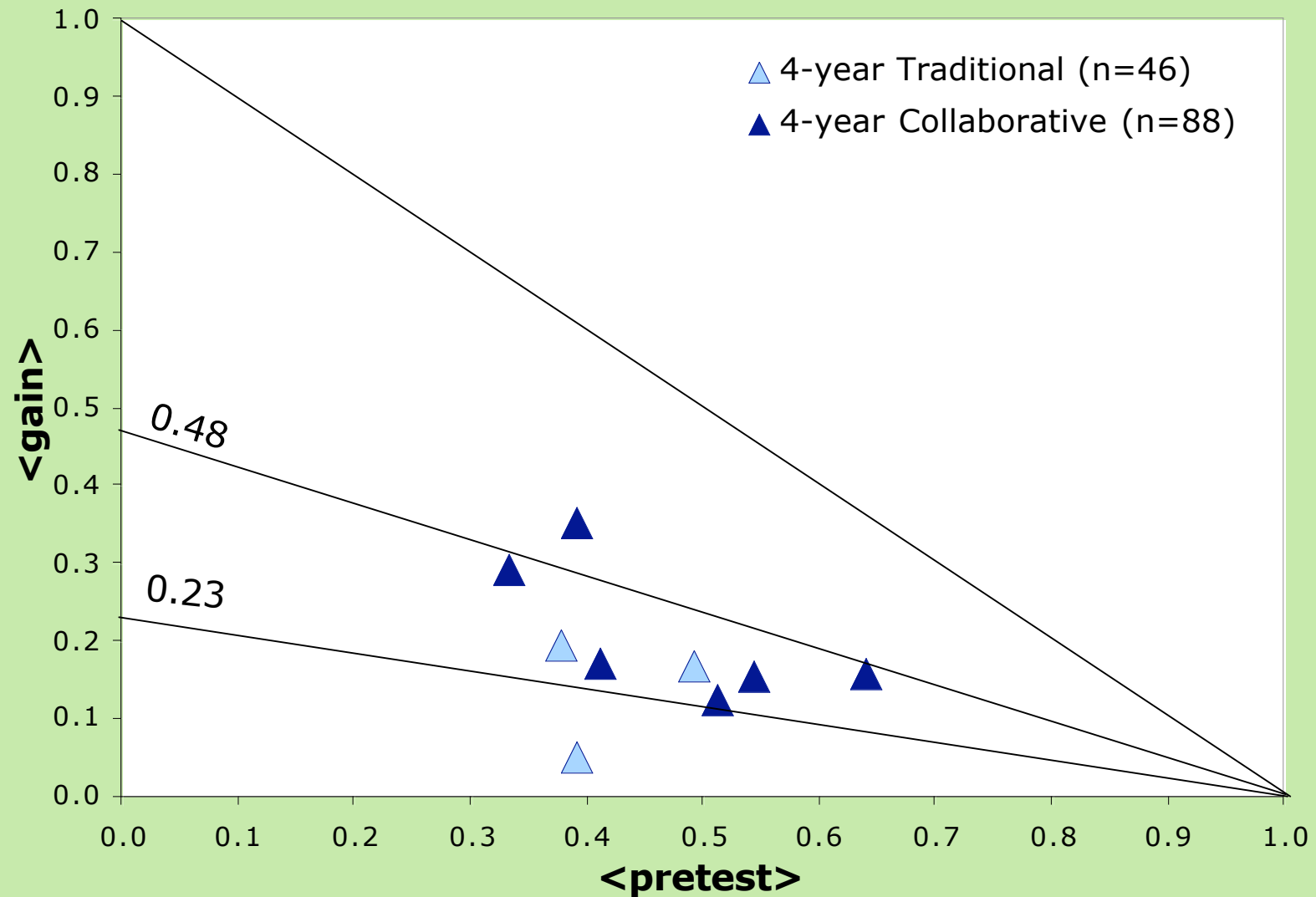
Standardized assessments

10,000 students tested

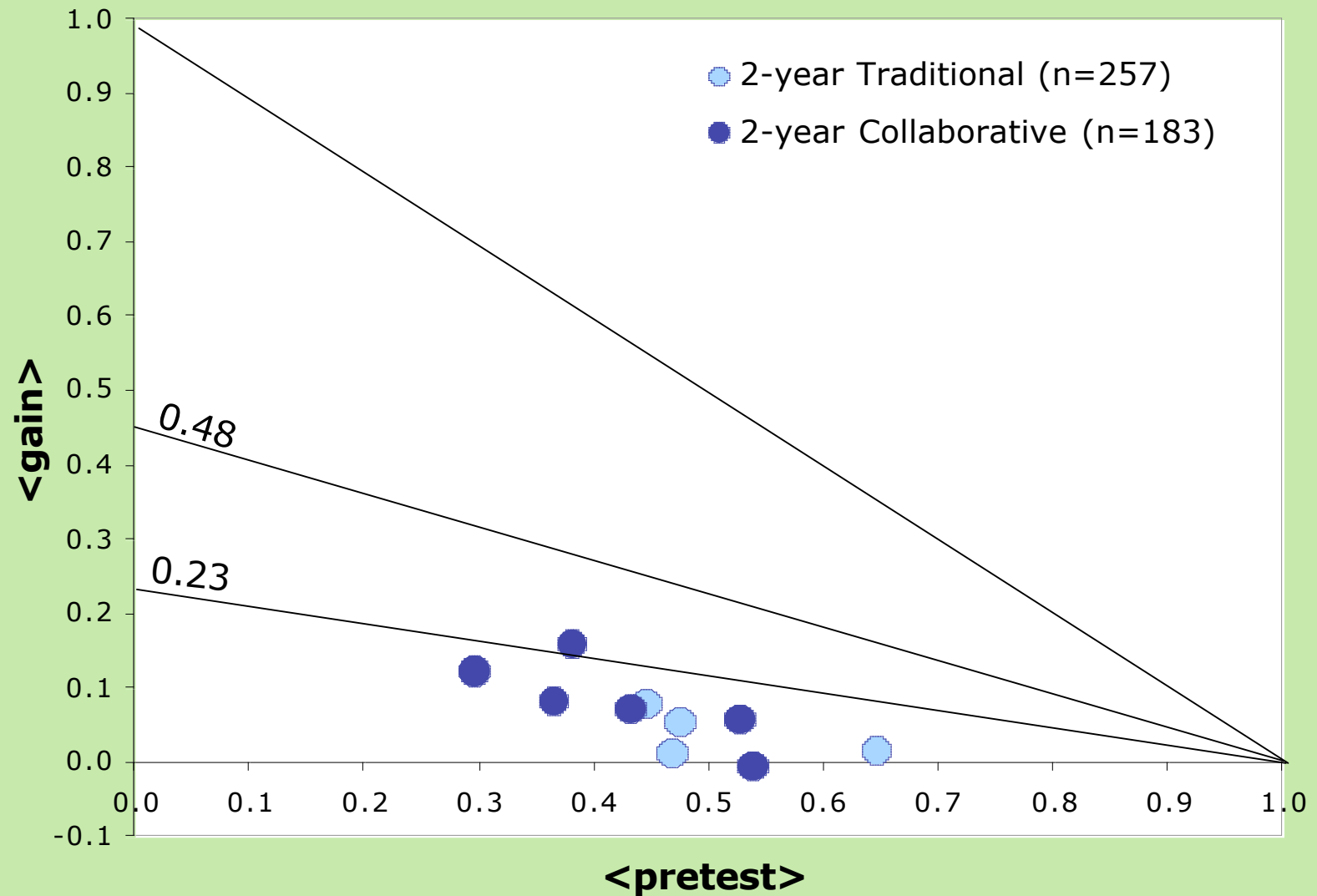
Results from 22 classrooms
throughout U.S.

Self-reported teaching techniques

Standardized assessments



Standardized assessments



Standardized assessments

4-year colleges: better with collaborative learning

2-year colleges: not as successful

Why?

Standardized assessments

22 additional 2-year college courses
from U.S. and Canada

Most use collaborative techniques

Outline

What is the effect of collaborative learning strategies on standardized assessments?

How well can students evaluate their own learning?

Student self-evaluation

Use the following scale to rate your comprehension of the concept of

_____.

- 1 - I am totally lost (I really have no clue at all)**
- 2 - I am pretty confused -- many things don't make sense to me**
- 3 - Some aspects confuse me, but it's beginning to make sense**
- 4 - I understand it mostly, but I still have some questions**
- 5 - I think I have a solid grasp of the concept**

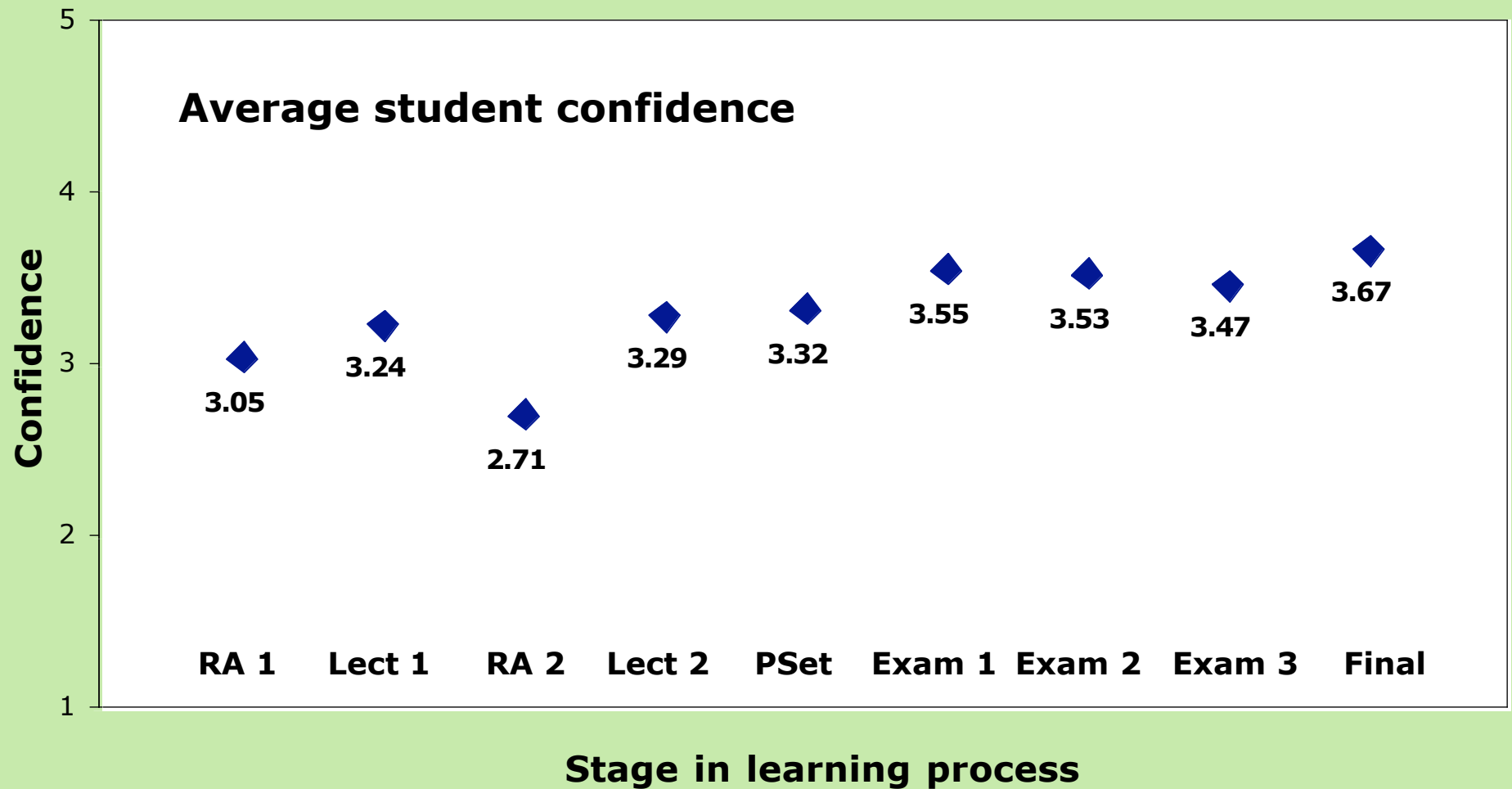
Student self-evaluation

Students rate their understanding throughout the learning process

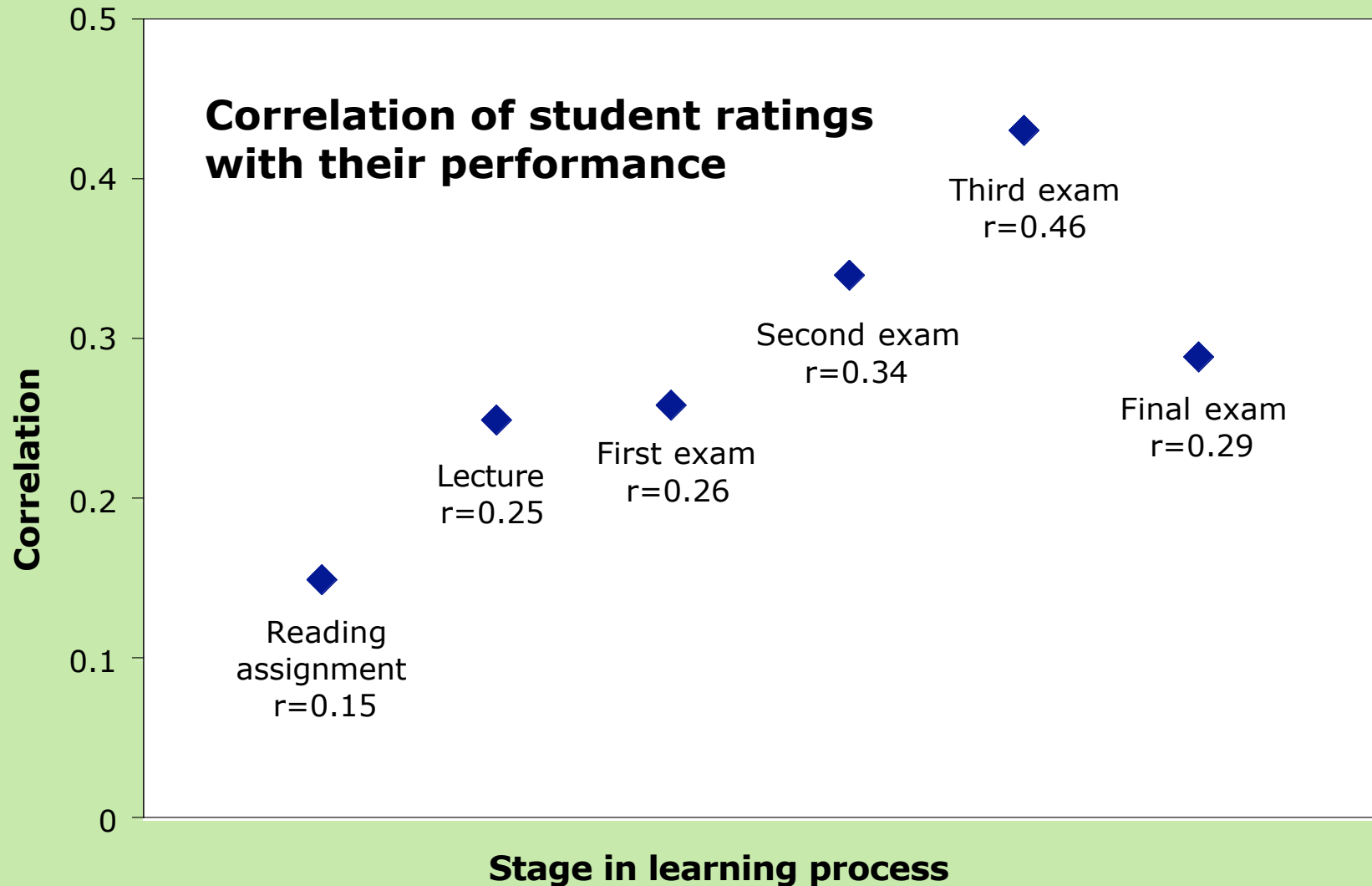
- 2x {
- Pre-class reading
 - Lecture
 - Tutorial
 - Homework
 - Exams

Compare rating with understanding

Student self-evaluation



Student self-evaluation



Self-evaluation

Students not good at evaluating own understanding,

BUT, they get better with greater knowledge and more feedback!

Summary

Collaborative strategies work better in 4-year than 2-year colleges...

...student self-evaluations not
informative

Thank you!

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