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# TEACHING & LEARNING SUMMIT 2016

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## Impact of Exam Wrappers on Improving First-Year Student Learning and Exam Performance in Introductory Chemistry

*Goal:* to determine whether chemistry students' participation in a self-assessment of and reflection on (i.e. "exam wrapper") their exam performance impacted both changes in students' study strategies and their subsequent exam performance

### Project Design

Research shows that first-year college students struggle to manage their learning process and to develop effective study strategies (Pascarella & Terenzini, 2005).

*Exam Wrappers* are short, reflective questionnaires taken immediately after receiving a graded exam, prompting students to assess their understanding of course material and to think about and adjust their study habits

1. How did the student prepare for the exam?  
(Here, the wrapper contained suggestions listed in the course syllabus)

2. What errors did the student make on the exam?

3. How should the student study for the next exam?

### Wrapper procedure

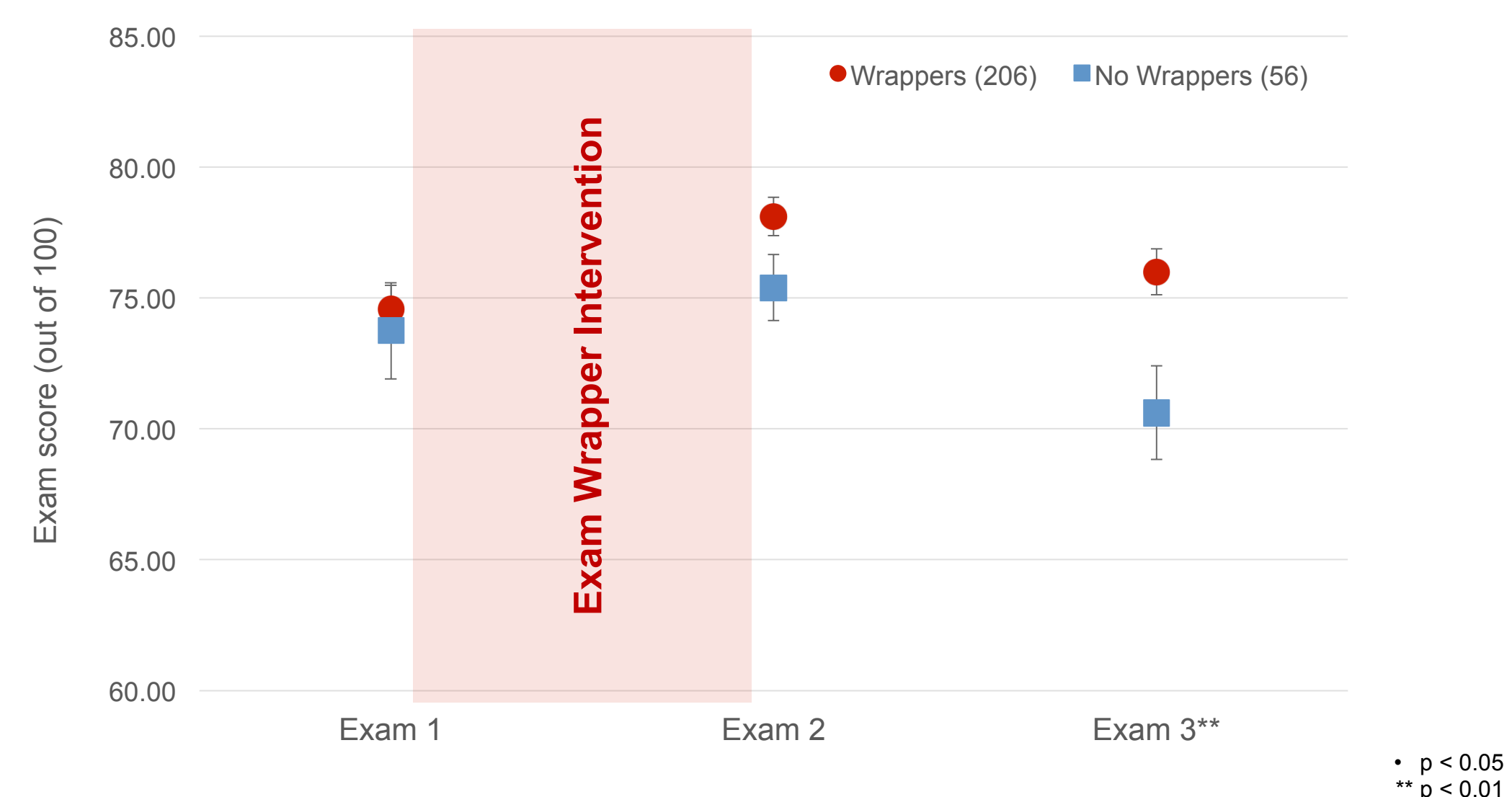
1. Distribute wrappers when exams are handed back
2. Students complete wrapper in class, or as homework for completion grades only (*For 09-105 Introduction to Modern Chemistry, they were assigned as an extra credit opportunity, completed outside of class after semester Exam 1*)
3. Collect wrappers from students. Serves two purposes:
  - Spot check for patterns
  - Keep wrappers from getting lost
4. Return wrappers to students before next exam to review – provide additional questions about study habits:
  - "How closely have you been following your designated study plan?"
  - "Based on your responses to the reflection, what must you still do to prepare for the upcoming exam?"

Ambrose, et al., (2010). *How Learning Works: 7 Research-Based Principles for Smart Teaching*. Jossey-Bass.

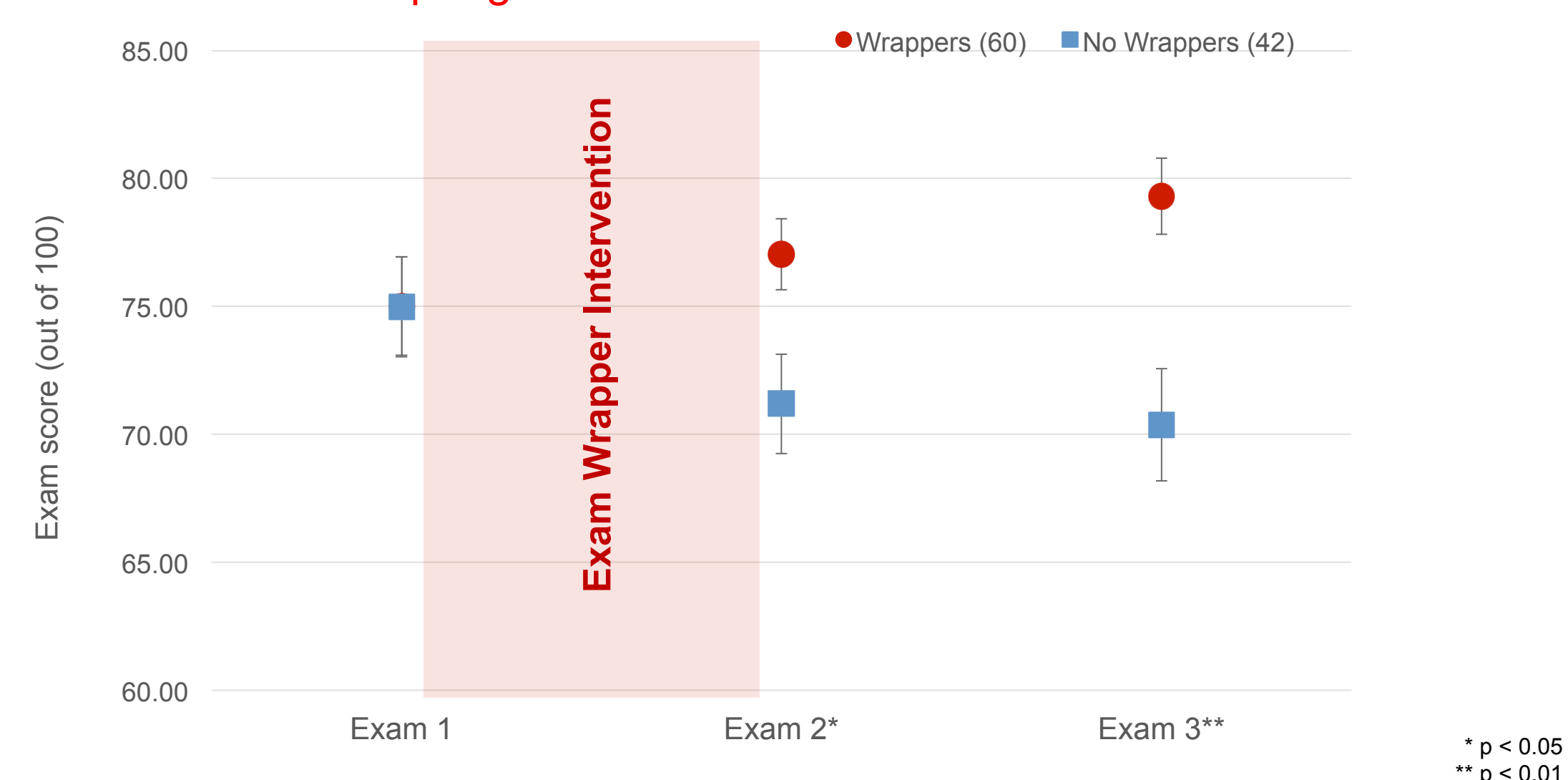
Lovett, M. C. (2013). "Make exams worth more than grades: Using exam wrappers to promote metacognition" in *Using reflection and metacognition to improve student learning*, Kaplan, M.; Silver, N.; Lavaque-Manty, D.; Meizlish, D., ed. San Francisco: Sterling, VA: Stylus.

### Project Evaluation

#### Fall 2015 Semester Exam Scores



#### Spring 2016 Semester Exam Scores



#### 1. How did the student prepare for the exam?

- ☺ Completed a variety of practice problems before the exam.
- ☺ Prepared a study guide for her/himself.
- ☹ Crammed for the test the night before.
- ☹ Only reviewed general concepts, not specific problems.

What types of problems did the student perform well on? How do these problems differ from the ones they missed?

#### 2. What errors did the student make on the exam?

Can any trends be observed based on certain concepts or problems?

#### 3. How should the student study for the next exam?

Does performance on problems correlate to study habits (both good and poor)?

What behaviors or habits should the student avoid or change before the next exam?

What study strategies worked well and should be repeated for future exams?

- In both semesters, students who completed an exam wrapper achieved higher exam scores than those who did not
- In Spring 2016, students who completed just one wrapper additionally improved their exam performance throughout the entire semester.

### Questions to Answer in Future Studies

Will the use of *more* wrappers (for a single class) yield even *bigger* improvements in exam performance throughout a semester?

How will student exam performance change after completing an *online* versus a paper exam wrapper?

**Acknowledgements** : Many thanks to Emily Daniels Weiss for including me in this project and for her and the Eberly Center's evaluation, summary, and providing of data that made this presentation possible