IMPROVING STUDENTS’ LEARNING IN STATIC SKILLS: USING HOMEWORK AND EXAM WRAPPERS TO STRENGTHEN SELF-REGULATED LEARNING

KJ Chew, Dr. Helen Chen, Beth Rieken, Autumn Turpin, Dr. Sheri Sheppard
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Presenters

KJ Chew

Autumn Turpin
Homework is not fully utilized for its value as a learning tool, resulting in the implementation of a wrapper.
What Are Wrappers?

Exam wrappers are “structured reflection activities that prompt students to practice key metacognitive skills after they get back their graded exams.” (Lovett 2013)
Research Questions

1. What can be learned from students’ experiences with homework and exam wrappers with respect to the potential impact on students’ learning?

2. What insights into the student learning and the course experience can the teaching team gain from reflections captured in homework and exam wrappers?
## The Class: ENGR 14

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Overall (n=70)</th>
<th>Characteristic</th>
<th>Overall (n=70)</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td>URM</td>
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<td>Senior</td>
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</table>

*Note: Observations that say “I prefer not to answer” in the survey were removed from this table. URM stands for “Underrepresented Minority.”*
The Class: ENGR14

Week 4

Exam 1

HW 3

HW 3 Wrapper

Grade

In-Class Student Reflection

Mistakes, Confidence, Satisfaction, Completion Strategies

Week 9

Pre-Exam 2 Wrapper

Exam 2

Post-Exam 2 Wrapper

Grade

In-Class Student Reflection

Mistakes, Confidence, Satisfaction, Completion Strategies, Study Strategies

In-Class Student Reflection

Mistakes, Confidence, Satisfaction, Completion Strategies, Study Strategies

Study Strategies

Mistakes, Confidence, Study Strategies, Satisfaction

Time: 5 Weeks

Stanford University
Research Questions

1. What can be learned from students’ experiences with homework and exam wrappers with respect to the potential impact on students’ learning?

2. What insights into the student learning and the course experience can the teaching team gain from reflections captured in homework and exam wrappers?
RQ 1: Impact of Wrappers Implementation on Students’ Performances

Students’ Reaction to Wrappers

“Signs were not a problem anymore. Success!”

“I was organized with solutions, I answered specifically what homework asked, my signs were on point.”

“Yes, I made no mistakes in regards to external vs. internal loads, or pin joints specifically.”
RQ 1: Impact of Wrappers Implementation on Students’ Performances

Chronological Change in Confidence Level

<table>
<thead>
<tr>
<th>Concept</th>
<th>HW3 M</th>
<th>HW3 SD</th>
<th>HW4 M</th>
<th>HW4 SD</th>
<th>EXAM 2 M</th>
<th>EXAM 2 SD</th>
<th>t</th>
<th>p</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting Up and Solving Equilibrium Equations</td>
<td>3.93</td>
<td>0.57</td>
<td>--</td>
<td>--</td>
<td>4.08</td>
<td>0.70</td>
<td>2.44</td>
<td>0.02</td>
<td>0.29</td>
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<tr>
<td>Drawing FBDs</td>
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<td>--</td>
<td>4.06</td>
<td>0.58</td>
<td>4.21</td>
<td>0.61</td>
<td>2.56</td>
<td>0.01</td>
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</table>

*Note: Confidence levels were measured in the 5-point Likert Scale, with 1 being “Not Confident”, 3 being “Moderately Confident” and 5 being “Extremely Confident”.*
RQ 1: Impact of Wrappers Implementation on Students’ Performances

Chronological Change in Average Mistake Types Identified per Student

** t = 3.22, p = 0.00

<table>
<thead>
<tr>
<th></th>
<th>HW3</th>
<th>HW4</th>
<th>EXAM2</th>
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<tbody>
<tr>
<td>mean</td>
<td>1.23</td>
<td>0.76</td>
<td>0.87</td>
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</table>
What do the Quantitative Results Mean?

1. Encouraging signs as the positive impact occurred during the period in which the wrappers were implemented.

2. Mistake Types Identified: Students might stop making one type of mistake but start making another one, canceling out each other.

3. Study did not include a control group; there is no direct evidence linking the chronological increase of confidence and decrease in mistake to the utilization of wrapper.
## RQ 2: Wrapper as Information Gathering Tool for Instructors

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Exam 2 Scores Above Average (n=39)</th>
<th>Exam 2 Scores Below Average (n=31)</th>
<th>df</th>
<th>t</th>
<th>p</th>
<th>Cohen’s d</th>
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<tr>
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<td>SD</td>
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<td>2.24</td>
<td>0.96</td>
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Conclusion and Future Work

Results of this study echoes other wrapper studies (Craig, University of Toronto), showing encouraging signs in terms of qualitative data but no direct evidence linking wrapper implementation to the positive quantitative impact observed.
Acknowledgement

We would like to thank the following parties:

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6. Anna Breed
7. Participating Students
Thank you for your attention!

Contact Information

KJ Chew  
kaijunch@stanford.edu

Autumn Turpin  
aturpin@stanford.edu

Beth Rieken  
bethrieken@stanford.edu

Dr. Helen Chen  
hlchen@stanford.edu

Dr. Sheri Sheppard  
sheppard@stanford.edu