Reinventing homework as cooperative, formative assessment

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The problem

- Students need practice
- Students need feedback
Reinventing homework

The problem

- Grading is a lot of work
- Matching comments to grades/rubrics is hard
- Delay between work and feedback
- Solitary work: not the best mode for everyone
- A lot of them don’t read the comments anyway
Reinventing homework

Automation

• Off-the-shelf programming problems

• Testing systems with grading hooks

• Online quizzes
Reinventing homework

A homework question

Devise at least two interestingly-different tiebreakers for A* pathfinding on a 2D grid, and show a test case where they behave differently.

Analyse which of your tiebreakers performs “best” on your test case, and discuss whether there is a tie-breaking strategy that will work well for all test cases or whether their relative performance depends on the problem.
Reinventing homework

An earlier attempt

- “Work together, write alone”
  - Confusion about acceptable collaboration
  - Grading multiple “copies”
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An earlier attempt, 2

• Revisions
  – Good for learning!
  – Unexpected revision, no time, skip it
  – “I already got (almost) full credit”
  – Apathy
  – If the workload was heavy before. . .
Reinventing homework

Idea

• Group work
• Revision cycle
• Comments, no grades
• Grades, no comments
• Limited scale
Limited scale

5: The answer **is correct**, or may have very minor errors in areas not addressed by the problem (e.g. simple arithmetic mistakes)

3: The answer **demonstrates substantial understanding** but is incomplete or contains errors in areas relevant to the problem.

0: The answer may or may not have included relevant facts, formulas, or figures, but **demonstrates little or no clear understanding** of how to apply them or approach the problem.
Reinventing homework

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Reinventing homework

Possible worries

- “Free rider” in group
- Grades swing $+$ or $-$
- Students dislike—or “like”
## Reinventing homework

### Revision performance

<table>
<thead>
<tr>
<th>Original score</th>
<th>Revision score</th>
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<td>3</td>
<td>0  21 24</td>
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<tr>
<td>0</td>
<td>3  6  11 6</td>
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Reinventing homework

Revision performance (a different class)

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Reinventing homework

Revision performance (yet another class)

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</table>
Reinventing homework

Revision performance (aggregate)

Original score: 0 3 5
Count: 56 108 51

<table>
<thead>
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<td>15 42 51</td>
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<td>13 12 21 10</td>
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Final score: 0 3 5
Count: 25 78 102
### Student response

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<tr>
<th>Question</th>
<th>Response</th>
<th>Avg</th>
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<tr>
<td>Q1 Liked group work</td>
<td>0 0 2 3 8</td>
<td>4.46</td>
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<td>Q2 Group work effective</td>
<td>0 0 5 2 6</td>
<td>4.08</td>
</tr>
<tr>
<td>Q3 Comment/revision effective</td>
<td>0 1 1 3 8</td>
<td>4.38</td>
</tr>
</tbody>
</table>
Conclusion

- Group work
- Revision cycle
- Comments, no grades
- Grades, no comments
- Limited scale
- Increased cooperation
- More repeat engagement
- Less grading work
- And...
Students appreciate it

The homework policy “gave more motivation to actually read comments, and having the opportunity to address them definitely helped concepts sink in.”

● Any questions?

● blahetadp@longwood.edu