Cumulative Exams (with a twist)

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Cumulative Exams (with a twist)

I use cumulative exams to (a) evaluate learning and (b) promote retention.

When first hearing about cumulative exams, students generally have a negative reaction – their impression is that cumulative exams are more difficult because knowledge has to be retained for longer periods of time.

To make cumulative exams more palatable to students, I came up with a unique administration method:

1) Because each exam is cumulative, I set it up so that a later exam gives students a second chance to demonstrate their understanding.

2) Students can replace their score on the previous exam if they score higher on the next one; however, if they perform worse, their original score remains the same.

### Research in Cognitive Psychology

Research in cognitive psychology has demonstrated that repeated testing is not only an effective way to measure learning, but it is also a way to increase long-term retention (e.g., Roediger & Karpicke, 2006). Cognitive research has also clearly shown that distributed practice leads to better long-term retention than massed practice, such as cramming for one exam (e.g., Kornell, Castel, Eich, & Bjork, 2010).

Putting these findings together, research has shown that students (particularly, low-scoring students) retain more material after the course is over when the course uses cumulative exams throughout the semester (Lawrence, 2013).

### Microsoft Excel

- In Microsoft Excel, I first create one set of columns with students' original percentages for each exam (i.e., one column for Exam 1, Exam 2, etc.).

- In a second set of columns, I insert a formula for each exam for each student that compares the original percentage to the one that followed it. If the later exam had a higher percentage, then that higher percentage replaces the original exam percentage; otherwise, the percentage stays the same.

- Feel free to contact me for an example Excel spreadsheet that contains these example formulas:

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### Exam Policy:

1) All exams are cumulative
2) If the next exam is ↑, then the previous score is raised to that %.
3) If the next exam is ↓, then the previous score does not change.
4) An exam score is only (potentially) affected by the next exam.

### Example:

<table>
<thead>
<tr>
<th>Exam</th>
<th>Original Scores</th>
<th>Adjusted Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>65%</td>
<td>86%</td>
</tr>
<tr>
<td>Exam 2</td>
<td>86%</td>
<td>90%</td>
</tr>
<tr>
<td>Exam 3</td>
<td>90%</td>
<td>90%</td>
</tr>
<tr>
<td>Exam 4</td>
<td>83%</td>
<td>83%</td>
</tr>
</tbody>
</table>

### REFERENCES

