Small Whiteboards (SWB): Updating an Old Technology with New Pedagogies
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Abstract

Updating the old technology of classroom "slates," we will discuss how individual-sized whiteboards can be used to increase student interactivity in small-enrollment courses. These "small whiteboards" can be used to invite classroom participation from each student (like electronic classroom response systems in large-enrollment courses) and they also allow for students to respond with multiple representations or even multistep calculations. Small whiteboards are particularly relevant for upper-division physics courses where small numbers of students wrestle with geometric reasoning, multiple representations, integrating new ideas with their lower-division understandings, and increased mathematical sophistication.

Types of SWB Questions

Review
Ask students to write down what they already know about a topic
"Write down something you know about the dot product."• Produces a good review discussion that is anchored in what students already know• Often brings up notational issues• Chance to highlight multiple representations
Recall
Ask students to recall a specific formula
"Write down the formula for the electric potential everywhere in space due to a point charge not located at the origin."
Good for highlighting sense-making strategies like:
• Fleshing out an iconic formula• "What kind of a beast is it?"• Checking dimensions• Limiting cases• Symmetry
Compute
Ask students to perform a short calculation
"Find the determinant of matrix: A = \[
\begin{bmatrix}
1 & 2 & 1 \\
3 & 0 & 5 \\
2 & 1 & 3 
\end{bmatrix}
\]"
• Can highlight a particular technique, but can also bring out multiple ways of calculating a quantity.
• Works well when students are working in a notation they’re not familiar with (like Bra-Ket or tensor notation).

Examples of Student Responses: “Write down something you know about the dot product.”

<table>
<thead>
<tr>
<th>Comparison of Classroom Response Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Logistical</strong></td>
</tr>
<tr>
<td>Equipment &amp; Cost</td>
</tr>
<tr>
<td>Socratic Questions</td>
</tr>
<tr>
<td>Flashcards</td>
</tr>
<tr>
<td>SWB’s</td>
</tr>
<tr>
<td>Clickers</td>
</tr>
<tr>
<td>Ubiquitous Presenter</td>
</tr>
</tbody>
</table>