An Investigation of In-class Labs on Student Learning of Linear Data Structures

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Problem
• 6-7 sections
• 33 students max
• 1 instructor
• 2 TAs / section
• Integrated lecture/lab

CSC116

Transition!

CSC216

Retention!

CSC316

Research Question
• Do in-class laboratory activities on linear data structures increase student learning on learning outcomes related to linear data structures?

Acknowledgements
Jordan Connor for survey data entry.
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NCSU IRB# 4169

Study Methodology

<table>
<thead>
<tr>
<th>Metric</th>
<th>Section 001</th>
<th>Section 002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrolled</td>
<td>85</td>
<td>102</td>
</tr>
<tr>
<td>Participants</td>
<td>49</td>
<td>60</td>
</tr>
<tr>
<td>Meeting Time</td>
<td>TH 2:05p-3:35p</td>
<td>MW 2:05p-3:35p</td>
</tr>
</tbody>
</table>

Results

No significant difference between in-class labs and active learning lecture!
• E1 P4 Q8, E1 P4 Q9, & E1 P4 Total:
  • Section 001 had intervention
  • Section 002 had significantly better grades
• E2 P3: Linked Node Question
  • Section 002 had intervention and significantly better grade

Observations

<table>
<thead>
<tr>
<th>Obs.</th>
<th>Class Type</th>
<th># Off Topic Lecture</th>
<th># Off Topic Exercise</th>
<th>Questions of Teaching Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lab</td>
<td>5</td>
<td>7</td>
<td>32</td>
</tr>
<tr>
<td>2</td>
<td>Lec.</td>
<td>61</td>
<td>50</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>Lab</td>
<td>10</td>
<td>43</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>Lec.</td>
<td>46</td>
<td>16</td>
<td>----</td>
</tr>
<tr>
<td>5</td>
<td>Lec.</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>6</td>
<td>Lab</td>
<td>5</td>
<td>10</td>
<td>33</td>
</tr>
<tr>
<td>7</td>
<td>Lec.</td>
<td>52</td>
<td>54</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Lab</td>
<td>16</td>
<td>5</td>
<td>----</td>
</tr>
<tr>
<td>Lab Average</td>
<td>9</td>
<td>16.3</td>
<td>38.3</td>
<td>53</td>
</tr>
</tbody>
</table>

• 5x more likely off topic during lecture portion of lecture group
• 2x more likely off topic during exercise for lecture group
• 5x more likely for lab group to ask for help

Problem

- Implement AbstractSequentialList
- Uses iterator and inner classes
- Inspect 3rd party library code
- Consider prog.analysis notifications

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