Are CBT Tests Really More Difficult?
Explaining Score Differences between Paper-Pencil and Computer-Based Exams

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National Commission for the Certification of Crane Operators

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Score Differences

• On average, those taking computer-based tests score 4 points lower than those taking paper-pencil tests.

• On average, those taking computer-based tests have a pass rate 7% lower than those taking paper pencil tests.
ANSI/ANAB Accreditation Issue

• ISO/IEC 17024 standard
  • 9.3.2 The certification body shall have procedures to ensure a consistent examination administration

• ANSI issues a Non-Conformity, concerned that exam administration might not be consistent, and computer-based testing might not be fair to the candidates
  • ANSI Citation: “Research into the differences between the paper and CBT scores and passing rates has been promised. The differences are substantial and need to be explained and/or corrected.”

• We needed to investigate the reasons behind the performance differences.
Hypothesis

We reasoned that those taking computer-based assessments might have received less training, or training further back in time, than those taking paper-pencil tests.

We used an optional demographic survey, administered at paper-pencil testing and at computer-based test sites, to test the hypothesis.
10 Question Survey

1. What is your current primary job position?
2. If you are an operator, how long have you been a lifting equipment operator?
3. In what industry did you gain the majority of your experience?
4. What is the main reason you are seeking certification or recertification?
5. At what age did you first enter the industry?
10 Question Survey

6. What is your highest education level?
7. What was the main type of test preparation you received to prepare for this test?
8. How much test preparation in the classroom did you receive?
9. How much test preparation in the field (hands-on) did you receive?
10. How long before taking this exam did you receive your test preparation?
Data Limitations

• These are only preliminary analyses.
• Some of the analyses shown include only results from paper-pencil examinees, others have data from both computer-based and paper-pencil examinees.
• At the time of the data extraction, test score data was linked to the paper-pencil examinees, but not to the computer-based examinees.
## Type of Test Prep Received

What is the main type of test prep you received?

<table>
<thead>
<tr>
<th>Training course / third party trainer</th>
<th>Training course / in house employer</th>
<th>Vocational instruction or Community College</th>
<th>Union/Apprenticeship Program</th>
<th>Military</th>
<th>Self-study/online program</th>
<th>no formal test preparation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Test Scores</td>
<td>83</td>
<td>79</td>
<td>80</td>
<td>82</td>
<td>76</td>
<td>79</td>
<td>77</td>
</tr>
<tr>
<td>Percent Responding</td>
<td>64%</td>
<td>12%</td>
<td>4%</td>
<td>13%</td>
<td>0%</td>
<td>4%</td>
<td>3%</td>
</tr>
</tbody>
</table>
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<th>no formal test preparation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Computer Based Testing</strong></td>
<td>23%</td>
<td>9%</td>
<td>1%</td>
<td>13%</td>
<td>0%</td>
<td>28%</td>
<td>15%</td>
<td>11116</td>
</tr>
<tr>
<td><strong>Paper Pencil Testing</strong></td>
<td>63%</td>
<td>12%</td>
<td>4%</td>
<td>13%</td>
<td>0%</td>
<td>5%</td>
<td>3%</td>
<td>8396</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td>41%</td>
<td>10%</td>
<td>2%</td>
<td>13%</td>
<td>0%</td>
<td>23%</td>
<td>10%</td>
<td>19512</td>
</tr>
</tbody>
</table>
What was the main type of test preparation you received to prepare for this exam?
## How Much Test Prep?

How much test preparation in the classroom did you receive?

<table>
<thead>
<tr>
<th></th>
<th>4 hours or less</th>
<th>more than 4 hrs, up to 1 day</th>
<th>2-3 days</th>
<th>4-5 days</th>
<th>6 days to 3 weeks</th>
<th>More than 3 weeks</th>
<th>No formal test preparation</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Based Testing</td>
<td>8%</td>
<td>9%</td>
<td>19%</td>
<td>11%</td>
<td>7%</td>
<td>5%</td>
<td>41%</td>
<td>11110</td>
</tr>
<tr>
<td>Paper Pencil Testing</td>
<td>4%</td>
<td>16%</td>
<td>48%</td>
<td>18%</td>
<td>9%</td>
<td>3%</td>
<td>3%</td>
<td>8474</td>
</tr>
<tr>
<td>Grand Total</td>
<td>6%</td>
<td>12%</td>
<td>32%</td>
<td>14%</td>
<td>8%</td>
<td>4%</td>
<td>24%</td>
<td>19584</td>
</tr>
</tbody>
</table>
How Much Test Prep?

How much test preparation in the **classroom** have you received?

- **4 hours or less**: 7.6% (CBT) 3.5% (PPT)
- **More than 4 hours, up to 1 day**: 9.3% (CBT) 15.9% (PPT)
- **2-3 days**: 48.2% (CBT) 19.0% (PPT)
- **4-5 days**: 18.0% (CBT) 11.2% (PPT)
- **6 days to 3 weeks**: 8.5% (CBT) 6.9% (PPT)
- **More than 3 weeks**: 2.7% (CBT) 5.4% (PPT)
- **No formal test preparation**: 40.5% (CBT) 3.2% (PPT)
## How Long Since Test Prep?

How long before taking this exam did you receive your test preparation?

<table>
<thead>
<tr>
<th></th>
<th>Less than 1 week</th>
<th>1-4 weeks before testing</th>
<th>5 weeks to 6 months before testing</th>
<th>More than 6 months but less than one year</th>
<th>More than 1 year</th>
<th>No formal test preparation</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Based Testing</td>
<td>23%</td>
<td>31%</td>
<td>12%</td>
<td>4%</td>
<td>5%</td>
<td>25%</td>
<td>11077</td>
</tr>
<tr>
<td>Paper Pencil Testing</td>
<td>64%</td>
<td>25%</td>
<td>5%</td>
<td>1%</td>
<td>1%</td>
<td>5%</td>
<td>8501</td>
</tr>
<tr>
<td>Grand Total</td>
<td>41%</td>
<td>29%</td>
<td>9%</td>
<td>3%</td>
<td>3%</td>
<td>16%</td>
<td>19578</td>
</tr>
</tbody>
</table>
How Long Since Test Prep?

How long before taking this exam did you receive your test preparation?

- 63.6% less than 1 week
- 31.3% 1-4 weeks before testing
- 24.8% 5 weeks to 6 months before testing
- 11.8% more than 6 months but less than 1 year
- 4.8% more than 1 year
- 4.9% no formal test preparation
Final Decision

Evidence was provided that the difference in scores between CBT and PPT examinations could be due to the differences in test preparation among the candidates.

Therefore, CBT testing does not provide an unfair disadvantage to candidates.

Non-conformity was closed.
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THANK YOU FOR YOUR ATTENTION

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