Content Specific Simulation-Supported Learning and High-Stakes Exams: Longitudinal Outcomes

Presented by:
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Disclosures & Objectives

- **Disclosures:**
  - No conflicts of interest
  - Sponsorship/commercial support by Elsevier

- **Learner Objectives:**
  - Discuss trajectory of scores on high-stakes exams over three post-test times points
  - Compare and contrast groups (content specific simulation versus usual course simulation)
Background

- Human Patient Simulation (HPS)
- High-stakes standardized exams
- HPS reinforces didactic learning
  - may increase standardized exam scores
- Minimal longitudinal research
  - Lasting effectiveness of HPS demonstrated by high-stakes standardized exam scores?
Purpose

- Examine trajectory of scores on high-stakes after content specific simulation

- Compare trajectory of scores
  - Experimental group (content specific simulation) versus control group (usual simulation)
Research Questions

- How do students who experience a human patient simulated clinical experience perform on content specific standardized high-stakes exams?

- How do scores on high-stakes exams differ by group (experimental versus control)?
Methods

- Quantitative, experimental, longitudinal, repeated measures design
- Traditional baccalaureate nursing students (n=94) enrolled in adult health nursing course
- Didactic cardiovascular content with subsequent cardiovascular specific standardized exam (pre-test)
Methods

- Randomize, didactic material, pre-test (T1)
- Dyads completed simulated clinical experience
  - Experimental – cardiovascular simulation
  - Control – usual course simulation
- Comparisons of high-stakes exams scores
  - Completion of simulation (T2)
  - End of course (T3)
  - End of program (T4)
Pre-test Comparison

- 94 students completed all waves of testing
- Pre-test (T1)
  - Control group scored significantly higher
    \[(F(1,93) = 21.54, p < .000)\]

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>977</td>
<td>157</td>
</tr>
<tr>
<td>Experimental</td>
<td>823</td>
<td>156</td>
</tr>
</tbody>
</table>
Post-test 1 Comparison

- Post-test (T2) (simulation completion)
  - Experimental group scored significantly higher
    \( (F(1,93) = 5.04, p = .027) \)

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<tr>
<th>Groups</th>
<th>Mean</th>
<th>Standard Deviation</th>
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<tbody>
<tr>
<td>Control</td>
<td>900</td>
<td>184</td>
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<tr>
<td>Experimental</td>
<td>982</td>
<td>171</td>
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</table>
Post-test 2 & 3 Comparison

- No significant differences at T3 and T4

<table>
<thead>
<tr>
<th>Group</th>
<th>Time</th>
<th>Mean</th>
<th>Standard Deviation</th>
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<tbody>
<tr>
<td>Control</td>
<td>T3</td>
<td>955.38</td>
<td>143.81</td>
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<tr>
<td>Experimental</td>
<td>T3</td>
<td>1002.26</td>
<td>161.59</td>
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<tr>
<td>Control</td>
<td>T4</td>
<td>938.10</td>
<td>89.76</td>
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<tr>
<td>Experimental</td>
<td>T4</td>
<td>947.74</td>
<td>104.62</td>
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</tbody>
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*T-test for T3 and T4 Scores by Groups*
Percent Change

- Percent change
  - Significant differences existed between groups in percent change from T1 to T2 and T1 to T4
    \( F(1,92) = 38.185, p = .001 \), \( F(1,77) = 19.158, p = .001 \)

<table>
<thead>
<tr>
<th>Time</th>
<th>Mean</th>
<th>Standard Deviation</th>
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</thead>
<tbody>
<tr>
<td>T1- T2</td>
<td>Control -6.91</td>
<td>Control 19.865</td>
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<tr>
<td></td>
<td>HPS 20.65</td>
<td>HPS 23.167</td>
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<tr>
<td>T1- T4</td>
<td>Control -2.41</td>
<td>Control 15.970</td>
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<tr>
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<td>HPS 18.09</td>
<td>HPS 24.825</td>
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</table>
Discussion

- Targeted simulation may result in greater short-term knowledge
  - Yet, differences in scores did not persist
- Percent change and mean scores increased in experimental group from T1 to T4
  - While control group mean scores decreased
- Unexplained
  - Why control group scored higher on T1
Conclusion

- Positive short-term effects of targeted simulation experiences on high-stakes exams
- More research may discover additional variables contributing to results
References


