The Effect of High-Impact Practices on Students’ Learning Style: A Quasi-Experiment

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• High-impact educational practices have been shown to increase student engagement (Kuh, 2008)

• High-impact experiences are critical in allowing undergraduates to develop a connection to content in a field (Quaye & Harper, 2014)
• Kuh (2008) outlined the characteristics of high-impact educational practices.

• High-impact practices can have huge impacts on student learning, engagement, and motivation (Kuh & O’Donnell, 2013).
Many of the HIE practices can be tied to experiential learning theory (Kolb, 1984).

Kolb (1984) outlined the factors of the experiential learning cycle.

Learning style can be altered by intervening environmental factors (Kolb & Kolb, 2005).
Literature and Framework

- Kolb’s (2009) model for experiential learning
• $N_0$: There is no difference in change for KLSI scores between groups exposed to high-impact practices in undergraduate courses and those not exposed
## Methods

*Pretest-Posttest Quasi-Experimental Design (Shaddish, Cook, & Campbell, 2002)*

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest</th>
<th>Treatment</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>C₁: Traditional Instruction</td>
<td>O₁</td>
<td></td>
<td>O₂</td>
</tr>
<tr>
<td>T₁: HIE Course</td>
<td>O₁</td>
<td>X</td>
<td>O₂</td>
</tr>
</tbody>
</table>
• Groups

• $C_1$: Intact traditional lecture-based courses
  - Summer 2014 Agricultural Leadership Course
  - Fall 2014 Agricultural Education Course

• $T_1$: Course purposively designed with High-Impact Practices
  - Fall 2014 Study Away Course
  - Fall 2014 Student Teaching Course
## Methods

<table>
<thead>
<tr>
<th>High Impact Practice (Kuh, 2008)</th>
<th>Study Away Course</th>
<th>Student Teaching Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-Year Seminars and Experiences</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Common Intellectual Experiences</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Learning Communities</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Writing-Intensive Courses</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Collaborative Assignments</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Undergraduate Research</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Diversity/Global Learning</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Service Learning/Community Based</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Internships</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Capstone Courses and Projects</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Instrumentation

• Kolb’s Learning Style Inventory (KLSI) version 3.2

• Places students into one of nine learning styles based on their scores in 4 learning modes

• Internal reliability for the four learning modes has been calculated at $\alpha = 0.77$ to $\alpha = 0.84$
  • Post hoc reliability for our study ranged from $\alpha = 0.81$ to $\alpha = 0.83$

• Test retest reliability has been calculated above $\kappa = 0.90$
Data Analysis

• MANOVA
  • IV (1): experimental unit

• DVs (4)
  • absolute value of change in AE,
  • absolute value of change in RO,
  • absolute value of change in AC,
  • absolute value of change in CE
Results

• Beginning of Semester

Control Group \( n = 35 \) Beginning KLSI Scores \((C_1 \ O_1)\)

HIE Group \( n = 49 \) Beginning KLSI Scores \((T_1 \ O_1)\)
Results

• End of Semester

Control Group \((n = 35)\) Ending KLSI Scores 
\((C_1 O_2)\)

HIE Group \((n = 49)\) Ending KLSI Scores 
\((T_1 O_2)\)
Results

Control Group \((n = 35)\) Beginning KLSI Scores \((C_1 \, O_1)\)

HIE Group \((n = 49)\) Beginning KLSI Scores \((T_1 \, O_1)\)

Control Group \((n = 35)\) Ending KLSI Scores \((C_1 \, O_2)\)

HIE Group \((n = 49)\) Ending KLSI Scores \((T_1 \, O_2)\)
Results

• There were significant differences between groups
• Null hypothesis was rejected

<table>
<thead>
<tr>
<th>Multivariate Tests</th>
<th>Value</th>
<th>F</th>
<th>Hypothesis df</th>
<th>Error df</th>
<th>Sig</th>
<th>Partial Eta Squared</th>
<th>Noncent. Parameter</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pillai's trace</td>
<td>.268</td>
<td>7.247a</td>
<td>4.000</td>
<td>79.000</td>
<td>.000</td>
<td>.268</td>
<td>28.986</td>
<td>.994</td>
</tr>
<tr>
<td>Wilks' lambda</td>
<td>.732</td>
<td>7.247a</td>
<td>4.000</td>
<td>79.000</td>
<td>.000</td>
<td>.268</td>
<td>28.986</td>
<td>.994</td>
</tr>
<tr>
<td>Hotelling's trace</td>
<td>.367</td>
<td>7.247a</td>
<td>4.000</td>
<td>79.000</td>
<td>.000</td>
<td>.268</td>
<td>28.986</td>
<td>.994</td>
</tr>
<tr>
<td>Roy's largest root</td>
<td>.367</td>
<td>7.247a</td>
<td>4.000</td>
<td>79.000</td>
<td>.000</td>
<td>.268</td>
<td>28.986</td>
<td>.994</td>
</tr>
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</table>

Each F tests the multivariate effect of HIE Current Semester. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

1. Exact statistic
2. Computed using alpha = .05

• Hotelling’s $T^2 = 0.37; F(4, 79) = 7.25; \rho \leq 0.01; \eta_p^2 = 0.27; 1 - \beta = 0.99$
Results

- Univariate main effects as a post hoc to significant MANOVA

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
<th>Noncent. Parameter</th>
<th>Observed Power a</th>
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</thead>
<tbody>
<tr>
<td>Change in AC</td>
<td>45.067</td>
<td>1</td>
<td>45.067</td>
<td>4.298</td>
<td>.041</td>
<td>.050</td>
<td>4.298</td>
<td>.535</td>
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<tr>
<td></td>
<td>859.886</td>
<td>82</td>
<td>10.486</td>
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<td></td>
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<tr>
<td>Change in CE</td>
<td>95.184</td>
<td>1</td>
<td>95.184</td>
<td>11.783</td>
<td>.001</td>
<td>.126</td>
<td>11.783</td>
<td>.924</td>
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<tr>
<td></td>
<td>662.376</td>
<td>82</td>
<td>8.078</td>
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<td></td>
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<tr>
<td>Change in AE</td>
<td>255.677</td>
<td>1</td>
<td>255.677</td>
<td>12.830</td>
<td>.001</td>
<td>.135</td>
<td>12.830</td>
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<tr>
<td></td>
<td>1634.073</td>
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<td>19.928</td>
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<td>Change in RO</td>
<td>270.028</td>
<td>1</td>
<td>270.028</td>
<td>16.350</td>
<td>.000</td>
<td>.166</td>
<td>16.350</td>
<td>.979</td>
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<tr>
<td></td>
<td>1354.294</td>
<td>82</td>
<td>16.516</td>
<td></td>
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</tbody>
</table>

The F tests the effect of HIE Current Semester. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05
Conclusions/Implications

- Students undertaking a high-impact experiences appear had more change in learning style.

- Post-secondary educators stimulate more change through implementing HIE practices in their instruction.

- Students are likely more engaged in the instruction on a personal level and environmental factors are at work (Kolb & Kolb, 2005).
Conclusions/Implications

- Although all areas had change RO exhibited the greatest differences
  - What is it about HIE that would change reflective observation?

- AC had the least difference in change
  - Are there factors about an HIE that would not influence abstract conceptualization?
Conclusions/Implications

• Is learning style change desirable? If so, which direction do we want students to move?

• More research is needed to determine the implications of directionality of learning style change
What are the questions???