

Lesson Study in Economics:

Developing Students' Thought Processes For Choosing Appropriate Statistical Methods

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BACKGROUND	THE LESSON	THE STUDY
<p>Course: BUS 230 - Business and Economics Communication and Research</p> <p>About the Course:</p> <ul style="list-style-type: none"> - Students conduct a statistical analysis appropriate for their own research project. - Students write a significant research paper. - MTH 145 (Elementary Stats) is a prerequisite <p>Learning Goals:</p> <p>Help students develop a way to organize knowledge of statistical tests that is conducive to applying this knowledge to answer research questions.</p> <p>Challenge:</p> <ul style="list-style-type: none"> - Students are competent in computation and implementation procedures for statistical tests. - Students have not yet organized this knowledge in a way that is effective to apply it. <p>We want students to consider key questions:</p> <ol style="list-style-type: none"> 1) Number of variables? 2) Scale of Measurement? 3) Intent of test (Differences or Co-movement)? 4) Independent or Paired Samples? 	<p>Background on the Statistics Unit:</p> <p>Students (re)introduced to a number of statistical tests, how to implement them, how to interpret result, and how to identify appropriate statistical tests to answer research questions.</p> <p>Our Knowledge Organization - Decision Tree:</p> <ul style="list-style-type: none"> - Jointly developed a lesson on how to organize knowledge about statistical tests. - Based on the <i>four key questions</i> to the left. <p>Four In-class Exercises:</p> <ul style="list-style-type: none"> - Challenged students to: <ul style="list-style-type: none"> (a) Pick statistical test for a research question (b) State reasons for the choice - Focused on four statistical tests: <ul style="list-style-type: none"> (A) One-sample T-test (B) Independent Samples T-test (C) Paired Samples T-test (D) Chi-Squared Test of Independence. <p>Fall 2011: Two exercises - Decision Tree - Two exercises Spring 2012: Decision tree thru unit - Four exercises</p> <p>Week Later Pop-Quiz: Recreate Decision Tree from Memory</p>	<p>Classroom Observation:</p> <ul style="list-style-type: none"> - Students' written work, observed students' discussions - Did students reflect on <i>four key questions</i>? - Did students get it right? - Did they have irrelevant considerations? - Did they have well-articulated reasons for their decisions? <p>Findings in Fall 2011:</p> <ul style="list-style-type: none"> - Improved performance after the decision tree intervention. - Decision trees drawn from memory reveal students did not yet completely understand decision-making process. <p>Findings in Spring 2012:</p> <ul style="list-style-type: none"> - Students' overall performance same or worse than those in Fall 2011 who had not been exposed to decision tree. - Excellent use of key questions - Excellent retention of the decision tree. <p>Surprising Findings / Remaining Challenges:</p> <ul style="list-style-type: none"> - Statistical and colloquial vocabulary caused significant confusion (eg: independence, relationship) - Confusion on what constitutes a variable and what is the scale of measurement.

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