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Assessing the Effectiveness of the HBL Pedagogy

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An exploratory set of studies was conducted to compare the effectiveness of the Hypothesis-Based Learning (HBL) and Physics by Inquiry (PBI) pedagogies. During two different semesters (fall 2003 and spring 2004), 83 Oklahoma State University elementary education students (77 female, 6 male) received identical content instruction differing only in pedagogy. Students were assessed regarding self-efficacy, physics expectations, science process skills, and physics content. Analyses reveal that HBL and PBI cause statistically similar gains in elementary education students' self-efficacy scores and physics expectations. Both populations were similar before and after instruction, with similar changes in performance occurring on the same items; no statistically significant differences were caused by pedagogy. Analysis revealed that both groups scored approximately 90% on the process instrument and were not statistically different. While no significant differences in Exam Item performance existed for Light and Color or Astronomy by Sight problems, HBL caused a significant student score improvement on the Electric Circuits problem. The major analysis conclusion is that HBL produces largely the same results as PBI, providing explicit evidence that open and directed inquiry pedagogies can be equally effective.