

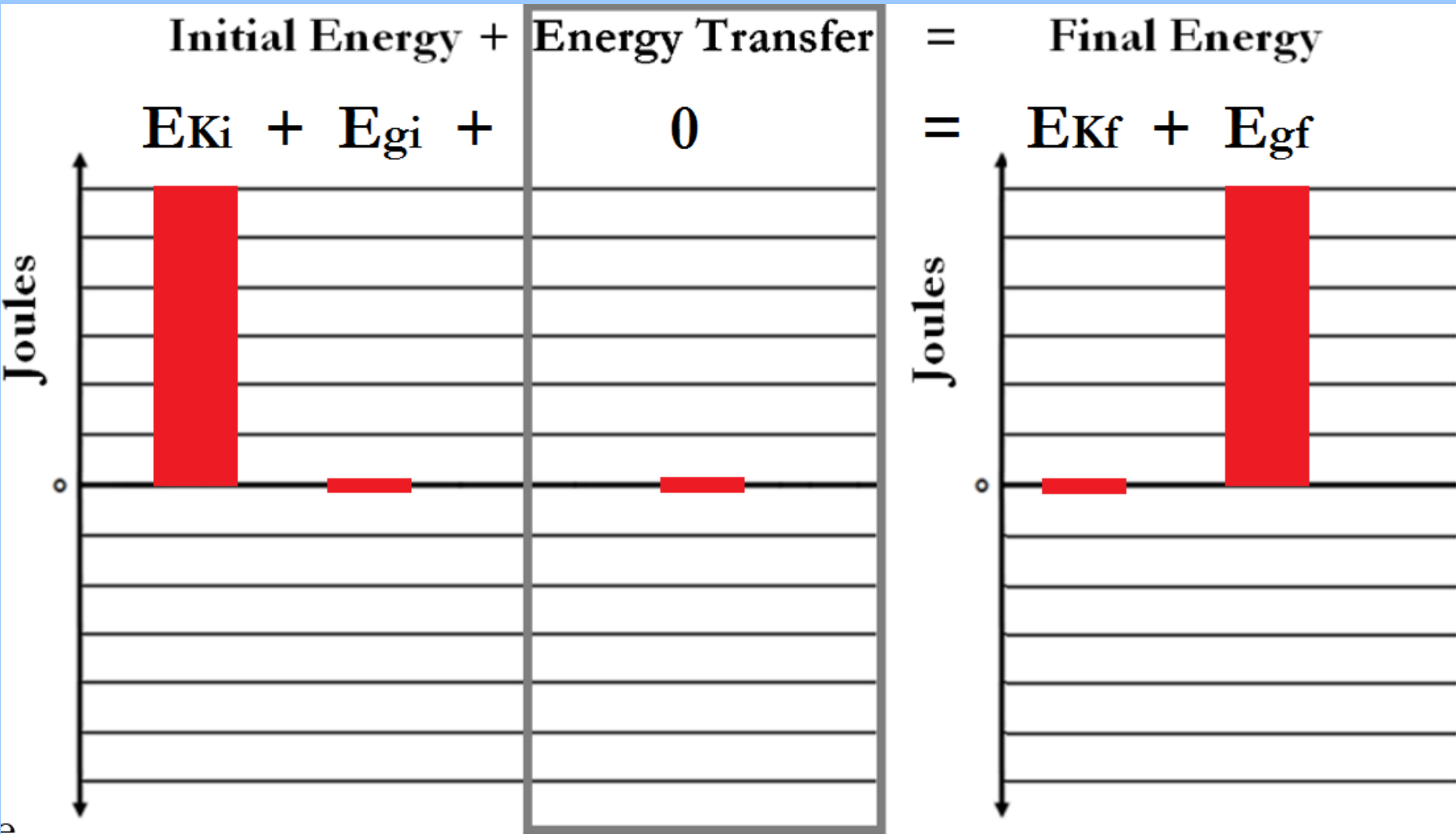
Energy and Work Instructional Strategies in General Physics

Background

I evaluated the effectiveness of scaffolded instructional strategies related to energy and work. I had found that students struggled to apply energy concepts to model physical phenomena. A student-centered and a traditional approach to teaching energy and work were compared.

Research Questions

- 1) Will interactive physical modeling strategies improve students’ appropriate selection of an energy and work approach or force and motion approach to solve a problem?
- 2) Will incorporation of student-led energy and work physical modeling activities improve students’ ability to identify energy changes in a system?
- 3) Will the incorporation of pictorial system diagrams and energy bar graphs improve students’ abilities to identify the energy changes in a system?

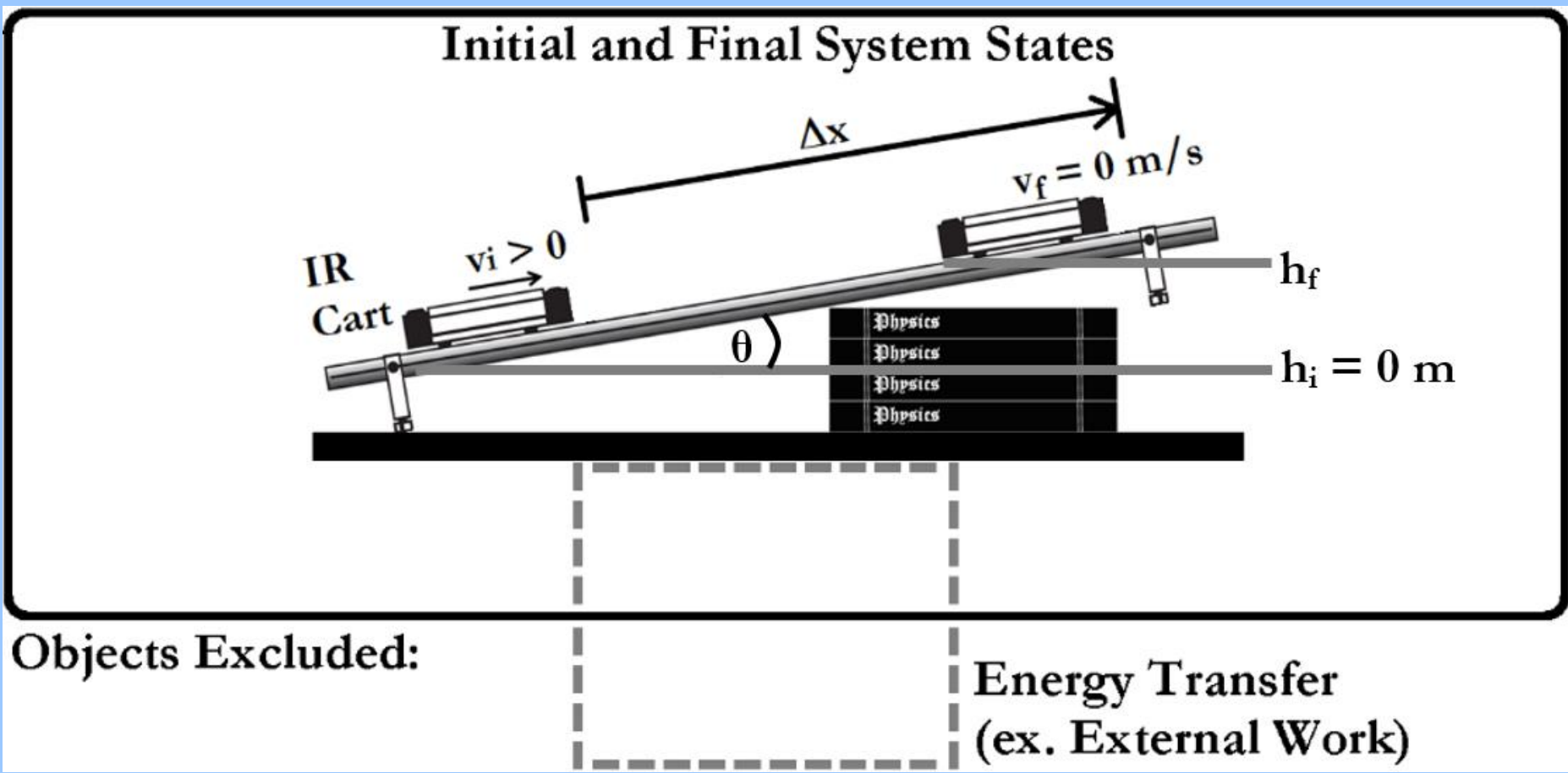


Data Collection and Analysis

Research Questions	Data Source		
Question 1	Pre-Test, Post-Test	Survey	Interviews
Question 2	Pre-Test	Examples of Student Work	Post-Test
Question 3	Pre-Test	Classroom Observation Notes	Post-Test

Treatment

Students drew system diagrams and energy bar graphs that modeled energy and work scenarios. Students simulated scenarios using physical manipulatives such as low friction dynamics carts and motion encoder tracks. They made predictions and tested their predictions by analyzing data collected.



Results

Students in the Treatment Group showed slightly greater gains in interpretation of lab data. No significant difference in gains were found on traditional assessments of energy concepts. No significant difference in preference for student-led interactive physical modeling over traditional instruction was found.

