
**Purpose of This Study**

To determine whether using technology with student-centered inquiry would enhance the development of middle schools students’:

- Conceptual learning
- Mathematical self-efficacy

Using the principles of Universal Design for Learning as my curricular and pedagogical framework, I incorporated LEGO® Mindstorm Robots into student-centered inquiry projects designed to support students with EV3 design engineering projects in an effort to meaningfully merge science instruction with deliberate, content-specific mathematics instruction.

**Expected Outcomes**

- Increase self-efficacy as evidenced by an increase in post-test scores.
- Compare and contrast strategies used to manipulate LEGO® Mindstorm Robots into student-centered inquiry projects designed to support students with EV3 design engineering projects in an effort to meaningfully merge science instruction with deliberate, content-specific mathematics instruction.
- Evaluate student performance.

**Research Question:** What is the impact of using Lego® Mindstorm Robots on 7th grade students’ mathematical self-efficacy?

**Results**

Average score increases from pre- to post- on a tool designed to measure self-efficacy in mathematics:

- **ITEM 1:** “I can solve most problems if I invest the necessary effort.” 13.78% increase in affirmative responses from pre to post.
- **ITEM 2:** “It’s alright with me if I’m not the best at everything as long as I get to participate.” Students reported a 10% increase in affirmative responses from pre to post.

**Study Design**

- **Action Research Project:** Study conducted by a teacher, in part, to help her better understand how to improve her own practices (future “actions”).
- **Length of Study:** Students were engaged with the LEGO® Mindstorm Robots daily for 40 minutes during Connections class over a 20-day period.
- **Data Collection:** Mixed Method Study
  - Pretest/Posttest to determine mathematical self-efficacy
  - Qualitative Data, including observations and student reflections.
- **Context/Subjects:**
  - Seventh grade middle school aged children.
  - Project Based Learning middle school.
  - 80 total participants.

**Works Cited**


