Integration of an Engineering Curriculum on the Social-Emotional Development of Preschool Students with and without Disabilities

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I. Introduction

What is Early Childhood STEM?

![STEM Diagram]

Whether through gardening, building blocks, or playing at the water table, children demonstrate readiness to engage in STEM learning early in life.

Why Early Childhood STEM?

- Science achievement gaps already exist at the beginning of Kindergarten between certain groups and persist through 8th grade (Morgan et al., 2016).
- “Without such education starting and continuing throughout the early years, many children will be on a trajectory in which they will have great difficulty catching up to their peers” (Allen & Kell, 2015).
- Peer mediated intervention with Legos: a role-playing intervention for groups of three students each role-playing an Engineer, a Supplier, and a Builder (LeGoff, 2004).
- Children with disabilities, specifically autism, are interested in highly structured, predictable, and systematic play, that involves engineering and construction such as with Legos (Hu, Zheng, & Lee, 2018).
- Lego play therapy has led to an increase in interaction, which in turn promoted sharing, collaboration, conflict resolution, verbal and non-verbal communication (Hu, Zheng, & Lee, 2018).

What, then, are the benefits of STEM in early childhood?

- STEM as an approach to learning in early childhood

Research question:

What is the effect of integrating a STEM-based curriculum on the social-emotional development of preschool students with and without disabilities?

II. Methods

- Investigation of students engaging in STEM curriculum
  - cooperative play
  - collaborative problem solving

**HOW?** Wee Engineer Curriculum (Engineering is Elementary, Museum of Boston)

- **WHY?**
  - A systematic way to implement STEM over a six-week period.
  - Intentional planning of four challenges
  - Support of ongoing reflections through questions

The four challenges:

- **Noisemakers**
- **Wrecking ball**
- **Rafts**
- **Fans**

**Explore**

Find out more.

**Create**

Try an idea.

**Improve**

Make it better.

III. Results

- Students can engage in the Engineering Design Process.
- The curriculum created a platform for collaboration to begin between and among students with and without disabilities.
- Students with disabilities participated more actively and expressed ideas through their creations.
- Students with disabilities emerged as leaders both in their eyes as well as in the eyes of other students.
- STEM drives childhood development.
- All students saw themselves as capable of solving problems.
- The curriculum was a springboard for integrating STEM.

IV. Conclusions

- STEM drives childhood development.
- STEM impacts educators.
- STEM may help develop a Growth Mindset.
- The philosophy behind STEM focuses on a process of learning through inquiry.

V. References


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