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

Gurupriya Ramanathan
Boise State University

Yvette Mere-Cook
Boise State University

Deb Carter
Boise State University

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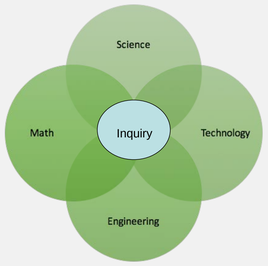
Early and Special Education

I. Introduction

What is Early Childhood STEM?



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

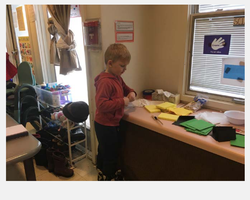
- The four challenges:

Noisemakers

Wrecking ball

Rafts

Fans



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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