Design Thinking as a Tool for Enhancing Creativity in STEM Education among Special Needs Teachers

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Context & Motivation

- Growing interest in STEM among students with disabilities
- STEM teachers lack skills for special needs instruction
- Challenge of teaching same curriculum to diverse learners
- Need for innovative and creative teaching strategies

What are the Issues?

Key Challenges

- Declining enrollment trends
- Reliance – fully on textbook
- Limited instructional resources
- Lack of teacher preparation

Students with Disabilities

Special needs education encompasses students with:

- Physical, sensory, cognitive impairments
- Developmental and learning disabilities
- Intellectual, emotional, behavioral issues

Equitable access to STEM careers is essential for all students.

What is Design Thinking (DT)?

Design Thinking is a human-centric approach that:

- Encourages users to think like designers
- Prioritizes empathy and user needs
- Fosters innovative problem-solving
- Creates conducive environments for creativity

Design Thinking Workshop Overview

- **Participants:** 40 special education teachers from Perak, Malaysia
- **Duration:** Two-day intensive workshop
- **Focus:** Creative problem-solving for STEM teaching
- **Framework:** Stanford d.school module

Three Components of Creativity

Domain-Relevant Skills
Knowledge and expertise in subject matter

Creativity-Relevant Skills
Abilities to think and work creatively

Task Motivation
Drive to engage in creative work

Three Main Workshop Sessions

Creative STEM Teaching
Addressing STEM challenges in special education

Design Thinking
Learning DT processes and tools

Idea Pitching
Sharing innovative lesson plans and activities

Research Design

- **Duration:** 12-week study over 10 weeks post-workshop
- **Sample:** 12 teachers from 12 districts in Perak (stratified sampling)
- **Criteria:** 5+ years experience teaching STEM to students with disabilities
- **Method:** Open-ended interviews with validation by expert reviewers
- **Analysis:** Manual open-coding to identify emergent themes

Major Themes

1. Prioritizing Students
Teachers focused on student needs before lesson planning

2. Impactful STEM Lessons
More meaningful and creative lesson designs

3. Confidence to Create
Enhanced creative thinking and classroom confidence

Impact on Teachers

- Shifted mindset from teacher to designer
- Adopted empathic teaching approaches
- Gained confidence in creative problem-solving
- Developed student-centered lesson plans
- Improved student engagement in STEM classes

Key Insights

- DT enables creation of innovative STEM pedagogies for special needs
- Design thinking mindset enhances teacher creativity and confidence
- Empathic approaches improve learning for students with disabilities
- DT can facilitate meaningful STEM learning experiences

Conclusions

- Design Thinking is a powerful tool for enhancing creativity in STEM education
- Special education teachers benefit from DT training in lesson design
- Creates innovative teaching approaches for students with disabilities
- Enables STEM educators to teach innovatively while supporting student diversity


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MANUAL
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S.T.E.M
(Science Technology Engineering Math)
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STEM
PENGKODAN WARNA UNTUK MASALAH BUTA WARNA
LARUT MATANG SELAMA
SK LONG JAAFAR
LMS
PENGEKODAN WARNA
UNTUK MASALAH


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Grazie

Thank You