The Pursuit of STEM Education: 5 Considerations for Design and Implementation

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Challenge Activity

A task (or series of tasks) in which students apply skills and knowledge to create a product that is rooted in a problem to be solved or question to be answered.
Purpose of Challenge Activity

A used to facilitate the integration of STEM practices into classroom instruction.

Key features:
- Learning is situated in a problem or question.
- Students create a product.

The product can be a:
- Tangible
- Media
- Digital artifact
- Presentation

Larmer & Mergendoller (2019)
5 essential design considerations:
- Learner-Centered
- Performance Context
- Constraints
- Technology
- Assessment
Learner-Centered

Attendance to student relevance, ownership, and voice.

**Relevance:**
- Students’ Prior knowledge, experiences, and misconceptions
- Local community
- Other environments
Contextualizing the challenge activity to resemble an authentic situation beyond the school setting.

**College & career readiness:**
- Communication
- Collaboration
- Critical Thinking
- Information Analysis/Synthesis

Performance Context
Constraints

Limiting factors that may impact the design and delivery of the challenge activity.

Factors:
- Timeframe
- Number of learners
- Materials
- Space
Technology

The instructional tools used to facilitate the challenge activity.

**Tools includes:**
- Hardware
- Applications
- Supplies
Assessment

Critique and feedback on viability of the product created in the challenge activity.

**Methods:**
- Rubric
- Claims-Evidence-Reasoning
- Open class/ small-group discussions
Challenge Activity example: PSA

Title:
Public Service Announcement (PSA)

Goal:
Create an animation or video that address a current issue that is relevant to your environment.

Objective:
Students use Scratch coding software to create a 30-90 second animation that addresses a resolution to bullying situation.

Scan for highlights of the PSA Challenge Activity

AECT 2019-Rice
Pilot Study

When:
Summer 2019

Participants:
5 middle school in-service teachers

Purpose of study:
Impact on teachers’ perception of their confidence and competence

Scan for a summary of the Ch. A. M. P. pilot study
Questions
Thank You!

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Challenge Activity
Theoretical Framework

Challenge Activity

Learner Centeredness
Performance Context
Constraints
Technology
Assessment

Constructivist Design Theory

Personal
Realistic & Relevant
Multiple Perspectives

STEM
PBL
Inquiry
Discovery