2021 AEP Virtual Gathering

STEM-Integrated Arts: A Discussion With Some "Sciencey" People

Presenters

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Session Description

Presenters will introduce participants to a professional development program, supported by a U.S. Department of Education grant, that promotes STEM-integrated visual arts classes. With increased STEM confidence and new technical skills, art teachers develop lessons for their standards-based art classes that use digital design, physical computing with programmable circuit boards and fabrication tools such as 3D printers and laser cutters/engravers. When students use these technologies as media for creating meaningful artwork, they likewise develop confidence in their abilities and broaden their identities both as artists and as "sciencey" people. This work with students from families with low incomes may help them imagine that they have a place in the future design economy (and in family-sustaining, in-demand STEM careers).

STEM-integrated arts lessons (rather than arts-integrated STEM lessons) provoke questions about the various definitions of the transdisciplinary STEAM approach to education which typically include hands-on problem-solving, emphasis on process over product, creativity and the overlapping, transferable thinking skills that each of the component disciplines contain. Using chat, polls, breakout rooms and shared online documents during the session, presenters are eager to discuss the following with session participants:

- What are the benefits and risks if school systems make a distinction between the STEM and STEAM approaches?
- What needs to be done to ensure the important characteristics of STEAM have a place in school systems long term?

Learning Objectives

- Participants will increase their awareness of visual arts lessons that use digital technologies, coding, and fabrication equipment.
- Participants will compare definitions of arts integration, STEM, and STEAM in order to discuss who is included or excluded when we make these distinctions.
- Participants will evaluate the potential of these programs to equitably prepare students for the future workforce and to help students form their identities as both artistic and "sciencey" people.

Session Outline and Summary

Participants will be asked to consider what makes someone "sciencey," a term that comes from research on the "science capital" of teens. High science capital, which is related to social privilege, predicts how likely students are to feel a STEM career is "for" them.

Participants will then be introduced to a professional development project that has the goal of raising the science capital of students from families with low incomes by training their art teachers to use digital design, coding, and fabrication tools in their art-standards-based classes.

Utilizing Google Jamboard and Zoom breakout rooms, participants will have the opportunity to discuss whether differing definitions of STEAM pose a risk to ensuring its place in school systems long term.

Supplemental Materials

SLIDES:
STEM-integrated Arts: Sciencey

SCIENCE CAPITAL:

- Archer et al. (2015) Science capital: a conceptual, methodological, and empirical argument for extending Bourdieusian notions of capital beyond the arts. *Journal of Research in Science Teaching* 52(7), p. 922-948
- STEM Participation & Social Justice Research
- Science Capital Made Clear
- How Sciencey Are You?

EXPLORATORIUM:

- Arts Projects & Exhibits
- Art as a Way of Knowing Conference 2011
- Learning Dimensions of Making and Tinkering