Science Connections to Science Capital: Enhancing Child and Family Learning
Thursday, May 9
2:15 pm - 3:30 pm (75 minutes)
Science Connections to Science Capital
Enhancing Child and Family Learning
Presentation Format
Presentation Format

Panelist Introductions
Session Description
“Science Capital”
Panelist Presentations
Breakout Groups
Q&A
Expected Outcomes
Expected Outcomes

- Understand the concept of “science capital”
- Use the idea as a theoretical lens to analyze your existing programs/events or as a conceptual framework with which to create new programs/events
- Be inspired by the real-world program/event examples from 4 different museums and adapt these approaches to your environment
Panelist Introductions
American Museum of Natural History

Sarah Moshenberg
Explora
Tara Henderson
Chicago Children’s Museum
Alexandra Pafilis Silverstein
Ghost Panelists
American Museum of Natural History

Jenny Ingber, PhD
Providence Children’s Museum

Janella Watson
Session
Description
Building “science capital” among children and families may help to address inequities in participation in science fields and promote social justice within science education. Informal institutions, like museums, are well-positioned to work with children and families from a range of backgrounds to ensure opportunities for learning science and enhancing science capital.
Theoretical Lens
"Science capital": A conceptual, methodological, and empirical argument for extending bourdieusian notions of capital beyond the arts

Louise Archer, Emily Dawson, Jennifer DeWitt, Amy Seakins, Billy Wong

First published: 20 March 2015 | https://doi.org/10.1002/tea.21227 | Cited by: 8

Abstract

This paper sets out an argument and approach for moving beyond a primarily arts-based conceptualization of cultural capital, as has been the tendency within Bourdieusian approaches to date. We advance the notion that, in contemporary society, scientific forms of cultural and social capital can command a high symbolic and exchange value.
Article Inspiration

To read the whole article:


This link is case sensitive, so type it in just as it is written!
Science Capital

Building “science capital” among children and families may help to address inequities in participation in science fields and promote social justice within science education. Informal institutions, like museums, are well-positioned to work with children and families from a range of backgrounds to ensure opportunities for learning science and enhancing science capital.
Inequalities in Science Participation

Inequalities in post-16, science participation remain a matter of international policy concern. There is a broad consensus among governments, industry, and the science education community that more needs to be done to increase and widen participation in post-16 science, particularly in areas such as the physical sciences and engineering and among those from under-represented groups, such as women, working-class, and some minority ethnic groups (e.g., ACOLA, 2013; House of Lords, 2012; US President's Council of Advisors on Science and Technology, 2010).
A Potential New Lens

Yet despite decades of attempts to understand and solve the problem, and considerable resource being devoted to the issues, participation rates remain stubbornly resistant to change (e.g., Smith, 2011). This paper seeks to offer a potential new lens (“science capital”) for understanding uneven patterns in science participation, with the hope that this might also offer some fresh ideas for how the issue might be tackled.
Sociological Measures

We begin by setting out an argument as to why sociological measures of cultural capital (designed to elicit social class) could usefully also include some science-related aspects. We then outline our (ongoing) conceptual approach to theorizing “science capital” and how we have translated this into a survey tool for use with school students.
Exchangeable Resources

Capital is a key component within Bourdieu's theory of social reproduction. Bourdieu (1977, 1984, 1986) conceptualizes capital as the legitimate, valuable, and exchangeable resources in a society that can generate forms of social advantage within specific fields (e.g., education) for those who possess it. In The Forms of Capital (1986), Bourdieu identified four key types of capital—economic, social, cultural, and symbolic capital—which through interactions with habitus (a person's internalized matrix of dispositions, which guides behavior) within fields (social contexts), produce relations of privilege or subordination within society.
Panelist Presentations
Saint Louis Science Center

Christian Greer
Youth Exploring Science (YES Program)
YES Community Partners

COMMUNITY PARTNERS

The YES Program cultivates relationships with community-based organizations focused on wellness, diversity, and education. YES teens frequently work with these partners to facilitate science events and participate in internships.

21st Century Afterschool
Annie Malone
Arete
Better Family Life
Blossomwood Day School
Boys and Girls Club of Greater St. Louis
Brown School
Confluence Academy
Cognizant Technology Solutions
De La Salle Middle School
Delta Sigma Theta Sorority
East St. Louis Community College
Employment Connection
Family Resource Center / MMP
Forest Park Forever
Forest Park Pharmacy
Gateway Harley-Davidson
Gateway Homeless
Gia Community Development Corp
Girls Scouts of Southern Illinois
Girls Inc.
Griffin Center
Harris Stowe State University
Illinois Math and Science Academy
Jamison Agency
Marian Middle School
Marygrove Child Center
Matthews Dickey Boys and Girls Club
Mission: St. Louis
Monsanto Family YMCA
NCADA
Neighborhood Houses
New Life Community Church
Northside Youth And Senior Services Center, Inc.
Park Central Development
Project Raise The Roof
Saint Louis Torchbearers 2
SLACO
SLPS – Gateway
SLPS – LeClaire
SLPS – NROTC
SLPS – Peabody
SLU – Educational Talent Search
St. Louis Black Rep
St. Louis College of Health Careers
St. Paul Missionary Baptist Church
St. Charles Lwanga Center
St. John Community Improvement Corporation
St. Louis ArtWorks
St. Louis City Family Court
St. Vincent Greenway, Inc.
Storman Academy
Top Ladies of Distinction, Inc., St. Louis Chapter
YES Teens and Coding
YES Teens and Robotics
YES Teens and Aerospace
Summertime Science

Summertime Science (STS) is a free summer camp for Community Organizations to bring their campers for engaging hands on science activities.

The target audience is Pre-K and up and we teach about 4,000 each summer.

The activities are led by YES Teens and directly supervised by YES Staff.

STS activities are focused on a science concept or “theme” for the Summer.
Summertime Science

Students participate in two science activities for one hour each and enjoy a free lunch provided by SLPS school district.

Programming is Monday thru Thursday, 10 am to 12 pm, June 17, 2019 to Aug 1, 2019.

Students do make-and-take activities that allow them to continue to reflect on their experience during the Summer.

Most of the organizations that participate are Community Partners.
Gateway Eagles

The summer K-2 participants explore new environments and try new things, while learning new skills. Active and retired pilots in the area who work with youth to spread a love of flight, aviation, and STEM learning.
Gateway Eagles

The summer K-2 participants explore new environments and try new things, while learning new skills. Active and retired pilots in the area who work with youth to spread a love of flight, aviation, and STEM learning.
Community Science Educators also go through deep dives and extensive training on a topic before they engage teens who will later engage early learners.
YES Teen Mentoring

YES teens learn the basics of flight like the four forces and the physics behind the concept of lift and the role of airfoils.
Simulated environments are used to demonstrate core principles and test knowledge of science process skills, geometry, algebra, and engineering using technology.
YES Teen Training and Flight Hours

Each experience module gives them the opportunity to “level up” and apply the skills they have already learned in new ways.
Critical thinking and creative problem solving are ignited through a challenge-based approach to engagement. Teen mentors help lead the way.
The summer K-2 participants explore new environments and try new things, while learning new skills.
K-2 Group Using the Simulators

The summer K-2 participants explore new environments and try new things, while learning new skills.
Identity Management and Transformation

The summer K-2 participants explore new environments and try new things, while learning new skills.
Impact on Learning

Students often express what they learned and how the experience made them feel more like a scientist, engineer, or pilot.
Impact on Learning

Students often express what they learned and how the experience made them feel more like a scientist, engineer, or pilot.

I learned how to fly and what to do when your GPS is broken.
American Museum of Natural History
Sarah Moshenberg
Discovery Day

Goddard Riverside Partnership
Discovery Day

- Over the course of 10 Saturdays throughout the school year, families living in NYC public housing from all five boroughs are bussed to the Museum for a day of family science fun
- Funding for the program is provided by the New York City Council
- Just completed our 5th year of the program- 963 participants served-woohoo!
- Every participant (child AND adult) receives a backpack with science tools and return tickets to take home
- All program materials are produced bilingually and at least half of the staff present are English and Spanish speakers.
Discovery Day

- Recruitment
- Science experiences accessible to whole family
- Community
- Parent engagement aspect
Discovery Day

Challenges:
- Recruitment and attendance
- Logistics
- Meeting participants’ expectations/needs
Goddard Riverside Partnership

- Began in 1998 with just 3-5 year olds, now children join the 7 year long Science and Nature Program after completion of the Head Start year.
- Students from the Goddard Riverside Head Start (CBO) come to the Museum for 23 weekly classes throughout the academic year with parents and teachers.
  - Classes are 2 hours long and introduce science concepts that complement the sciences of the Museum.
  - Dioramas and Museum objects/specimens support science learning.
- PD sessions monthly for the teachers from the Head Start
- Funding is both grant supported and supported by tuition program from the Science and Nature Program.
Goddard Riverside Partnership

- Recruitment
- Science experiences accessible to whole family
- Community
- Parent engagement aspect
Goddard Riverside Partnership

Challenges:
- Attendance
- Teachers’ schedule and turnover
- How to build community with audiences from varied backgrounds
Explora
Tara Henderson
STEM Charging Stations for Young Children and Families
LG-94-17-0260
Objectives:

- **Build interest** and awareness of the importance of early STEM learning experience for setting up young children for future success.

- **Build capacity** among childcare providers, librarians, and parents to provide STEM learning activities for young children.

- **Increase access** to STEM learning opportunities for low-income children of color and their parents/caregivers.

- Demonstrate the power **collective impact**.
Growing a Scientist
Children and Adults Exploring and Discovering Together

- Congregation Albert
- Edgewood Library
- Christina Kent Early Childhood Center
- Cuidando los Ninos
- Five Sandoval Indian Pueblos Head Start
- Haa’ku Learning Center (Acoma)
- Paradise Hills Community Preschool
- Parents Reaching Out
- Plaza Feliz Child Development Center
- Toy Lending Library – Albuquerque
- Toy Lending Library – Gallup
- Toy Lending Library – Las Cruces
I, as a parent, have enjoyed the opportunity for my child to extend his knowledge of things in the world. My child has enjoyed the experience that is hands on.

I discovered that I can do small but fun science related things with my kids.

Exploring science with an atypically developing child is similar to exploring with a typically developing child - Just need patience!
I discovered my kid will eat brussel sprouts.

Thank you for your patience and dedication to science. My family and I learned a lot, I also learned a lot, it brought our families together.

That this class opened my eyes to new ways to allow kids to learn about nature.

Shaving cream has a lot more uses than I thought.
Chicago Children’s Museum
Alexandra Pafilis Silverstein
TRAEL

Tinkering, Reflection and Engineering Learning
1. Collaborative Learning

Family as Learning Unit: Caregiver Role

Design elements to support adult-child collaboration

Facilitation to support family interaction

• Children’s Museums: places of mediated learning
2. Engineering Process

Set a goal.
Predicted what might happen.
Tested what you made.
Changed it after testing.
3. Reflection: Putting Words to Experience

Talked about what you tried.
Reviewed your process.
Still thinking about what you might change.
How open-ended or specific is the task?

- **Open ended**
- Make Something

- Make Something that Does Something

- **Specific**
- Make Something that Does THIS (rolls, flies, etc.)
## Engineering Design Process

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<td>Examining Others’ Creations</td>
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• Engaging experts from the community to **develop** and **lead** programs for young children and their families

• Examine ways (and ways to assess how) expert-led experiences can advance **children’s STEM learning**.
When experts’ oral narratives include explicit reference to *doing* engineering:

- Families talk about more elements of the engineering design process
- Families engage in more hands-on testing, and iterating their design
- Children report more STEM-related content in their own narratives about their experiences
We are identifying and understanding synergies between experiences with experts and their narratives and family engagement patterns.

Ultimately, this work can offer recommendations and resources to enrich STEM learning opportunities for young children.
Breakout Groups

Select a panelist whose program/event example resonated with you.

Go to h/her table and participate in a discussion.

If you have examples of your own to share, please share them!

We will break for approximately 15 min.
Breakout Group Prompts

Do you have programs/events that foster science capital?

How can you connect science capital in your community?

What might be the long-term impacts of science capital?
Q&A
Share-outs!
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