AMERICAN MUSEUM OF NATURAL HISTORY

LONG-TERM ISE PROGRAMMING, AND PERSISTENCE IN STEM

Brian Levine, Manager of Youth Programs, blevine@amnh.org

The Lang Science Program at AMNH

- 7-year natural science experience for 6th – 12th grade NYC students.
- Annual competitive entry for new cohort of ~20.
  - *21st cohort accepted in 2019; 14 have graduated.*
- Curriculum throughout designed to help participants work collaboratively, and view themselves as people who know, and can do, science.
  - *Middle school coursework spirals through a variety of AMNH-related sciences.*
  - *High schoolers have more autonomy – elective courses & annual research projects.*
- Also included: family engagement; special events; and college and career prep.

Research Questions

- In what ways does long-term participation in an informal OST museum program mediate changes in academic and social capital that contribute to persistence with STEM?
- What hypotheses can we generate about program design principles based on analysis of participants of an informal OST museum program?
- What are the STEM majors and STEM trajectories of long-term participants of an informal OST museum program?
- How do the STEM major and STEM career outcomes of these participants compare to other college students and graduates?

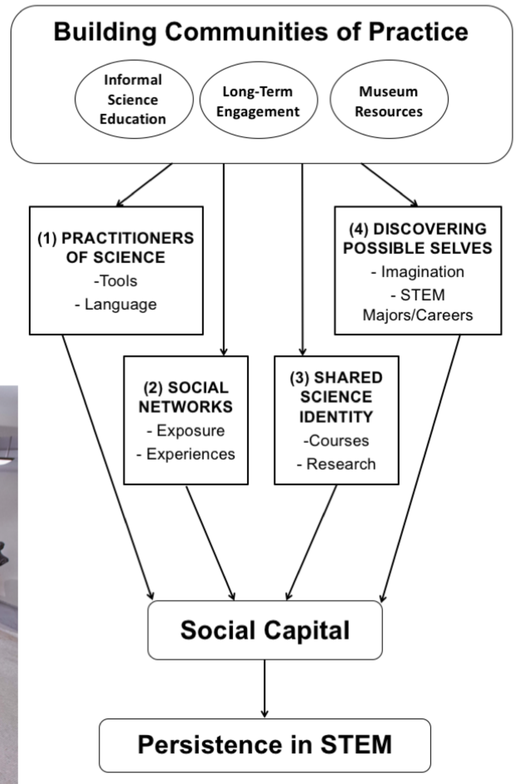
Study Sample

- 66 alum (of 74 at the time) surveyed.
- 62 indicated major
  - *65%/35% female male*
  - *32% African-American, 29% Asian, 23% Latina/o, 13% White non-Hispanic*
- 21 selected for in-depth, semi-structured interviews
  - *Selected across diversity of college experience (still in vs. completed) and racial/ethnic/gender backgrounds, with an emphasis on groups historically underrepresented in STEM.*

Quantitative Analysis

Participants STEM majors and employment compared to:

- Local (CUNY) statistics: ***Lang graduates far exceed CUNY students in STEM.***
- Overall national (US) statistics: ***Lang graduates far exceed general population in STEM.***
- Nationally (US), students who graduate from STEM-specialized high schools: ***Lang graduates are on par with this population.***



Qualitative Analysis

The Lang program appears to utilize four themes which foster persistence in STEM:

1. Students are practitioners of science
2. Students build social networks
3. Students have a share identity in STEM
4. Students are encouraged to discover possible selves

Practitioners of Science	Social Networks	Shared Identity	Discovering Possible Selves
Authentic experiences as practitioners of science including lab investigations, fieldwork, exhibit design, citizen science projects, publication opportunities, & the use of museum collections to investigate research questions	The quantity and quality of enduring relationships with museum educators, scientists, and peers.	Through long-term participation in an informal science education context with like-minded peers, youth actively view themselves as "science people" and make career choices based on this identity.	Informal science education experiences that foster participants' awareness of possible careers and preparedness for college and for a STEM career.
"I loved all the fieldwork. I thought it was so cool…Like, it's one thing to learn about it in the classroom, but to go outside and actually do it. My favorite was the ecology and evolution [research team]…I loved going to Robert Moses State Park … to collect our own fish. …It was really rewarding. …Lang taught me to be curious, and not just to be curious, but to also seek out answers." (Lang alumnus, ecology and evolution major at an Ivy League university).	*"[A Lang alumnus] had a big impact on me wanting to go [to a particular college]. He had a good time at Lang, and was able to do science-associated stuff at [the college]. I ended up working for him as a science teacher later on in my [college] experience. Now we're teaching it, instead of learning it…nice little bit of continuity." (Lang alumnus; biology degree from a northeastern college; applying to graduate school).*	*"I think I really liked the access to the resources in the museum, access to a lot of the curators there, a lot of the staff members and other students who had the same interests and shared the same interests as I did. I really enjoyed going to the museum. It shaped who I am today. The middle school I went to didn't have a lot of programs. …I think the museum was sort of my outlet to be as nerdy as possible and be around a group of students who had the same interests." (Lang alumnus; biology degree from a state college; presently working as a researcher).*	*"I certainly became aware of a lot of fields of science that I didn't know…If I had to pinpoint the moment where I was, 'yes, I would really like to do biochemistry', I think…when we were… learning a lot about genetics and molecular biology…we went on a field trip to an R&D facility…I thought it was the coolest thing ever…I want to end up doing that one day…and I kept pursuing it." (Lang alumnus; biochemistry and molecular biology major from a northeastern university; presently working as a researcher).*

This poster is based on the work published in Habig, B., Gupta, P., Levine, B., & Adams, J. (2018). An informal science education program's impact on STEM major and STEM career outcomes. *Research in Science Education* (2018). https://doi.org/10.1007/s11165-018-9722-y