

Out of School Time (OST) OPPORTUNITIES AND STEM IDENTITY

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meeting
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PROJECT GOAL:

Develop a student survey which can be used with STEM and non-STEM first year college students to test whether earlier exposure to certain Out-of-School Time (OST) programs and opportunities within programs predicts a boost in attitudes related to STEM interest, identity and careers, especially for students underrepresented in STEM

- **Generate hypotheses to be incorporated into the survey instrument;**
- **Develop, pilot test, and validate instrument;**
- **Analyze initial data and disseminate preliminary findings**

HYPOTHESES GENERATION: OST STAKEHOLDERS

- Providing **relevant and real-world examples** for students to picture STEM careers and picture themselves in STEM careers
- Including relevant and **real-world issues** in their programs
- Importance of **location**, be in on a college campus or in a natural setting (wherever science happens)
- **Building community among participants**
- **Building relationships with adults** (especially young adults, i.e. undergrads and graduate students, not just professors)
- Having instructors, guest speakers, or mentors that **look like their participants**
- Finding ways for participants to **connect with someone who has a similar story**

THE INSTRUMENT:

Comprehensive survey – 29 questions (15-20 minutes to complete)

- Career interest
- STEM interest
- **STEM identity**
- **Participation in OST activities – structured**
- Family interest and involvement in STEM
- Barriers to participation in OST STEM activities
- Demographics

THE INSTRUMENT: STEM IDENTITY

14. How strongly do you agree or disagree with the following statements?

	Strongly Disagree	0	1	2	3	4	5	Strongly Agree
I saw myself as a STEM person at the beginning of middle school.		0	1	2	3	4	5	
I saw myself as a STEM person at the beginning of high school.		0	1	2	3	4	5	
I saw myself as a STEM person at the end of high school.		0	1	2	3	4	5	
I see myself as a STEM person now.		0	1	2	3	4	5	

15. How strongly do you agree or disagree with the following statements?

	Strongly Disagree	0	1	2	3	4	5	Strongly Agree
My family sees me as a STEM person.		0	1	2	3	4	5	
My friends/classmates see me as a STEM person.		0	1	2	3	4	5	
My teachers see me as a STEM person.		0	1	2	3	4	5	
Topics in STEM excite my curiosity.		0	1	2	3	4	5	
I enjoy learning about STEM.		0	1	2	3	4	5	
I am interested in learning more about STEM.		0	1	2	3	4	5	
I feel confident in my ability to learn STEM.		0	1	2	3	4	5	
I understand concepts I have studied in STEM.		0	1	2	3	4	5	
I can do well on tests/exams in STEM.		0	1	2	3	4	5	

THE INSTRUMENT: OPPORTUNITIES

11. If you participated in STEM programs/activities outside of school, did you experience the following opportunities? Mark all that apply. Leave blank those that do not apply.

	If you experienced the following opportunities in out-of-school time STEM program, please mark how often and during which time period you participated				This opportunity increased my interest in STEM
	5-8		9-12		Mark if yes
	Sometimes	Often	Sometimes	Often	
Interacting directly with someone who works in a STEM career (e.g., as a guest speaker, on a field trip)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working with older students (e.g., college students, graduate students)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Spending time on a college campus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning about STEM careers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning about the contributions and experiences of people of color and women in STEM	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taking on a leadership role	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working with/mentoring/tutoring younger students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participating in hands-on STEM activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working on real world STEM issues/problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choosing, designing, or carrying out my own STEM project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participating in STEM-related activities that make a scientific impact	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participating in STEM-related activities that are meaningful to me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participating in STEM-related activities that make an impact on my community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participating in STEM-related activities that make society and/or science more equitable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having positive relationships with adults	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being recognized by program leaders for my contributions (or ideas) during the program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sharing aspects of my cultural experiences or identity during the program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Giving feedback to leaders/providers during/after the program, including voicing my confusion or concerns	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Finding others in the program that have similar interests	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Becoming part of a community (network)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Presenting some aspect of my experience to close or extended family, friends or others (virtually or in-person)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Engaging in additional STEM opportunities after the program ends (as a result of the program)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Returning to the program as an alumnus/a/ helper/mentor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I did NOT experience any of these opportunities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PILOT TESTING:

Large pilot study – the beginning of the fall semester

- 1,134 **first year** college students
- in **mandatory English/FYE classes** – STEM and non-STEM students
- at Historically Black Colleges and Universities (HBCU), Hispanic Serving Institutions (HSI) and large public universities

WHICH OST OPPORTUNITIES ARE SIGNIFICANT
PREDICTORS OF STEM IDENTITY?

Individual Regression Results

	Outcome: STEM identity at the beginning of high school	Outcome: STEM identity at the end of high school
Opportunities experienced in STEM programs/activities in middle school (dummy variable)	Effects	Effects
Participating in STEM-related activities that are meaningful to me	.47***	.47***
Participating in STEM-related activities that make an impact on my community	.47***	.36**
Learning about STEM careers	.39***	.37***
Participating in hands-on STEM activities	.35**	.49***
Working with older students (e.g., college students, graduate students)	.23*	.23*
Learning about the contributions and experiences of people of color and women in STEM	.28*	.31*
Sharing aspects of my cultural experiences or identity during the program	.28*	.29*
Becoming part of a community (network)	.29*	.29*
Presenting some aspect of my experience to close or extended family, friends or others (virtually or in-person)	.26*	.30*

	Outcome: STEM identity at the beginning of high school	Outcome: STEM identity at the end of high school
Opportunities experienced in STEM programs/activities in middle school (dummy variable)	Effects	Effects
Spending time on a college campus	.39**	NS
Working on real world STEM issues/problems	.39**	NS
Choosing, designing, or carrying out my own STEM project	.39**	NS
Having positive relationships with adults	.23**	NS
Taking on a leadership role	.30*	NS
Giving feedback to leaders/providers during/after the program, including voicing my confusion or concerns	.27*	NS
Engaging in additional STEM opportunities after the program ends (as a result of the program)	.34*	NS
Returning to the program as an alumnus/a helper/mentor	.33*	NS

	Outcome: STEM identity at the beginning of high school	Outcome: STEM identity at the end of high school
Opportunities experienced in STEM programs/activities in middle school (dummy variable)	Effects	Effects
Interacting directly with someone who works in a STEM career (e.g., as a guest speaker, on a field trip)	NS	.38***
Being recognized by program leaders for my contributions (or ideas) during the program	NS	.27*
Finding others in the program that have similar interests	NS	.26*
Participating in STEM-related activities that make a scientific impact	NS	NS
Working with/mentoring/tutoring younger students	NS	NS
Participating in STEM-related activities that make society and/or science more equitable	NS	NS

DIVING DEEPER IN THE DATA:

Join me in my breakout group to talk about

- Additional data from this study
- Additional identity studies and findings
- Findings from a study on mentoring and identity
- Strategies you'd like to test to measure belonging in future studies