

FREE

Purpose: To support groups of academically-able young women to think seriously about engineering as a career.
To follow the course of their career decision making over time.



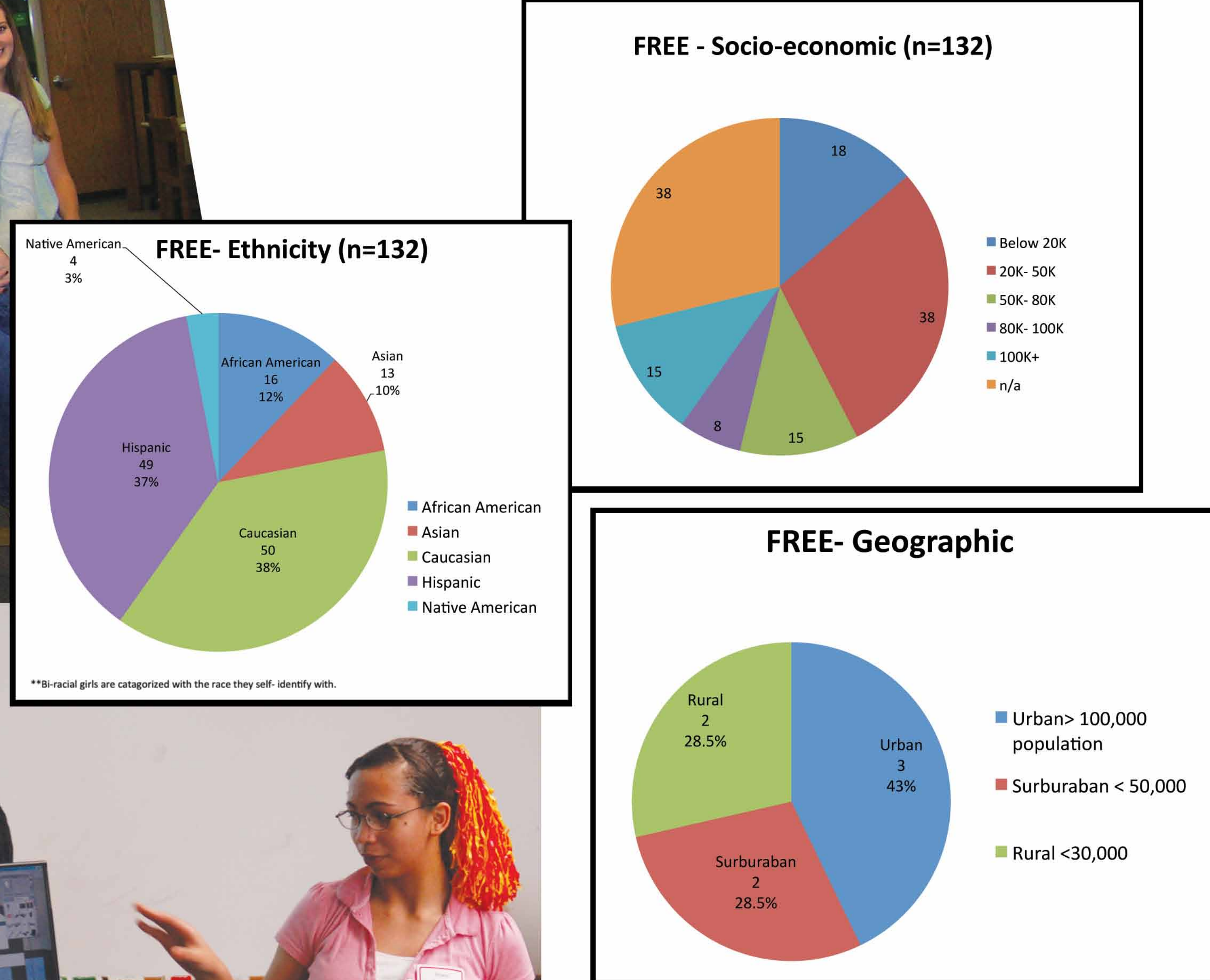
Female Recruits Explore Engineering



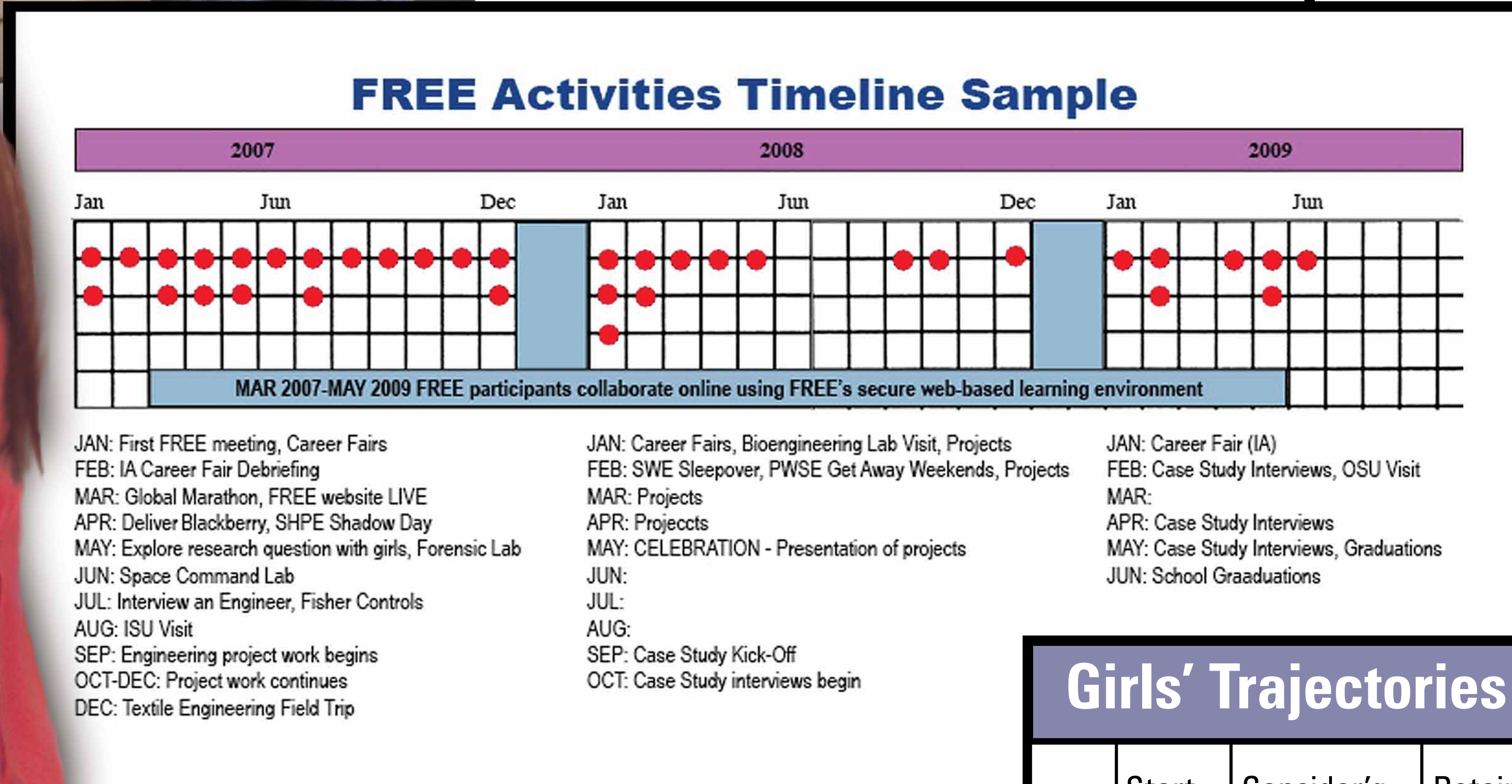
Context: Researchers and high-achieving female students from Colorado, Iowa, and Ohio.



Methodology: Participatory action research and case study research



Data Collection:



STEM or engineering-based projects, such as Pen with a candy top, Adjustable high-heeled shoes, Playground for disabled children, RoboNanny, Green Kitchen, Cleaning up bodies of water of pollutants

Research Questions & Preliminary Findings:

Our results suggest that many high-achieving girls know little or nothing about engineering; thus, they really can't develop an interest in it or choose it. Theoretically they are free to choose, but their "choice" is empty.

Research Questions	Preliminary Findings
1. What do high school girls want to know about engineering?	Not hard to get girls interested in engineering activities. Were surprised at the different types and contexts of engineering. Interested in the benefits of engineering to self and others. Concerns about engineering surfaced (<i>questions about time, stress, women in the field, curricular requirements</i>).
2. How does the prospect of engineering fit into the contexts of the girls' lives?	Most of the girls knew little about engineering when FREE began and very few were planning to pursue engineering (<i>see table below</i>). Engineering did not fit easily into girls' lives. The FREE project was difficult to fit into their busy schedules. The girls: 1. saw engineering as a largely male domain 2. were concerned that the practice of engineering may be incompatible with future family lives.
3. How do racial, socio-economic, and rural/urban positioning affect girls' perspectives on engineering?	Lower socio-economic class minority girls had more difficulty fitting engineering into their lives than middle class white girls. Pursuing engineering in college or a career was more than a matter of being interested. The girls in FREE lacked other resources making it difficult to pursue even with interest <i>Lack of role models, mentors and communities of practice</i> <i>Lack of knowledge about college</i> <i>Fear of what college will bring</i> <i>Immigration status</i> <i>Lack of economic resources.</i>
4. How and why do young women's interests in engineering change over time?	Once exposed to interesting aspects of engineering, interest grows, even to the point of expressing a desire to pursue engineering in college (<i>see table below</i>). After exposure to engineering, the girls began to name more styles of engineering, identify more characteristics, and express more personal interest

Girls' Trajectories of Interest in Engineering Over Time

	Start Spr 07	Consider'g Eng at Start	Retained Aug08	Consider'g Eng Aug 08	Stay in Eng Eng	Stay in NEng	Switch Eng → NEng	Switch NEng → Eng
CO	69	16 (23%)	38 (65%)	15 (39%)	6 (16%)	19 (50%)	4 (11%)	9 (24%)
IA	46	13 (28%)	21 (29% & 56%)*	10 (48%)	7 (33%)	1 (5%)	2 (9.5%)	5 (24%)
OH	20	2 (10%)	15 (75%)	12 (60%)	2 (10%)	3 (15%)	2 (10%)	10 (50%)
	131	31 (24%)	74 (65%)	37 (50%)	15 (20%)	23 (31%)	8 (11%)	24 (32%)

*One site in IA was an urban district serving 4 schools. Retention in this multi-school site was 29%. Retention in single school sites was 56%.

Recommendations:

- We must proactively provide contexts in which engineering and other STEM-related interests can be developed, supported, and nurtured.
- Cultivate communities of practice to support career exploration and influence vocational development.
- Programs like FREE that provide sites for engineering practice must be supported and protected.

Research Team: Practitioners, experts and scholars in anthropology, career development and post-secondary education transitions, education, engineering, Latino studies, Native American studies, sociology, curriculum and instructional technology, and women's studies.



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