



FEMME 2 STEM ~ PROGRAM OVERVIEW

Description and Goals:

FEMME 2 STEM [F2S] is a transformative design program which unifies theory and application through multidisciplinary collaborations culminating in temporary to permanent hands on, site specific design installations. Teen girls serve as social environmentalist who utilize problem solving skills to engage, confront, address and bring awareness to social, health and environmental issues within the community. F2S focuses on architectural design, engineering and technology in the fall and medical/health sciences in the spring. F2S culminates with a (3) week summer, "Building Heroes" design, build, impact boot camp which integrates skills and knowledge obtained during the semesters to engage and impact their community. Goals: Create learning experiences which increase girls who pursue post-secondary education and STEM careers; increase leadership, creative and critical thinking skills; and increase community awareness of STEM and impact under-utilized space in distressed areas through student-led transformative design projects.

F2S targets high school girls who reside in Roseland and far south suburban neighboring communities. Addresses: need for increased math and science skills among students attending low performing schools; access to information and experiences which increase confidence in pursuing STEM careers; need for youth advocacy, engagement, leadership and critical thinking; and community engagement and asset development. In the 2012 summer boot camp, girls converted a trash-filled vacant lot in Roseland into a playground. Students received local press and were awarded "grand prize" for place making by the Chicago Metropolitan Planning Council. *Outputs:* completion of school year program and summer boot camp; college visits; STEM related field trips; STEM speaker series; and research training. *Outcomes:* increased math, science, college enrollment and STEM careers; reduced at-risk behaviors; repurposed community space; expanded partnerships with CBOs, universities and local government. An independent evaluator is contracted to assess participant/community impact and outcomes.

Specifically in the Roseland community, Girls 4 Science is a community partner which provides STEM education to girls ages 10-18 through lab-based science education and experiences. FEMME 2 STEM, is the only program which targets high school girls and integrates transformative design and community engagement for impact. The inclusion of partners in STEM, health, education, government, faith and community based organizations provides F2S with strong partnerships which promote innovative experiences which engage students and the community. The multi-disciplinary approach implemented in F2S provides college access services and enrollment, health promotion, risk avoidance and leadership development. Experiences like the upcoming 2013 summer boot camp which integrate health and community mapping, with a design and build project, provide students with practice-based learning in the community to increase their efficacy and confidence in STEM.

Implementation:

F2S program enrollment activities include: submitting an application, attending an Information Session with a parent, and participating in a four (4) hour student orientation. After enrollment, Girls meet on Saturday for six (6) hours twice per month during the school year. The fall sessions are hosted in collaboration with the Chicago Architecture Foundation's "Saturday Studios" which are studio-based workshops (once per month) rooted in design challenges, hands-on creative exercises and communication skills for high school student. Workshops are designed around a variety of themes that help the emerging designer understand the exciting world of architecture, engineering and construction. F2S Staff attend the workshops with students and capitalize on the concepts and information received by students at the Saturday Studio for the following F2S meeting. This on-site (at D2F) meeting is used to expand the information received and incorporate it into planning for the summer boot camp.

The spring session is solely focused on medical /health sciences. Students attend their monthly meetings and learn various aspects of the field. They are introduced to communicable diseases, epidemiology, medical research and preventive medicine. Dr. Virginia Bishop of Northwestern University assists the F2S staff in developing a multi-disciplinary experience which integrates a student-identified health issue into the summer design boot camp. Field trips which further ground the girls in STEM are scheduled throughout the program. The program culminates with a three (3) week summer, "Building Heroes" design, build, impact boot camp which integrates skills and knowledge obtained during the fall and spring workshops to impact their community. The summer boot camp meets Monday-Thursday, from 10 a.m. -4 p.m. and is housed in the community at a site identified by the F2S staff through a local partnership. After completion of the summer boot camp, the "Girls of Promise, Women of Power" Luncheon is hosted to highlight the accomplishments of F2S students and their projects as well as women professionals who work in STEM related fields, community partners, and award scholarships.

Evaluation Outcomes (synopsis of full report):

Independent Evaluator: Dana Powell Russell, Phd

Key Findings:

- The importance of planning and organization, teamwork and collaboration, the value of community engagement, and the function of different tools and materials were key areas of learning among Femme 2 STEM participants. There appears to be strong alignment and reinforcement of knowledge and skills between the Boot Camp and fall/spring semester components of the program. Participants expressed pride in their accomplishments, and the awareness that little changes can have a big impact on their community.
- Participants' interest in STEM is higher than their self-confidence in STEM. On a 5-point scale, respondents expressed a more positive attitude about their interest in STEM (average rating: 4.36) than they did about their self-confidence in STEM (average rating: 4.00). While interest and self-confidence levels were relatively positive across the board, key areas for growth are their interest in math (4.00) and general academic self-confidence (3.18).

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- Technology and creative problem solving have both the highest interest and the highest self-confidence levels among participants. On the 5-point scale, respondents reported strong interest and self-confidence levels in technology (4.75 and 4.63, respectively) and creative problem solving (4.50 and 4.38).
- Boot Camp participants reported higher levels of self-confidence in designing, building, and creative problem solving than their peers who had only participated in the Saturday Studios. The data may suggest that the depth of the Boot Camp experience may have had a bigger impact on the participants' self-confidence in the hands-on aspects of STEM, when compared with the breadth of the Design Studios experience.
- Participants report that Femme 2 STEM increases their likelihood of engaging in positive behaviors and avoiding negative, risky behaviors. Across the board, respondents reported an increased likelihood of positive behaviors related to STEM education and careers, as well as an increased likelihood of positive personal behaviors such as avoiding negative peer pressure, dangerous situations, sex, and drugs.

Summer Program 2012 (snapshot)

- Public Workshops-Design & Build workshops Facilitated by Lead Architect, Alex Gilliam and Katherine Darnstadt, Latent Design of Chicago
- Live Twitter Boards & Mini Build Projects (Handmade tables & chalk boards).
- Community Assessment Scavenger Hunt
- Familiarization with Community Assets/Conducted Interviews with business owners, residents, youth, community service organizations
- Designed & Built Non-Traditional Play Area to address community need-safe place for children
- Residents helped with building process. Donated transportation/time/tools/ expertise
- STEM Professionals spent lunch hour with participants and shared how STEM careers can impact distressed communities as well as exposure to career opportunities

Fall & Spring Program 2012-2013 (snapshot)

- STEM Participants attended Architectural Design Studios sponsored by the Chicago Architecture Foundation. The following are design studios attended by STEM Participants:
 - Landscape Architecture
 - BRT 2.0-CTA Rapid Transit
 - Water, Filter, Meter H2O
 - Lighting & Design
 - Rapid Deploy Shelter
- National Institute of Health (NIH) Training
- Community Based Participatory Research Training- Dr. Virginia Bishop (Northwestern)

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- Outbreak/STI Surveillance/Epidemiology – Yaa Simpson, Chicago Dept. of Public Health
- Conduct Peer Focus Groups & Surveys
- Public Health Workshops-Northwestern University-Control of Disease, Outbreak investigation, etc.
- Surveillance of Disease & Peer Sexual Behavior monitoring via social media, i.e. Facebook & Twitter
- Field Trips in professional facilities-Chicago Department of Health, International Museum of Surgical Science, Chicago, IL

Summer Program 2013 (snapshot)

- Public Workshops-Design & Build workshops Facilitated by Lead Architect, Alex Gilliam and Katherine Darnstadt, Latent Design of Chicago
- Live Twitter Boards & Mini Build Projects
- Selection of Christian Fenger High School as the site for the summer build project.
- Use of Textizen to gather student data for ideas regarding transforming an old classroom into a meeting space for students to promote peace and school pride.
- Use of engineering and architectural software to create design models
- Integration of Music as a Science Workshop (Mix Master Academy)
- Students used power tools and mathematical equations to complete the design and build project, including tables and fixtures.
- Phase II will begin on October 19, 2013 to complete a build-out of the north wall.