

Innovations in Intervention Settings



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By the time they reach school, boys and girls have had quite different out-of-school science experiences, and this disparity persists through high school. There are marked differences between male and female levels of participation in extracurricular science activities, with males participating more often in activities such as working on science projects or hobbies.

This lack of informal science experience may negatively affect future learning outcomes in science for girls.

Informal science learning is promoted by activities that occur outside the school setting, are not developed primarily for school use, and require voluntary as opposed to mandatory participation as part of an accredited school experience.

Out-of-school intervention programs offer opportunities for informal science learning in a host of innovative settings that help bridge the gap between girls' everyday lives and science.



With increasing frequency, experimental interventions to make science, technology, engineering, and math (STEM) accessible to girls demonstrate that innovative, nontraditional settings may be key to achieving goals in STEM and gender equity.

“Setting” refers both to the physical location of the intervention (e.g., a museum, zoo, or commercial pharmaceutical laboratory) and to the context in which the intervention is delivered (e.g., through the Girl Scouts or 4-H or neighborhood community center).

A recent review of projects funded by a multimillion dollar government program revealed a range of innovative settings in STEM programming for girls. These nontraditional settings yield new opportunities to capture girls' interest in STEM and STEM careers and, equally important, to engage community resources in STEM and gender equity issues in innovative ways.



- Classrooms in schools



- Museums and parks
- Health care facilities
- Television and radio stations
- Research facilities
- Government and university laboratories
- Industrial and commercial sites
- Community groups
- Community centers
- Online

Traditional interventions in the classroom include STEM courses (usually at the high school or university level), gender-fair STEM curricula, and gender equity training for educators. These components are integrated into the regular curriculum or school setting with varying degrees

of success. The populations engaged in traditional settings are generally limited to educators and students.

Informal and nontraditional settings provide new contexts and opportunities for girls. Specifically, they engage new audiences in community dialogue about STEM and gender equity; involve multigenerational approaches; draw on new material resources; and provide the framework to deliver proven strategies to encourage girls to pursue STEM interests.



Programs in innovative settings offer opportunities to reach populations other than those reached by classroom-based interventions. These programs may engage whole new audiences - for example, paraprofessional staff at a neighborhood community center or scientists at a government or commercial research facility - who have not previously thought about STEM and gender equity.

Outside the traditional one-grade classroom, multiple layers of service recipients and deliverers can be incorporated in innovative settings. For example, older students can be engaged in a learning process that includes leading activities for younger children, transforming the experience into a multigenerational exercise.

In addition, programs in nontraditional settings bring new resources (funds, facilities, technology, human capital) to the gender equity arena. Capitalizing on extant material and personnel resources - assets that are frequently beyond the average school or school district's resources - broadens the scope of STEM experiences available to girls.

Outside resources are particularly valuable in the most underfunded urban and rural districts, where girls have few authentic classroom-based STEM experiences because of lack of materials and equipment.



Innovative settings permit the implementation of proven strategies to engage girls in STEM more effectively than those used in the classroom. Some intervention strategies are particularly suited to innovative settings, particularly mentoring and role modeling, summer camp experiences, internships, and electronic communication.

Mentoring and Role Modeling. This strategy links STEM professionals with girls who have limited knowledge of the availability and relevance of STEM study and career opportunities. Interacting with scientists and engineers from local industry, universities, or research facilities; physicians; nurses; veterinarians; radio and television technicians; and others in technical professions permits girls to see STEM professionals active in the community. Interventions that take place in the work place, such as career-shadowing field trips, are particularly suited to this purpose.

Summer Camp. The opportunity to spend a week or more in a setting that encourages girls to pursue their STEM interests in the company of like-minded peers can be invaluable for girls who do not receive positive support in the traditional school setting. Summer camps sponsored by universities, community groups, museums, or research facilities offer an intensive exposure to STEM concepts and skills, often in more depth than school curricula provide. Personal growth (enhanced self-confidence and STEM self-efficacy) as well as academic accomplishment often result from such summer camp experiences.

Internships. Research in teaching and learning demonstrates that for many students the best way to learn is to do. Engaging girls in the research process through meaningful internships in local industry or universities broadens their horizons, gives them opportunities to learn new skills and demonstrate their proficiencies, provides role model contact with STEM professionals, and sparks personal and academic growth. Early internship experiences may shape the education and career plans of girls as early as middle school, encouraging them to form long-term career goals.

Cyberspace as a New Setting. As technology proliferates, so do opportunities to engage girls in meaningful STEM experiences online. The electronic realm of cyberspace has become a “setting” for STEM interventions in recent years. Several recent interventions centered on helping girls make connections with female STEM professionals via e-mail or the Internet. Although electronic mentoring, or “telementoring,” lacks the immediacy of face-to-face relationships between mentors and mentees, the benefits to girls in communities where female role models in STEM are unavailable are very real.



Traditional in-school interventions often benefit participants, but their scope and impact are limited by the structure and resources of the school or school system. In addition to augmenting the number and types of science experiences girls receive, informal science programs in innovative settings offer girls access to “real world” STEM environments, broaden their perspectives, and provide opportunities for more authentic STEM experiences.

Beyond direct benefits to target populations, innovative settings also provide opportunities to engage STEM professionals and others in STEM and gender equity issues. Finally, creativity in intervention settings provides opportunities to draw on new human and material resources beyond those available within schools.



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