2019

LiFE: An Integrated Approach to Increase the Number of Women Pursuing Careers in STEM

Bruce G. Bukiet

James Lipuma

Nancy Steffen-Fluhr

NJIT New Jersey's Science & Technology University

LiFE

Leadership & iSTEAM for Females in Elementary School

National Science Foundation

LiFE: An Integrated Approach to Increase the Number of Women Pursuing Careers in STEM (2019)

Vision

Need to increase the numbers of women persisting in STEM pathways
LiFE fosters interest, engagement, and collaboration, for women in STEM.
Develop STEAM clubs for elementary school girls that leverage:
- hands-on, minds on, exploration STEM activities
- community inspired grand design challenges
- collaborative teams showcasing their solutions at annual event
- mentoring by female role models
- building communication skills, teamwork, leadership
- summer professional development program and more

Create a playbook showing how any educator, anywhere can:
- foster broader participation in STEM
- join a network to support women to pursue STEM careers
- make visible the many pathways to a successful future in STEM

Partnerships

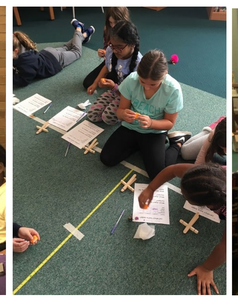
Diverse set of NJ School Districts:
- **Hillside** – home of the Girls Rock Science Club **LiFE** is built on
- **Morris Plains, Weehawken – New: Long Branch, Newark**

LiFE Collaborators
US Army – leadership, role models, design challenge
Apple - educational technology and software training, professional development
NJ School Boards Association – connections to all NJ districts
NJ Department of Education and **Future Ready Schools-NJ** - connects to hundreds of NJ education leaders

NJIT orgs.: Murray Center for Women in Technology, Society for Women Engineers, Educational Opportunity Program, Society of Hispanic Engineers, National Society of Black Engineers, Albert Dorman Honors College, Female faculty across the school.

Goals/Metrics/Evaluation

Objectives:
1) Understand the current state of the Girls Rock Science club
2) Determine from students the types of projects and activities in STEM that interest them
3) Investigate with teachers STEM projects to be offered and resources needed to accomplish effective STEM projects suited to their specific community and situation
4) Investigate interventions for broader participation of young women with an integrated program of iSTEAM activities and skillbuilding experiences.
5) Determine the effectiveness of the LiFE project activities.
6) Determine if continuing the **LiFE Clubs** through grade 6 increases persistence in STEM interest.
Methods: E.g., Standardized test scores, Attitude surveys, Skill development, Activity participation and artifact creation



Leadership/Communication

NJIT serves as the backbone organization and collaboration/communication hub to foster shared leadership.

Consistent and continuous communication among partners, and iterative feedback to make continuous quality improvement in project design

Partners bring together knowledge, assets and resources to gather and develop materials, and procedures for iSTEAM projects for **LiFE** members

Each district **LiFE** team develops and customizes girls clubs (recruitment, meeting frequency and timing) to community particulars, share and support

Partner Quarterly Meetings provide strategic direction, build partnership, discuss process, schedules, successes, needs, and challenges

In progress initiatives:
Bi-monthly Student Teleconference with each other & STEM professionals.
Students-teach-students STEAM - Twice annually via video link, club members "teach" students in other clubs about projects, facilitated by NJIT Virtual and in-person visits by role models

Expansion, Sustainability, Scale

LiFE playbook will provide best practices, case studies, and customizable materials.

To expand, we will recruit
- Dedicated elementary school educators,
- STEM-focused college students and non-profits willing to volunteer,
- Universities that promote service education,
- Private and public organizations working to promote STEM.

To sustain and scale
- Form steering committee
- Add new partners
- Engage with other NSF projects ERCs, STEM for All Showcase

Outcomes

2018 Summer Institute – designed to address desires of participating teachers
- Most useful: tech. training, the hands-on activities, and planning club activities
- Better understood expectations of them as club leaders
- Increased STEM knowledge and gave new approaches to teaching
- Gained support from interactions

5 Clubs - 4 Schools - 3 School Districts – Over 150 kids – in 1st year
- Oversubscribed clubs in Hillside had two half year sessions
- Weehawken policy required parallel club for boys

8 STEAM Tank Teams – 3 successful in regionals will go to the finals in Oct. 2019

3/14/2019 Pi Day ~ 200 girls, including new school district of Long Branch
- Included student presentations/posters of their projects

5/29/2019 Liberty Science Center Girls' Summit culmination event
- Private IMAX showing of Dream Big:

Challenges: 2 of the 3 districts had change of superintendent
- 2 teachers could not fulfill the year – one due to health; one was let go
- Reorganization coming in one district will lead to expanding clubs to 2nd grade

Award No 1744490

Bruce Bukiet, Associate Dean, College of Science and Liberal Arts
James Lipuma, Director Collaborative for Leadership, Education, and Assessment Research
Nancy Steffen-Fluhr, Director of the Murray Center for Women in Technology

Project partners: Apple, US ARMY

Evaluator: Cindy Blitz, Executive Director of the Center for Effective School Practices