

## Background



**Girls Excelling in Math and Science (GEMS)** is an afterschool club started in 1994 by a parent, Laura Reasoner Jones, who was dismayed to hear her 10-year old daughter Julie opt herself out of attending a magnet school because “Math is hard.” Julie’s math performance had been good in school, therefore Laura wondered what else might be causing her self doubt. Laura decided to address the issue. Collaborating with Julie’s teacher, she started the first **GEMS** club for Julie and her friends in fifth and sixth grade.



Julie at 10

During the following 25 years, **GEMS** clubs have operated globally to provide resources to support leaders to implement community-based, single-sex learning environments with over 200 hands-on STEM activities. Through the website library, **GEMS** provides free, equal access to these activities for students, parents, and educators. The mission of **GEMS** is to cultivate curiosity and confidence in STEM for girls in elementary and secondary school.

## Literature

### Informal STEM learning for girls

- Interventions such as female role models, hands-on activities and single-sex learning environments, can increase girls’ interests and shape their identities in STEM areas (e.g., Chen et al., 2011; Holmes et al., 2012; Tyler-Wood et al., 2012).
- Girls may benefit from informal learning environments in which they have freedom to follow their own interests and values, feeling less pressure from school academic requirements or standardized testing, and working in collaborative groups (McCreedy & Dierking, 2013).
- Continuity is crucial for informal STEM communities which are a critical catalyst in helping girls move along their lifelong learning trajectory (McCreedy & Dierking, 2013).

### Narrative Identity

- People’s identities rely on what prior experience they have had, what current context they live in, and the kind of person they are going to be (Clandinin & Connelly, 2000).
- Narrative identity is a collection of stories, told by different narrators which can be applied as the missing link between learning and its sociocultural context (Sfard & Prusak, 2005).

## Research Questions

- How do the original **GEMS** participants remember and describe their experiences?
- In what ways did participation in **GEMS** shape their personal and professional experiences?
- What themes can be identified between the individual experiences of the original **GEMS** participants during and/or after experiences in the **GEMS** club?

## Theoretical Framework

**Community of Practice** (Lave & Wenger, 1991)

**Narrative Inquiry** (Clandinin & Connelly, 2000; Polkinghorne, 1995)

**Dewey’s Experience Constructs** (Dewey, 1938/1998)

## Methods

### Participants:

- Nine Original **GEMS** participants
  - Women in their 30s

### Data Collection Activities:

- Survey and Individual and Focus Groups Interviews
- Open-ended survey questions

### Data Analysis Plan:

- Thematic analysis and review of the finalized individual and group interview transcripts with each original **GEMS** girl to evaluate individual and shared experiences.
- Interpretation of survey responses from original **GEMS** girls to further connect common experiences from during and after **GEMS**.

## References

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## Significance & Purpose

### Argument:

- Girls begin to lose interests and confidence in STEM fields in middle and high school, even though they perform as well as boys.
- Deeper exploration of successful learning environments for marginalized students help to build upon existing effective models.
- Research focuses on girls’ experiences during STEM programs but less often on how the informal STEM learning shapes their life experiences in the long term.
- Retrospective study provides a window into the impact of experience and a mirror for current informal STEM learning environments.

### Purpose:

- Understand potential long-term impacts of **GEMS**.
- Explore how **GEMS** supports both girls’ learning and participation in STEM activities.
- Investigate the successful characteristics of **GEMS** related to advocating for girls in STEM fields.

## Sample Interview Questions

### Interview Questions for Original GEMS Girls:

- If you could talk to yourself in **GEMS** as the person you are now, what would you say?
- How did being in an all female environment impact your learning through **GEMS**?
- When you were a young girl, did you consider gender to impact how you viewed certain subjects?
- Do you think that gender is a factor in the career you are in now as an adult?
- Would you encourage your own daughter to join a club like **GEMS**?
- Did you feel like you were learning in **GEMS** and in what ways?
- What made **GEMS** special to you? Do you have any memories from **GEMS**?
- How has **GEMS** impacted you in getting to the point you are now in life and your career?

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