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Evidence in Action

A K20 Center Research Brief

Career Exploration Through Experiential Learning - Forensics

*Yanowitz,
2016*

Introduction

This brief examines a study exploring the long-term impact of a short, 2-day forensic science summer camp designed for middle and high school students. The authors situate the research within literature on informal science education (ISE), noting that ISE experiences “grab learners’ attention, provoke emotional responses, and support direct experience” (p. 42) and can complement formal schooling by offering hands-on, voluntary, and socially rich learning environments.

The research also draws on theories of career development and self-efficacy, emphasizing adolescence as a critical period for shaping STEM interests and career pathways. Prior studies show that science camps can boost short-term attitudes toward STEM, but little is known about long-term effects, especially for short, non-selective camps. This study addresses that gap by examining whether a brief CSI-themed camp produced lasting changes in students’ science self-efficacy and STEM engagement one year later.

Methodology

Research Design:

The study used a longitudinal pre-post-follow-up design. Students completed surveys before the camp, immediately after, and again approximately one year later. The design focused on changes in science self-efficacy, continued STEM engagement, and students’ perceptions of lasting impact.

Sample:

Across two summers, 124 students attended the camp, with 66 students (53%) completing the one-year follow-up. Students ranged from grades 7-12 and represented 27 school districts, many with high poverty indicators. The camp was intentionally non-selective, requiring only a teacher recommendation. As the article notes, “Grade point average was not used as a selection criterion.”

Data Analysis:

Quantitative data (self-efficacy and engagement scales) were analyzed using repeated-measures ANOVA and descriptive statistics. Qualitative responses to the open-ended



“lasting impact” question were analyzed using inductive content analysis, with high inter-rater reliability ($\kappa = .80-1.0$).

Results

1. Self-Efficacy Gains Were Immediate and Long-Lasting

Students' science self-efficacy increased significantly from pre-camp to post-camp and remained elevated one year later. As the article states, “mean self-efficacy approximately 1 year later... was also significantly higher than pre-camp.”

Implication: Even a short, well-designed STEM camp can produce durable confidence gains.

2. Students Engaged in More STEM Activities After the Camp

On average, students reported engaging in 2.1 additional informal STEM activities (e.g., watching science shows, visiting museums, reading science materials) because of the camp.

Implication: Short-term camps can spark ongoing curiosity and self-directed STEM learning.

3. Students Reported Clear, Meaningful Long-Term Impacts

Among students who said the camp had a lasting impact (88%):

- 45% cited increased knowledge (“This camp made me more knowledgeable of science and math.”)
- 31% cited enjoyment
- 22% cited influence on future plans
- 16% cited greater interest in STEM
- 14% cited social benefits
- 10% cited increased self-confidence

Implication: Students internalized the experience in diverse and personally meaningful ways, reinforcing the value of hands-on, socially rich STEM programming.

Application into Practice

Schools can adapt this model by implementing a short-duration, high-engagement STEM camp using the following components:

1. Use an Intriguing, Media-Connected Theme

The CSI camp leveraged students' familiarity with forensic science from TV and media. Schools can:

- Use themes like forensics, space exploration, environmental investigation, or robotics.
- Build modules around solving mysteries or real-world problems.

2. Prioritize Hands-On, Inquiry-Based Activities

The camp emphasized:



- Small-group investigations
- Hypothesis generation
- Evidence collection
- Data analysis
- Authentic lab techniques

Schools can replicate this by partnering with science teachers or local STEM professionals to design 4-6 modular investigations.

3. Keep It Short but Intensive

A 2-day, 12-14-hour total experience was sufficient to produce long-term impact.

This makes the model feasible for:

- Weekend camps
- Summer bridge programs
- After-school intensives

4. Use Near-Peer or Teacher Support to Build Success

The camp's low student-teacher ratio and supportive environment helped students feel competent. Schools can:

- Recruit teachers, paraprofessionals, or STEM club members as facilitators
- Train staff to provide encouragement and scaffolded support

5. Highlight STEM Careers and Real-World Connections

University faculty shared their backgrounds and career paths. Schools can:

- Invite local professionals
- Include career spotlights
- Connect activities to real STEM jobs

6. Encourage Post-Camp Engagement

Provide students with:

- Lists of local STEM events
- Museum passes
- Recommended books, shows, or websites
- Opportunities to join STEM clubs

This supports the continued engagement observed in the study.

Work Cited

Yanowitz, K. L. (2016). Students' perceptions of the long-term impact of attending a "CSI science camp." *Journal of Science Education and Technology*, 25, 916-928.