Youth-Led Café Scientifique New Mexico Model Framework

Theory of Action:
Teen participation leads to increased engagement and interest in STEM and STEM careers, and to their increased understanding of the nature of science and the work that scientists do.

Scientist's participation leads to improved presentation skills, a unique opportunity to share their work, and a stimulus to think differently about their research and how it connects to society.

Claims and Intended Outcomes:
Youth will develop: 1) an informal community that engages in scientific discourse, thought, and exploration; 2) an understanding of current STEM issues and the ability to communicate that understanding confidently; 3) skills and attitudes for life long learning and an appreciation of science as a process of reasoning from evidence.

Scientist-presenters will develop improved public speaking skills and opportunities to think about and share their research from a broader societal perspective.

Theoretical Underpinnings:
Environment Influences on Learning (Gutierrez, 2008; Eisenhart and Edwards, 2004). Where learning takes place influences what prior knowledge, language and experiences will be brought into the learning process.

Social Development Theory (Vygotsky, 1978). Café youth more fully develop their cognitive abilities by engaging in experiences within their zone of proximal development, guided through social interactions with STEM professionals.

Social Learning Theory (Bandura, 1977). Youth develop self-efficacy as STEM professionals by modeling the behaviors of scientists and engineers solving problems.

Engaging and Increasing Interest (Campbell and Jolly, 2004; Tai et. al., 2006). The combination of engagement, capacity building, and continuity of learning is essential to increasing youth's interest in careers. Youth interest is a strong predictor of science degree attainment.

Communicating Science Improves Research (Feldon, 2011) The effort required to communicate scientific ideas in a broader context improves scientists' research skills.

Key Program Elements
No-cost, free choice learning takes place in a welcoming and relaxed social atmosphere.

Relevant and engaging topics and activities stimulate youth interest and skills in STEM and STEM careers.

Learning about STEM research from short, dynamic presentations given by STEM experts is reinforced in discussions.

Youth leadership encourages ownership of the program and helps youth develop communication skills.

Coaching and youth critique of "dry runs" improves presentation quality.

Biographic sketches of written for teens portray scientist-presenters as real people.

Science essays written for teens introduce the presenters' research.

Continual evaluation and feedback ensures ongoing program improvement.

Evidence of Outcomes / Impact (Foutz and Luke, 2010)
Surveys: Café program positively influenced youth attitudes about science. Items designed to measure youths' attitudes towards science, scientists, and science-based careers showed statistically significant differences between the participant and non-participant groups.

Youth participants rated their science self-efficacy/ cognitive competence significantly higher than non-participating youth.

Positive Youth Development-related items measuring changes in confidence, contribution, caring, compassion and cognitive skills and attitudes showed statistically significant gains. Gains were greater for underrepresented minorities than other groups.

Café participants positively rated six statements about the degree to which they felt a sense of belonging to and ownership of the Café community.

Benefits enumerated in scientist focus groups: 1) personal satisfaction from doing outreach; 2) opportunity to share their enthusiasm for their work with the teens; 3) care given to ensuring presentations are appropriate to non-professional audience; and 4) opportunity to think differently about their research and how it connects to the broader field or society changed how they approach their own research.

CREDIT: Modeled after the ITEST Model Framework (ITEST LRC, Education Development Center, Boston MA. Contact Joyce Malyn-Smith at jms@edc.org.)

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