
Appendix X

The Value of Out of School Time Programming

Out of school time (OST) programming can be an effective complement to school day learning. OST programs can offer opportunities for students to immerse themselves in a variety of STE experiences to gain new skills and knowledge, apply school learning, and develop literacy and fluency in different contexts. OST programs can include before- and after-school programs; weekend and summer (or vacation week) programs and camps; informal learning centers, such as museums, zoos, nature centers, and community gardens; summer learning experiences; or youth clubs and internships that focus on youth development.

Interest and Engagement

STE programming in OST learning environments can capitalize on students' interest about the world in which they live and can offer multiple contexts that promote active engagement. Students can spend more time focused on a science activity or an engineering challenge that is of particular interest to them. Many OST programs offer peer networks that foster sustained participation with students and families. This sustained engagement and freedom within informal, flexible learning time motivates students as they develop mastery and competency with science concepts and practices in OST programs.

Identity

Developing an STE identity involves multiple elements, such as getting young people interested in STE topics and professions, developing competency and a sense of confidence, and getting all youth to envision themselves as potential contributors and participants in this enterprise (NRC, 2012). OST programming that provide students with STE mentors or opportunities to engage with STE professionals allows them to build relationships and develop their ideas about the types of people who work in these fields. STE professionals serve as role models whom students can ask questions about how they became interested in their career, what happens on a daily basis in their work, and how they contribute to their community. Such experiences can be particularly beneficial to girls' perceptions and career goals (Tan et al., 2013).

Relevance

OST programming that offers STE experiences can also increase students' awareness of the relevance of science in their lives and prepare them for active citizenship with compelling local, regional, or global issues, such as energy resources, water quality, invasive organisms, and erosion. These experiences can give students a chance to spend more time investigating phenomena, problems, and solutions than they can during the school day. Strategies that involve the community underscore the importance of connecting the school science curriculum to students' lives and the community in which they live. It is through such connections that students who may traditionally be alienated from science recognize science as relevant to their lives and future and deepen their understanding of STE concepts and practices (NRC, 2015). The community context for science education capitalizes on community resources and makes science more culturally, linguistically, and socially relevant for diverse student groups (González et al., 2005). Students can develop critical consciousness of social inequity especially as such inequities exist in their communities. STE experiences in OST programs can contribute to students' awareness and understanding of the connection and value of STE in addressing and solving societal issues.

Career and Life Skills

OST programs can offer students essential life and career skills, such as working in teams and communicating ideas to a variety of audiences. Students who interact with STE professionals are more aware of career paths and options, as well as an understanding of what these potential jobs entail. OST programs often provide STE field trips that engage students in a variety of activities and offer different perspectives on science, technology, and engineering skills and careers.

Schools and teachers are a critical part of students' STE education, but are only one part of a larger system of what students need to achieve success in K–12 and beyond. OST programs that strive to enhance STE learning opportunities for all students focus on creating engaged young citizens who can contribute to a dynamic and dexterous workforce and develop the capacity and competencies needed to contribute to their community and the innovation economy. What happens outside school can be equally as important as what happens in school in setting a child's direction, activating their interest, and developing their understanding of the role of STE in their dynamic world (Noam et al., 2013).

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