Classroom to College STEM Connection

United States
Mary Kaczorowski

Organization type: nonprofit/ngo/citizen sector
Budget: $100,000 - $250,000
Website: http://www.saefoundation.org

- At risk youth
- Boys' development
- Education reform
- Girls' development
- Youth development
- Youth leadership

Project Summary

Concise Pitch

Concise Summary: Help us pitch this solution! Provide an explanation within 3-4 short sentences.

Classroom to College STEM Connection is an innovative program developed by the SAE Foundation, the charitable arm of the Society of Automotive Engineers (SAE) International. It aims to connect collegiate students majoring in a science, technology, engineering, and mathematics (STEM) degree program to public school students in elementary and middle school classrooms in the Detroit Public School (DPS) System. Collegiate students from local colleges will be recruited and trained to support the delivery of SAE's, A World In Motion® (AWIM), K-12 science, technology, engineering, and mathematics (STEM) education program to DPS’ elementary school students. In exchange for volunteering in the classroom, these classroom mentors will receive a $500 stipend for an education related expense.

About Project

Problem: What problem is this project trying to address?

SAE has a long history of collaboration and works with corporations, community organizations, volunteers, and educators, organizations to reach students with STEM programming. As SAE’s programs are traditionally delivered in the classroom, students from diverse academic, socioeconomic, and ethnic backgrounds participate. In addition, SAE seeks to increase the participation of traditionally underrepresented groups in STEM subjects and careers through special initiatives. One such initiative, a collaboration between SAE and the National Society of Black Engineers (NSBE), is the Summer Engineering Experience for Kids (SEEK) academy. The SEEK Academy provides a free summer experience to minority students who are mentored by NSBE members through an accelerated, three-week AWIM curriculum. Approximately 4,000 students have been reached through the SEEK model since 2007 in either Columbus, OH or Washington, DC. Two new SEEK academies, Oakland and San Diego, CA, began in 2011. A SEEK Detroit is planned for summer 2012. Great Minds in STEM (formerly known as HENAAC), an organization that identifies, honors, and documents the contributions of Hispanic American professionals in fields as math, science, partners with the SAE Foundation to bring AWIM into resource-challenged middle- and high-schools in traditionally underserved communities across the country. Their Viva Technology program utilizes the JetToy Challenge to energize students about the possibilities that lie in the world of science and math. The SAE Foundation is continually on the look out to work with other mission aligned organizations to create science- and technology-literate elementary, and middle school students. Our hope is that our participation in Changemakers may result in more opportunities for partnership and collaboration. The Classroom to College STEM Connection would strengthen the initiative already taking place in the Detroit Public School System. Approximately 200 words left (1600 characters).

Solution: What is the proposed solution? Please be specific!

The Classroom to College STEM Connection creates a pathway for university students to fill this gap through their participation in AWIM classrooms. The Classroom to College STEM Connection will not only provide a memorable learning experience for these elementary students, but will also provide a meaningful volunteer experience for these university students. While giving back to their local community, the college
students may also be fulfilling their community service commitment, which an increasing number of universities require for graduation. While the college students teach and advise younger learners on STEM concepts like force, friction, and motion, as an added bonus, they will also gain a better understanding of how these concepts apply and integrate into their own studies. The College to Classroom STEM Connection represents a win-win for both set of students involved.

Impact: How does it Work

Example: Walk us through a specific example(s) of how this solution makes a difference; include its primary activities.

Since 2004, DPS' 5th grade students have participated in AWIM's JetToy activity, where they study the concepts of force and friction while designing, building, and testing a balloon powered vehicle. Presently, SAE Foundation funders subsidize the curriculum, and local corporations provide classroom volunteers. Over the past several years, recruiting corporate volunteers has become difficult as fewer corporations allow staff members to volunteer on company time. As a result there has been a steadily decreasing number of corporate volunteers going into the Detroit Public Schools classrooms. Volunteers in the classroom is a key contributing factor to AWIM's proven effectiveness. This project would focus on recruiting and training college students to participate in AWIM classrooms as volunteers. Those students would receive professional development training to ensure accurate content delivery of the JetToy curriculum. At the same time, these students would interact with corporate participants as well, thereby, offering these students an valuable interaction and exposure to practicing STEM professionals.

About You

Organization:
SAE Foundation

First Name
Mary

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About Your Organization

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SAE Foundation

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Organization Country
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Country where this project is creating social impact
How long has your organization been operating?
More than 5 years

Is the project that you are entering related to this organization?
Yes

The information you provide here will be used to fill in any parts of your profile that have been left blank, such as interests, organization information, and website. No contact information will be made public. Please uncheck here if you do not want this to happen.

Innovation

What stage is your project in?
Operating for more than 5 years

Share the story of the founder and what inspired the founder to start this project

In 1990, SAE International saw the need for K-12 STEM education programs and began developing A World In Motion® (AWIM). The first "challenges," for grades four, five and six released in 1991. In the mid-1990’s, with a grant from the National Science Foundation, SAE developed its middle school curricula. Today, the AWIM consists of inquiry-based, age-appropriate "challenges" for grades 4-10, with K-3, literacy based design challenges coming in 2012.

SAE has long enjoyed the support of corporate partners who recognize and understand the importance of cultivating future generations of STEM professionals. As more and more schools and school districts - struggle with funding cuts and shrinking budgets, corporations are being asked to help fill the gap by providing the needed resources to deliver much needed and wanted science, technology, engineering, and mathematics (STEM) education programs. This is especially true in districts serving underrepresented populations. The nation’s K-12 education does an even poorer job of "engaging and nurturing" minorities and girls to pursue careers in the STEM fields.
A Detroit corporation and the SAE Foundation joined forces in 2004 to “stem” this crisis in the Detroit Public School System by providing funds and resources to deliver AWIM’s 5th grade, JetToy educational experience to students and educators in the Detroit community, and beyond.

The College to Classroom STEM Connection model will not only enhance and strengthen this initiative but can also be replicated to other district-wide initiatives currently underway.

**Social Impact**

Please describe how your project has been successful and how that success is measured

In 2005, SAE engaged Goodman Research Group, a research firm specializing in the evaluation of educational programs, materials, and services, to conduct a five-year, two-part multi-tiered method study to examine the long-term impact of the AWIM program on students and teachers.

Feedback from teachers surveyed for the Goodman Research study indicates:
- Participation in one AWIM Challenge, including working in student teams to complete an authentic engineering design experience, is enough to start students on a path of knowledge and interest in engineering.
- Students who use AWIM acquire and retain a strong knowledge of engineering.
- When an industry volunteer is involved with AWIM activities, students learn more.
- Involving an industry professional volunteer in the classroom enhances both teachers’ and students’ short term experience, and has a lasting effect on students’ increased knowledge of engineering.
- AWIM use has a positive cumulative impact on teachers’ knowledge and comfort level teaching physical science concepts.
- AWIM activities successfully teach students scientific concepts and specific challenge contents.
- Students who begin AWIM activities at a younger age seek out more STEM-related experiences over time.

As we move forward into new program models into informal science education settings, we will continue to monitor and measure the effectiveness of the AWIM program. In addition to pre and post participation surveys, the AWIM program staff and AWIM Advisory Council are currently in the process of building a Program Optimization Survey as a mechanism to further improve AWIM’s effectiveness through teacher and volunteer feedback and input.

This new evaluation tool is complete and in testing phase in the Plymouth-Canton school as part of their AWIM district-wide initiative. The Optimization Survey will be rolled out and available to all AWIM users in fall 2011.

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How many people have been impacted by your project?

More than 10,000

How many people could be impacted by your project in the next three years?

More than 10,000

How will your project evolve over the next three years?

1) Engage students in STEM subjects and STEM careers at an even earlier age, with literacy-based, K-3 AWIM activities due out in January 2012.
2) Deliver the AWIM experience in after school and out of school learning environments. AWIM’s unique design makes it suitable for both a traditional in-class and an afterschool setting. AWIM's afterschool program model offers educators the option to implement by classroom teachers and/or local corporate employees.
3) Expand into growing new geographic areas that have a base population of STEM professionals.
4) Improve the student volunteer ratio from 29:1 to 24:1 by continuing to bridge the gap between industry and academia by placing a trained industry volunteer in every AWIM classroom.

Sustainability

What barriers might hinder the success of your project and how do you plan to overcome them?

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Since its inception, more than 4 million elementary and middle school students have participated in the A World In Motion program across North America. The AWIM program is also now delivered in several other countries around the globe through corporate collaborations.

Adequate Funding Base: Corporate donors - particularly auto related companies - have historically provided the majority of funding to the Foundation. In an effort to diversity funding sources, the Foundation's core strategies for 2011 are to 1) Seek continued support from this funding source, 2) Cultivate and solicit non auto-related, STEM-focused companies, 3) Increase funding from private foundations and, 4) Grow individual giving through the annual fund.

Cost of Program: In 2009 the distribution model for the AWIM program was also changed, as all curriculum kits were previously provided to educators at no cost. Kits are now provided at EITHER no OR low cost. In addition, the SAE Foundation and AWIM program staff now provides contractual services to other several organizations who have no STEM programming of their own, who use parts of the AWIM curriculum for a fee. This has resulted in a new revenue stream which helps to keep the cost of the program as affordable as possible.

Name recognition: At the height of market penetration, the AWIM program reached approximately 100,000 students annually with a traditional in-classroom delivery model. Historically, the program's reach centered around geographically areas with the automotive industry is strongest. As a result, expanding the program into areas where local educators and corporations are not familiar with SAE or the AWIM program has been challenging. We are making progress in this area, however, as we implement some of the strategies listed above. In addition, as after school programming as become more important and accessible to reach and engage students in STEM subjects, an after school model is now offered. This provides more flexibility and an easier entry way into new geographical areas and opens up the possibility to collaborate with more diverse partners which helps the name recognition of the SAE Foundation and A World In Motion program.

Tell us about your partnerships

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The SAE Foundation works with a variety of corporate partners to help them develop a STEM education outreach strategy that can be delivered locally, regionally, nationally, and even internationally. Many corporations provide general support to the SAE Foundation while others provide funding for specific initiatives such as the one described in this idea concept.

SAE also has a long history of collaboration and often works with similar, mission-aligned organizations that do not have their own curriculum, to help them to reach their target students with AWIM. For example, the Girl Scouts of Western Pennsylvania utilize parts of the AWIM curriculum. In their elementary and middle school outreach program to enrich the STEM education experience for girls in Western PA.

Another initiative, a collaboration between SAE and the National Society of Black Engineers (NSBE), is the Summer Engineering Experience for Kids (SEEK) academy. The SEEK Academy provides a FREE summer experience to minority students who are mentored by NSBE members through an accelerated, three-week AWIM curriculum. Approximately 4,000 under served students have been reached through the SEEK model since 2007 in Columbus, OH and Washington, DC. This summer SEEK academies also took place in San Diego and Oakland, CA.

Great Minds in STEM (formerly known as HENAAC), an organization that identifies, honors, and documents the contributions of Hispanic American professionals in fields as math, science, partners with the SAE Foundation to bring AWIM into resource-challenged middle- and high-schools in traditionally underserved communities across the country. Their Viva Technology program utilizes the JetToy Challenge to energize students about the possibilities that lie in the world of science and math.

Currently, the SAE Foundation is exploring the possibility of a national partnership with 4-H to reach students in underserved rural communities and is continually on the look out for partners to reach more students with AWIM to create science- and technology-literate elementary, and middle school students.

**Explain your selections**

The AWIM curriculum being provided to schools in the Detroit Public School District is subsidized by a Detroit company foundation. The annual budget shown above represents the portion of that company's donation that goes annually towards distribution of the AWIM program nationally, as well as locally through their community based outreach.

**How do you plan to strengthen your project in the next three years?**

By improving the student volunteer ratio by providing a trained volunteer for every DPS classroom participating in AWIM's JetToy challenge.

By building on existing relationships with area colleges, that may already exist as a result through SAE's Collegiate Design Series program, and establishing new relationships with Detroit area schools to utilize the talents and resources college students offer.

**Partnerships and Accountability**

Please tell us more about how your partnership was formed and how it functions. What specific role does each partner play? What unique resources does each partner bring to the initiative?

This Detroit corporation was one of the first contributors to the Foundation since its establishment in 1986. The initiative in the Detroit Public School System is only a part of how and what they support for the SAE Foundation.

In this initiative, they provide a Company Coordinator, a volunteer who recruits other volunteers from the employee pool and works with AWIM staff to coordinate teacher and volunteer training each school year. This person matches volunteers to classrooms using AWIM's online tools and volunteer website. In past years they have hosted a volunteer recognition event at the close of the school year. In addition, they provide staffing and volunteers for a large, culminating JetToy competition which is held at SAE's World Congress gathering in Detroit's Cobo Center each April.

The Detroit Public School System provides access to their teachers and classrooms to deliver the JetToy experience each spring. The SAE Foundation and AWIM program staff bring more than 60 years of combined experience in primary, elementary, and high school teaching, curriculum design and evaluation, business development, and program management to make this program an impactful and meaningful experience.

**How are you building in accountability for students’ successful STEM learning outcomes? Please provide a summary and examples.**

Students who participate in an AWIM activity complete a pre and post participation survey. These two assessments measure the following outcomes:
- Increased understanding of the specific content presented. For example, in building the JetToy, students increase their understanding of factors that influence speed and distance, and the effect of nozzle size.
- Improved knowledge of the specific science and math standards practiced.
- Greater knowledge, understanding, and interest in what engineers do.
- Expansion of vocabulary focusing on engineering concepts.

In addition, a recently completed 5-year longitudinal study surveyed teachers and volunteers to measure the impact and success of the AWIM program. An executive report of these findings is available at [www.awim.org](http://www.awim.org). Videos about AWIM can also be found at [www.awim.org/videos](http://www.awim.org/videos).

**Needs**

Investment, Human Resources/Talent, Marketing/Media.

Please use this space to elaborate on your selection above and/or to add needs that may not be listed.

**Offers**


Please use this space to elaborate on your selection above and/or to add offers that may not be listed.