

## Building STEM Partnership Teams in Suburban Districts

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### ABSTRACT

Recently, partnerships designed to increase student achievement and interest in science, technology, engineering, and mathematics (STEM) fields have become common. Partnerships have been developed between university departments, regional industry, youth organizations, and K-12 schools. Despite this, little guidance exists concerning how to create a team of industry partners to support K-12 STEM initiatives in suburban districts. The School District of Kettle Moraine has, during the last two years, established a partnership team including school personnel and local industry representatives. Techniques in recruiting potential partners, strategies for setting up meetings, and examples of partnership activities that have occurred in the district are discussed.

Keywords: STEM, Conference Proceedings, K-12 Outreach, Partnering

### INTRODUCTION

To promote integrated science, technology, engineering, and mathematics (STEM) curricula, partnerships have been promoted on a variety of levels. Examples include partnering between departments of universities (Schneider & Pickett, 2006), between universities and K-12 schools (Foster et. al., 2010), and between universities and youth organizations (Tucker, Hanuscin, & Bearnese, 2008). Partnerships between urban K-12 districts and industry have also been demonstrated (Trotter, 2007). Little attention has been devoted to building partnerships between industry and suburban K-12 districts; this review will outline one such district's approach.

### STEM PARTNERSHIP TEAM RECRUITMENT STRATEGY

The first step in recruiting a partnership team was the selection of a figurehead, an individual with connections to both industry partners and school district leaders. As a community leader, the district superintendent maintains contacts with a variety of industrial partners as well as district personnel, thus she was selected for this role. She identified key district personnel and secured their support of the team. A partnership team coordinator responsible for facilitating and managing the team was also identified. The district selected school representatives to include one principal from each level (elementary, middle, and secondary) as well as teachers from the middle and secondary levels. Due to a current lack of STEM initiatives at the elementary level, elementary teachers were not included; it is likely they will be added in the future. Industry partners were selected from a variety of backgrounds, including small (< 50 employees), medium (50-500 employees) and large (500+ employees) employers, covering a wide variety of industries. Members came from the engineering, consulting, health care, information technology, construction, and architectural fields; most were middle-to-senior executives with extensive experience. The partnership team coordinator extended personal invitations to the

industry representatives and discussed the required commitment; all invited partners accepted. After news of the team spread, external partners (such as technical college representatives and chamber of commerce members) asked to participate in the team and were included.

### **EXECUTION OF STEM PARTNERSHIP TEAM MEETINGS**

Initially, an organizational meeting was conducted to review the scope of the partnership team and the time/resource commitment of members. It was determined that the team would meet four times per year, for up to two hours between 7:30 and 9:30 am; meeting locations would rotate among the facilities of the industry partners. Online polling software was used to determine meeting times that minimized conflicts among team members. Three of the four meetings would focus on secondary, middle, and elementary STEM initiatives, respectively. The fourth meeting would be an opportunity to talk about STEM initiatives from a district perspective; it would also provide an opportunity to review any issues with the functioning and/or composition of the team itself. Each meeting would open with a review of the current programs at the applicable level and give members (especially industry members) an opportunity to ask questions, give input, or provide feedback. Challenges and goals of the programs would then be presented, and the partnership team would work to identify resources and strategies to address challenges and meet goals.

### **EXAMPLES OF PARTNERSHIP TEAM ACTIVITIES**

In the first year of regular (non-organizational) partnership team meetings, three primary partnership activities have occurred. These have addressed three critical needs of the district: first, increasing female student enrollment in STEM curriculum electives; second, locating sources of external funding for major STEM-related capital expenditures; and third, developing engaging STEM experiences in the district's elementary schools.

While all students in our middle school are required to have two experiences – in the sixth and seventh grades – in pre-engineering coursework as part of the Project Lead The Way (PLTW) curriculum, the eighth grade course is optional. Female students represent less than 20% of the students in the eighth grade course. To remedy this, the partnership team suggested a guest speakers program where younger, female engineers in the area would speak to all 6<sup>th</sup> and 7<sup>th</sup> grade middle school students concerning their own career and personal histories. Ten female engineers were identified and a schedule developed to provide a variety of guest presentations throughout the school year.

Capital expenditures remain a major obstacle to implementation of STEM curricula, particularly at the middle and high school levels. While initial expenditures to implement the PLTW middle and high school curriculum were supported by grants from the Kern Foundation, recent curriculum changes and the addition of the Biomedical Sciences curriculum sequence from PLTW have generated significant new costs. The partnership team has proposed strategies to identify sources of funding to offset these costs.

New curricula options were also explored by the partnership team, including the deployment of elementary engineering units to complement the existing hands-on science program. Also, the partnership team assisted with the deployment of a new Civil Engineering and Architecture course at the high school level. Several industry partners are active in relevant fields and provided valuable expertise; they will have an active role in the execution of the class.

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## AUTHOR INFORMATION

Christopher Reis has been a mathematics and engineering teacher with the School District of Kettle Moraine since 2004. He has served as the district's STEM coordinator since 2010. He received a bachelor's degree in electrical engineering from the University of Cincinnati, and a master's degree in secondary education from Xavier University. Prior to entering the teaching profession, he worked in industry as a systems analyst with Procter and Gamble. He can be emailed at [reisc@kmsd.edu](mailto:reisc@kmsd.edu).