

Connecting Local Industry and the Community to Engineering Student's Projects at Middle Tennessee State University

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Abstract – This paper discusses the effectiveness of an organization like the Experimental Vehicles Program at Middle Tennessee State University in enlisting the intellectual and financial support of local industry, and involving the surrounding community in engineering projects on campus. The purpose, goals, implementation, organizational structure, and future of the program are provided here as a model for similar programs at the collegiate or secondary school level.

Keywords: Student Projects, Experimental Vehicles, Fundraising, Management, Industry, Community Involvement.

INTRODUCTION

The Experimental Vehicles Program at Middle Tennessee State University (EVP at MTSU) was founded during the summer of 2004 by the local student chapters of the American Society of Mechanical Engineers (ASME) and the Society of Automotive Engineers (SAE). Both organizations had recently completed their own competition vehicle programs, and were in the midst of analyzing their respective outcomes. These programs included the *Formula SAE*, sponsored by SAE, and *SolerBike Rayce USA*, and *The Great Moonbuggy Race*, both of which are sponsored by ASME. The engineering societies had been competing in these events for several years with mixed success.

Although students within both organizations collaborated heavily on each project, the various projects lacked unity of purpose and efficient sharing of resources. Realizing this disparity, the organizations jointly decided to develop a blanket program to facilitate the procurement and distribution of financial, intellectual, and human resources.

The purpose of this entity, which eventually became EVP, was to act as the financial and public relations arm of the vehicle programs, tasks for which engineers are notoriously ill equipped. The organizational predecessor to EVP was tasked with raising funds for vehicle projects and generating interest among students in order to fill out the ranks of the vehicle teams.

Additionally, it was decided that this organization would oversee the managerial aspects of the three concurrent vehicle projects, which included allocation of funds, tools, and floor space, project planning and scheduling, and resolution of any disputes between vehicle projects.

Since its inception, EVP has greatly improved the organizational and financial situation of the vehicle projects. The students of ASME and SAE, and those that later joined EVP, learned valuable lessons in creating and managing a complex organization. EVP has succeeded in attracting the attention of businesses in the middle Tennessee area and the support of the local engineering community. The program has also introduced students from neighboring elementary, middle, and high schools to the vehicle projects through a series of events designed to produce interest in science and engineering.

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STATEMENT OF PURPOSE

As stated in its Constitution, the Experimental Vehicles Program was formed to “facilitate the operations and collaboration between the Middle Tennessee Student Chapters of ASME and SAE concerning competition vehicle projects, and provide a means for interdisciplinary involvement in said projects”.

EVP was formed in order to manage the limited funds, space, and tools allotted to student projects at MTSU, to maintain project scheduling and documentation, and to improve communication between the project teams and upper level management¹.

To fulfill these requirements, EVP will solicit the aid of students both within and outside the ET Department. These managers will ensure that proper project documentation procedures are enacted, schedules are created and followed, and inter-team communication adheres to a standard format. These efforts will reduce team learning curves, improve project timelines, and provide effective communication within the organization².

EVP allows students from outside the Engineering Technology Department to gain experience in their chosen field by acting as managers, industry liaisons, and public relations and human resources officers. This interdisciplinary collaboration³ is beneficial to ET students, who have an opportunity to observe the managerial aspects of engineering projects, and to students outside of the ET discipline, who obtain a better sense of the technical aspects of the program. The true strength of EVP is the intellectual diversity of its members.

GOALS

The primary goal of EVP is to allow the engineering technology students involved with the vehicle teams to focus on the engineering and technology aspects of their projects, and to provide an avenue for the involvement of local industry and the engineering community with the vehicle teams.

In years past, this has not been the case. Teams suffered from a lack of funding and labor. Past situations led to a general sense of uncertainty that greatly restricted creative expression and imagination. Vehicle designs were limited to the realm of the cheap, quick and simple, and vehicle performance at competitions exhibited a clear inverse relationship to project budget. The lack of funding even led some teams to use their own personal finances to complete their project.

One of the original goals of EVP was to create a brochure highlighting the various vehicle projects in order to attract the attention of local industry for sponsorship purposes. This brochure has generated considerable interest in the program and the vehicle projects, and has helped secure the financial support of members of the local engineering industry, like Siemens International in Nashville, TN.

The brochure, which was reproduced in poster format, also served as a recruitment tool. EVP members hung posters around campus, which attracted many students who were previously unaware of the existence of vehicle projects at MTSU. Student involvement in the projects has since swelled, and many technically skilled individuals studying in other disciplines have helped fill out the ranks of the vehicle teams. The program has also given many undeclared students a better idea educational path they will take.



Figure 1: Front Page of EVP Brochure

IMPLEMENTATION

EVP began as a name only; one that happened to fit well on a brochure. ASME and SAE recognized the need for a promotional brochure for fundraising purposes, and decided to share resources. They established plans to publish a brochure detailing all of the vehicle projects undertaken by the Engineering Technology Department at MTSU.

As a matter of practicality, the ASME and SAE leadership established EVP as an official student organization so that any funds raised through the brochure could share a common account. This replaced the old method of doling out each sponsorship or donation into individual project accounts that may or may not need the money at that particular time. In this way, EVP would help manage the team's financial resources, ensuring that each team had the funds they needed.

Soon, however, the full potential of a blanket organization like EVP became evident. ASME and SAE began hosting fundraising and awareness events under the EVP banner. EVP began to organize presentations and informational meetings for local businesses, and hosted events on campus that displayed previous vehicles and future concepts. During the fall 2004 semester, the leadership of the MTSU chapters of ASME and SAE met jointly to discuss the requirements and organizational structure of EVP.

ORGANIZATIONAL STRUCTURE

After realizing the potential of EVP, the ASME and SAE leadership met to define the program's organizational hierarchy. The EVP organization is modeled after the traditional American corporation, which consists of a board of trustees and elected officers.

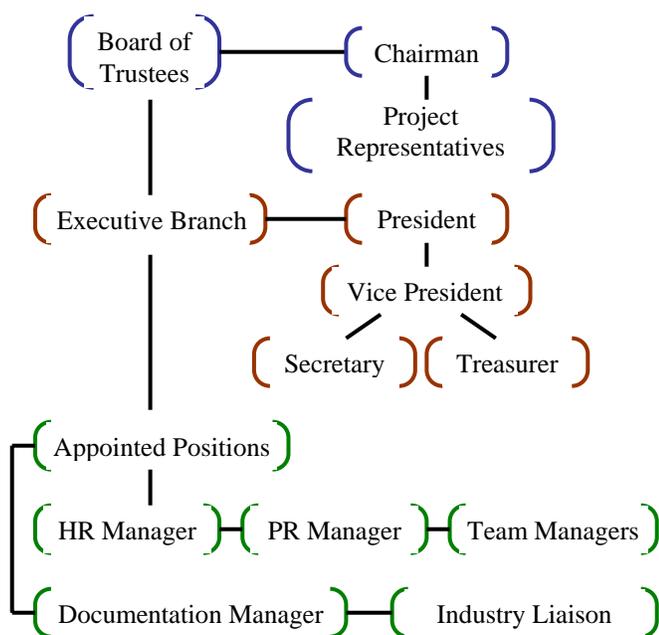


Figure 2: EVP Organizational Hierarchy

The two engineering societies decided to ensure that the executive decisions of EVP remained under the influence of the Engineering Technology Department by creating a controlling board of trustees made up of ASME and SAE members only. The EVP board is organized into five chairs, which represent the five vehicle programs currently managed by EVP. The board is led by a chairman, who is elected by the board.

The president of EVP must be a Junior or Senior level ET student. All other elected officials, including the vice-president, secretary, and treasurer, are open to any student at Middle Tennessee State University; however, all elected officials must be approved by the board.

The board also actively solicits talented individuals to fill unelected positions, such as the Public Relations and Human Resources officers. Candidates for these positions usually come from outside of the ET Department. These positions give students of other academic disciplines the opportunity to gain experience in their field and fulfill degree requirements.

Business and accounting majors, for example, get a taste for their chosen field by handling the EVP accounts and transactions, including the creation of purchase orders, invoices, and budget forecasts.

This arrangement gives non-technical students a taste for the technical aspects of running a manufacturing type organization, and provides a glimpse into the managerial, PR and HR realms of business for the ET students.

FUTURE

EVP plans further consolidation of the various vehicle projects during the spring semester of 2005, and will improve its infrastructure to reflect the lessons learned during the fall of 2004.

Primarily, EVP will focus more time and energy on campus events and fundraisers, which could rival the effectiveness of industry fundraising events in terms of capital produced. EVP is currently organizing a fundraising and awareness event for the early spring semester, which will take place in one of the large outdoor common areas on campus. The event will feature the completed 2004-2005 vehicles and presentations by the vehicle teams. Local food and service vendors will be on hand, and a percentage of their proceeds will go directly to EVP.

EVP is also creating a website that will showcase the vehicle teams and emphasize the design and construction methods used. The EVP website will be a resource for future MTSU teams, as well as for teams from other schools who intend to enter the competitions. The website will also feature the organizational structure and implementation strategy of EVP, so that other institutions may use EVP as a model for their own vehicle programs.

The program plans to pursue additional industry alliances⁴ and sponsorships from companies with representation in the Murfreesboro and Nashville area, including Nissan, Saturn, Wright Industries International, and General Electric.

CONCLUSION

The true test of the success of the Experimental Vehicles Program at MTSU will come when the EVP teams compete in 2005. However, EVP has already surpassed the expectations of its founders in terms of fundraising and project organization.

At present, the Experimental Vehicles Program has raised over \$50,000.00 for its vehicles programs, and anticipates generating much more during the spring 2005 semester. Each vehicle project saw its budget double, and two new projects were added to the roster, making a total of five vehicle projects under EVP.

EVP added both a Mini Baja and a Solar Splash team to the 2005 roster. The Mini Baja is an event hosted by SAE International, and features off-road rallies across the world. Vehicles must be able to negotiate varied terrain, including rocks, mud, and even deep water. The Mini Baja events attract top-shelf engineering schools from around the globe.

The Solar Splash is an annual event hosted by ASME National and held in Buffalo, New York. It is billed as the "World Championship of Intercollegiate Boating." Many well-known engineering schools from the United States and Canada compete in the Solar Splash event, including the US Naval Academy, École Technologie Supérieure, and California State Polytechnic University.

EVP has also generated important contacts within the local business community that are only beginning to thrive. During the fall semester of 2004, EVP hosted a series of events with representatives from the local industry and businesses communities. By working closely with companies like Siemens International and the Lane Auto Museum, EVP was able to raise enough funds to double the operating budgets of previous Solar Vehicle, Formula SAE, and Moon Buggy teams, and had enough funding left over to start pursue two additional competitions: the SAE Mini Baja and Solar Splash competitions.

Student interest in the projects is unprecedented, and the vehicle teams have seen their rosters grow exponentially. In 2003, fewer than twenty students contributed to the Solar Vehicle, Formula SAE, and Moon Buggy teams, many of whom worked on each project. Presently, EVP has nearly a hundred student members, with close to 20% coming from non-Engineering disciplines.

The interdisciplinary environment of EVP is beneficial to both the ET and non-ET students, who are given a unique opportunity to experience different aspects of project management and implementation. Since the first solar vehicle project in 2001, the Engineering Technology Department has seen a significant rise in retention rates among its students, due in part to the hands-on EVP projects that give students an immediate application for their classroom skills⁵.

The initial successes in attracting local industry and student interest in vehicle projects illustrates how an organization like EVP can allow a general education school to compete with top name engineering schools around the world.



Figure 3: 2005 EVP Vehicle Concepts – *Formula SAE, Mini Baja, Solar Vehicle, and Solar Boat*

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