

Engenius Solutions: Creating an Entrepreneurial Revolution at RHIT

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Undergraduate engineering is changing at Rose-Hulman Institute of Technology through Engenius Solutions. Funded by a grant from the Lilly Foundation, Engenius Solutions allocates financial and intellectual resources in an effort to help undergraduate engineers think like entrepreneurs as well as engineers in their careers. Project ideas are solicited from students, faculty, staff and the general public for evaluation by Engenius Solutions. Those ideas that meet the specific criteria establish by Engenius Solutions are accepted and the idea is then developed and prototyped by teams composed of undergraduate engineers. Engenius Solutions then provides the necessary resources to assist their clients in commercializing the developed idea. The organization is led by four undergraduate students who are overseen, but not hindered by, a group of six faculty and staff members.

This paper will present an overview of Engenius Solutions including the goals of the program and its organizational structure. A discussion of the objective of the organization, to increase entrepreneurship among undergraduates by allowing students to manage their own company in an effort to allow engineers to become more familiar with business and more comfortable when handling interactions between entrepreneurs and engineers, is included along with multiple aspects of the projects including Intellectual Property protection, business plan development support, market analysis, prototyping, and the design process.

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Introduction

Engenius Solutions is striving to assist in the development of engineers who have the ability to think like entrepreneurs. Rose-Hulman Institute of Technology is stellar at technical undergraduate education and has been recognized as such, but with the experiences that undergraduates are gaining through Engenius Solutions sponsored activities, graduates of Rose-Hulman will be able to analyze technology as entrepreneurs and engineers. This combination of skills will keep Rose-Hulman graduates in demand for years to come.

Increasing the value of undergraduate education at Rose-Hulman is the primary objective of Engenius Solutions, but other goals exist as well. Through on-campus lectures, information sessions, presentations to campus groups, and a student-tailored website, Engenius Solutions is seeking to raise student awareness of business opportunities created by their own technical innovations. Historically, students at Rose-Hulman have created many useful technologies, but have lacked the entrepreneurial insight needed to take the technology to the marketplace. Recently, Engenius Solutions has launched the Entrepreneurial Revolution at Rose-Hulman Institute of Technology with hopes of educating all students of the institute in entrepreneurship.

Background

The Organization

Engenius Solutions is managed by four undergraduate students (CEO, Business Manager, Marketing Manager, and Technology Manager) who oversee the day-to-day operations of the organization and report to a Board of Governors composed of six staff and faculty members. The Board of Governors has absolute authority within the organization, but refrains from exercising that power unless it is completely necessary. The CEO reports directly to the Board of Governors while the other three managers report to the CEO.

The CEO's main responsibilities include the successful operation and implementation of the program as well as being a spokesperson for the school and the organization in the academic and business communities. Additionally, the CEO serves as the liaison between the student managers and the Board of Governors.

The Marketing Manager is in charge of marketing both Engenius Solutions and Engenius Solutions projects. The CEO and the Marketing Manager determine a marketing plan to execute on an annual basis and the Marketing Manager is then responsible for the successful execution of it. When individual projects are to the point where they are ready for commercialization, the Marketing Manager will head the commercialization efforts.

The Business Manager works with the project team leaders to ensure the successful development of ideas. He is the main contact between student developers and outside clients. Initial evaluation of submitted ideas is also the responsibility of the business

manager. The Business Manager acts as an intermediary between the management team, project team members, and clients.

The Technology Manager is in charge of the majority of the technical aspects within Engenius Solutions. In addition to administering the website, he is responsible for evaluating the technical feasibility of potential projects. The Technology manager also constantly searches for new technologies that may increase the efficiency of the Engenius Solutions Process.

Undergraduate students at Rose-Hulman are the unsung heroes of Engenius Solutions. All development is done by undergraduates, with assistance from Rose-Hulman professors when necessary. The experience gained by student developers is unique in that they are created a project that it can be sold, not just so that it can work which is often the case in the classroom.

The Engenius Solutions Process

The Engenius Solutions Process ultimately begins with an inventive mind having an idea. Typically, Engenius Solutions seeks ideas that require technical development, are capable of being developed at a moderate cost, and are technically realizable at the undergraduate level. While many good ideas exist that do not fit that mold, Engenius Solutions is only interested in those ideas that meet the establish criteria.

An inventor then submits a simple application that contains enough information to initially evaluate the idea. The Engenius Solutions Managers search to see if the idea has already been developed, if there seems to be a potential market for the developed product, and whether it will be a good fit for students at Rose-Hulman. In many instances, outside sources (professors, business professionals, business schools, etc.) are also used in initial evaluation. If the submitted idea meets these requirements, Engenius Solutions and the inventor will enter into an Inventor's Agreement which sets up the roles of the two parties, an initial budget, and estimated milestones.

Often, ideas that are submitted by students are then subsequently developed by the student(s) that submitted the idea. The most common occurrence of this is a group of students that are seeking funding for their senior design project. In this case, the students are overseen by faculty, although they still report to Engenius Solutions and must fulfill requirements that Engenius Solutions has above those of the student's course. In the case that the accepted idea was proposed by an inventor outside of Rose-Hulman, the Business Manager will begin by soliciting applications from students to work on a specific project. Interviews will be conducted with students who apply and the team will be selected at the completion of interviews. After project teams are established, development begins.

The development of technology that occurs at Engenius Solutions is managed in a similar style to the project management that has taken place at Rose-Hulman for years. The major difference being that throughout the development process, the goal of

commercializing and creating a product from the developed technology are kept in mind and design decisions are made to increase the probability of reaching this goal.

During development, weekly reports are submitted to the Business Manager and the Management Team is involved in key decisions, but the development is mostly on their own to create their own innovations. It is believed that giving students the opportunity to be technically creative, without major oversight, leads to a better experience for the developers and a better final product. However, once development is completed, the Management Team is involved in the next steps of the Engenius Solutions Process.

Commercialization of a technology is by far the most difficult, but most rewarding step in the Engenius Solutions Process. Projects that are developed, and most projects in development, are placed on the Engenius Solutions website (www.engeniussolutions.org) where they can be viewed by anyone at anytime and potentially lead to contacts interested in commercialization. But, before too much work can be done with the commercialization of a project, Intellectual Property issues need to be addressed.

The most common form of IP protection for an Engenius Solutions project is through the use of patents. The Management Team collaborates with a law firm in Indianapolis to write and submit a patent, allowing students to gain experience with the patent filing process. Initially, all newly created IP is property of Engenius Solutions, but after commercialization has occurred and Engenius Solutions has recovered its investment, IP is assigned to the inventor. This reinforces the fact that Engenius Solutions is more interested in experiencing the entrepreneurial process rather than gaining from it financially.

Often, projects that appear to have a strong market potential will be patented, but due to financial constraints all projects cannot be patented. Thus, it is necessary to further research the market potential of projects. Evaluating the market potential of a project has been accomplished, in some instances, with the assistance from business students from local universities in Indiana. This works out well because both technical and business students are able to help each other learn about the different aspects of the project. Currently, attempts are being made to formalize this program with additional schools in Indiana so that students throughout the state can benefit from Engenius Solutions.

Once intellectual property protection has been obtained commercialization can really begin. Using the knowledge gained from the in-depth market analysis, specific companies are targeted to market the new technologies. Efforts are made to reach an agreement with these companies that will lead to the successful commercialization of an Engenius Solutions project.

While, the commercialization of an Engenius Solutions project has not occurred in the short history of the organization, it appears that Engenius Solutions will complete the Engenius Solutions Process by commercializing a project in the near future. In the organization's first year, a group of undergraduates developed the Laundry Alerter, a device that calls students in their dorm rooms after a laundry cycle has been completed.

The technology was patented during the summer after it was developed and contact with a laundry service provider interested in utilizing the technology was made shortly thereafter. It was decided during discussion with the laundry service company that a few additional features needed to be implemented before the product was used commercially, so development is currently being continued with a new group of undergraduates. Prior to the creation of Engenius Solutions this would not have been possible, but now it seems likely that this project will soon be commercialized.

The Past to the Present

Engenius Solutions was created through a grant for the Lilly Endowment in Indianapolis, IN. The grant was proposed by a group of faculty at Rose-Hulman who envisioned a program in which students would aide other students in realizing the potential in technologies that are developed at the undergraduate level. The initial purpose of the grant remains intact today, but the organization has evolved into more than was originally intended.

During the first year, an enormous amount of effort was put into establishing the identity of Engenius Solutions throughout Indiana. This included creating and distributing marketing materials, appearing at trade shows and presenting to groups throughout Indiana, and soliciting project ideas for the first academic year that Engenius Solutions existed. The first version of the Engenius Solutions website was also created. The initial management team did an excellent job of establishing Engenius Solutions and laying the foundation for improvements in the following years.

In February of 2003, the new Engenius Solutions management team was hired. The new CEO was hired and his initial task was to form his management team. This was done by soliciting applications, interviewing candidates, and selecting those who would be most effective at the respective positions as well as work well with one another. Once, the new team was formed, the two teams transitioned. This process did not go as well as it could have, but the problems encountered were noted and safeguards have been put in place so they do not occur again. The biggest problem was the transfer of knowledge from one manager to another. To combat this, the new Engenius Solutions Management Team developed documentation and communication standards that are to be followed by the Management Team *and* all project teams. These standards ensure the successful management of Engenius Solutions from year to year. In addition, the standards for project teams followed during development ensures that the steps necessary for commercialization can be followed by the Engenius Solutions Management Team even if the developers are no longer at Rose-Hulman. These standards are a key aspect of Engenius Solutions, because of the rate at which the people involved in Engenius Solutions changes.

Eight projects were successfully developed in the first year, which led to a change in the overall strategy of Engenius Solutions once the new management team was fully transitioned; it was now time to commercialize projects. Marketing materials were created with this specific goal in mind and the Marketing Manager's role was redefined

to allow him to focus more on successful commercialization. Engenius Solutions is confident that these efforts will yield a completely successful project, such as the Laundry Alerter, in the near future.

The Entrepreneurial Revolution

During the summer of 2003, the Engenius Solutions Management Team decided that they wanted to affect more students at Rose-Hulman than just those that worked on project teams. The managers wanted to create an environment that was conducive to entrepreneurial activities among students whether they were working with Engenius Solutions or not. To achieve this goal, the Management Teams devised the Entrepreneurial Revolution.

The revolution started with a new student section on the Engenius Solutions website, www.engeniussolutions.org. The section contains commentary from Engenius Solutions managers on their entrepreneurial experiences and also has links to entrepreneurial activities in recent, local news. When new students arrived on campus for orientation, they found an Engenius Solutions folder containing a letter from the CEO and marketing materials on their desks. Nearly three months later, students are still seen carrying these folders with them on campus. A short presentation was given to the incoming freshmen class about entrepreneurship, as well. The focus was on successful student entrepreneurial endeavors including the creation of Google, Inc. and a popular college website, www.homestarrunner.com. The presentation was both entertaining and educational, and led to student realization that they have the ability to be successful entrepreneurs while undergraduates. The revolution then headed to the classroom.

Engenius Solutions sponsored projects in courses such as *The Entrepreneur* and *Technical Communications*, relating real-life entrepreneurship to pre-existing courses. The CEO was also involved in giving lectures to nine sections of *College and Life Skills*. A mock activity was devised where the class acted as their own entrepreneurial venture involved in evaluating technology, developing it, protecting the intellectual property, and commercializing the technology. The basis for this venture was an Engenius Solutions project. This allowed for the actual technology to be shown to the students, making it real for them. Again, student feedback was excellent. In two weeks, numerous students expressed that they followed the process that was shown them to evaluate their own ideas. The revolution was working and continues today.

After the first two weeks of the Entrepreneurial Revolution, evidence of increased interest from students was observed. Following the on-campus presentation made to the incoming freshmen class, four students contacted Engenius Solutions to discuss their potential ideas. In the months after, that number has nearly tripled and is expected to continue to rise. While still in its early stages, it appears that the Entrepreneurial Revolution will have the desired effect at Rose-Hulman.

Conclusion

The implementation of the Entrepreneurial Revolution has strengthened the role that Engenius Solutions plays on campus and in students' undergraduate education. Through continued development of Engenius Solutions and the Entrepreneurial Revolution, the entrepreneurial awareness of Rose-Hulman students will continue to increase, leading to the development of a new generation of engineers who appreciate evaluation of emerging products from both technical and business viewpoints.