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Abstract

In an effort to compete for multimillion-dollar grants that require researchers to translate their findings for the general public in the form of outreach programs, the University of Florida developed the Scientific Thinking and Educational Partnership (STEP) program. This article describes the evolution of the STEP program, from the creation of a model outreach program called ufgenetics.com—a Web site geared toward media professionals and middle school and high school teachers—to the testing, evaluation, and promotion of that project. The STEP program has garnered over \$1 million in grants in just 2 years of existence.

Keywords

multimillion-dollar grants, Genetics Outreach, research, universities, programs, National Science Foundation (NSF), Educational Partnership Program

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Abstract

In an effort to compete for multimillion-dollar grants that require researchers to translate their findings for the general public in the form of outreach programs, the University of Florida developed the Scientific Thinking and Educational Partnership (STEP) program. This article describes the evolution of the STEP program, from the creation of a model outreach program called *ufgenetics.com*—a Web site geared toward media professionals and middle school and high school teachers—to the testing, evaluation, and promotion of that project. The STEP program has garnered over \$1 million in grants in just 2 years of existence.

Faculty members at Tier 1 research universities are in fierce competition for grant dollars to support their programs. The majority of federal research and development dollars distributed to Tier 1 research universities (80%) is distributed to just 100 institutions (Owen-Smith, 2001). Even among this elite group of universities, some universities are faring better than others. Ten universities receive 21% of federal grant dollars (Owen-Smith). University of Florida researchers are competing with other institutions for multimillion-dollar grants from agencies such as the National Science Foundation (NSF), the United States Department of Agriculture (USDA), and the Howard Hughes Medical Institute (HHMI). Social scientists interested in applying for these large grants have found themselves at a disadvantage because a majority of these grants focus on life and applied sciences.

In the past few years, USDA, NSF, HHMI, and other granting agencies have begun incorporating a new requirement into their grant projects that may be fortuitous for social scientists. These agencies are requiring grant projects to include not only new scientific research, but also a "broader impact" component, which requires researchers to disseminate their findings to the general public. Many applied and life scientists struggle to create these "broader impact" outreach programs because they feel ill equipped to relate

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their research to the public or the media (Lundy, Ruth, Telg, & Irani, 2006). While the "broader impact" component of grant projects may be an obstacle for many life and applied scientists, UF agricultural communication and education faculty members turned it into an opportunity with the creation of the Scientific Thinking and Educational Partnership (STEP) program.

The Birth of the STEP Program

Lesson Learned 1: Investigate the need to be filled at your university and develop an innovative idea that administrators will support.

Rather than leaving scientific researchers to develop outreach programs on their own for their grant projects, agricultural communication and education faculty members, along with a UF plant scientist, decided to step in and work as a team to produce effective outreach programs that could be incorporated into these grants. This group of faculty members pooled their expertise in communication, critical thinking, and plant sciences research to create the STEP program in July 2006. The faculty team members became the STEP directors and focused initially on grants dealing with genetics. UF administrators provided financial support for the program in the belief that it would help make UF researchers more competitive for grants.

Lesson Learned 2: Allow enough time to build and test the program.

At the onset of the STEP program, UF administrators committed resources for 2 years of seed money, with the hope that after the first few years, STEP would become self-sustaining through grant funding. STEP received funding from the University of Florida Genetics Institute (UFGI), the Institute of Food and Agricultural Sciences (IFAS), and the Division of Continuing Education (DOCE). The funding supported a full-time program coordinator, part-time student assistants, software, and equipment. The overall goals of the STEP program were to improve the quality of problem solving and decision making in the sciences, focusing on developing this capacity in faculty, students, and citizens, and to build bridges between UF research, teaching, and Extension faculty to collaborate on grant projects.

To determine the best way to handle this mission, the STEP team developed a needs assessment and distributed it to UFGI faculty. This needs assessment asked faculty how they developed outreach programs for grants and in which areas they would like some assistance. Approximately 56% of the faculty responded that they needed help with multimedia development, such as integrating video into Web sites. Half of the respondents stated they desired guidance communicating with media professionals. Almost half (44%) said they would like assistance with in-service teacher training.

In response to the needs assessment, the STEP team decided to focus on developing multimedia components for grant projects. Over the next 6 months, the STEP directors and program coordinator met with science faculty and developed a total of 10 grant project proposals for a variety of agencies, including the HHMI, USDA, and NSF. The grants focused on outreach, but the role of the STEP team changed dramatically for each grant proposal. In one proposal, the team members proposed holding a workshop on critical thinking for high school science teachers; in another, STEP proposed developing puzzles that would train genetics students to be better abstract thinkers; in another, videos would be developed and incorporated into a computer game for agronomy students.

The benefit of this approach to writing grant proposals was that it allowed the STEP team to interact and network with a diverse group of faculty working toward better science education and outreach at UF. It also gave the team a chance to explore different areas, including new media, mobile technology, and computer gaming. The downside of trying to create made-to-order outreach components in the various grant proposals was that it required a great deal of time from the STEP directors. While the program coordinator could focus solely on developing STEP grant proposals, the directors had other full-time duties outside of the STEP program. In the end, 3 grants were funded out of the 10 proposals, totaling over \$1 million. It is possible that more grants would have been funded if the STEP team had focused on a single approach instead of offering an array of programs.

Over the course of the next 6 to 8 months, the STEP team members found themselves heading in a variety of directions. Much to the frustration of the team, a focused direction for the STEP program did not become clear until the end of the first year. If the STEP program had been limited to a single year of funding, the program would have found its footing just as the funding ran out, and STEP would have made little return in grant dollars on the investment made by UF administrators. The 2-year funding allowed the team to find its way and determine STEP's niche. Having the time to try different approaches, determine the best funding avenues for grants, and build partnerships was essential in making STEP successful.

Lesson Learned 3: Take the time to understand the strengths and weaknesses of team members.

Part of that first-year growth process involved bringing in an advisory council that could offer a fresh perspective on the STEP program and its progress. The council consisted of faculty involved in science education throughout UF, including the College of Education, IFAS, and DOCE. The council was presented with STEP's goals and strategies. They were also

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given a list of grant proposals that had been submitted and a list of potential projects for the future. The advisory council expressed concern that the goals of STEP were too broad and the projects too diverse. The council also stated that some of the goals expressed by STEP were similar to existing programs at UF. While the council members shared their concerns with regard to the mission of the STEP program, they were able to offer few solutions.

The STEP team reviewed the comments provided by the advisory council and determined that STEP needed to have a clearer mission that would be unique at the University of Florida. The directors decided that instead of each project involving the entire STEP team, projects would now be carried out in smaller teams with only the necessary STEP members. Each STEP member would have a specialized role in the grant projects, depending on area of expertise.

Part of the frustration in developing projects through STEP stemmed from the fact that team members were performing duties outside of their specializations. Education specialists were asked to develop communication projects and vice versa. The skills of outside faculty members were also being tapped to fill gaps in expertise on individual projects. In the end, the STEP team members felt pulled in multiple directions, and the program's additional external members were becoming difficult to manage. When team members had a clear role and purpose, they could focus on their individual pieces of the puzzle effectively. Clearly delineating the roles of the STEP team members and working in small teams became even more important later, when student workers were hired to help with project productions.

Lesson Learned 4: Create a model project that can be adapted in the future for other projects.

The STEP team created a model that showcased its unique approach for outreach programs. The model included educational videos focusing on genetics that offered a simple, entertaining explanation of cutting-edge research. The videos included humor, dynamic graphics, and music to interest the general public in science. The videos were short—less than 3 minutes—and offered an entertaining overview of genetics research at the University of Florida. These videos were featured on a Web site that also included lesson plans for middle school and high school science teachers and print news stories for journalists. The idea was that this model could be adapted for future grant projects dealing with other topics.

Lesson Learned 5: Create a showcase project.

Having a tangible product that demonstrated the type of outreach program that STEP could develop also made STEP easier to promote. Advisory council members mentioned that they had a difficult time visualizing the kind of products that STEP could create. After creating this model project, promotion became much easier. During promotional meetings, the STEP team would begin by showing the model Web site and its videos. Rather than spending the majority of the time trying to explain the STEP concept, the STEP team would devote the rest of the time to a question-and-answer session.

Lesson Learned 6: Outsource specialized communication and technical development if the team members are not experts in that area.

The model project became known as “ufgenetics.com.” This Web site housed STEP-developed materials that would introduce middle school and high school science teachers as well as journalists to the innovative genetics research taking place at the University of Florida. The STEP team contracted an outside Web design company to develop the Web site because the team felt that Web sites created by UF Web designers had a very “institutional” feel to them, with blocky graphics and complicated navigation. The STEP team wanted the ufgenetics.com site to have a clean design and look similar to other science education Web sites, such as those of the Discovery Channel and National Geographic. The site included a content management system that allowed nontechnical personnel to update the text on the pages, revise navigation, and upload videos. One of the STEP directors and the program coordinator worked closely with the production company to develop the “look and feel” of the Web site, as well as to determine the features of the site.

While the decision to pay an outside company to develop the site was a difficult one at the time, in retrospect, the money and time spent on the Web site was well worth the investment. Some of the STEP team members had Web design experience and could have developed a basic site, but not at the technical level that would have given the ufgenetics.com Web site a professional appearance.

Lesson Learned 7: Integrate undergraduate and graduate students who have production experience into the development of materials for your program.

The STEP team wanted to use the ufgenetics.com site to showcase the wide range of genetics research at UF. To accomplish this, a series of interviews was conducted with genetics faculty from diverse disciplines, including entomology, veterinary medicine, microbiology, and environmental horticulture. Students were hired as reporters, videographers,

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education specialists, and graphic designers to produce materials for the ufgenetics.com Web site. During the first few weeks, the students were trained in the ufgenetics.com model of outreach. They checked in weekly with the program coordinator to review the materials they had created. The students developed a complete set of communication materials, including videos running from 1 to 3 minutes in length that highlighted interesting aspects of genetics research; news feature stories with associated photos; lesson plans with objectives, activities, and assessments; and the "This is Your Brain on Science" video series, featuring interviews with scientists explaining how they became scientists. By the end of the summer, 26 videos, 8 lesson plans, and 8 news feature stories had been produced. The ufgenetics.com Web site was unveiled in September 2007. During the summer of 2008, students produced another 19 videos, 6 lesson plans, and 6 news feature stories.

Lesson Learned 8: Take the time to evaluate your products and programs.

Through a suggestion of one of the students, the videos from the ufgenetics.com site were also uploaded onto YouTube (visit <http://youtube.com> and search for "ufgenetics" to view videos) and a similar Web site geared toward teachers called TeacherTube (<http://teachertube.com>). The STEP team also worked with the local PBS station affiliate to provide ufgenetics.com videos as fillers to be aired in between programs.

The STEP team spent the next year promoting the ufgenetics.com model to faculty members, developing grant projects, and testing the model's viability. The STEP team was interested in not only creating effective outreach programs that translated the scientific research from UF to the general public, but also in testing those programs to determine if they effectively reached target audiences.

The team started by testing the ufgenetics.com materials with science teachers. A series of focus groups was conducted with science and agriscience teachers to determine the usefulness of the videos, lesson plans, and news stories for classroom purposes. The teachers offered suggestions for improvement, which were then incorporated into the next series of ufgenetics.com materials as they were being developed. The teachers also recommended additional science topics for use in the ufgenetics.com model.

The effectiveness of the ufgenetics.com Web site was also calculated through the program Google Analytics. As of September 3, 2008, the ufgenetics.com site had been viewed 2,298 times, with most of the national traffic from Florida, Georgia, and New York. Internationally, the site has been viewed predominantly by people in Romania, India, and Canada. A

little more than 50% of the visitors to the site are using the Internet browser Internet Explorer to view the site, followed by Firefox and Safari. YouTube video views were also tracked. The 45 ufgenetics.com videos have been viewed 79,350 times as of September 3, 2008, and 24 people have subscribed to the "UF Genetics" channel to receive updates when new videos are posted.

The overall success of the STEP program can also be measured in grant dollars. In the past 2 years, STEP has collaborated on the following grants: the Howard Hughes Medical Institute Precollegiate Science Education Program grant for \$676,000, a USDA Higher Education Challenge grant for \$145,000, and a USDA Food and Agricultural Science National Needs Graduate Fellowship Grants Programs grant for \$229,500. STEP has also collaborated on grants totaling another \$1 million that are currently under review.

The Future of STEP

The first 2 years of the STEP program were so productive and positive that UF administrators extended funding for the program coordinator for another 2 years. This is a vote of confidence for STEP, especially when it is taken into account that the University of Florida has endured 2 years of cutbacks in state funding.

Incorporating students into the production process started as a matter of convenience, but now offers interesting grant opportunities. The student workers were so successful in producing materials for the STEP project that faculty members from science departments have become interested in having their students work with STEP. The STEP directors are working on grant proposals that would teach science students to translate their scientific research for the general public and produce news stories and news releases focusing on their areas of research. Grant proposals have also been submitted that would create a formal course to bring together science students and communication students in teams to produce "ufgenetics.com" style materials highlighting their research.

The STEP team is also venturing into other types of technology to deliver outreach programs, including social networking tools such as wikis and mobile video devices such as iPods. In the future, the STEP directors will continue to collaborate on grants that work off of the ufgenetics.com model and extend the model to meet the needs of additional target audiences.

The ufgenetics.com model has been adapted to showcase UF research in the areas of small farms, environmental horticulture, and food safety. By using a model that was already developed, the STEP team was able to create

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well-developed and tested outreach programs that could be incorporated into grants. These derivative outreach programs could be reformatted to meet the goals of other grants with much less time and cost than the initial ufgenetics.com project.

In the coming months, the STEP team will turn its attention to promoting STEP to the UF administrators who have provided funding. The promotion efforts will also be directed toward faculty members who could collaborate with STEP on grant projects in the future.

Conclusion

The STEP program has been successful in generating grants by creating unique outreach programs involving social scientists, scientific researchers, and students. Ultimately, creating a successful program required the STEP team to endure a year of growing pains. It took the dedication of the STEP directors to stay committed to the program when the future was uncertain. By incorporating the following lessons learned, other universities can learn from STEP's model:

1. Investigate the need to be filled at your university and develop an innovative idea that administrators will support.
2. Allow enough time to build and test the program.
3. Take the time to understand the strengths and weaknesses of team members.
4. Create a model project that can be adapted in the future for other projects.
5. Create a showcase project.
6. Outsource specialized communication and technical development if the team members are not experts in that area.
7. Integrate undergraduate and graduate students who have production experience into the development of materials for your program.
8. Take the time to evaluate your products and programs.

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Keywords

outreach, grants, collaboration, genetics, research, YouTube

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