

Designing and Delivering Student-Led Outreach Events for Middle School Students

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Abstract – The Girls Researching Our World (GROW) Program at Kansas State University (K-State) has for six years offered summer and academic year science, technology, engineering, and mathematics (STEM) outreach activities for middle-school girls. During this time, a wide range of people have contributed to delivering the workshop, including university faculty members, graduate students, undergraduate students, practicing engineers and scientists, public school teachers, Girl Scout leaders, and administrators. These individuals have held a variety of roles (*e.g.*, presenter, escort, chaperone, tour guide, speaker). Our methods of delivering the GROW Program have evolved over time and concentrate on building relationships and creating connections between the girls and this array of interested contributors.

The GROW Program has well-established processes for effectively leveraging a small amount of faculty time to design exciting hands-on activities, for recruiting university students to be involved in all aspects of our programs, and for training escorts and chaperones to support the success of the event. This practitioner-focused paper shares details and lessons learned for each of these processes, as well as information on the planning necessary for a successful outreach event. We outline the advantages and challenges of designing an event in this manner, and discuss why this approach is beneficial with regard to enhancing the informal learning of middle-school girls.

Introduction

The Girls Researching Our World (GROW) Program provides outreach activities in science, technology, engineering, and mathematics (STEM) for middle-school girls. We have developed a process to organize and design our outreach activities to create relationships between the girls and adults at our events. The need for mentors and networking for girls and women in science begins at the primary school level and continues through graduate education and careers in business and industry (Thom, 2001). We believe that if the girls who participate in our events make connections or build relationships with women who help facilitate our events, then those girls will be more likely to visualize themselves pursuing careers in a STEM field.

The demand for each GROW event has steadily increased since our first event in 2000. The GROW Summer Workshop hosts approximately 100 middle school girls annually. This event routinely has a waiting list of 20-30 girls, and our most recent academic year event had 50 girls on the waiting list when we stopped adding names to the list. Based on our experience, 100 girls is the maximum number we can effectively handle on campus for any one event. Thus, the most feasible way to add capacity to a particular event is to replicate offerings, but this presents other challenges.

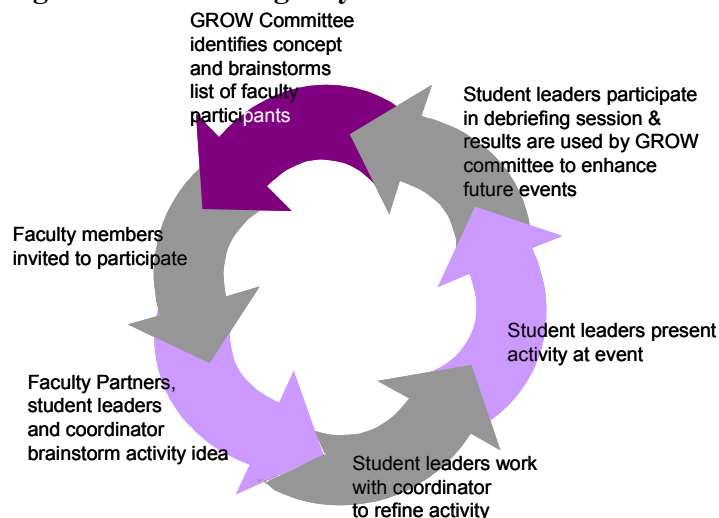
When we first began to offer GROW on-campus events, the activities were primarily delivered by faculty members. The GROW Steering Committee members used their connections on campus to recruit faculty presenters for the workshop. Faculty members donated their time to support GROW events. While many faculty members did so willingly and have volunteered to participate year after year, we were faced with growing demand for additional offerings of events from our audience. Thus, it was necessary to consider alternate methods that would allow us to efficiently use faculty time, and simultaneously increase capacity in our offerings.

Evolution of Delivery Methods

As we considered methods for efficiently utilizing faculty time, we recognized that a model already existed. One of the early Summer Workshop sessions, “DNA Detectives” was a hands-on activity that had been offered each year since 2001. The original activity was created and delivered by a post doctoral fellow with the assistance of two students. In 2002, the post doctoral fellow and students were gone, but the outline of the activity was provided to a visiting faculty member who updated, refined, and delivered it for two years at the Summer Workshop. It is now a staple activity and is delivered by graduate students. This evolution has strengthened the activity and given it a stability that has allowed us to offer this popular session each year.

We decided to use a similar process to design our Saturday events held during the academic year. This year two new and very exciting events were planned and delivered – an event that highlighted the roles engineers and scientists have in disaster preparedness and relief, and an event that highlighted the linkages between STEM and the fine arts. Our current process for designing a new day-long event will be illustrated utilizing our recent event entitled “Engineers and Scientists to the Rescue”. This process is displayed in Figure 1.

Figure 1 Event Design Cycle



Ideas for Saturday events originate with the GROW Steering Committee. Steering Committee members are faculty members from a range of science-based disciplines across campus. Each year’s new events are identified and selected during a brainstorming session at the beginning of the year. This year the “Engineers and Scientists to the Rescue” event seemed a natural to start with since several natural disasters had recently been in the news. The Steering Committee identified K-State faculty members having expertise that pertained to disaster preparedness or

response. These individuals were contacted to inquire about their interest in participating in the event. In some cases Department Heads were contacted to help identify possible faculty partners. The email used as an initial inquiry is provided in Figure 2. This invitation came from a GROW Steering Committee member who is also a faculty member, so it was a peer-to-peer request. The response was overwhelming. Every faculty member, male or female, who was approached to participate, agreed to be a faculty partner, and furthermore their responses were almost instantaneous.

Figure 2 Sample Email for Faculty Support

Dear *(faculty member name)*,

GROW (the NSF-supported Girls Researching Our World project) is planning an all day on campus event for middle school girls interested in science, engineering, math or technology on December 3rd. The theme of the day is to highlight the roles played by scientists, engineers and technology in disaster response/preparedness. As in previous GROW events, the activities will be delivered to the girls by KSU students under the supervision of Susan Arnold Christian, the GROW Project coordinator, and one or more of the GROW PI's (Douglas, Dyer, Freeman, Montelone, Spears). Your names were recommended to us to help make a connection to electrical engineering at this event.

I am inviting you to help Susan and I to develop an activity for this event- based on *(name of their discipline)* and the role your discipline plays in providing vital help by setting up communication during and after natural disasters in some setting that the girls will relate to easily. Your input can be provided either on-line or in-person. Susan and I would be happy to spring for coffee or lunch if you elect the latter. (FYI- the other activities planned are based around water quality, food distribution, mold control and the GIS commons). You are not expected to be available on December 3rd.

I promise that we will ask no more than an hour of your time. Susan has had a lot of experience turning sketchy ideas into wonderful activities for girls of this age group. Their positive experience is good for K-State and an investment in our future.

Thanks in advance for considering this opportunity!

Faculty members were asked to identify students who would actually lead the activities. Student leaders included both graduate and undergraduate students, and both male and female students. From a design perspective, our objective was to have at least one female faculty member or student leader on each team so that the girls who attended this event would interact with female role models during each activity.

The next step in the process was to design the hands-on activities. The GROW Project Coordinator met with each of the faculty partners and student leaders to help brainstorm activity ideas. The Project Coordinator's expertise in framing activities to be age-appropriate, and her ability to recognize challenges inherent in dealing with girls of this age group is critical at this stage of the process. She explains to the activity leaders that middle-school students will be most engaged by hands-on activities rather than lectures or demonstrations; that they will connect first

with the facilitator as a person rather than with the material presented; and that they are interested in how the topic of activity affects peoples' lives. She is also instrumental in helping the faculty members understand the natural tendencies of girls of this age group, which may include such behaviors as forming cliques, using a rebellious attitude as a defense mechanism when intimidated, and not engaging as well in large group discussions as they do in small groups.

After the initial meeting with the faculty member, the GROW Project Coordinator and the student leaders held follow-up meetings to plan and refine the activity, and to prepare for the event. Information on leading an activity in a gender-equitable format was also provided at this time. In some cases, other student workers assisted in preparing materials for the day. Delivery of the activities on the day of the event was done by the student leaders.

This process offers a rich partnership for everyone involved and offers an activity to the participants that has been carefully planned and has the support of many talented people. The relationships among the various contributors have a direct impact on the success of the event and how the girls connect with the activities. This type of a partnership between the staff of the GROW Program, faculty and students creates a team atmosphere that can be felt by the participants on the day of the event. The relationships are solid and there is an atmosphere of everyone working together to give the participants the best experience possible. Our objective was to effectively utilize faculty members' expertise to help design exciting and cutting-edge offerings, while minimizing the amount of time they were required to contribute. Ironically, almost all of the faculty members wanted to be present to observe the event.

Lessons Learned

- Give specific details about the amount of time requested from the faculty members and students.
- Let the individual faculty members determine their level of involvement beyond that agreed upon initially. They may regard their task as finished after the first meeting or they may want to continue to participate in all future meetings with students as well as attend the event to observe the activity.
- Bring your own ideas for hands-on activities to the meetings with faculty and students to use as a starting place. This will give them an example of the types of activities that would be appropriate for the age group.
- Give the student leaders enough flexibility to make the activity their own. Their personal investment will make them more comfortable as they lead the activity and will help them be more confident as they present the material to the girls.
- Encourage the student leaders to tell their personal story as part of their activity. You have recruited these students specifically because they are a success story and a STEM role model; they should share their stories with the middle-school participants..

- Make the link to STEM careers and high school courses they should take if they wish to pursue the particular discipline. If the girls like a particular activity, they need to know what career fields would map to that activity and the process of how to get there.

Recruiting and Training Those on the Front Line

Two other groups of people who are vital to the success of our events are our student escorts and chaperones. Escorts support daytime activities, and chaperones support nighttime activities. Chaperones are necessary for the Summer Workshop since it is a residential camp. Some students hold both an escort and a chaperone role, while others serve in only one role or the other.

At each of our events, we divide the girls into small groups (10-12 girls). These small groups are together the entire time they are on campus and are escorted by two female students in STEM or education disciplines. Ideally, we prefer to pair a STEM student with an education student to support each group. The escorts are the individuals who can potentially make the strongest connections with the girls by the sheer nature of the amount of time they spend together. This lends itself to building strong “big/little sister” relationships.

We actively seek female students of color to participate as escorts and chaperones, because we believe it is critical for our middle-school participants to encounter role models from as many underrepresented groups as possible. These students are recruited through various listservs across campus, including those of the student chapter of the Society for Women Engineers, the Women in Engineering and Science Program, the Multicultural Engineering Program, and several minority student groups. We also strongly encourage students who have participated as escorts in one event to serve in that role for subsequent events. This gives those middle-school girls who return to multiple events the opportunity to recognize someone they remember from an earlier event, which reinforces their connections with those escorts and provides a greater sense of comfort and familiarity with the surroundings. An example email used to recruit students to serve as escorts is provided in Figure 3.

Figure 3 Sample Email Recruiting Student Escorts and Chaperones

Hello Students!

This summer we will be offering science and engineering workshops for middle and high school girls. We need female KSU students to serve as escorts and chaperones for these events.

GROW Summer Workshop: June 21-23

EXCITE! Summer Workshop: June 26-29

Role of a chaperone: Stay overnight in the dorms with the girls and WESP staff. Looking for someone who can have fun, calm jittery adolescent emotions and help girls go to bed and wake up on time!

Role of an escort: Help girls get around campus during the day and keep groups on schedule. Daily schedule runs from 8am – 10pm. Escorts can either sign up to stay with one group all day long, for all three days or work in shifts.

Rate of pay: 8am - 10pm \$6 per hour; 10pm - 8am \$3 per hour; Meals will be provided.

You may sign up to be an escort or chaperone or both. This will depend on your schedule.

If this sounds interesting to you please consider applying! It is an awesome experience and you will be amazed at the impact you can make in these young women's lives!

Attached is an application in Word and a PDF version, use whichever format works best for you. Please complete this and email it to suarnold@k-state.edu or drop it off at the GROW office (125 Seaton) by February 28th. I realize you may not have some of the information at this point. Please fill out as much as you can.

If you don't see any attachments with this e-mail, you can find the application on the web by clicking on the following links:

Application in MS Word format: http://www.k-state.edu/excite/06_escort_application.doc

Application in pdf format: http://www.k-state.edu/excite/06_escort_application.pdf

Feel free to check out the info on our websites from past workshops and email me with any questions you may have:

<http://www.k-state.edu/grow/general/pastevents/grow2005/grow2005.htm>

http://www.k-state.edu/excite/prior_events.htm

I will look forward to receiving your application!

After escorts and chaperones are selected, we provide training for them with regard to their roles and our expectations. For the summer workshop, one-and-a-half hour training sessions are held once each month during the four months prior to the workshop in June. For day-long events during the academic year, training sessions are abbreviated and more focused, typically a single meeting 1½ - 2 hours in length. Our escort and chaperone training has been continuously improved over the years. Because the role of escorts and chaperones is to build relationships, we now pair them up prior to the first meeting so that all of the discussions, team activities, and games played in the training sessions are done by the escort and chaperone teams that will work together during the event. We also recruit students of color to help us lead our diversity sessions. These students belong to organizations on campus who coach their members in leading diversity training sessions. We also ask the escorts to complete evaluation surveys anonymously and use

this information to help us refine and improve our training process and the events. An outline of topics covered in the training sessions for the summer workshop is provided in Table 1.

Table 1. Outline of Escort and Chaperone Training Sessions for Summer Workshop.

<u>March Training Session</u> ✓ Introductions (10 minutes) ✓ Workshop Details and Packet Distribution (20 minutes) ✓ Role Expectations (20 minutes) ✓ M&M post-it game to review what they learned (10 minutes) ✓ How to Work with Teen Girls (20 minutes) ✓ Questions and Answers (10 minutes)
<u>April Training Session</u> ✓ Schedules (20 minutes) ✓ Workshop Details (20 minutes) ✓ Leadership Styles (40 minutes) ✓ Questions and Answers (10 minutes)
<u>May Training Session</u> ✓ Last Minute Details (20 minutes) ✓ Diversity Session using Scenarios (60 minutes) ✓ Questions and Answers (10 minutes)
<u>June Training Session</u> ✓ Logistics (T-shirts and packets) (10 minutes) ✓ Escort Schedule (5 minutes) ✓ Main Schedule (5 minutes) ✓ Transportation List (5 minutes) ✓ Group Schedule (5 minutes) ✓ Registration (10 minutes) ✓ Opening Session (10 minutes) ✓ Scavenger Hunt (10 minutes) ✓ Go over List of Girls including Any Medical Concerns (15 minutes) ✓ Cell Phone List (5 minutes) ✓ Questions and Answers (10 minutes)

The escorts are our future scientists, engineers and educators. They have told us in our debriefing meetings that their experiences have strengthened their decisions to pursue careers in science and engineering. In addition, these escorts have indicated a future commitment to outreach and engagement of pre-college students. The escorts who are not STEM majors have told us that

their experiences made them reconsider their decision. We often hear comments such as the following from our students: “I wish there had been a program like this when I was a girl!”. The discussions that follow such comments frequently include statements about how the escort’s education path might have been different had they known all the opportunities that could have been available to them.

Successes and Challenges; Suggestions for Replication

Creating events that are student-led has been a rewarding experience for everyone involved with our program. The young girls who attend our events make comments in their surveys such as:

- *The students told us all about themselves, and they were really nice!!!*
- *I liked my escort. She was really nice and she taught us about what college is really about. She said it’s not just partying.*
- *I liked how the people leading the rescue groups were full of information and were extremely helpful.*

The student participants make a strong connection with all the middle-school students involved and the messages the girls hear from K-State students seem to connect in a more direct way with the girls than the messages they hear from adults. At the end of our Saturday events, we organize a closing session where the middle school girls have the opportunity to share their excitement and tell the entire group about their experiences that day. The girls really enjoy standing up with the microphone and sharing stories of what happened in their hands-on activities.

The K-State students who lead the activities also come away with new insights into their disciplines. Their comments to us share a powerful message of strengthening their resolve to continue in their education paths. They tell us that leading an activity that is a practical application of what they are studying in their classes and is a benefit they did not expect when they signed up to help with our events. One of our K-State student participants shared the following:

- *It was good experience to teach and explain concepts to those with less education--good practical experience for the real world*

The challenges of creating an event that is student-led are minimal once a structure is in place. We have found that the initial request to faculty members to seek their participation works best and is more successful if the contact is made by a faculty peer. The email is much more likely to be opened or the call returned if they recognize the name of the person contacting them. Once that contact has been made and they indicate that they are interested, the follow-up work and communication can be passed off to the Project Coordinator. It is also important to realize that deadlines established by the event planners should be such that faculty members are given sufficient time to incorporate the event into their calendars.

We also have encountered some challenges in arranging payment for our student event leaders and escorts. The procedures and paperwork involved in hiring temporary employees at our institution are rigorous and need to be addressed with sufficient lead time. When the students were asked why they chose to participate in our events, one-quarter of them said that payment was critical to their participation. If students do not receive payment in a timely manner, it can negatively affect their future involvement.

Finding convenient times to meet with all of the students involved in an event can also be challenging. Be prepared to set up a number of training sessions in which the same material is repeated to new groups of students. The mode of communication that seems to work best is email. Multiple short, concise messages seem to be more effective than one or two long emails that detail everything they need to know. Giving students deadlines in the messages is also very important and sending reminders to them on the day of or the day before meetings is critical to high attendance rates. Accumulating a list of student cell phone numbers prior to the event has also been helpful. You can use communication with the students as an opportunity to model good project management skills to which they may not have been exposed before.

Conclusion

Those of us who organize outreach programs at universities have a rich resource at our disposal. Many times we do not tap this resource to its fullest potential. Our students have drive and passion that can set the tone for our outreach efforts. However, we must be willing to invest the time to mentor and work with these students to develop their leadership skills and provide them opportunities to utilize those skills. Organizing outreach events that can take significant time and energy, but the results for both the participants and the student leaders make that investment extremely worthwhile.

Some indicators that this method of delivering student-led events is a success are:

- An increase in the number of students who sign up to help with our events. We often have a waiting list of 20-30 students who want to help with the events.
- 22% of our K-State student escorts help at more than one event.
- Students who say their experience at our events has solidified their decision to pursue a future in STEM.
- Enthusiastic faculty response to our calls for help in planning our events.
- 25% of our faculty participate in more than one event.
- The connections and relationships that are built between faculty and students, students and students, and students and participants.

There are many reasons to continuously improve the way we do outreach events for young women. We want our events to be popular, up to date and exciting. We want local and national recognition. We want to get the biggest bang for the buck. But the bottom line comes down to the fact that we want to make a difference in future education and career choices of the girls who participate in our programs. Using an event format where the girls can meet and interact with people engaged in STEM at all levels: undergraduate students, Master's students, Ph.D. students, and faculty members, gives our message a unique and powerful punch. We have to remember that it is not enough to tell girls about the choices they have to make but to *show* them--give them living examples to whom they can connect and build relationships.

“Children close their eyes to advice, but open their eyes to example.”
Anonymous quote from *The Last Word: A Treasury of Women's Quotes*

Acknowledgment

This project was supported by grants 9975936 and 0117423 from the National Science Foundation. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

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