Professionalizing the Role of Peer Leaders in STEM

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Abstract

Efforts to improve retention in science, technology, engineering, and mathematics (STEM) majors frequently utilize peer mentors and/or leaders. At Northern Kentucky University, the STEM Ambassador (SA) program involves students in the creation of a STEM community through multifaceted roles as mentors, peer-learning facilitators, and social organizers. The program utilizes best practices in organizational leadership and leadership development to maximize the effectiveness of the SAs. The program has resulted in positive perceptions of the SAs, increased retention of STEM students that participate in the SA-led activities, and a well-nurtured, professionally developed set of students that serve the STEM community.

Background

Retaining undergraduate students in science, technology, engineering, and mathematics (STEM) majors is a widespread, complex problem. According to the President's Council of Advisors on Science and Technology, less than 40% of students who begin college as a declared STEM major complete a STEM bachelor's degree (Olson & Riordan, 2012). While this attrition rate is not more than non-STEM majors (Chen, 2013), STEM employment is predicted to grow at a greater rate than non-STEM employment (Langdon, McKittrick, Beede, Khan, & Doms, 2011) and maintaining the United States' competitiveness in the global economy relies upon success in science and technology (Olson & Riordan, 2012).

Tinto's (1987) influential work about persistence in college suggested the level of academic and social integration a student feels at an institution has a direct relationship to the likelihood that a student will persist. This was true across types of institutions (e.g., two-year or four-year, residential or commuter campus) and a variety of individual student characteristics. In addition, Stage (1988) found persistence is improved when both academic and social involvement occur. Specific to the STEM disciplines, Seymour and Hewitt (1998) found that high performing students leave STEM disciplines at equal rates as low performing students. They also brought to light concerns of inadequate support mechanisms, such as academic, career, or personal mentoring. Murphy et al. (2007) built on this work, demonstrating the importance of students feeling they are accepted, valued members of STEM departments and disciplines.

The complexity of the problem has led to multifaceted approaches to improve retention in STEM with different populations. For instance, a number of efforts have focused on specific disciplines, such as engineering, to better understand why students leave to inform retention strategies (Eris et al., 2010; Hartman & Hartman, 2004). Other initiatives have concentrated on minority and underrepresented groups (Drane, Smith, Light, Pinto, & Swarat, 2013; Levin & Levin 1991). Many of these programs utilize a common set of evidence-based practices including peer mentoring (Chesler & Chesler, 2002; Wilson et al., 2013), bridge programs (Gilmer, 2007), learning communities (Graham, Frederick, Byars-Winston, Hunter & Handelsman, 2013), reformed teaching practices (Lewis, 2011), and undergraduate research (Graham et al., 2013).

Activity	Goal	STEM Ambassador Involvement
Peer-Led Undergraduate Study Sessions	Retention	Significant–lead sessions, determine direction of sessions
Build STEM Community	Retention	Significant–organize and execute events, contribute to social networking sites
Unified Recruiting Strategy	Recruitment	Moderate–communicate with potential students and parents at recruitment events
Early Undergraduate Research	Retention	Limited–encourage students to apply

Table 1. Project Activities and STEM Ambassador Involvement

These evidence-based practices frequently rely upon current STEM students to serve as peer leaders and/or mentors in an attempt to address issues outlined by Seymour and Hewitt (1998) and Tinto (1987). Peers as leaders, in the role of mentors and tutors, have been known to improve student performance, attitudes about the tutored subject, and sense of self-confidence (Cohen, Kulik, & Kulik, 1982). Peer leader programs appear to not only benefit the students being served by the leaders, but also the leaders themselves and the institution as a whole (Shook & Keup, 2012). They can be instrumental in developing a social community and act as a resource to other students by referring them to services or by providing them with general information students may not seek on their own (Shook & Keup, 2012).

At Northern Kentucky University (NKU), student persistence in the STEM disciplines mirrors national trends. NKU is a regional, comprehensive university with more than 15,000 students. A majority of them are commuters, contributing an extra barrier for forming attachments to the university and/or to their majors (Tinto, 1987). Moreover, a large portion of NKU students are non-traditional, the first in their family to attend college, and work a significant number of hours (National Survey of Student Engagement [NSSE], 2012). A team of faculty from five different STEM departments (Biological Sciences, Chemistry, Computer Science, Mathematics and Statistics, and Physics and Geology) utilized research by Tinto (1987), Seymore and Hewitt (1998) and Murphy et al. (2007) to develop a comprehensive approach to recruiting, engaging, and retaining STEM students at NKU.

The multi-pronged approach involves early undergraduate research opportunities for students (Bowling, Bullen, Doyle, & Filaseta, 2013), peer-led study sessions for various courses, the development of a STEM community, and a unified STEM recruiting strategy (Table 1). The efforts span all of the STEM disciplines at the university, including biological sciences, chemistry, computer science, mathematics, statistics, physics, geology, and engineering technology. The goals of the project are specifically to: (A) increase the retention rate of first-time freshmen who declare a STEM major from under 30% to at least 60% and (B) increase the number of undergraduates who complete a bachelor's degree in STEM from a four-year mean of about 120 to about 180 (a 50% increase). Peer leaders, known as STEM Ambassadors (SAs), are a central component of the various aspects of the project (Table 1).

Research suggests that students are more likely to be engaged and retained if they are connected to a social community (Shook & Keup, 2012; Murphy et al., 2007) and are involved in peer tutoring and mentoring (Cohen et al., 1982; Chesler & Chesler, 2002; Wilson et al., 2013). As such, the SAs were tasked with providing peer academic assistance, which was based on reformed teaching practices known as Peer-led Team Learning (Lewis, 2011), and building a professional and social community among STEM students. In order to increase the effectiveness of the SAs, a series of leadership development activities were integrated into the program by an expert in organizational

leadership.

The most similar program to NKU's STEM Ambassadors described in the literature is the Gateway Science Workshop (GSW) at Northwestern University (Micari, Gould, & Lainez, 2010). The program trains students to facilitate learning. As in the SA program, there is a focus on leadership and gaining skills through practice in a professional role. However there are several differences, the most notable being the multifaceted role of the SAs rather than the one-dimensional focus on peer learning in the GSW program. The SA role is akin to a professional position, requiring collaboration, self-direction, teamwork, decision-making, and communication, among other career skills. In the first year of the project, the STEM faculty recognized a need for structured, comprehensive leadership training for the SAs. Thus, they sought expertise outside of STEM. A faculty member trained in the field of industrial-organizational psychology with expertise in leadership joined the team as senior personnel to create structured leadership training and development and provide guidance regarding SA hiring practices. The focus of the following discussion is the implementation of the SA program to meet the broad needs of improving retention in the STEM disciplines, specifically how the SAs were developed in their role as peer leaders.

STEM Ambassador Program

The SA program was launched in the 2010-2011 academic year and has evolved into a formalized, replicable model. Each year 15 SAs, three from each STEM department, are employed for a $1000 stipend each semester. The SAs have two primary responsibilities: the facilitation of peer-led study sessions and planning and coordinating social events each semester (Table 2). The SAs frequently participate in the informal mentoring of students through these activities. Additional aspects of the role are talking to prospective students and parents during recruitment events, advertising STEM-wide activities, and conducting meetings with fellow SAs and faculty leaders. Leadership development of the SAs is not only designed to aid in the growth of the skill sets that prepare them to be successful members of the project team, but also to better equip them for their careers.

Nature and Responsibilities of Role. SAs prepare for and facilitate weekly Peer-Led Undergraduate Study (PLUS) sessions. There are three PLUS sessions per week in each of the STEM disciplines; each SA conducts two of the three weekly sessions and they work in pairs. Two of these sessions are connected with a specific course section in a STEM general elective or a course that has a relatively low success rate. Generally, students enrolled in the specific sections are encouraged to attend. The third weekly session is open to all STEM students, and the students who are enrolled in targeted sections and other sections are invited as well. Students are informed of the sessions by faculty, SAs that attend the classes, and various messages sent through the course management system and social websites. In addition to specific course review, these sessions provide a venue for informal mentoring and support for the STEM academic community.

PLUS sessions build on successful learning programs that originated from various STEM disciplines. PLUS sessions share many characteristics of Peer-Led Team Learning (Tien, Tien, Roth, & Kampmeier, 2002), however it differs in three significant ways. First, students are not required to attend PLUS sessions, although all students are encouraged to attend by SAs, faculty, and advisors. Attendance varies by discipline, yet all disciplines have observed a year-to-year increase with 273 individual students (~15% of all STEM students) participating in 2013-2014, approximately a 100% increase from 2010-2011. Second, not all sessions have prepared problems to solve; instead some focus on reviewing challenging topics and defining the problems to work through during the session. Finally, there are STEM-wide PLUS sessions held in a large room with each discipline having a group of tables to work together, allowing students to move between disciplines easily.

The PLUS sessions provide students with a regular outlet for academic support and students develop connections within the STEM community. The SAs not only facilitate the exchange of ideas and interaction about course topics and problems, but they provide a social connection by being a friendly, familiar face at each session. Through their role facilitating the sessions, the SAs interact with diverse students who possess different learning styles, motivations, and needs. Communicating with individuals, mentoring them, and building relationships with different students represent the central social-interactional skills of leadership. Furthermore, the sessions reinforce the SAs' discipline specific knowledge in addition to building their leadership skills.

Throughout the semester the SAs plan and implement a number of social activities open to all students within the STEM disciplines. The SAs decide on the social activity, determine necessary confines and resources to implement (with guidance from faculty leaders), delegate tasks, and follow up with reflections and lessons learned. For each activity, a subset of SAs take leadership roles in the event planning process and assign tasks to other SAs and sometimes other STEM majors interested in supporting the event. Each SA takes a leadership role in at least one social event for the year. The SAs have hosted campus bonfires, movie nights, bowling outings, ice-cream socials, and a variety of other events. Many of the students who attend the PLUS sessions also participate in the social activities coordinated by the SAs. Developing and facilitating social events is an avenue for SAs to build and enhance the STEM community. In doing so, the SAs gain event planning and leadership skills through managing conflict, working with different personality types, learning to rely on other people, and learning to delegate. The relationship between the faculty and SAs is closer to that of a faculty-graduate student relationship than that of a typical faculty-undergraduate. The SAs are empowered to take on their role proactively rather than receiving direction entirely from the faculty. SAs reflect on their experiences in writing and periodically meet with the project team faculty member from their respective discipline. The SAs also take turns conducting a monthly meeting with the entire project team.

SA Selection. Utilizing best practices for hiring, a competencies list outlining the knowledge, skills, and abilities (KSAs) needed for successful job performance in the SA role was established through a review of the skills critical for leader effectiveness (Frisch, 1998). Leadership may be defined as the process of influencing people to accomplish a collective goal (Northouse, 2012) and it requires the ability to interact with people, facilitate effective interaction among others, solve complex, unexpected problems, and adapt to changes (Mumford, Marks, Connelly, Zaccaro, & Reiter-Palmon, 2000a; Mumford, Zaccaro, Harding, Jacobs, & Fleishman, 2000b). O*NET Online, the Occupational Information Network, was also used to identify the KSAs associated with jobs aligned with the SA position, for example a teaching assistant, event planner, and public relations manager (Peterson et al., 2001). In all, this process resulted in a list of 25 competencies required for the SA role (Appendix A), providing the foundation for designing a selection interview and training/development.

Interviews are a common selection method and research shows a marked improvement in the validity of interviews when they are "structured" versus "unstructured" (Campion, Palmer, & Campion, 1998). Structured interview questions and a corresponding rating sheet were developed around eight of the job competencies deemed most critical to assess in the selection process and those that could be feasibly assessed through an interview (Appendix B). Both project faculty and current SAs participate in the interviews and selection of new SAs. The SAs are intentionally hired so that each year there has been a combination of veteran and new SAs.

STEM Ambassador Training and Leadership Development

A critical component of the SA program is the training and development provided to cultivate the SAs' nascent leadership, teamwork, and professional skills. The training and development for the SAs includes an orientation workshop and regular leadership development sessions, along with support, feedback, and mentorship from the organizational leadership faculty and the project STEM faculty. These elements of the program not only foster SA effectiveness but will support the SAs' future career success by creating a continued emphasis on personal and professional development (Ashford & DeRue, 2012).

The SA training and leadership development consists of a comprehensive program to challenge and support the SAs as they develop their skills. The SAs come to the role with strong discipline-specific knowledge, but lack formal knowledge about leadership, teamwork, and professionalism. The SAs require formal experience and structured leadership development opportunities to enhance these skills (Hirst, Mann, Bain, Pirola-Merlo, & Richver, 2004). A particular strength of this student leadership development experience is that it is situated within the students' discipline, in addition to allowing multidisciplinary networks to be formed with other STEM students and faculty. Furthermore, the structured, systematic program is based on best practices in leadership development (Day, 2001).

Background and Objectives. The purpose of leadership devel-

Facilitation of peer-led undergraduate study (PLUS) sessions	Informal mentoring of current STEM students	Leadership Development
Organization and execution of social events		
Conduct and participate in project meetings		
Represent department and STEM at recruitment events		

Table 2. STEM Ambassador Roles and Responsibilities

opment is to increase the capacity of individuals to engage in leadership behaviors (McCauley & Van Velsor, 2004). Leadership development assumes that, with readiness to learn and motivation, leadership behavior can be enhanced, and research supports this presumption (Day & Sin, 2011; Johnson, Garrison, Hernez-Broome, Fleenor, & Steed, 2012; Snook, Nohria, & Khurana, 2011). Overall, effective leadership requires developing interpersonal (e.g., social awareness, communication, and conflict management) and intrapersonal (e.g., adaptability, emotional regulation, and personal initiative) competencies (Day, 2001). Therefore, in addition to gaining an understanding of the concepts of leadership, teamwork, and professionalism, the program objectives for the SA training and development include the following:

- develop interpersonal skills for building professional relationships, resolving workplace conflict, delegating and coordination work tasks, and working collaboratively with others on a team;
- develop intrapersonal awareness of personal strengths and areas for growth;
- foster self-leadership skills, such as time management, stress management, and holding oneself personally accountable for workplace tasks and results;
- cultivate ability to engage in self-reflection in order to learn from experience;
- recognize the ambiguity and complexity inherent in a professional environment, including the need for adaptability, personal initiative, and creative problem-solving; and
- build planning, communication, and organizational skills that foster project management and effective meeting facilitation.

Typical leadership development techniques include coaching, mentoring, network development, feedback, and challenging job assignments, with the core elements of challenge, support, and feedback (Day, 2001). In addition to feedback from others, such as supervisors and peers, self-assessment and reflection are critical for individuals to learn from experience and gain self-awareness (Ashford & DeRue, 2012; Avolio & Gardner, 2005). Thus, the *overarching goal* for the SA development includes learning that professional success is a function of both inter- and intrapersonal knowledge and skills, along with technical expertise.

To meet these objectives, the program provides the SAs with the setting to develop their skills (and make some expected novice mistakes) in a low-risk environment where they receive feedback and the consequences for mistakes are minimal. The SA training and development program components—an orientation workshop, challenging assignments, mentorship and coaching, and leadership development sessions—are discussed below.

Orientation Workshop. The training and development process for the SAs begins with a one-day orientation workshop called a "kickoff." The orientation is held the week prior to the start of the semester and includes all project personnel. The orientation focuses on several objectives: fostering an understanding of the SA role and expectations, including how to facilitate the PLUS sessions, building initial team cohesion, and learning about professionalism; facilitating meetings; and cultivating team communication. The team also sets goals for the semester at the orientation.

To facilitate the orientation, and the subsequent leadership development effort, the mindsets of SAs coming into this experience are considered (Snook et al., 2011; Thomas, Jules, & Light, 2012). Specifically, students are accustomed to structured, well-defined roles based on their experiences as students and employees. SAs are advised that the role is somewhat self-directed—more like a professional job than traditional student employment. Additionally, unlike their typical interactions in courses where tasks are structured and planned by an instructor, the SAs learn that this role emphasizes that they take personal initiative to solve problems, ask questions, seek solutions, work as a team, and be open to personal growth. SAs receive a handbook for future reference and formal university nametags. Team building activities and a lunch are also included to develop initial team cohesion.

Challenging Assignments. Direct experience is an important component of leadership development, especially assignments—often known as "stretch assignments"—that put individuals in novel, challenging situations. Through these experiences, individuals learn about influencing others, building teams, and solving problems (Day, 2001). The entire SA role is a series of "stretch assignments" that puts students in a complex, dynamic role which requires them to build relationships, guide and mentor peers in their learning, plan events, and lead meetings. The SA program is designed to provide students with the opportunity to define their own plans, determine how to accomplish activities, and suggest new ideas and changes.

Mentorship and Coaching. Mentorship is based on a personal relationship with a more experienced individual who guides a less experienced person—these relationships may be formally defined or informal (Lester, Hannah, Harms, Vogelgesang, & Avolio, 2011). Effective mentoring requires an ongoing, meaningful relationship characterized by regular communication, feedback, support, and encouraging the mentee to set challenging goals and exceed high expectations. Mentoring is incorporated in the SA program through regular meetings with the project faculty in the SAs' discipline, in addition to meetings with the project faculty collectively. The SAs are also required to complete monthly reflective journal entries which they share with the project faculty. Through these interactions, the faculty model professional behavior, mentors guide the SAs through their learning experience and provide supportive advice (Allen, Eby, & Lentz, 2006).

Similar to mentoring, coaching is a developmental practice that facilitates personal and professional growth by providing support as an individual seeks to develop leadership effectiveness (Day, 2001). Coaching support is provided to the SAs by the organizational leadership faculty member on a formal basis at leadership development sessions and an informal basis through availability via email, phone, or face-to-face impromptu meetings. The STEM faculty provide discipline-specific mentorship, while the "leadership coach" understands the dynamics of teams and leadership and assists the SAs with navigating challenges that they encounter. For example, SAs most commonly consult the "coach" for advice related to resolving conflict among the SAs, appropriate ways to broach concerns to project faculty, and managing stress. As a coach, the focus is providing support for the SA to engage in his/her own analysis of the situation and potential solutions.

Leadership Development Sessions. Throughout the fall and spring semesters, the leadership faculty member orchestrates monthly leadership development sessions less than two hours in length. SAs are encouraged to provide suggestions for the focal topic of the sessions, for instance conflict resolution, stress management, time management, creative problem-solving, personality differences in the workplace, motivation, and definitions of leadership. Topics are determined based on the leadership faculty member's observations of SAs needs and SA suggestions. All sessions relate back to the broader SA training and development program objectives.

The session structure varies, but generally includes a discussion of content and perspectives related to the topic and engagement in an activity. Activities include self-assessment questionnaires, reflective journaling, problem-solving scenarios, and games. Importantly, these sessions strengthen the team of SAs by allowing them to engage in discussions and activities together. They also provide a regular opportunity for the SAs to ask questions and address concerns collectively as a group.

Evidence of Effectiveness

Ongoing evaluation of the project has included multiple sources of quantitative and qualitative data to guide program improvement and provide initial evidence of the project's effectiveness. Outcomes related to the SA program in particular focused on the following: (a) STEM student participation and

Activity		2010-2011	2011-2012	2012-2013	2013-2014
PLUS Sessions - Individual Student Participation By Disciplinary Focus of the Session	Biology	--	--	43	91
	Chemistry	69	50	81	157
	Computer Science	12	27	54	68
	Physics and Geology	48	68	44	34
	Mathematics and Statistics	10	12	55	63
	Total	139	157	277	413
Social		252	296	246	333
Total STEM Majors		1523	1570	1634	1764

Table 3. Annual Individual Participation

perceptions, (b) retention of STEM majors, and (c) SA development.

STEM Student Participation and Perceptions. One measure of success of the program is student participation in the activities planned and organized by the SAs. As the project has progressed, student participation in SA-led activities has increased, involving a larger portion of the total STEM majors each year (Table 3).

While a formal program evaluation was in-place, it did not provide immediate feedback for the current SAs. To address this issue, the SAs developed a questionnaire with guidance from the project faculty. Students who attended PLUS sessions in 2011-12 (n=157) and 2012-13 (n=277) were sent the online questionnaire asking about the effectiveness of the sessions. A total of 42 participants from 2011-12 and 62 from 2012-13 completed the survey for an average response rate of approximately 25%. A Likert scale of strongly agree (5), agree (4), neutral (3), disagree (2), and strongly disagree (1) was utilized.

Overall the response was positive regarding SA effectiveness, with the responses indicating the SAs were able to explain the concepts and increase student understanding (Table 4). Lower agreement was seen during 2012-13 than the previous year.

In a separate survey administered by the program's external evaluator, a portion of the questionnaire directly addressed the PLUS sessions and interactions with SAs through slightly different questions. The results confirmed the findings of the previously described survey, with overwhelmingly positive feelings about the SAs and their leadership of the PLUS sessions.

Open-ended comments from STEM students also provide evidence of their perceptions of the SAs. In 2011 and 2012, the external evaluator for the project conducted focus groups of students that had attended PLUS sessions. The peer-to-peer relationship with the SAs was important for the PLUS sessions, as demonstrated by student comments. For some, contact with the SAs feels like the first thread in creating a network of peers on campus.

"I am totally intimidated by my chemistry professor. I try to ask a question and I stutter. These guys [the Ambassadors] are on my level."

"When I see them [the Ambassadors] on campus, if I have not been to a peer-led study session lately, they always say, 'Hey, haven't seen you in a while, everything okay?' That is so nice. They are great people, nice, receptive and respectful. They don't make me feel stupid. They are open to talking about issues outside of class, too. In fact, one of them told me about the summer undergraduate research opportunity and that I should apply for it. I am so excited and I would just love to get it. I feel like I am beginning to build a network."

"I've met some people I know I would never have met if I hadn't attended these sessions. I've made connections that are important. I've learned some things about classes and professors that will help me get through better. Oh, another thing. I've met people who are in my classes by coming to these sessions. I probably would never, ever have talked to them. It is great knowing people in your class to study with or just even feel good about asking questions."

The unique aspect of bringing various STEM disciplines together presents challenges. While participation in SA-led events, both peer learning and social activities, has grown, increasing student participation will continue to be a focus. The SAs may be the first point of reference for younger students. The regularly occurring academic and social events provided by the SAs gives STEM students opportunities to engage and connect with their peers in order to increase the success and enhance the commitment of students to STEM and the university. As the project has progressed, new and different social events are being implemented and evaluated to assist in establishing the STEM community earlier in the students' careers.

Overall the responses to the SAs' effectiveness have been very positive, both in quantitative and qualitative data collected over the first three years of the program. Students that interact with the SAs frequently indicate a mentoring relationship. SAs are role model students who demonstrate effective study habits and learning strategies and provide knowledge about how to get more information related to undergraduate research, upper-level courses, graduate school, and other topics for students.

Students indicated slightly less satisfaction of the PLUS sessions during the 2012-13 academic year, which may be due to a stronger discouragement of tutoring. As the PLUS sessions have developed over time and grown in attendance, the SAs have focused on building collaboration between students and problem solving, rather than directly assisting individual students. Similar to the GSW program (Streitwieser & Light, 2010), the SAs struggle with teaching versus facilitating, but ultimately gain confidence over time.

Retention of STEM Majors. The overall goal of the project and SA program, started in 2010, is to increase retention of STEM majors. Thus, initial retention data provide some evidence for program effectiveness. We examined retention rates for 1203 freshmen who declared STEM majors when they entered the university starting in the fall of 2009 through the fall of 2013. The overall retention of these students was approximately 60% from freshman to sophomore year, 45% sophomore to junior year, and 38% junior to senior year. The largest loss of students occurred after the second fall semester, with an average of 26% of the students leaving the STEM majors. This exit of students from STEM programs after the second fall semester was consistent in all STEM majors at NKU. Of the 929 students who participated in project activities from 2010-2014, 340 were first-time declared STEM freshmen who were part of the 1203 tracked for retention (36.6%). The remainder of the participants was composed of students who declared a STEM major after their freshman year (15.8%), declared a STEM major before 2009 (15.6%), or transferred from another institution (32%).

The retention rates of the students who participated in project activities were substantially higher than the retention rates for all STEM majors (Figure 1). Of the students tracked for retention, 81 students participated in two or more PLUS sessions and 65 students attended two or more social activities (independent groupings). To mediate differences based on sample size, 50 students were randomly selected from the group of STEM students who had never participated in a PLUS session or social activity and were used as a comparison group. There are no significant differences between ACT math, science, or composite scores for the participants in SA-led activities and non-participants (one-way ANOVA p-values >0.6).While the self-selection bias is a factor and it is difficult to isolate causal effects solely to participation in activities, this trend suggests that students interacting with the SAs have increased retention in STEM at NKU.

While the overall retention of STEM students at the university is still below desired levels, it is promising to see the high retention rates of those who participate in the SA-led events. In addition, we have witnessed a number of students entering STEM majors after their first year, increasing the number of majors at the sophomore level by 20-35% over the last three years. This may be due to the SA efforts to build community (Murphy et al., 2007), although other institutions have reported this trend as well (NSSE, 2013).

SA Development. Assessment of the outcomes for SA training and development is in preliminary stages, as the initial focus

	Fall 2011 & Spring 2012		Fall 2012 & Spring 2013	
	M	**SD**	**M**	**SD**
The SAs were **knowledgeable** at the PLUS sessions.	4.37	.90	4.05	1.14
The SAs **clearly explained concepts** at the PLUS sessions.	4.08	1.14	4.03	1.16
The SAs were **helpful in answering my questions** at the PLUS sessions.	4.20	1.09	3.95	1.08
The SAs **helped me better understand** concepts from my course(s).	4.27	1.06	3.95	1.06
I **felt comfortable asking** the SAs questions at the PLUS session(s).	4.37	.95	3.98	1.05
PLUS sessions increased my **understanding of course concepts**.	4.13	.97	3.86	1.09
PLUS sessions increased my **connection to other students**.	3.35	1.21	3.23	1.08
PLUS sessions increased my **awareness of other STEM activities**.	3.08	1.40	3.03	1.22
PLUS sessions increased my **interest in STEM disciplines** (as a major and/or career path).	3.50	1.04	3.29	1.07

Table 4. Selection of Survey Results of Student Perceptions of STEM Ambassadors and PLUS Sessions

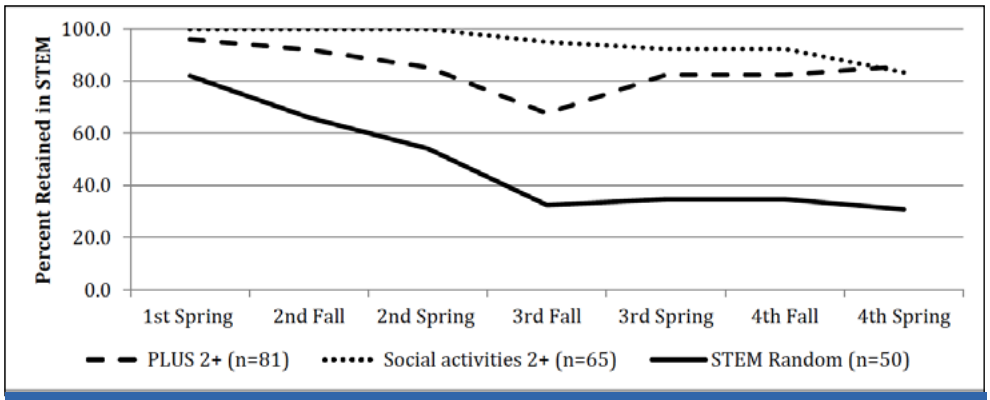

Figure 1. Retention rate of participants and STEM random comparison group.

was the development of the program content and structure. During initial phases of program development, formative assessments, such as short reaction questionnaires following the orientation and leadership sessions, provided feedback to gauge the SA's reactions and guide modifications. However, preliminary evidence of SA development outcomes was collected from the third cohort of SAs through open-ended responses to questions about their experience. Specifically, the questions asked the SAs to consider the following: (a) the top two things they had learned about people and about themselves, (b) what they had identified as their strengths and areas for growth in working and interacting with people, (c) what they found to be the most challenging and rewarding aspects of their role, and (d) what would be important advice for future SAs. Participation in the open-ended questionnaire was voluntary, and ten of the 15 SAs completed and submitted the questionnaire. Collectively, the SAs had 2.4 semesters of experience in the role. Their responses were analyzed by the faculty member with expertise in leadership for the prevalent themes regarding the SAs' learning from the experience. Recurring themes were extracted when they were present in three or more of the SAs' responses.

Four themes emerged from the review of the SA responses. Two of these themes related to insights about working with other people, and the other two related to insights about themselves. First and foremost, the SAs reported the central importance of trusting those on one's work team and delegating responsibilities to accomplish collective objectives. In addition, students reported that their experience working with other SAs and interacting with students in PLUS sessions allowed them to become aware of others' perspectives. Specifically, individuals have different experiences, motivations, perspectives, and ways of solving problems.

The third theme reported by the SAs was an insight that it is acceptable to be vulnerable or imperfect. Specifically, a theme emerged regarding that it is reasonable not to know something or for everything not to be perfect. They noted the importance of maintaining a personal perspective of the "bigger picture" because without this perspective, they cannot take appropriate risks or try new things for fear of failure. Finally, the fourth theme that emerged addressed the notion that as a professional and teammate, one must recognize his/her boundaries with regard to commitments so that he/she may appropriately prioritize and engage in time management.

In 2011 and 2012, the external evaluator for the project conducted focus groups with SAs. The most common "benefits of being an ambassador" shared by the SAs were the opportunity to build leadership skills, the enjoyment of helping students learn, and the ability to contribute to their academic departments. The majority of the participants expressed that they *"learned organization and leadership"* and *"how to be a professional"* by being SAs. They expressed that students looked up to them and they were often used as *"counselors and motivators."* One ambassador commented on the stress of being seen as a leader:

> *"As a leader you are under constant evaluation. As a SA you have to be careful of what you say, you have to embody the mission and attitude of STEM to reflect positively."*

Ambassadors stated that another benefit of their role was being able to help students learn. The ambassador described their role as "facilitators of learning opportunities," and several expressed enjoying the opportunity to share their passion for the various STEM disciplines with the students. One ambassador stated:

> *"As an ambassador, I've received a lot of enjoyment out of teaching. Seeing the excitement of the students solving a problem. And also, the importance of community in a learning atmosphere. It's not crucial, but it helps immensely to feel part of a community when you are learning and to feed off of your peers."*

Another said:

> *"I really like teaching other people and it's really rewarding when a student says,'Wow I finally get it now, from what you said.'"*

The SAs expressed the need to be adaptable in helping students learn. When asked to describe this, the following statements reflect the majority of the SAs' comments.

> *"Everybody has a different learning style and will not learn and retain information in the same way. That's one of the biggest learning obstacles we have to overcome. You need to be flexible and accommodate ourselves [sic] and our leadership to each individual peer that we are helping."*

> *"There is a need to explain the same material in a million different ways so they can learn, I like to see them learn."*

Working within their specific departments was also seen as a benefit and SAs saw part of their role as building closer relationships within the departments. One SA stated, *"We are kind of a bridge between professors and the students,"* while another said, *"We are here to help our departments grow."* The SAs' comments illuminate their growth and appreciation for leadership and ability to work and learn with others.

Another measure of SA effectiveness in both developing as leaders and contributing to the project as critical team members includes the creative ideas, initiatives, and suggestions provided by the SAs to develop the project activities and the SA program. For instance, the SAs led the development of formative assessment for the PLUS sessions. They also prompted the creation of a 360-degree feedback procedure, requesting more comprehensive feedback on their roles. Through this process SAs will review their own work, as well as get feedback from project faculty and other SAs. The goal is for the SAs to reflect on what works well, what could be improved, and suggest changes for the next semester.

The SA program develops a cadre of graduates who can enter the workforce or graduate school with a nurtured network of professionals, professors, and peers. There have been 41 SAs between the fall of 2010 and the spring of 2014. Approximately 50% of the SAs were female and 88% white, non-Hispanic; these proportions are aligned with the enrollment at the university (Northern Kentucky University Institutional Research, 2015). Twenty-four of the SAs have graduated and all were retained in their STEM program at NKU. Many of the SAs are now enrolled in professional and graduate programs (Table 5). While it is clear the students employed as SAs were likely on a successful career path before being a part of the program, future work will explore the impact of the project on the career progression of these peer leaders.

Current Status	Number of SAs
Employed in STEM (industry or academia)	13
STEM Professional Program (i.e. pharmacy, medical)	11
Undergraduate Student	7
STEM Graduate Program	4
Employed Outside of STEM	3
Post-graduate Education	2
Military	1
Total	41

Table 5. STEM Ambassador Career Status

Conclusion

The SA program at NKU develops peer leaders for a broad professional role using best practices from organizational leadership. An intentional interview process ensures newly hired SAs possess, or are motivated to acquire, the knowledge, skills, and abilities necessary to be successful. Training and development then build specific professional and leadership competencies including self-reflection, ability to work in teams, problem solving, addressing conflict, effectively running meetings, delegating, and planning. These skill sets are expanded to foster a well-developed community of STEM students, providing ben-

efits to the STEM disciplines at the university as well as the peer leaders themselves. While other programs have developed peer mentors and peer teachers, SAs take on a professional role by managing several different responsibilities.

A limitation of the present effort that should be addressed in future work is the addition of quantitative pre- and post-measurements to assess the training and development. Such an assessment plan would focus on measuring intrapersonal (e.g., self-awareness, time management), interpersonal (e.g., meeting facilitation, conflict resolution), and leadership (e.g., creative problem-solving) competencies before and after the SA experience.

The empowerment of the SAs is a unique aspect of the program and has led to the successful development of a STEM community on campus. The SAs' contributions to the program development are evidence of creative problem solving and leadership. Moreover, they demonstrate their "empowerment" which allows the program to be organic and change as we learn what does and does not work. Other institutions implementing similar programs may benefit from this continuous development/organic approach.

A faculty member with expertise in organizational leadership implemented best practices in the field. She brought vital insight into the hiring practices and effectively facilitated a large group of individuals. While the STEM project faculty brought significant skills and knowledge regarding their disciplines, the organizational leadership faculty provided an outside perspective and coaching for all involved in the large project. Other similar programs involving a large number of peer leaders would likely benefit from involving such a professional.

References

Allen, T. D., Eby, L. T., & Lentz, E. (2006). Mentorship behaviors and mentorship quality associated with formal mentoring programs: Closing the gap between research and practice. *Journal of Applied Psychology, 91*(3), 567.

Ashford, S. J., & DeRue, D. S. (2012). Developing as a leader: The power of mindful engagement. *Organizational Dynamics, 41*(2), 146-154.

Avolio, B. J., & Gardner, W. L. (2005). Authentic leadership development: Getting to the root of positive forms of leadership. *The Leadership Quarterly, 16*(3), 315-338.

Bowling, B., Bullen, H., Doyle, M., & Filaseta, J. (2013). Retention of STEM majors using early undergraduate research experiences. In Proceedings of the 44th ACM technical symposium on computer science education, pp. 171-176.

Campion, M. A., Palmer, D. K., & Campion, J. E. (1998). Structuring employment interviews to improve reliability, validity, and users' reactions. *Current Directions in Psychological Science, 7*(3), 77-82.

Chen, X. (2013). STEM Attrition: College Students' Paths into and out of STEM Fields. Statistical Analysis Report. NCES 2014-001. *National Center for Education Statistics.*

Chesler, N. C., & Chesler, M. A. (2002). Gender-informed mentoring strategies for women engineering scholars: On establishing a caring community. *Journal of Engineering Education, 91*(1), 49-55.

Cohen, P. A., Kulik, J. A., & Kulik. C.L.C. (1982). Educational outcomes of tutoring: A Meta-analysis of findings. *American Educational Research Journal, 19*(2), 237-248.

Day, D. V. (2001). Leadership development: A review in context. *The Leadership Quarterly, 11*(4), 581-613.

Day, D. V., & Sin, H.P. (2011). Longitudinal tests of an integrative model of leader development: Charting and understanding developmental trajectories. *The Leadership Quarterly, 22*(3), 545-560.

Drane, D., Smith, H. D., Light, G., Pinto, L., & Swarat, S. (2013). The Gateway Science Workshop Program: Enhancing student performance and retention in the sciences through peer-facilitated discussion. *Journal of Science Education and Technology, 14*(3), 337-352.

Eris, O., Chachra, D., Chen, H. L., Sheppard, S., Ludlow, L., Rosca, C., . . . & Toye, G. (2010). Outcomes of a longitudinal administration of the persistence in engineering survey. *Journal of Engineering Education, 99*(4), 371-395.

Frisch, M. (1998). Designing the individual assessment process. *Individual psychological assessment: Predicting behavior in organizational settings, 135-177.* San Francisco, CA: Jossey-Bass.

Gilmer, T. C. (2007). An understanding of the improved grades, retention and graduation rates of STEM majors at the Academic Investment in Math and Science (AIMS) Program of Bowling Green State University (BGSU). *Journal of STEM Education, 8*(1-2), 11-21.

Graham, M. J., Frederick, J., Byars-Winston, A., Hunter, A.-B., & Handelsman, J. (2013). "Increasing persistence of college students in STEM." *Science, 341*(6153), 1455-1456.

Hartman, H., & Hartman, M. (2004). Leaving engineering: Lessons from Rowan University's College of Engineering. *Journal of Engineering Education, 95*(1), 49-61.

Hirst, G., Mann, L., Bain, P., Pirola-Merlo, A., & Richver, A. (2004). Learning to lead: The development and testing of a model of leadership learning. *The Leadership Quarterly, 15*(3), 311-327.

Johnson, S. K., Garrison, L. L., Hernez-Broome, G., Fleenor, J. W., & Steed, J. L. (2012). Go for the goal (s): Relationship between goal setting and transfer of training following leadership development. *Academy of Management Learning & Education, 11*(4), 555-569.

Langdon, D., McKittrick, G., Beede, D., Khan, B., & Doms, M. (2011). STEM: Good jobs now and for the future. ESA Issue Brief# 03-11. *US Department of Commerce*.

Lester, P. B., Hannah, S. T., Harms, P. D., Vogelgesang, G. R., & Avolio, B. J. (2011). Mentoring impact on leader efficacy development: A field experiment. *Academy of Management Learning & Education, 10*(3), 409-429.

Levin, M. E., & Levin, J. R. (1991). A critical examination of academic retention programs for at-risk minority college students. *Journal of College Student Development.*

Lewis, S. E. (2011). Retention and reform: An evaluation of peer-led team learning. *Journal of Chemical Education, 88*(6), 703-707.

McCauley, C. D., & Van Velsor, E. (Eds.). (2004). *The Center for Creative Leadership Handbook of Leadership Development.* (Vol. 29). John Wiley & Sons.

Micari, M., Gould, A. K., & Lainez, L. (2010). Becoming a leader along the way: Embedding leadership training into a large-scale peer-learning program in the STEM disciplines. *Journal of College Student Development, 51*(2), 218-230.

Mumford, M. D., Marks, M. A., Connelly, M. S., Zaccaro, S. J., & Reiter-Palmon, R. (2000a). Development of leadership skills: Experience and timing. *The Leadership Quarterly, 11*(1), 87-114.

Mumford, M. D., Zaccaro, S. J., Harding, F. D., Jacobs, T. O., & Fleishman, E. A. (2000b). Leadership skills for a changing world: Solving complex social problems. *The Leadership Quarterly, 11*(1), 11-35.

Murphy, T. J., Shehab, R. L., Reed-Rhoads, T., Foor, C. E., Harris, B. J., Trytten, D. A., . . . & Moor, W. C. (2007). Achieving parity of the sexes at the undergraduate level: A study of success. *Journal of Engineering Education, 96*(3), 241-252.

National Survey of Student Engagement. (2012). *Northern Kentucky University Institutional NSSE 2012 Report*. Available at : https://oie.nku.edu/research/student-engagement/12survey.html.

National Survey of Student Engagement. (2013). *A Fresh Look at Student Engagement—Annual Results 2013*. Bloomington, IN: Indiana University Center for Postsecondary Research.

Northern Kentucky University Institutional Research. (2015). *Northern Kentucky University 2014-15 Common Data Set*. Available at: https://oie.nku.edu/research/dataset.html.

Northouse, P. G. (2012). *Leadership: Theory and practice*. Thousand Oaks, CA: Sage Publications.

Olson, S., & Riordan, D. G. (2012). Engage to Excel: Producing One Million Additional College Graduates with Degrees in Science, Technology, Engineering, and Mathematics. Report to the President. *Executive Office of the President*.

Peterson, N. G., Mumford, M. D., Borman, W. C., Jeanneret, P. R., Fleishman, E. A., Levin, K. Y., . . . & Dye. D.M. (2001). Understanding work using the Occupational Information Network (O* NET): Implications for practice and research. *Personnel Psychology, 54*(2), 451-492.

Seymour, E., & Hewitt, N. M. (1998). Talking about Leaving: Why Undergraduates Leave the Sciences. *Higher Education, 36*(1), 115-116.

Shook, J. L., & Keup, J. R. (2012). The benefits of peer leader programs: An overview from the literature. *New Directions for Higher Education, 2012*(157), 5-16.

Snook, S., Nohria, N., & Khurana, R. (2011). *The handbook for teaching leadership: Knowing, doing, and being*. Thousand Oaks, CA: SAGE.

Stage, F. K. (1988). University attrition: LISREL with logistic regression for the persistence criterion. *Research in Higher Education, 29*(4), 343-357.

Streitwieser, B., & Light, G. (2010). When undergraduates teach undergraduates: Conceptions of and approaches to teaching in a peer led team learning intervention in the STEM disciplines: Results of a two year study. *International Journal of Teaching & Learning in Higher Education, 22*(3).

Thomas, R. J., Jules, C., & Light, D. A. (2012). Making leadership development stick. *Organizational Dynamics, 41*(1), 72-77.

Tien, L. T., Tien, L. T., Roth, V., & Kampmeier, J. A. (2002). Implementation of a peer-led team learning instructional approach in an undergraduate organic chemistry course.

Journal of Research in Science Teaching. 39(7), 606-632.

Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition*: University of Chicago Press, 5801 S. Ellis Avenue, Chicago, IL 60637.ERIC.

Wilson, Z. S., Holmes, L. Sylvain, M. R., Batiste, L., Johnson, M., McGuire, S. Y., . . . & Warner, I. M. (2013). Hierarchical mentoring: A transformative strategy for improving diversity and retention in undergraduate STEM disciplines. *Journal of Science Education and Technology, 21*(1), 148-156.

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Appendix A.

STEM Ambassador Competencies

General Professional Competences

1) Active Listening – giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times
2) Advertising – knowledge of strategies and tactics for displaying and disseminating messages to promote events
3) Career/professional focus – motivated towards becoming a professional and planning for career
4) Creative problem-solving – developing, designing, or creating new applications, ideas, relationships, systems, or products; including critical thinking to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems
5) Dependability/integrity – being reliable, responsible, and dependable (including having time available); filling obligations; being honest and working with integrity; conscientiousness
6) Discipline-specific knowledge – understanding of the facts, concepts, and principles of one's discipline
7) Eagerness to learn (love of learning/discipline; including desire to learn in Ambassador role) – being driven by curiosity, a desire to explore, interact with, and make sense of one's environment; being passionate about learning, solving problems, and growing personally and professionally
8) Stress tolerance/emotion management – dealing calmly and effectively with high stress situations; maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior, even in difficult situations
9) Time management – managing one's own time and the time of others
10) Verbal communication – communicating information and ideas in speaking to others so that they will understand

Leadership and Social/Team Competencies

11) Adaptability/Flexibility – being open to change and variety in the workplace; the ability to use varied mental frameworks, adjust one's approach, and remain optimistic, but at the same time, realistic
12) Coaching/mentoring – helping others to improve their knowledge and skills; encouraging others and modeling behavior for others; giving others feedback
13) Cooperation – working well with others; being pleasant with others on the job and displaying a good-natured, cooperative attitude
14) Coordination and delegation – assigning and coordinating the tasks of others to accomplish a goal
15) Instructing – teaching others how to do something (i.e., study skills, problem-solving)
16) Interpersonal sensitivity – knowledge of, and appreciation, of individual differences in ability, personality, and interests, including patience with others and interest in learning about others; being sensitive to others' needs and feelings and being understanding and helpful on the job, including authenticity, transparency, and honesty
17) Intrapersonal awareness (including self-reflection, emotional regulation, metacognition) – being capable of self-reflection and learning from experience; thinking about one's own behavior, thinking, emotions, and actions
18) Knowledge of teamwork and organizations (including leadership) – understanding principles of organizations and teams; team decision-making and problem-solving
19) Negotiation – bringing others together and communicating to reconcile differences
20) Personal initiative – being persistent and proactive; seeing the need for change or and intervention; willingness to take the lead, take charge, and offer opinions, direction, and solutions; being self-directed
21) Persuasion – influencing and convincing others to change their minds or behaviors; inspiring change in others
22) Planning and organizing – developing specific goals and plans to prioritize, organize, and accomplish work; scheduling events, programs, and activities, as well as the work of others; including being attentive to detail
23) Scanning/Monitoring – monitoring one's surroundings, including the environment, other people, and one's own behavior, to detect or assess problems in order to make improvements, changes, or take corrective action
24) Social perceptiveness/awareness – being aware of others' reactions and understanding why they react as they do; establishing and maintaining effective, cooperative working relationships with others; actively looking for ways to help others
25) Team/social-orientation – encouraging and building mutual trust, respect, and cooperation among team members; working with others and having a service-orientation focused on how one may help others

Note. Competencies retrieved, or adapted, from O*Net Online: http://www.onetonline.org/ developed by the National Center for O*Net Development, sponsored by the U.S. Department of Labor, Employment & Training Administration.

Appendix B

Structured Interview Protocol and Rating Sheet

Instructions to Interviewers: Student responses to the interview protocol should provide some indication of the competencies listed on the rating sheet. Please see the competencies list for definitions of the competencies. The competencies focused on in the structured interview are those assessable via interview questions; the others are either not assessable in an interview format and/or will be included in training and development for Ambassadors. Note that leadership ability is a function of all of the competencies working in coordination. Interviewers should record notes and rate the interviewees on the rating sheet.

Good morning/afternoon. Thank you for taking the time to talk with us today about the STEM Ambassador position. During this interview, we will tell you more about the STEM Ambassador position, and you should feel free to ask us questions about the position. We are also going to ask you several questions to get to know you. The questions do not have a right-or-wrong answer; rather we are looking for your thoughts and perceptions.
First, we would like to ask you. . . .

1) Why are you interested in the STEM Ambassador position?
   a. Potential Follow-up/Further Prompt 1: Why did you apply to the position?

   b. Follow-up 2: We want to be sure that you understand the STEM Ambassador position, so I am going to briefly explain the STEM Ambassador role. The primary role of STEM Ambassadors is to work with NKU students in science and mathematics majors to build a community that will help students feel connected to their major and NKU so that they may be as successful as possible in their college experience. One aspect of the Ambassador role is peer learning. We call the learning sessions, PLUS, for Peer Led Undergraduate Study Sessions. In these sessions, students are invited to come to a common place to study and discuss the concepts in their classes. STEM Ambassadors are responsible for facilitating these regularly scheduled weekly sessions.

   In addition to peer learning, STEM Ambassadors are expected to work together to create new activities, events, and programs that students will find informative or simply just fun. For example, this year the STEM Ambassadors held a mentoring session where freshman and sophomore students could ask more experienced junior and senior students various questions about their major and eat pizza together. Other activities included selling STEM t-shirts and holding a "pie a professor" event. Other examples of events you would be expected to attend include NKU'S Black and Gold Days and NKU's Celebration of Student Research and Creativity.

   In addition to the weekly peer learning sessions and the events that the Ambassadors plan and organize throughout the semester, STEM Ambassadors are expected to attend regular weekly and monthly meetings with faculty who oversee the project. In this position, the faculty provide guidance and support, but we allow the Ambassadors freedom to be creative and plan and lead their own events. If you were to become an Ambassador, you will be provided with more information and training about the position.

   c. Do you have any questions at this time?

We would like to move on to get to know you better.

2) We are interested in whether you are involved in other NKU groups or activities and also whether you have leadership experience, whether in these NKU groups or groups in your community or workplace.

3) We understand that you may have other jobs during the school year at the same time as the STEM Ambassador position. If so, how flexible can you be in your work hours? For instance, can you be available during evenings and on the weekend?
   a. Follow-up 1: How much notice do you need to be given to change your work schedule or request a particular time off from work?

4) What are your career plans/goals after graduating from NKU?
   a. Potential Follow-up Prompt: Why did you choose your major?

5) What would you say if a student asked you if he/she should choose your major?

We would now like to ask you several questions to learn about your thoughts and opinions regarding different situations.

6) One of the challenges that the STEM Ambassadors face is motivating students to get involved in the peer learning PLUS sessions. If you were a STEM Ambassador, what would you do to get students involved?

7) When a student arrives at an event for the first time, for instance a peer learning PLUS session, what do you expect he/she would be thinking and feeling?

8) If you were working at a peer learning session with someone struggling to understand concepts and he/she got frustrated, how would you handle it?
   a. Follow-up 1: Why do you think students struggle in college?
   b. Follow-up 2: What have you struggled with in school, and how did you deal with it?

9) Once a student has attended a peer learning session for the first time, how might you encourage him/her to return?

10) In this position, in addition to working with the students in STEM disciplines, you will also have the opportunity to participate in leadership development training and exercises to develop your skills for your future professional career.
   a. What is your reaction to this aspect of the position?

11) Imagine that you are at a peer learning session and a difficult question is asked of you and you do not know the answer. How would you handle this situation?

12) Imagine you are one of STEM Ambassadors. Describe what would make that teamwork experience rewarding to you. Explain.
    a. Follow-up Question: Now, describe what would make that teamwork experience unfulfilling or frustrating. Explain.

Finally, we have a few more questions to get to know you better.
*Note: If time is running low, these questions can be asked as the interviewer sees fit.

13) Think about a specific time or experience where you were especially stressed out or frustrated. How did you respond?

14) Think of a time when things did not go as planned. How did you react to it? What did you do?

15) What do you consider your primary strength?

16) What do you consider your primary weakness?

17) What do you hope to get from this experience?

18) What key talent or skill would you bring to the position?

Thank you for your time today. Before we go, do you have any questions for us about the STEM Ambassador position? If anything comes up, please contact us at_____ (provide emails). It will take us several weeks to finish the interviews and make hiring decisions, and we will follow up with you at that time. Thank you again and take care!

Student Name: _____

Interviewer's Initials: _____

Ratings

Based on responses to the interview questions and the general discussion, rate your assessment of the following competencies as demonstrated by the applicant. Circle your ratings below using the following scale.

Low	Below Average	Average	Above Average	Excellent	Other, or not able to rate
1	2	3	4	5	N/A

1) Eagerness to Learn

1 2 3 4 5 N/A

2) Career/Professional Focus

1 2 3 4 5 N/A

3) Time Management

1 2 3 4 5 N/A

4) Adaptability/Flexibility

1 2 3 4 5 N/A

5) Creative Problem-Solving

1 2 3 4 5 N/A

6) Social Perceptiveness/Awareness

1 2 3 4 5 N/A

7) Personal Initiative

1 2 3 4 5 N/A

8) Verbal Communication

1 2 3 4 5 N/A

9) What is your overall assessment of this applicant's likely effectiveness in the position?

Very low effectiveness Low Moderately effective High Very High Effectiveness

1 2 3 4 5 N/A

10) How confident are you in your ratings?

Very low confidence Low Moderately confident High Very High Confidence

1 2 3 4 5

Notes/Comments about Applicant:

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