Use of Front-end Evaluation to Design an Ambassador Program (ISEAmP)

Dr. Tonya Lynette Smith-Jackson, NC A&T State University

4 authors in this order Brianna Benedict is a senior in Industrial and Systems Engineering at North Carolina A&T State University. She is an ISE Ambassador and is active in several organizations including IIE. She is also in the Accelerated Bachelors to Masters Program in ISE. Garner Stewart- Industrial and System Engineering junior at North Carolina A&T State University. Along with working as an ambassador for his department, he also works as a tutor for the Center of Academic Excellence, volunteers for various services in the community and on campus, and actively participates in numerous organizations. Elaine Vinson, MS, Adult Education (concentration: Instructional Technology): Elaine Vinson is the Undergraduate Program Coordinator in the Department of Industrial and Systems Engineering at North Carolina Agricultural and Technical State University, Greensboro, NC. Her role is centered on advising, and recruitment with focuses in retention strategies and student development. Tonya Smith-Jackson, PhD, CPE: Tonya Smith-Jackson is chair and professor of Industrial and Systems Engineering at N.C. A&T State University. Her teaching-learning research focuses on inclusive pedagogies and methods to measure inclusion to support academic success.

Ms. Brianna Shani Benedict, Industrial & Systems Engineering

Greetings! My name is Brianna Benedict and I attend North Carolina Agricultural & Technical State University where I am pursuing a Bachelor of Science degree in Industrial & Systems Engineering. After graduation, I intend on continuing my education with the Accelerated Bachelors Master's program for Industrial & Systems Engineering. I enjoy making a difference in my community and spending time with family and friends. My role as Miss Institute of Industrial Engineers allows me the opportunity to interact with my peers and to encourage everyone to maintain involvement within our department and community. Also, my role as ambassador of the Industrial & Systems Engineering department permits me to serve as a role model and mentor to the incoming freshmen to ensure they are on the right path towards success. One day, I hope to design a school for inner city students that will provide the support and resources where they can define their own success.

Garner Ted Stewart II, Department of Industrial & Systems Engineering

Junior Industrial & Systems Engineer Major ISE Ambassador

Ms. Elaine Smith Vinson, North Carolina A&T State University

Elaine Vinson is the Undergraduate Program Coordinator in the Department of Industrial and Systems Engineering (ISE) at North Carolina Agricultural and Technical State University. She has more than 20 years' experience in academia in recruitment and retention. Prior to joining the ISE Department, she spent 13 years working in industry in forecasting and planning for a textile company. Ms. Vinson holds the Bachelor's of Science degree in Administrative Systems with a concentration in Economics and the Master's of Science degree in Adult Education with a concentration in Instructional Technology from North Carolina Agricultural and Technical State University in Greensboro, North Carolina. Ms. Vinson's research interests are in developing and validating recruitment and retention techniques.

Use of Front-end Evaluation to Design an Ambassador Program (ISEAmP)

Abstract: University Ambassador Programs typically use a selective process to identify undergraduate juniors and/or seniors with strong leadership capabilities. The role of the ambassador is multifaceted, consisting of supporting departmental recruitment, peer-mentoring of other students, and serving as student liaisons for departments or colleges/schools and their respective stakeholders. The Industrial and Systems Engineering (ISE) Department, at North Carolina A&T State University, implemented a scaled-down version of an ambassador program to enhance student engagement and retention through peer mentoring. The program is referred to as ISEAmP (ISE Ambassador Program). A front-end evaluation was conducted to extract student requirements and success metrics. Initial results of the front-end evaluation are discussed and recommendations are provided to apply to the next implementation of the program in fall 2014.

Introduction

In 2011, N.C. A&T State University (N.C. A&T) adopted a 2020 strategic plan[1], which provided a new vision and strategic initiatives to advance education, research, service, and outreach. One of the initiatives focuses on intellectual climate, with the goal to provide stronger learning support systems and enhancing students' intellectual experiences. One means to address the intellectual climate initiative is to engage the students in peer-centered support structures such as ambassador programs. Ambassador programs help students develop professional skills, especially in the areas of communication and interpersonal relations[2]. Ambassador programs also facilitate student engagement. Student engagement is now highly relevant to most universities, given the new Carnegie Classification emphasis on the constructs reflecting student engagement in higher education[3]. However, activities to engage students are often discussed by non-students. Likewise, the roles and effectiveness of ambassadors are often discussed and evaluated from an external perspective, namely that of faculty and administrators. More explorations are needed to capture a student-centered perspective on ambassador programs, and peer-mentoring observations are one way to capture perspectives from students. As a major component of ambassador programs, peer mentoring is recognized as an impactful mechanism for academic success and retention[4,5].

The perspective of ambassadors who are immersed in the day-to-day activities of mentoring could provide significant value to our understanding of students' needs. Ambassadors' perspectives may provide rich opportunities to design a comprehensive program that is directly matched to the students' needs, since ambassadors can be fully immersed in the program as it is delivered. Additionally, ambassadors serve as trusted "indigenous" members of the peer-mentoring community and are able to observe student communities in a form closer to the natural state. When faculty and/or researchers observe student communities, the lens of observation is clouded by biases introduced by the non-student observer's role as evaluator, administrator, and at times, course instructor. These observer biases are well known in the research literature and can be compounded by actor biases (students being observed), such that students may significantly alter their behaviors when observed by non-students.

Purpose of the Project

In this project, we focused on a *student ambassador-led effort* to observe the process of a new ambassador program that consisted of, among other functions, a peer-mentoring component for first-year students in industrial and systems engineering (ISE). The program is called ISEAmP or Industrial and Systems Engineering Ambassador Program. ISEAmP consists of four components: (1) Peer mentoring with trained student mentors who provide advice and support; (2) Social events selected and implemented by peer-mentors; (3) Academic culture socialization, where peer-mentors help students understand and utilize academic support infrastructure; and (4) Seminars, which combine efforts of peer-mentors and the undergraduate advisor to facilitate skills such as internship/coop preparation, curriculum feedback, and professional skills development. In year 1, a scaled-down version of the ambassador program was implemented and the front-end evaluation focused on the peer-mentoring component (refer to Figure 1).

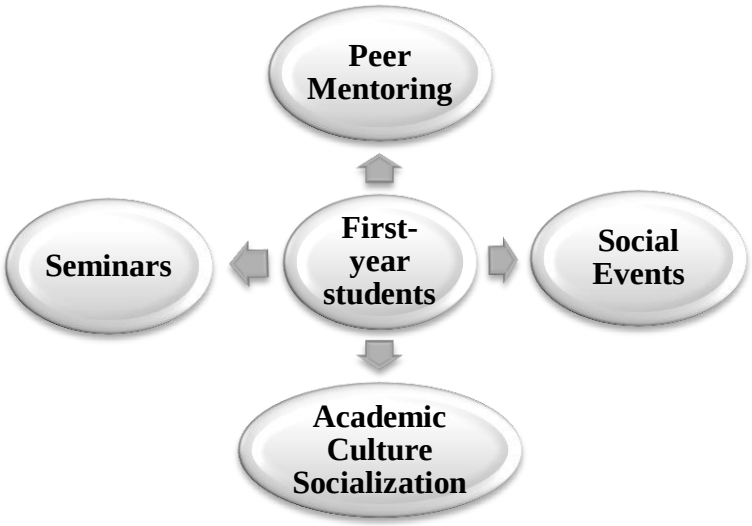

Figure 1. *A scaled down schematic of ISEAmP*.

Front-end evaluation is a method used to capture important features of programs as they are implemented[6,7]. Front-end evaluations help to identify content and requirements of a program from users' perspectives as they engage in an early iteration of the program that is smaller or implemented as a beta test version[8]. The front-end evaluation of ISEAmP was designed to identify valid metrics and student-centered requirements for future evaluations of the scaled-up version to be implemented in fall of 2014. The first-year freshman peer-mentoring component was the focus of the front-end evaluation, since this component was foundational to the entire program. The project operated on the proposition that information provided to ambassadors serving in their peer-mentoring role will be different, and possibly richer, than information provided to the department through more formal surveys.

Method

An ethnographic research approach was used to identify day-to-day challenges experienced by first year students. Ambassadors served as participant observers (POs) and recorded observations on a daily basis while interacting with first-year undergraduate students in the ISE program. Both Ambassadors implemented peer-mentoring support mechanisms. The primary channels of

communication included one-on-one meetings with first year students and group meetings. Ambassadors also used GroupMe® to communicate with first year students on a daily basis.

Participant observers (POs). Ambassadors will henceforth be referred to as participant observers (POs). The characteristics of the POs were one female senior and one male junior; both were African American and ranked in the top 5% of their respective cohorts (the GPA requirement to participate in ISEAmP is 3.0 or higher). Both possessed great 'people skills,' had previous internship experience, registered with Career Services, and held leadership positions in the Institute of Industrial Engineers (IIE), Alpha Pi Mu (ISE's Honor Society), Society of Women Engineers (SWE), and the National Society of Black Engineers (NSBE). Active participation in organizations or professional societies are a requirement to serve as an ambassador in ISEAmP.

Training.The Undergraduate Advisor and Department Chair met with the POs weekly for an hour. The POs kept a journal of all meetings and events. Training sessions were centered on (but not limited to) the following topics:

- History of ISE
- Departmental missions and initiatives
- Discussion of 2020 Preeminence Strategic Plan
- IIE Ethical Canons
- Academic culture
- Recruitment Materials
- Role plays of scenarios

Roles of POs. The POs' roles included communicating on a regular basis with the first year students, which meant orchestrating ways to disseminate information and follow up quickly and efficiently. POs also ensured the students attended monthly seminars, information sessions, fall and spring career fairs, pre-advisement meetings with their respective advisors, provided effective sources to obtain tutoring for difficult courses, served on the annual spring banquet committee, and attended recruitment activities such as Energy Day and University Day. POs also served as co-facilitators for seminars. They planned at least one social event each month, which meant networking with other student organizations in which they were affiliated. At the end of the fall semester, the POs hosted a Curriculum Review of the 2010 and 2012 Curricula (feedback from the 2012 curriculum review is of interest to the first year students.)

Instrument. The project sought to identify valid metrics and student-centered requirements for future implementation and evaluation of a scaled-up program. To accomplish this, the POs employed GroupMe® and a program called Academic Collaboration of Exemplary Students (A.C.E.S.) to communicate on a regular basis (virtually and face-to-face).

GroupMe is a social media that is operational with smart phones, tablets, laptops, and desk top computers, providing multiple access points throughout the day to communicate. The project ran on the assumption that all the participants owned a smart phone. However, in lieu of not owning a smart phone equipped with the GroupMe application, participants could also receive regular text messages through functionality such as short-message service (SMS). After setting up the GroupMe® forum, the POs were given a data set that included the first-year students' contact

information (name, classification, email address, and mobile number). This data was uploaded to the GroupMe® forum.

A.C.E.S., a study hall component, was implemented during the spring semester to promote more face-to-face collaboration between the POs, Alpha Pi Mu Honor Society members, and the first-year students. The goal was to provide tutoring and referrals for first-year students, and to create an environment where students could come together to work on assignments with the least amount of distractions. *A.C.E.S.* would allow students to not only be more productive, but also give them the opportunity to network with each other, and to meet upperclassmen. As it is, the majority of upperclassmen do not have consistent interaction with freshman or sophomores, which makes relationship building even more difficult. To this extent, the knowledge, experience, and mentorship of upperclassmen could be a key to the success of the first-year students in understanding which professors to take, and sharing academic resources; thus, strengthening the family oriented department. Another benefit of A.C.E.S. is a large number of upperclassmen were also in either ISE or other engineering organizations, and they could inform freshmen about the benefits of being in these organizations and the services they provide. A.C.E.S. offered various hours of operations, day and evenings.

In addition to A.C.E.S., the POs participated in mandatory freshman classes (mainly the colloquium). The colloquium is a 1-credit hour course designed exclusively with first-year students in mind (i.e., freshmen, and transfers). The goal of this effort was to continue relationship building with all first-year students, and non-traditional students. Many students miss extracurricular events and socials for various reasons; however, they usually attend the colloquium because a grade is attached. The colloquium presents a perfect opportunity for the POs to get to know all new students, and not simple the students who are proactive in the department.

Participants. The participants were the fall 2013 cohort enrolled in an ethnically diverse department that offers multiple degrees (Baccalaureate, Master's, and Doctoral). Participants agreed to connect with the ISEAmP program. The first-year cohort consisted of 32 students (27 freshmen and 5 transfer students). Because this project is observational, the data reported are those allowable by theFamily Educational Rights and Privacy Act (FERPA), namely ethnicity, gender, and age (see Table 1). Demographics on ethnicity and genderare as follows: 90.7% African Americans (n = 29; 14 females, 15 males), 3.13% Asian (n = 1 male), 3.13% Multiracial (n = 1 female), and 3.13% other (n = 1female). The mean age was 18.5 years. Because a sample of convenience was used, generalizations to populations of ISE first-year students should be made with extreme caution since the characteristics of first year students may vary from year to year; therefore, the results may vary as well.

Attrition. One male (age 18) and one female (age 20) was removed from the project because they switched to non-engineering majors. Both were African American. Out of the 30 remaining participants, three dropped from the group and some students muted the ISE chat group.

Table 1. Demographic Breakdown of Participants

			Gender	
Ethnicity	***N***	**%**	**Female**	**Male**
African American	*n* = 29	90.70%	14	15
Asian	*n* = 1	3.13%		1
Multiracial	*n* = 1	3.13%	1	
Other	*n* = 1	3.13%	1	
Totals	***n* = 32**	**100.0%**	**16**	**16**

Results

The observations were summarized and qualitatively analyzed by the POs. Analysis of the GroupMe texting data using the axial coding method showed very clear problem areas reported by the freshmen participants. These included how to study for academic success, difficulty with freshmen courses such as chemistry and calculus, and how to use study groups effectively. The POs' analyses also identified several interesting communication patterns when interacting with the freshmen participants. Patterns included no interaction at all or tentative interactions. For example, tentative interactions involved situations where students were hesitant to respond or admit challenges. To counter this, POs asked broad questions and thenasked more specific probing questions when checking-in with each student to avoid defensiveness and to respect privacy. Another key finding was the first-year students' lack of knowledge of the academic services available, in spite of orientations, announcements, seminars/workshops, chats, and other mechanisms used to increase awareness of support services. Another important finding was that some students opted out of the program by muting the chat or not participating in the chat after several weeks.

Table 2 provides a summary of sample comments and observations indicative of the qualitative themes identified by the POs. POs recorded their own reflections of the program and provided recommendations to scale-up ISEAmP.

*Table 2.*Codes/Theme and Sample Comments

Theme/observation	Sample Comments from Student
Logging study habits	*I have to study for a calc test*
Study groups	*The chemistry study session is in seminar room 13A*
Question style: broad approach	*How is your semester going?*
Question style: funnel approach	*What courses are you taking? Then proceed with "How are you doing in Calc1?*
Lack of knowledge of academic services	*I'm currently taking CHEM 106. I might need a little help with it. Can anyone help me?*
Difficulties with service courses	*I need a tutor for CHEM106, Can anyone help me with Calc 1 tonight?*

After the implementation of A.C.E.S., the POs used the application to also distribute information. The freshman began communicating with each other. They began creating their own study groups, asking more questions about Industrial & Systems Engineering organizational activities, promoting their own activities, and using each other as resources for courses. The POs also noticed the freshmen were more likely to communicate through GroupMe if they were having a more difficult time in a course than the previous semester. For example, a freshman

reached out to a PO about setting up time to discuss courses and to discuss how they could improve their academic achievement. Overall, the POs noticed a significant improvement amongst the freshman class. Some of the first-year students are interested in running for executive positions for the 2014-2015 academic terms.

Unfortunately, the curriculum review attendance for freshman and sophomores was not as expected; however, the POs were able to gather valuable information. This review validated concerns regarding the presentation of concepts of complex courses, a need for better communication with some instructors outside and inside the ISE department, suggestions as to how some courses should expose students to programming and other software applications, and the need for newer equipment in the science labs.

Approximately, a month after implementing A.C.E.S., the POs noticed that the most active users of the study hall were juniors and seniors who had been using the room for other reasons. The room was shared with all ISE seniors, and a senior design project team that was also collecting feedback from the ISE students to improve the layout of the room. In its present condition, the room lacks privacy, the layout is not conducive for a study hall, and also is in need of new hardware.

As a result of the POs attending the colloquium class, a few of the freshman started coming to A.C.E.S. but not the numbers we anticipated. Typically, the students who don't attend these programs are those with the most need. A.C.E.S. can help bridge the gap between the different classifications and increased use of other students as a resource can mean the difference between a department of average students and a Dean's list of high achieving students.

Discussion and Conclusions

Front-end evaluations provided opportunities to expand the design of the scaled version of a program to ensure the program aligns with users' needs and requirements. Although there are many similarities, this university has both formal and informal best practices that require front-end evaluation models to ensure the uniqueness of the institution and its students are accounted for in program evaluation. Similarly, front-end evaluations presented an opportunity to identify valid assessment metrics to measure the impact of a programwhile allowing prompt adjustments to the program as needed. In this effort, the project identified several initial user requirements to expand the ISEAmP.

Based on the ethnographic method, the following requirements can be translated into metrics to evaluate a future ambassador program for effectiveness and continuous improvement purposes.

POs:

1. Three to four ambassadors are needed to sustain the tasks expected of the ambassadors. Further, the size of the student population should clearly define the number of ambassadors needed for a program.
2. Ambassadors must be trained to interact with first-year students in non-intimidating ways.

    a. Such topics as stereotyping, stereotype threat, and developmental challenges associated with transitions should be discussed.
    b. Training should focus on communication, interpersonal relations, perspective-taking, and features and characteristics of academic culture.
3. Ambassadors should be adequately compensated for their work. Payment helps to convey expectations of professionalism and ensures ambassadors have time to commit to tasks without distractions from other obligations. To this extent, GroupMe allows for instantaneous responses that are sometime outside normal working hours. POs were compensated up to 10 hours per week. Therefore, a PO could use the majority of his/her work hours outside a regular workday. Before the end of the week, the ambassador will have to work for free or stop working when he/she reaches 10 hours. Employing an adequate number of ambassadors to work different shifts would eliminate this concern.

First year students:

4. Implement reward systems for first-year students that are shared and delivered by the ambassadors.
    a. Academic Improvements
    b. Student Involvement
5. Provide success data - add a component in the colloquium that addresses the effectiveness of study groups.
6. Create an informal yet respectful environment that is conducive for studying and relationship building. The room designated for A.C.E.S. serves too many functions; thus, creating distractions that prohibited effective studying.
7. Address the concerns of the freshmen regarding complex courses. Although, there is no direct control over funding in the chemistry and mathematics departments, the feedback should be passed on to the respective department chairs.
8. Ensure the new students and ambassadors are connected prior to the beginning of fall semester to start building relationships as early as possible during the recruitment phase. This may help reinforce information so when they arrive on campus, the information be familiar. GroupMe can also be used to disseminate information prior to orientation or any application that is equipped with the latest features such as texting, and emailing.
9. As the colloquium is a 1-credit hour course, use it as a vehicle to manage and monitor activities outside of class.
    a. Mandate weekly or group activities facilitated by the ambassadors.
    b. Have students log study hours for credit towards work in the course.
    c. Assign a PO to the colloquium. When the PO started attending the colloquium, attendance in A.C.E.S. improved.
    d. Arrange mini tours of support facilities upon arrival.

References

[1] University Strategic Plan TBD reference will be provided after blind review.

[2] Haas, C., McElholm, L., Renfro, S., Herkenham, E., Marshall, M., Alley, M. (2013). Engineering ambassador network: Establishment of successful ambassador engineering programs at four UTC Partner Schools. *Proceedings of the 120th ASEE Annual Conference and Exposition, January 23 – 26, 2013*, paper ID#7461.

[3] Pike, G. and Kuh, G. (2005). A typology of student engagement for American colleges and universities. *Research in Higher Education, 46,* 185 – 209.

[4] Dahlberg, T., Barnes, T., and Rorrer, A. (2007).The STARS Leadership Model for Broadenign Participation in Computing. 37th *ASEE/IEEE Frontiers in Education Conference, October 10 – 13, 2007, Milwaukee, Wisconsin,* Session F3A.
[5] King, S., Favret, J., Barney, G., and Landry, J. (2013). Engaging peer mentors in freshman programs. *5th First Year Engineering Experience (FYEE) Conference, Pittsburgh, PA,* Session F4C.
[6] Miles, R. and Clarke, G. (1993). Setting off on the right root: Front-end evaluation.*Environment and Behavior, 25*, 698-709.
[7] Perry, D.L., Garibay, C., &Gyllenhaal, E.D. (1998). Front-end evaluation for Life Underground, a Field Museum exhibition about life in the soil. *Current Trends in Audience Research and Evaluation, 11,* 59 – 67.
[8] Dierking, L. (2010). A comprehensive approach to fostering the next generation of Science, Technology, Engineering, and Mathematics (STEM) education leaders. *The New Educator, 6,* 297-309.