**Curriculum Goals**

This information was included in the IRB application

**Study Purpose**

The high demand for employees with computer science skills in the U.S. tech industry has spurred many programs aimed to teach K-12 students how to code (NSF, 2013). Students are increasingly gaining opportunities to learn how to code in their classrooms and through school-associated clubs (Google Inc. & Gallup Inc., 2016b). In addition to preparing students for future jobs, coding increases broadly applicable skills, such as critical thinking (Lye & Koh, 2014) and confidence through failure (Saujani, 2016), which can be particularly important for gender and ethnic minority students to learn. However, minority student groups report a lack of interest in learning computer science and a lack of relatable role models (Google Inc. & Gallup Inc., 2016a), which are driven by widely disseminated non-inclusive stereotypes (Cheryan, Master, & Meltzoff, 2015). Breaking down this stereotype of who computer programmers are and what their jobs entail is an important step towards increasing interest in computer science careers and skill development among gender and ethnic minorities in the U.S.

One method for increasing the interests of women and other gender minorities in careers that use coding is to introduce them to people and environments that do not fit the masculine, tech-focused stereotypes depicted in media and other settings (Cheryan et al., 2015). While female undergraduate enrollment in mathematics and computer science programs is approximately 27%, females comprise 60% of undergraduate agricultural and biological science majors (Shaw & Stanton, 2012). Therefore, harnessing female students’ preexisting interest in biological sciences may be an effective strategy for increasing interest in coding. In addition, non-traditional educational activities increase student interest in science and engineering fields (Dabney et al., 2012). Consequently, we expect that an educational event that teaches women and gender minority students about how coding in used in environmental science research (specifically, ecology) will increase their interest in pursuing computer science education and careers that utilize these skills and their confidence in achieving these goals.

The purpose of this study is to evaluate the effectiveness of a single day educational event in achieving learning gains and attitude changes among participants. The learning gains include: (1) increased understanding of ecological concepts (invasive species, plant disease, and biodiversity), (2) ability to articulate the broader relevance of ecological concepts, and (3) familiarity with how to code in the program R. The attitude changes include: (1) confidence in ability to code, (2) confidence in ability to pursue a career that involves coding, if desired, and (3) increased interest in coding and its potential application to multiple careers. The curriculum will be delivered in an educational setting (i.e. a university greenhouse, field lab, and classroom) using established instructional techniques (i.e. lectures and active learning).

**UF Coding in the Environmental Sciences Survey**

Only students who have completed the consent form (with a signature from your parent/guardian if you are under 18 years old) may complete this survey. Please answer each question to the best of your ability.

1. Based on your experience today, what gains did you make in your understanding of each of the following concepts? (select one answer per concept):

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | no  gains | a little  gain | moderate  gain | good  gain | great  gain |
| What an invasive species is |  |  |  |  |  |
| What the impacts of invasive species are |  |  |  |  |  |
| What biodiversity is |  |  |  |  |  |
| How to measure biodiversity |  |  |  |  |  |
| What a plant disease is |  |  |  |  |  |
| What the impacts of plant diseases are |  |  |  |  |  |
| How to code in R |  |  |  |  |  |

1. Briefly describe some of the impacts of invasive species.
2. Briefly describe why biodiversity is valuable to you.
3. Based on your experience today, how much did your opinion about each of the following statements change?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | large  decrease | small  decrease | no  change | small  increase | large  increase |
| I can learn how to code |  |  |  |  |  |
| I would like to take more coding courses |  |  |  |  |  |
| I am interested in a career that uses coding |  |  |  |  |  |
| I can have a career that uses coding |  |  |  |  |  |
| I know about careers that use coding |  |  |  |  |  |
| I know how to use data to answer questions |  |  |  |  |  |

1. List up to five careers that use coding.
2. I identify my ethnicity as (select all that apply):
   * Asian
   * Black/African
   * Caucasian/White
   * Hispanic/Latinx
   * Native American
   * Pacific Islander
   * Prefer to self-describe: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   * Prefer not to answer
3. I identify my gender as (select all that apply):
   * Female
   * Male
   * Non-binary/third gender
   * Transgender
   * Prefer to self-describe: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   * Prefer not to answer
4. I am currently in this grade (fill in circle):
   * 6th
   * 7th
   * 8th
   * 9th
   * 10th
   * 11th
   * 12th
   * Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_