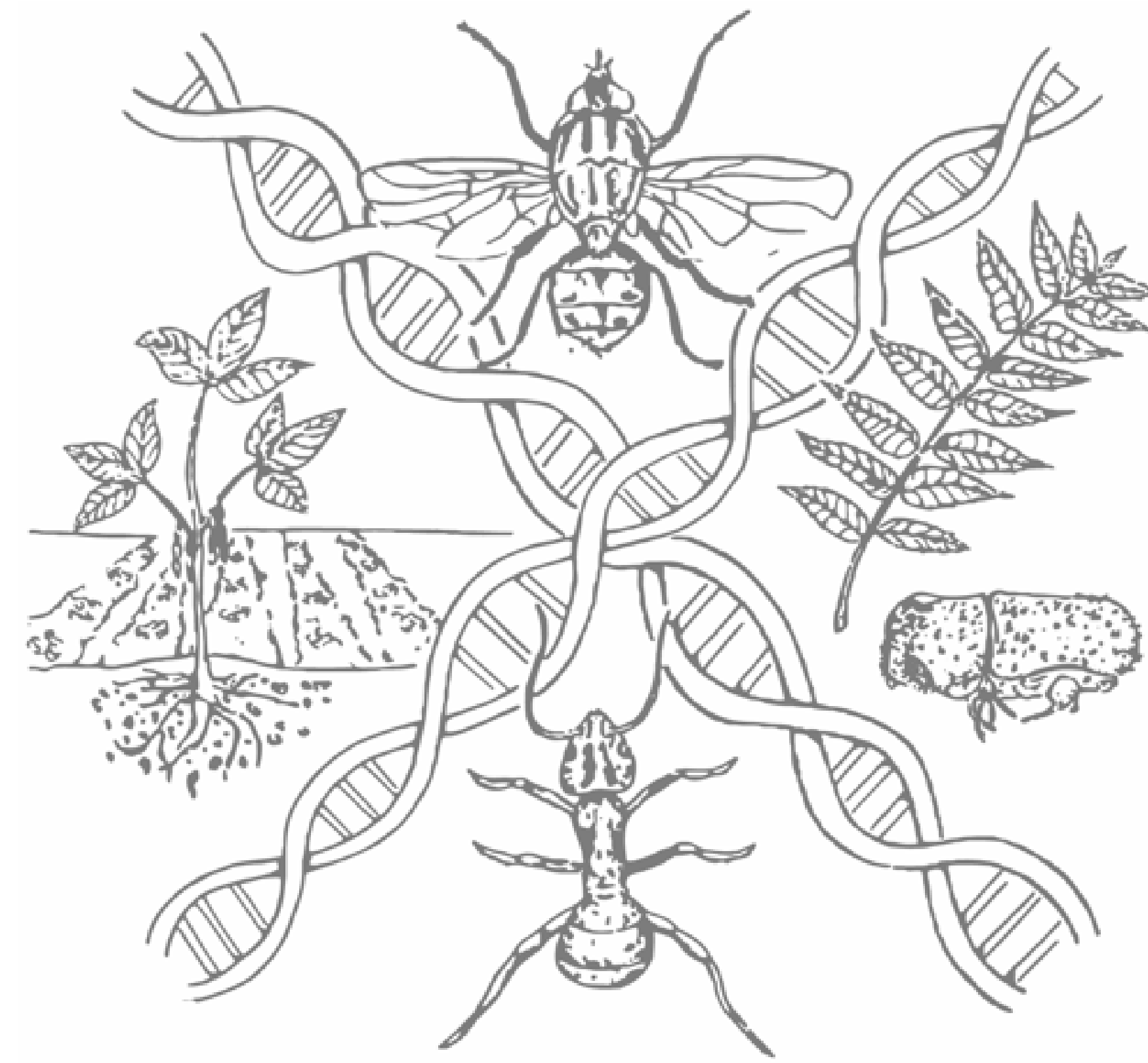
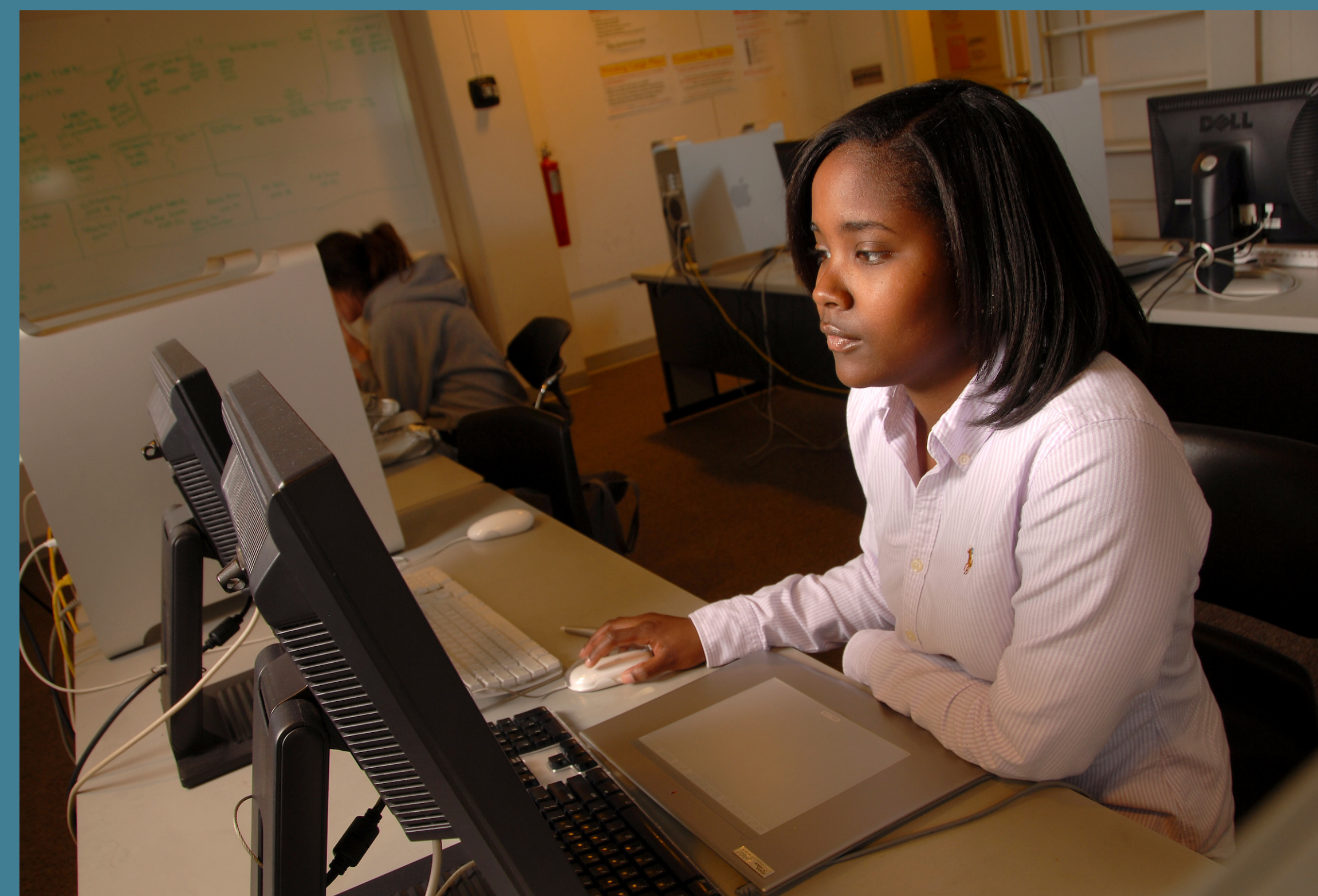


Women Undergraduates' Leadership and Career Development in a Summer Agricultural Research Program

Joseph L. Donaldson, Ph.D.
North Carolina State University
Kimberly D. Gwinn, PhD
Carrie Ann Stephens, PhD
University of Tennessee, Knoxville
Melissa Cregger, PhD
Oak Ridge National Laboratory
Scott Emrich, PhD
R.T. Trout Fryxell, PhD
Jamie Greig, PhD
Denita Hadziabdic, PhD
Sarah Lebeis, PhD
Bode A. Olukolu, PhD
Bonnie H. Ownley, PhD
Margaret Staton, PhD
University of Tennessee, Knoxville



Women-led and predominately women research teams are consequential for empowering women students to boost research skills; improve leadership skills; and expand career and academic goals.



“A lot of us suffer from imposter syndrome as women. We apologize, but I also have found strategies to get around those things [and] have found like a community of women who all believe in me and want the best for me.”

– 2020 BiGG Program Fellow

joseph_donaldson@ncsu.edu

 @Joseph_GoPack

RESULTS

A comparison of the retrospective post-then-pre data showed that the Fellows reported gains in all seven leadership skills measured. Of the five Fellows who completed the questionnaire, the number of Fellows who reported they knew much or very much about project management increased from one pre-program to four post-program, effective and efficient work habits increased from three to five; and maintaining accountability to their team increased from three to five. The five Fellows all reported they were more likely to enroll in a doctoral program in science, mathematics, or engineering and four reported they were more likely to work in a science lab because of the program. The seven Fellows who agreed to be interviewed reported that being on women-led and predominately women research teams expanded their science skills; provided them with valuable mentoring, specifically about leadership, academic, and career success; and helped them navigate challenges precipitated from being women in STEM. A representative comment follows: “So I've learned a lot from the different women leaders that I was able to talk to. I saw that...we all...have some of the same issues...we are underestimated for what we can do. A lot of us suffer from imposter syndrome as women. We apologize, but I also have found strategies to get around those things [and] have found like a community of women who all believe in me and want the best for me” (Participant 4).

IMPLICATIONS/RECOMMENDATIONS


Research and Extension Experiences for Undergraduates (REEU) projects typically measure research skillsets (Odera et al., 2015). In contrast, we specifically documented leadership development, academic, and career goals. Explore BiGG Data created conducive environments for women undergraduates to pursue their STEM and leadership potentials. It is recommended that follow-up interviews with BiGG Scholars occur on an annual basis to understand fully how this REEU may influence the Scholars' post baccalaureate experiences over time and demonstrate impact (Stripling & Ricketts, 2016). Consistent with social cognitive career theory studies outside of the food and agricultural sciences, results indicate that STEM undergraduates need community and opportunities to nourish their self-concepts as future scientists (Fouad & Santana, 2016).

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INTRO/THEORETICAL FRAMEWORK

A critical need exists for a diverse and talented workforce in Bioinformatics, Genetics, and Genomic Sciences (BiGG). The discrepancy between the women undergraduate population compared to women's critical underrepresentation in certain STEM fields such as computer science underscores the need for career development research among women undergraduates (Szelényi et al., 2013). Researchers launched the Explore BiGG Data program in the summer of 2020. This 8-week, virtual research experience engaged underrepresented and minority women in STEM disciplines. Explore BiGG Data's eight participants, referred to as Fellows, were immersed in research alongside women scientists, faculty mentors, and graduate students to develop their research abilities, gain leadership skills, and learn about BiGG academic and career pathways. Leadership and communications educators provided direct instruction, and the research team along with various women leaders shared career experiences with the Fellows in weekly “lunch and learn” sessions. The theoretical framework is social cognitive career theory – the interaction of self-efficacy, outcome expectations, and personal goals for influencing both career development and contextual factors that may affect careers (Lent et al., 1994; 2000). The purpose of this study was to understand to what extent, if at all, Fellows: (a) developed leadership skills, (b) changed their academic and career aspirations because of the Explore BiGG Program; and (c) benefited from the focus on women scientists and women in leadership.

METHODS

This convergent mixed methods study involved: (a) collecting and analyzing quantitative and qualitative data; (b) merging and comparing the results; and (c) interpreting the data (Creswell & Plano Clark, 2018). On the last day of the program, individual phone conferences were held with each Scholar, and they completed a retrospective post-then-pre questionnaire, with 14 questions, that measured perceptions of leadership skill attainment. Respondents used the following scale to indicate how much they knew both after and before the program: 1 (very little), 2 (little), 3 (some), 4 (much), 5 (very much), and data were analyzed by comparing frequencies before and after. The leadership skills measured were: (a) communicate appropriately and professionally using social media; (b) identify and analyze problems; (c) efficient and effective work habits; (d) maintain accountability to the team; (e) select appropriate mentor and acceptance of advice; (f) project management; and (g) see the “big picture” and think strategically.