Engaging Undergraduate Students in Research through a Quantitative Methods Class in Agriculture

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Background

Undergraduate research experience has contributed to students' academic and professional development.

- Higher GPAs and higher course grades (Vincent-Ruz, Grabowski, & Schunn, 2018; Sell, Naginey, & Stanton, 2018)
- Higher retention rates (Vincent-Ruz et al., 2018; Chan, Bhattacharyya, & Meisel, 2018; Sullivan, Subramaniam, & Schneider, 2018)
- Higher degree completion rates (Higgins, Beck-Winchatz, Davis, & Kruger, 2018)
- Greater aspirations for pursuing a higher level of education (Higgins et al., 2018)
- Higher likelihood of being accepted by a medical school (Vincent-Ruz et al., 2018)

Grant Objectives

Four agribusiness faculty members successfully developed a teaching innovation program that incorporated research experience into a quantitative class in agriculture (AGBU 3385).

- Objective 1: Identify and secure use of data for ten overarching projects that use real-world data to solve actual problems
- Objective 2: Break down each project into six themed sub-projects that students can manage within a one-semester course
- Objective 3: Rewrite course materials and Student Learning Outcomes to implement the projects in a PBL setting, supporting the next ten semesters (five academic years)

Combining Elements of PBL and TBL

- Sourcing from various databases in agriculture, the faculty members formed six research projects each semester for students to practice their quantitative skills in a real-world setting.
- With assistance from faculty mentors, each student team consisting of five members established appropriate hypotheses, utilized quantitative methods such as multiple regression, logistic regression, and ANOVA to analyze the data, and interpreted research findings. They were required to develop a research poster detailing the methodology, results, and conclusions and present their poster in class on the day of the final exam.
- Based on feedback from faculty mentors and other faculty members in the department, the teams presented the revised posters in a research conference such as the Undergraduate Research Symposium of the university and the Agricultural Consortium of Texas Research Symposium (ACT).

Research Topics in Spring 2019

Based on the Food Environment Atlas Data by USDA, the following 6 sub-projects were completed in spring 2019.

1. Association of Adult Obesity Rates and Access to Restaurants
2. Influence of Food Store Proximity on Obesity Rate of Adults
3. Do Food Assistance Programs (SNAP) Benefit Availability Influence the Perceived Adult Food Insecurity?
4. How Does Access to School Food Assistance Programs Impact Food Insecurity Among Children?
5. Relationship between Adult Food Insecurity and Distance to Stores Accepting SNAP Food Assistance
6. Relationship between Adult Obesity Rates and Access to Recreation and Fitness Facilities

Presentations at Academic Conferences

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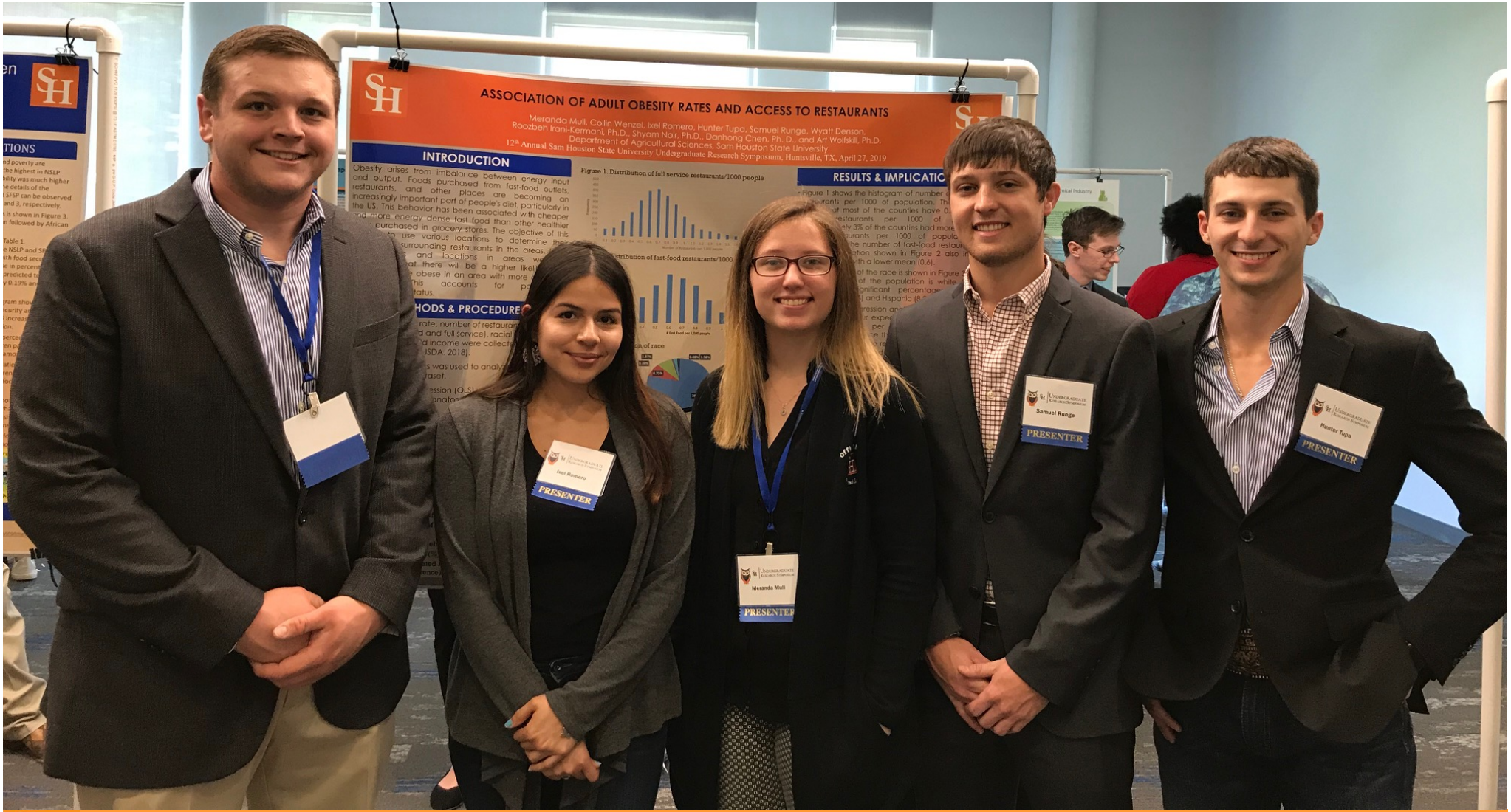

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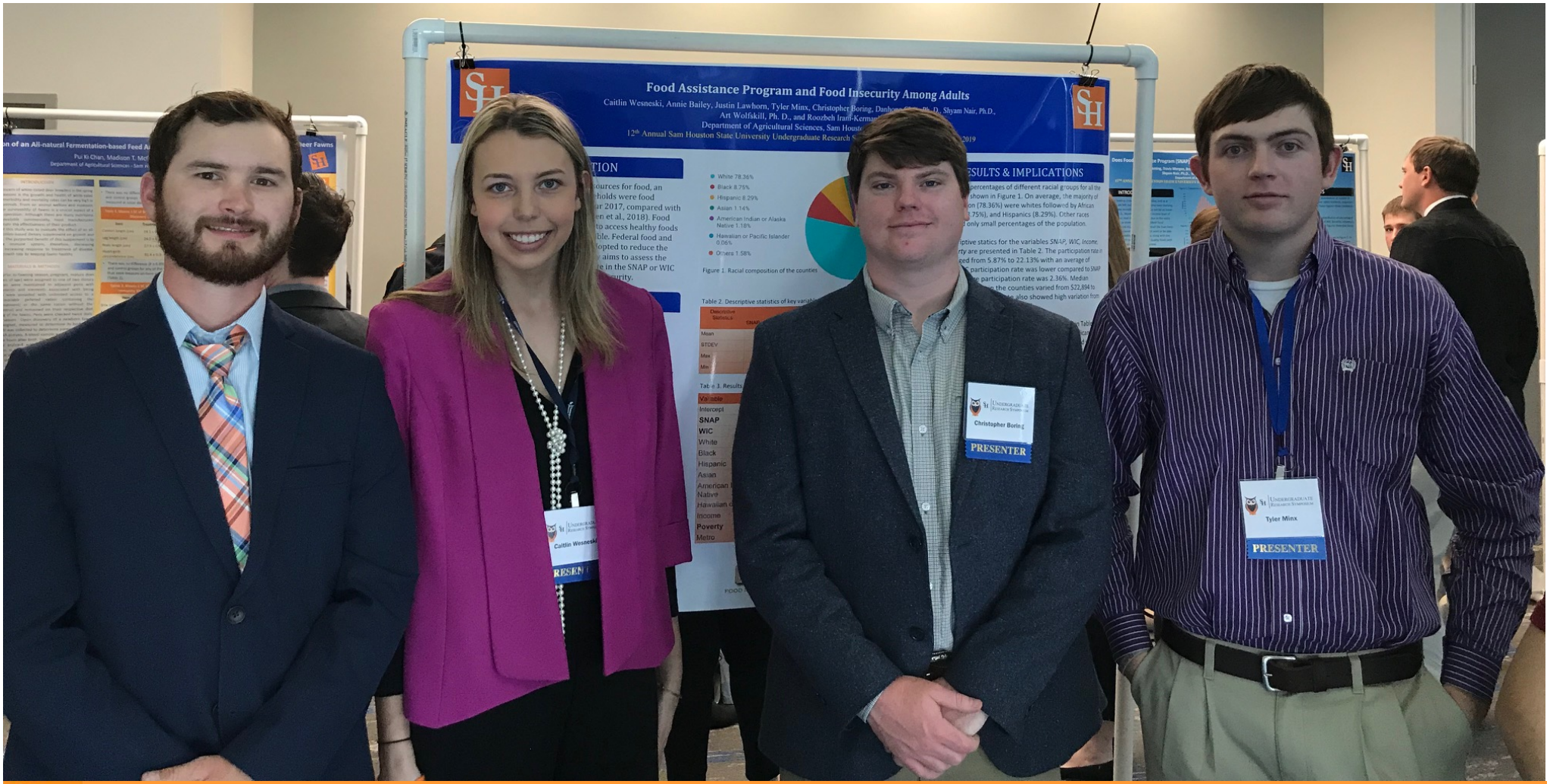

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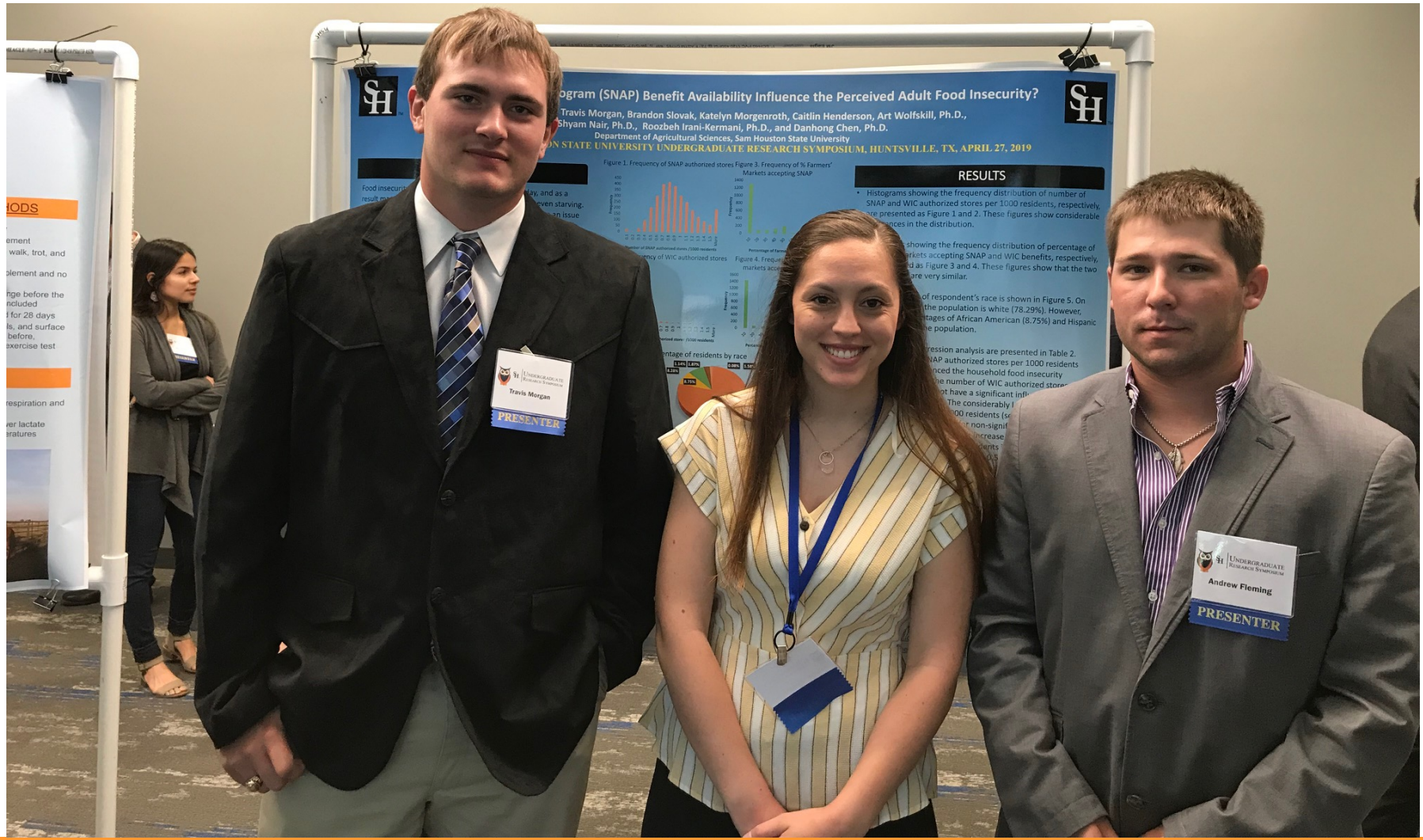

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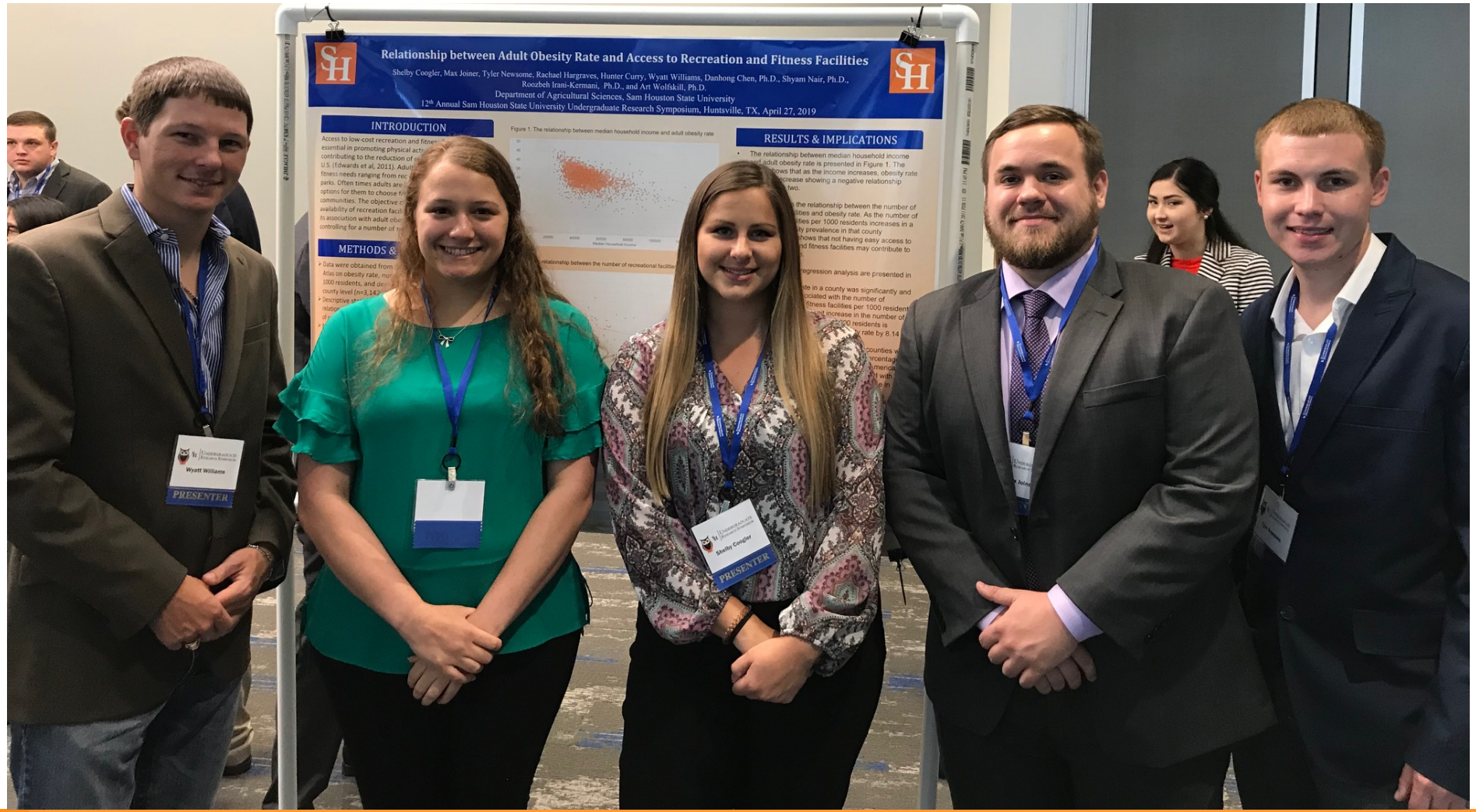
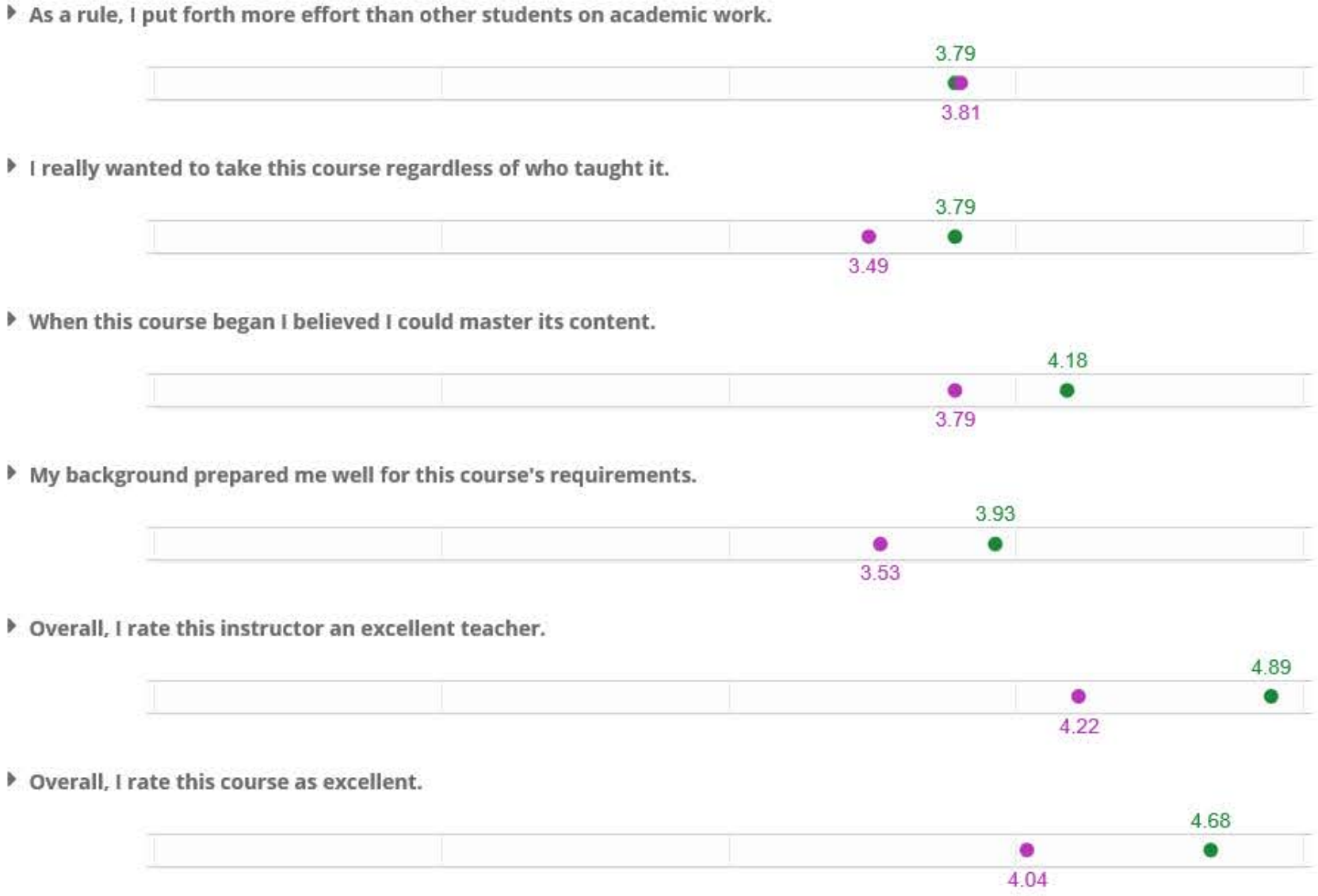
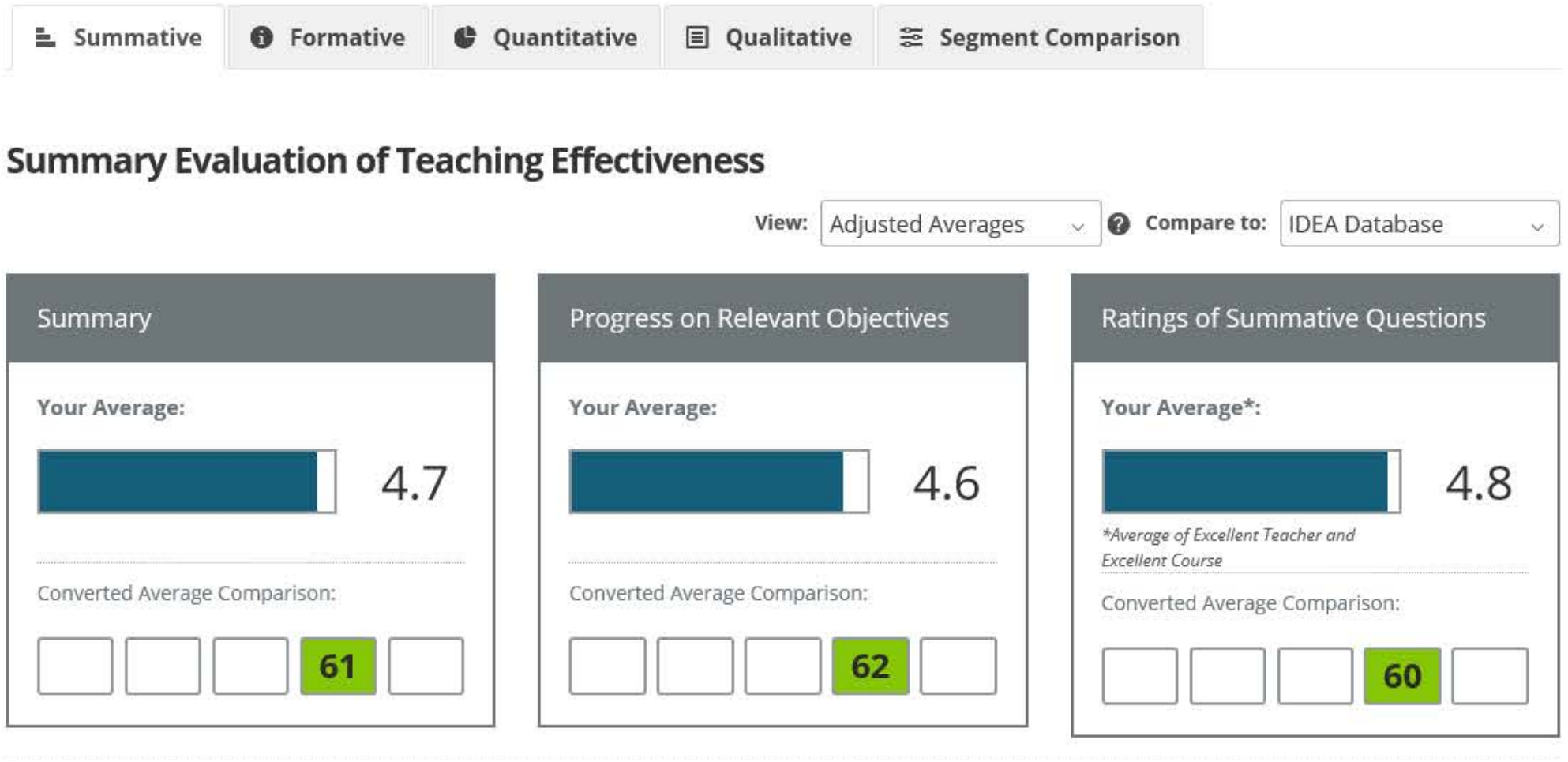


Students' Evaluation on Course Objectives through IDEA



Students' Overall Evaluation of the Instructor and Course



Discussions

- The objective of AGBU 3385 is to equip students with statistical and other quantitative analysis tools to enable them to make informed decisions using data.
- The research project allows students to create a new product (the research poster) elevating the learning objectives to the top of Bloom's taxonomy.
- The combination of PBL and TBL used in implementing the project also helps improve students' teamwork and other soft skills.
- This greatly improves the classroom learning experience of the students by enhancing their innate scientific curiosity and improving lifelong learning skills.
- IDEA student course evaluation results from the previous semesters indicated that students in general were highly satisfied with the research projects, creative activities, and their instructor and faculty mentors.