

Teaching and Educational Methods

Service-Learning in Agricultural Economics: Harnessing Local Food to Introduce Students to Applied Research and Extension

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Abstract

Despite the benefits resulting from experiential, active, and problem-based course design, most economics classes still rely on “chalk and talk.” Economics departments have been slow to develop accessible, course-based experiential learning opportunities such as undergraduate research, and even fewer incorporate service-learning projects. These activities provide an opportunity for students to apply economic concepts to their communities. However, the few service-learning based economics courses discussed in the literature do not include collaboration with departments of Extension, despite the clear synergistic possibilities.

This paper describes a project-based service-learning course where student undergraduate teams, with a master’s student team leader, serve as consultants to address an organizational or business problem faced by a local agrifood operation. Using economic tools and primary data collection and analysis, teams develop a marketing plan that provides actionable recommendations, including a presentation to the client. Students enjoyed the course, demonstrated improvements in conducting research and survey design, and by the end of the course, students were more knowledgeable about Extension and had positive perceptions of its impacts. While there are benefits to departments of agricultural economics or agribusiness developing these types of courses, they also require additional effort on the part of both the instructor and the students.

1 Introduction

The benefit to society of applied economics research is predicated on economists’ ability to translate academic findings into digestible information that is relevant to producers, consumers, and other stakeholders. While Cooperative Extension programming is a prime example, the Extension system is facing a crossroads as long-term personnel are retiring, and it is important that new hires represent the increasingly diverse communities in which they serve (Grotta and McGrath 2013; King 2018; Anigma and Stokes 2019; Taylor and Zhang 2019). However, many undergraduate students, even those at land-grant universities, are unfamiliar with the existence and mission of Extension (Grotta and McGrath 2013; Ebner et al. 2017; Henley, Herceg, and O’Grady 2018; Mott, Lorenz, and Britt-Rankin 2021). Experiential learning activities, including internships and research projects, could offer a crucial mechanism to educate students on the role of Extension in communities and its potential as a career (Grotta and McGrath 2013; Sellers et al. 2020; Mott et al. 2021).

Experiential learning fits well into the Extension mission of community engagement and can improve students’ ability to work independently and in teams, manage their time, ask questions and listen to stakeholders, and communicate with diverse and non-academic audiences (Ebner et al. 2017; Anigma and Gaebel 2018; Johnson et al. 2019; Sellers et al. 2020). These projects also benefit the local community and provide students the opportunity to apply their academic knowledge to the real world (Johnson et al. 2019; Sellers et al. 2020). In this paper, I describe an experiential, project-based service-

learning course designed to introduce students to survey research, market planning, and Extension and outreach.

Successful Extension personnel must not only be good communicators but also be willing to listen to stakeholders to understand their needs (Taylor and Zhang 2019; Evans and Bohman 2022). While opportunities such as the AAEA Graduate Student Extension Competition are available to train economists in Extension, there need to be more opportunities for exposure, especially among undergraduate students (Taylor and Zhang 2019; Shear 2020). These activities could also potentially address the lack of diversity in the discipline. While women have played an important role as agricultural economists in government positions, they are underrepresented in associate and full economic faculty positions with Extension appointments (Evans and Bohman 2022; Hilsenroth et al. 2022). Additionally, less than 5 percent of these positions are held by non-white economists (Hilsenroth et al. 2022). In order to increase interest in pursuing Extension as a career, faculty must begin recruiting and mentoring undergraduate students from a variety of backgrounds (Taylor and Zhang 2019), including designing research-based classes that are open to more than just the top honors students.

Agricultural courses have long relied on project-based learning, though this pedagogy is much less common within the field of agricultural economics (Smith and Rayfield 2016). In project-based learning, students take an active role in designing and evaluating projects that have real-world implications (Shih and Tsai 2017). Students in courses implementing project-based learning will find themselves developing competencies in teamwork, critical thinking, and interpersonal communication, often within an interdisciplinary framework, and these classrooms are associated with increased academic performance and peer interactions (Shih and Tsai 2017). Additionally, students in courses that incorporated academic research felt that it prepared them for their future careers and improved their research and presentation abilities (Kemp 2019).

One particular form of project-based learning, the service-learning project, has the ability to help economics students achieve economic mastery while also providing an introduction to Extension activities at land-grant universities. A service-learning course allows students to apply economic knowledge and tools to local, community problems in a way that can lead to enhanced conceptual understanding and increased student motivation (Hervani and Helms 2004; Ziegert and McGoldrick 2008). Students conducting service-learning projects have improved academic achievement and achieve deeper learning, including a better understanding of economic theory and increased analytical thinking skills (Hervani and Helms 2004; Ziegert and McGoldrick 2008). Service-learning also allows students to explore paradigms beyond self-interested utility and profit maximization by encouraging students to view economic tools as a way to improve communities and achieve pro-social outcomes (Ziegert and McGoldrick 2008).

This paper describes a new service-learning course that was taught in the Department of Agricultural and Resource Economics at the University of Connecticut in Spring 2022 and 2023. Student groups worked with an agrifood client throughout the semester to assess their needs and develop a marketing plan to address their strategic goals. As part of this project, the groups designed and disseminated a survey, the results of which were expected to inform their final recommendations. In the remainder of the paper, I describe the course, detail benefits and pitfalls, and provide a descriptive assessment of the student experience. This type of course could be implemented in any applied economics program to introduce students to working with community stakeholders and conducting independent research with real-world applications.

2 Teaching in Economics

Most economics instructors still primarily use traditional lecture methods in their courses, despite the increasing adoption of active learning and discussion activities in other disciplines (Becker and Watts 2001; Watts and Becker 2008; Picault 2019). This is concerning as methods such as cooperative and

small group learning have been shown to lead to improved academic outcomes for economics students, including increased peer interactions (Yamarik 2007). Given the high cognitive load faced by economics students, active learning activities, flipped classrooms, and undergraduate-led research are methods to more efficiently teach economic concepts, but they are not currently being implemented in most courses (Ziegert and McGoldrick 2008; Hultberg and Calonge 2017; Henderson 2016; Henderson 2018; Mendez-Carbajo and Davis-Kahl 2019). These educational practices have been shown to be especially beneficial for underrepresented students (Nagda et al. 1998; Ishiyama 2002; Russell, Hancock, and McCullough 2007). Thus, within economics education, there is clear room for growth in creative course design.

Additionally, while programs need to prepare students for the tasks they will be undertaking in the workforce, traditional academic research may not sufficiently incorporate the types of activities they will encounter in their jobs (Kemp 2019). Employers highly value “soft” skills such as creativity, communication, critical thinking, and teamwork (Boland and Akridge 2006; Noel and Qenani 2013; Gillespie and Bampasidou 2018; Feuz and Norwood 2019). Within these categories, specifically sought after competencies include active listening, concise and clear oral communication, and non-academic writing (Crawford et al. 2011), and McGoldrick (2008) found that economics departments with increased writing activities had students who demonstrated increased skills gains. However, economics students do relatively little writing in their coursework (Hervani and Helms 2004), and most employers felt graduates in agriculture and natural resources lacked the ability to communicate with lay audiences (Crawford et al. 2011). Project-based group work could address some of these skill gaps.

Employers value problem-solving skills, especially the ability to break an ambiguous concept into analyzable components, and expertise in collecting and analyzing data using Excel or statistical software, but current programs may not sufficiently cover these topics (Boland and Akridge 2006; Crawford et al. 2011; Gillespie and Bampasidou 2018; Jenkins and Lane 2019). Employers also increasingly seek ethical employees with cultural or gender awareness, which are also topics missing from many economics curricula (Boland and Akridge 2006; Crawford et al. 2011; Gillespie and Bampasidou 2018). An economics course that emphasizes lay communication, data analysis, and ethical considerations within an inclusive framework and team-based environment would address many of these concerns.

While undergraduate research experience is associated with positive student outcomes, these projects are often reserved for top students in economics departments, even though average or typical students may especially benefit from these activities (Henderson 2016; Henderson 2018). Additionally, undergraduate research opportunities are still not being systematically implemented in economics programs (Siegfried et al. 1991; McGoldrick 2008). An alternative approach is to integrate independent research into an upper-level or capstone course, which increases access to these experiences and exposes students to academic or Extension jobs within agricultural economics.

3 Course Development

Siegfried et al. (1991) notes that the primary goal of an economics program should be that students learn to “think like an economist,” and Hansen (1986, 2001) laid out six key competencies necessary to achieve this aim, which move from lower order to higher order proficiencies:

1. *Access existing knowledge.* This could range from the ability to locate data to accessing information on significant economic topics.
2. *Display command of existing knowledge.* This takes students one step further by expecting them to summarize and explain their economic topic or be able to describe an economic concept.
3. *Interpret existing knowledge.* Students must now be able to evaluate how economic concepts are used to explain or analyze specific topics or issues.
4. *Interpret and manipulate economic data.* Students should be able to explain relationships between distinct data points and interpret analytical results.

5. *Apply existing knowledge.* This competency entails students creating an academic report that analyzes a problem using economic concepts and data, or writing policy briefs on an economic issue.
6. *Create new knowledge.* Students ready to graduate should be able to perform their own research studies, and explain the problem, methodology, and results through a final academic paper.

Thus, higher-level courses should be taught in such a way that students leave having achieved objectives four, five, and six, and there are concerns that graduates have not attained these skills (Hansen 2001; Henderson 2016; Henderson 2018). While these competencies prioritize academic over lay communication, they also converge with many of the talents sought by future employers.

In developing the course, I considered Henderson (2016)'s suggestion that experiential learning activities in economics should be student-led, involve the community, incorporate group work, and be outcome-driven. Additionally, Siegfried (2001) notes that a good economics research project should require students to select their own topic and problem, develop a methodological approach, conduct and interpret a data analysis, and use both oral and written communication to explain their work. The course was designed for upper-division students who had already completed microeconomics and the department's Computational Analysis¹ course, which covers hypothesis testing and linear regression, in order to ensure students would be capable of analyzing the survey data they collect. The course was cross-listed in both the undergraduate and graduate program, and groups of undergraduate students, with a graduate student leader, worked collaboratively with a client throughout the semester.

Identifying and enlisting agrifood clients can be tricky as they should have a need or problem that is actionable and can be addressed by students within a fourteen-week period. They must also be willing to engage with the students. They are asked to attend the class at least twice, once to introduce the organization and problem, and again at the end during the final presentations. They also respond to group questions throughout the semester, sent to them by the instructor over email, and may help facilitate survey implementation. While a flyer advertising the class to agribusinesses was created to be shared during Extension farming workshops, recruiting generally occurred through informal networks. The most recent client, a food systems nonprofit, became involved after the director and instructor met during an unrelated initiative. Clients are secured before the start of the semester so that upon the first day students have an idea about the problem they will be asked to address. While this course has all student groups work with the same client, to reduce coordination issues and ensure the client receives multiple solutions to select from, it would be feasible to work with a variety of entities.

Students begin the semester by discussing the client problem and engaging in an exercise of writing initial ideas on post-it notes, allowing us to identify clusters of interest. Preliminary groups are then created based on interest and responses to a short instrument assessing research, data, and communication skills to ensure balanced competencies across groups. In the second week, students participate in a brainstorming session with their groups, including the development of key questions. At the end of the second week, the client visits the class to discuss their business problem in more detail with students, including the results they hope to see by the end of the semester. After this meeting, groups of three to four undergraduate students, with a graduate student leader, are then finalized based on proposed approaches. Thus, groups are formalized going into the third week of classes, and the majority of remaining classwork and assessments revolve around these groups. Students have total flexibility in crafting their solutions, and must consider the needs of the client and results from both primary and secondary data analyses. One constant across projects is that students must develop a

¹ *Computational Analysis in Applied Economics* is a three-credit course where students learn fundamental concepts of statistics and economics through analysis of economic data using Excel. Topics include calculating and interpreting one and two population summary statistics, data visualization through charts and figures, analysis of variance, correlation, and regression analysis.

strategy around the marketing mix “4P’s,” including specifics on product development or modification, a pricing analysis, a promotional strategy and a discussion of sales channels.

While groups work separately, and develop their own unique solution, they do share updates with each other to receive feedback. They also collaborate on survey design as they have the same target audience, and coordinating implementation increases the overall sample size, though this is not strictly necessary and could be difficult if there were multiple clients. Each group develops a set of proposed survey questions, and then as a class, we go through them to edit for clarity and debate their inclusion, considering tradeoffs between gaining additional information and overburdening respondents. This requires students to consider the value of each question, and what kind of role it would play in their final analysis. Students conduct power analyses to determine an optimal sample size and then are each responsible for attaining a given number to achieve that overall sample size; targets are generally in the range of 200 responses.

As observed in Table 1, the course objectives primarily address higher-level Hansen proficiencies. The first required deliverable is a situational analysis and secondary data exercise, which requires students to both *access* and *display command of their existing knowledge*. For the food systems nonprofit, groups utilized industry databases, data from a stakeholder survey conducted by the organization, and internal documents to analyze their client through Strength, Weaknesses, Opportunities and Threats (SWOT) (Wehrich 1982), Political, Economic, Social, Technological, Legal, Environmental (PESTLE) (Rahman 2023), and Porter’s (Porter 1979) frameworks. Survey development is based on results from the situational analysis and client discussions, demonstrating students’ ability to *interpret and apply* secondary data to an economic question. The survey implementation strategy is dependent on the client and their needs. For the food systems nonprofit, the survey was distributed through their listserv and at the local cooperative grocery store, as well as at a community farm day event. Students are expected to analyze their survey results, including *interpreting the data* so that it can be used in their final solutions. They are then expected to *apply the knowledge* gained from their primary and secondary data analyses, and the competencies developed in prior courses, to address their client’s problem. This culminates in

Table 1: Relationship Between Course Objectives and Hansen Proficiencies.

By the end of this course you, the student, should be able to ...	Hansen Proficiency
Design a survey for primary data research in the food industry	<i>Access existing knowledge; display command of existing knowledge; and interpret existing knowledge</i>
Assess survey data using a variety of statistical techniques	<i>Interpret and manipulate economic data</i>
Apply marketing plan best practices to a unique problem faced by a local stakeholder in the food industry	<i>Apply existing knowledge</i>
Develop a clearly designed client deliverable that makes actionable recommendations supported by sound economic research and principles	<i>Create new knowledge</i>
Graduate students will additionally be able to successfully lead a project team, including facilitating interpersonal interactions and achieving goals and deliverables	

creating new knowledge through a final marketing plan and presentation for the client. For the food systems nonprofit, each group used the results of their situational analysis, consumer survey, and discussions with the client to develop a new value-added food product using excess gleaned produce. While the student groups achieved the client's goal in their final product development, the solutions differed in the actual food item, packaging, labeling, promotion strategy, pricing, and logo redesign.

A key component of service-learning projects are structured reflections that require students to actively make connections between their coursework and community activities, improving their ability to transfer knowledge between various contexts (Hervani and Helms 2004; Ziegert and McGoldrick 2008). Following Henderson (2018), students complete project management reports as their primary reflection component. These biweekly submissions require each group to reflect on six project areas: their understanding of the client's business and needs, project goals and objectives using the Specific, Measurable, Achievable, Relevant, Time-bound (SMART) framework, a project timeline with both short- and long-term deliverables, a discussion of progress toward their goals (including missed deadlines and corrective actions taken), an analysis of the relationship between the project and course material, and an assessment of the capabilities of each team member (including competencies the group needs to improve upon).

At the start of the semester, I discuss with students the importance of these reflections, and include language in the syllabus explaining their purpose. However, beyond its use as a reflection, these reports also benefit teams by forcing them to set clear deadlines and ensuring all team members are on the same page, and students are encouraged to use a backward planning philosophy when establishing their timeline. These reports are especially useful in the first part of the course as students are still developing as a group. It also gives the instructor insight into the students' thought process beyond in-class conversations, and allows for formative feedback to be provided throughout the semester. Additionally, by considering the needs of their client each week, students must engage in collaborative, stakeholder-led work, requiring the ability to both listen and translate what they hear to understanding.

Students are not required to have taken any business courses, and given the semester time frame of fourteen weeks, the course can occur at a faster pace than students may be used to. Each week, students complete a module covering both market research and survey design concurrently. Examples of marketing topics include the 4P's, market segmentation, situational analysis (SWOT, PESTLE, Porter's 5 Forces), and strategic planning. Concurrently, students are also learning about secondary data sources and analysis, survey question design, sampling methods, survey dissemination, and communication best practices. Though a week is spent discussing survey data results, they are expected to have sufficient data analysis abilities through their Computational Analysis prerequisite. There are three primary homework assignments that constitute deliverables in progression toward the final plan. The first consists of a situational analysis, which requires the use of secondary data in addition to industry and academic resources. In the second, students submit a draft of their survey, including an explanation for the inclusion and design of each question. For the third, students create promotional material and present their proposed designs before the class to receive formative feedback. The final deliverable, which constitutes 40 percent of their grade, is a written marketing plan and a presentation of their plan before the client. To reduce stress for students, I incorporate the use of reverse outlines (Henderson 2016) for academic articles, provide reading guides for denser texts, and devote time in each class period for groups to meet among themselves and with me. While in final evaluations, 60 percent of students reported spending only one to three hours per week outside of class preparing for the course; the final 40 percent was evenly split between four and six hours or ten or more.²

² One potential explanation for this time discrepancy is that graduate students have supplementary assignments and reading that take extra time. However, this class also requires a large commitment from students due to the group activities, survey dissemination, and high expectations for client deliverables. In line with Henderson (2016), I do explain this to students on the first day of class to prepare them.

I also incorporate a module on land-grant institutions and Extension, with several purposes. First, I introduce students to the Extension system, including specific programs in the state that are targeted toward the small agribusinesses focused on in this course, and invite an Extension educator to meet with the class. This provides students with additional information on the resources that may be available to their client. As part of this module, we also discuss anti-racist approaches to outreach, including the importance of listening to stakeholders rather than imposing their preconceived ideas or worldview. This allows students to connect their project work with Diversity, Equity, Inclusion (DEI) initiatives on campus and in the state while also reminding them to consider the needs and preferences of their client. This was especially relevant for the food systems nonprofit, as students were tasked with creating a value-added product from gleaned produce that would be sold through the local cooperative, and whose profits would be used to fund the purchase of culturally appropriate food for their food pantry. Second, Extension programs are inexorably tied to land-grant institutions, and many undergraduate students are not familiar with the land-grant system or aware they are attending one. Through readings and videos, they learn about the Morrill and Smith-Lever Acts, including current Extension programming. However, to provide students with a clear picture of both the success and ramifications of the land-grant system, they also engage with the interactive Land Grab CT website³ (a local extension to Land Grab U⁴). This provides additional context on the community responsibilities of land-grant universities and Extension programs, and complements the philosophy of service-learning.

Graduate students that take the course are expected to serve as group leaders, including coordinating workload, facilitating communication, and maintaining team morale. To aid them in this role, they receive additional instruction in leadership competencies. This includes modules on providing candid feedback, leadership and communication style, effective communication, active listening, and managing team dynamics. Graduate students begin with a module on teaming, which recognizes the difficulty of managing groups and building teamwork in short-term environments when participants do not have pre-existing relationships. Each week, they reflect on the dynamics within their own groups through a discussion board dedicated to the graduate students, and they provide comments and feedback on each others' reflections. I also participate on these discussion boards to provide additional support and suggestions. While each homework assignment is completed as a group, the graduate student leaders also have a supplemental assignment that requires higher-level economic and econometric analysis. For instance, while the group promotional assignment consists of creating new promotional material and explaining the design and messaging choices, graduate students must additionally devise metrics to measure the success of their promotional activities and describe how evaluation datasets would be structured and analyzed.

4 Descriptive Outcomes

Both students and the clients appear to have benefitted from their collaboration in this course.⁵ In evaluations, students noted they valued that the course emphasized real-world applications and experiential learning. Students also appreciated the creativity of the project, with one writing that "I love when there isn't just one way to do something, it made me feel like I could focus on what I really wanted to do."

Students were asked to complete a short survey before and after the course, and below I present results for the ten students that completed both instruments. While the small sample size does not allow for any tests of statistical significance, there are some general trends. Students were first asked their perception of their skills in a variety of competencies (Table 2), as well as their use of key research databases (Table 3). While students reported improvements in most areas, they were especially

³ <https://www.landgrabct.org/>

⁴ <https://www.landgrabu.org/>

⁵ Client satisfaction was based on conversations during and after the course. However, implementing a short evaluation form for clients could have provided additional insight into their experience.

Table 2: Students Rating Themselves Very Strong or Somewhat Stronger than Average.

How would you rate yourself on the following competencies...	Pre	Post
Data Management/Handling	2	6
Statistical Data Analysis	2	5
Conducting Research	2	7
Survey Design	3	9
Survey Data Analysis	1	7
Project Management	6	7
Time Management	6	8
Teamwork	9	9
Leadership Abilities	7	7
Interpersonal Skills	8	9
Problem Solving	6	9
Applying Course Material to Real-Life Problems	4	6
Writing Academic/Research Papers	6	7
Writing for a Lay/Business Audience	2	5
Oral Communication/Public Speaking	5	5
Excel	6	8
PowerPoint	4	8
Canva	4	6
Social Media	6	8

Note: Students rated themselves on a six-point scale. “Somewhat stronger than average” and “Very strong” correspond to the two highest points. Ten students completed both pre- and post-assessments across the two semesters.

Table 3: Students Reporting Using Research Databases

Have used the following resource...	Pre	Post
Ibisworld	0	4
Mintel	0	3
Statista	5	6
Abi/Inform	0	3
Agricola	1	7
Google Scholar	8	9

Note: Ten students completed both pre- and post-assessments across the two semesters.

prominent in survey design and analysis, conducting research, data management, and use of PowerPoint. In contrast to the perceptions of employers (Crawford et al. 2011), most students rated themselves highly in teamwork, leadership ability, and oral communication at both the start and end of the course. They also demonstrated an increased use of databases such as IBISWorld, Agricola, and Mintel.

As seen in Table 4, despite attending the University of Connecticut, only three of the ten students were familiar with the concept of a land-grant university, while by the end of the semester only two could not name a land-grant (the most commonly offered example now being the University of Connecticut). Similarly, at the end of the course, most of the students were able to explain how land-grant universities are funded (including mentions of the Morrill Act and Native land theft) and what Extension personnel do.

Table 4: Students Correctly Answering Knowledge Questions

Question Text	Pre	Post
Do you know what a land-grant university is?	3	8
Provide an example of a land-grant university.	3	8
How are land-grant universities funded?	1	7
Have you heard of the Cooperative Extension system?	3	9
Have you interacted with Cooperative Extension agents/personnel?	2	7
What do Cooperative Extension agents do?	3	7
What is the relationship between Cooperative Extension and the land-grant system?	2	6

Note: Ten students completed both pre- and post-assessments across the two semesters.

Table 5 compares student perceptions of Extension at the start and end of the course. By the end of the semester, students were more likely to agree that Cooperative Extension improves quality of life, is a trustworthy source of information, and is relevant to most New Englanders. However, the course does not appear to have impacted student interest in pursuing a career in Extension.

Table 5: Student Perceptions of Extension

How much do you agree with the following statements...	Pre	Post
Extension is relevant to my life	3	4
Extension is relevant to the lives of other members of my family	3	5
Extension is relevant to most New Englanders	2	6
A career in Extension would be appealing to me	4	4
Extension is a trustworthy source of information	4	6
Extension improves the quality of life of those who use its services	3	8

Note: Ten students completed both pre- and post-assessments across the two semesters.

5 Conclusion

To continue attracting a diverse student population, economics programs need to better incorporate active learning activities into their curriculum. Service-learning courses integrating research and stakeholder engagement can encourage students to achieve higher-order economic competencies while providing exposure to problem-solving, teamwork, and communication. In this paper, I detailed an example of a project-based course where students collaborated with a client to develop a marketing plan for their operation. In line with best practices, the course allowed students to take the lead on project design, required them to analyze and interpret data they collected, incorporated small teams, and encouraged engagement with the local community. Student deliverables included both a written marketing plan and client presentation, providing experience with both written and oral communication.

There are several course design elements I found particularly useful. Each homework assignment was a core component of the final deliverable, which kept students on track and allowed for formative feedback. However, I learned students needed specific details for these assignments to provide clarity on how to approach each deliverable. For instance, for the literature review assignment, I provided a minimum number of articles to include, suggested a combination of academic and business sources, and invited the college librarian to class to provide an overview of available databases. The project management reports proved to be an effective mechanism to track team progress, and the reflections were especially important early in the semester when group dynamics were still being established and most project details were undecided. The leadership modules gave the graduate students confidence and

actionable recommendations for group management, and these could even be incorporated for undergraduates.

Overall, the course appears to have been a success. Students enjoyed the class, including their ability to work with a real client and direct their own learning. Their self-assessments demonstrated improvements in conducting research, survey design, and data management and use of research databases. The course also included a module dedicated to the land-grant system and Cooperative Extension, and by the end of the course, students were more knowledgeable about Extension and had positive perceptions of its impacts. While the course increased student awareness of Extension, and their attitudes toward programming, it did not impact their career interest. This could be because the course placed students in the role of consultant, with Extension acting as a service to be utilized, rather than emphasizing career opportunities within Extension. This could serve as an area of further development.

The biggest challenge in teaching this course is maintaining student engagement throughout the semester as they grapple with the large amount of coursework. A key facilitation strategy was to devote at least half of each class period to group work, which allows the instructor to recognize challenges regarding group dynamics, support students as they work through project ideas, and answer questions as they arise. Students were not required to have taken an introductory business management or marketing course, as those topics are covered in their weekly modules, but such a requirement could have reduced the metacognitive burden for students who were learning marketing principles concurrently with survey methods. Course design needs to carefully consider tradeoffs between requiring classes or competencies that exclude students and managing the amount of content the course must cover. Additionally, the course does take more instructor time than traditional classes, primarily around recruiting clients and managing relationships. Thus, while there are benefits to departments of agricultural economics or agribusiness developing these types of courses, they also require additional effort on the part of both the instructor and the students.

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