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Creating Leadership & Professional Development Through Extension Internships: Preparing the Next Generation of Agriculture Workforce

Abstract

Internships that incorporate hands-on work experience and opportunities to develop interpersonal skills and build professional networks support intern success and career readiness. The collaborative nature of Cooperative Extension enables educators to design programs that provide a broad perspective on career paths and equip interns with the mindset to tackle industry challenges. Using the National Association of Colleges and Employers (NACE) *Eight Core Competencies for Career Readiness* (self-development, communication, critical thinking, equity and inclusion, leadership, professionalism, teamwork, technology) as a framework, University of Maryland Extension (UME) used an interdisciplinary approach to design an internship that emphasizes developmental relationships, skills application, and reflection. A combination of qualitative and quantitative data was collected to measure and evaluate program outcomes. There was a statistically significant improvement in career competency skills, with most interns planning to continue their education and explore agriculture career options.

Abbreviations: NACE (National Association of Colleges and Employers), UME (University of Maryland Extension), NIFA (National Institute of Food and Agriculture), UMCP (University of Maryland), WFD (Workforce Development), IAA (University of Maryland, Institute of Applied Agriculture), STEM (Science, Technology, Engineering, and Mathematics)

Keywords: Workforce Development, Career Readiness, Career Competency Internship, Agriculture and Natural Resources

Introduction

The next generation of the agriculture workforce will face complex socio-environmental challenges across agriculture and natural resource disciplines. Current and future agricultural workers will concurrently need to protect natural resources, create better and more equitable markets, promote economic development and prosperity, address food and nutrition insecurity, and ultimately support food production. The United States Department of Agriculture's National Institute of Food and Agriculture (NIFA) states that to address current and future challenges and establish a sustainable future for agriculture, there is a need for a competitive and inclusive workforce. Developing a workforce with skills beyond the classroom is advantageous to food and agricultural sciences and is key to their success.

For organizations in the agricultural sector, investing in science, technology, engineering, and mathematics (STEM) degree-seeking undergraduates by exposing them to activities that emphasize both technical expertise and soft skills is a valuable strategy for cultivating a future workforce that is prepared and adaptable to work across issue areas (Karimi & Pina, 2021). While there is a time and resource investment, organizations that host internships also build a network and a potential applicant pool that are familiar with the host organization's mission, culture, and requirements (Maertz et al., 2014).

For interns, internships offer unique, real-world experiences that allow students to explore various fields and careers. Students who have held an internship position in college become stronger job candidates after graduation than students without internship experience, and qualified applicants are more likely to engage with companies they have experience with than those they only know second-hand (Hora et al., 2017; Maertz et al., 2014; National Association of Colleges and Employers, n.d.).

Classroom education aims to provide students with topic-specific knowledge base to pursue a career in a particular field. Classroom activities are not designed to offer the complexity or replication of real-world experiences that an appropriately designed internship can provide (D'Abate et al., 2009). Additionally, interpersonal or soft skills, which Crawford et al. (2011) describe as "attributes" to careers regardless of industry may not be developed solely in a classroom. These interpersonal skills, which include leadership, teamwork, empathy, critical thinking, and cultural sensitivity, go beyond the technical skills required for job placement and are necessary to prepare students to meet the challenges of agriculture in the 21st century.

While internship programs vary in their curriculum, expectations, and design, a structured program ensures interns have clear goals, responsibilities, and expectations while allowing them to explore and learn in an open environment. Recommendations for developing a well-rounded internship program include balancing structure and spontaneity, as well as creating both informal and formal approaches to knowledge and experience acquisition (Andrews & Cook, 2020). An internship that aims to meet the needs of industry and prepares students to face industry challenges often requires an interdisciplinary approach.

Parrella et al. (2023) investigated the career readiness of agricultural science students. They revealed five themes that influence a student's perception of career readiness: *Career Advice-Seeking Behavior, Employability Skills Development, Network Establishment, Relevant Experience, and Personal Growth*. The authors also noted that *high-impact experiences* enhanced students' confidence in their employability. While it is essential to structure an internship so that students receive the diversity of training

and experiences they require to enter the workforce, the delivery of training and experiences and the relationship between an intern and their mentor(s) are also key determinants of internship success (Maertz et al., 2014). The intern-mentor relationship is a crucial component of internship success and an intern's sense of accomplishment, as mentors are responsible assigning meaningful tasks, evaluating the success of tasks accomplished, and providing a positive outlook for a career in the industry (Liu, Xu, & Weitz, 2011).

However, internship success does not rest solely on the mentor. It is crucial that intern responsibilities be integrated into an organization's core operations and that interns interact with various employees and areas of the organization (D'Abate, Youndt, & Wenzel, 2009). Social networking opportunities within an organization can enhance learning and inform decisions about future employment with that organization (Liu, Xu, & Weitz, 2011). Furthering intern development and success, the integration of reflective activities, such as writing and self-assessments links interns' academic learning with their internship experiences and career competency training, by identifying both tangible and conceptual connections. This process enables them to gain new insights, reassess their roles as learners and emerging professionals, and foster meaningful growth in their professional development throughout the internship (Minnes et al., 2017).

Extension, as a community-facing organization that works alongside state and local partners, has a network pool that extends well beyond the college campus. This means that Extension is well-positioned to provide experiences and exposure to diverse fields within the agricultural sector and can assist in recruiting the next generation of Extension employees (Grotta & McGrath, 2013; Morris et al., 2002)

UME Workforce Development Internship

In response to the need for a qualified agricultural workforce, University of Maryland Extension (UME) designed a workforce development internship program in 2021 and launched its first cohort in Summer 2022. Career competency skills improvement and program outcomes were evaluated across three cohorts (2022-2024) to assess the effectiveness of program design and students' career readiness.

There are complex socio-environmental issues within the agriculture and natural resources discipline, and combined with the collaborative nature of Extension work, can support an interdisciplinary curriculum, paired with hands-on skill-building, that enhances students' career readiness beyond the classroom. Within UME, there is a need for a formal system to hire summer interns to meet the demand for assistance with summer fieldwork. Faculty on the UMCP campus typically have a readily available pool of applicants for summer research positions on campus; however, networks for advertising internship positions at off-campus research stations and Extension offices tend to be limited. Recruitment to off-campus locations is often unsuccessful due to transportation and housing limitations. Additionally, there is often a disconnect between campus and off-campus locations, and faculty have noted that students on campus are often unfamiliar with Extension services and off-campus opportunities (Loizzo & Lillard, 2015). This underscores the importance of a more formalized system to reach students from across the state to work at county Extension offices or Research and Education Centers.

As a result of this need, the University of Maryland's "Creating Leadership and Professional Development Through Extension Internships" program was developed. The program objectives are to provide undergraduate students — particularly those from community colleges and institutions outside the University of Maryland — with meaningful, experiential learning opportunities in Extension and applied research. It aims to increase interns' career readiness and leadership skills, increase the number of students from these institutions who continue their education and enter the agricultural workforce, and develop internal hiring and mentorship skills within UME faculty.

Materials and Methods

Program Overview

The UME Workforce Development Program (WFD) is a ten-week, full-time paid work and learning commitment in which interns gain hands-on experience in Extension

activities and participate in career development training. The internship was designed around the National Association of Colleges and Education's eight core competencies for career readiness (career and self-development, communication, critical thinking, equity and inclusion, leadership, professionalism, teamwork, and technology) as a framework for building professional development curricula and measuring skill development.

Short-term impacts and outcomes aim to increase interns' knowledge of Land-Grant University history and mission, Extension activities and research, and agriculture career options. Additionally, program outcomes aim to enhance knowledge and application of core competencies necessary for career readiness, as well as enhance leadership and networking skills through collaborative learning and reflection.

Medium-term desired outcomes are for interns to graduate with an agricultural and natural resource-related degree and to pursue higher education and/or a career in the field of agriculture. Long-term outcomes indicate that 90% of interns will graduate, 60% will pursue higher education, and 80% will secure employment in the agricultural sector.

Program Participation

Since the program’s launch in the summer of 2022, the UME WFD program has attracted interns from the University of Maryland, as well as other regional and national institutions. These institutions include five community colleges, three historically black colleges or universities, and three non-land-grant universities.

To engage student interns within and beyond land-grant universities, building diverse recruiting connections is imperative to reach a qualified candidate pool. These relationships take time; however, they ultimately support internship recruitment year after year. Building relationships with professors, counselors, advisors, and student club support, which includes recruitment and peer-to-peer recommendations. Local media, social media, extension mailing lists, newsletters, and word of mouth – family, peers, agents – have also been successful outlets for attracting qualified candidates.

From the summer of 2022 to the summer of 2024, 28 interns were placed in 14 Extension offices and Research and Education Centers, serving 17 of Maryland's 23 counties. Twenty-three unique UME faculty mentors have provided supervision and guidance, often working in mentor teams, to offer each intern customized, personalized attention. Fifty-two unique guest facilitators, including external and internal UMD industry professionals, career readiness facilitators, UMD faculty researchers, and leadership, participated in internship activities. Participating professionals enhance interns' learning, offer diverse expertise and perspectives, and serve as a built-in network for interns' future educational and professional development (see Table 1).

Table 1. *Internship Program Participation by Year*

Year	**Interns**	**Paid from Grant**	**Interns from UMD/IAA**	**Interns from unique Institutions**	**Mentors**	**Unique Mentors**	**Guest Facilitators**	**Unique Guests Facilitators**
2022	7	7	3	4	10	10	38	38
2023	9	7	4	5	12	6	33	8
2024	12	7	5	7	19	7	30	6
Total	**28**	**21**	**12**	**16**	**41**	**23**	**101**	**52**

“From UMD/IAA” and “From Unique Institutions” refer to the institutional origin of interns within each year. The IAA (Institute of Applied Agriculture) is a two-year associate’s program offered by UMD College of Agriculture and Natural Resources. The “Unique Mentors” and “Unique Guest Facilitators” represent unduplicated counts within each year.

Programmatic Design

UME’s programmatic approach for the WFD program weaves together three interconnected components: 1) *Extension* - educational activities and applied research specific to their mentors’ (supervisor) location and focus area; 2) *Career Competency*

Training - weekly virtual career readiness skill-building and industry professional guest lecture series; and 3) *Academics* – a Campus Residency and Research Tour which incorporates in-person leadership training, a UMD campus and research lab tour, and networking opportunities with faculty and staff from the College of Agriculture and Natural Resources (see figure 1). Weekly blogging enables interns to reflect on their work week, develop written and career readiness skills, and build visibility for both the intern and the WFD Program within Extension, on the UMD campus, and with partner organizations, thereby increasing intern opportunities beyond the summer program.

Career competency training is provided through virtual weekly group activities and discussions, as well as in-person training. Interns were asked to rate their level of skill on a scale from 1 (no level of competency/experience) to 5 (high level of competency/experience). Self-assessed skill level was

measured before and after the program. While this does not account for the mentor's rating of interns' improvement, it does account for the interns' sense of improvement and level of knowledge, comfort, and mastery of a competency". The internship concludes with a closing event, where interns present on their summer research and Extension activities.

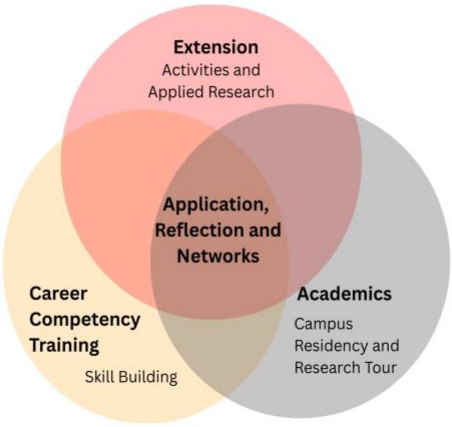

Figure 1. Three Interconnected Components of the University of Maryland's Workforce Development Extension Internship Design.

Methodology for Measuring Success

Interns for the WFD program were selected from a diverse range of institutions and undergraduate grade levels, as well as from several various majors related to agriculture and natural resources. When casting a wide net for participation, it is essential to consider that academic rigor varies by institution, as well as exposure to various opportunities. A range in intern knowledge and experience is inevitable, including variations in digital literacy, common digital office skills, and workflow organization, even if all interns meet the standardized requirement for participation. A quantitative benchmark cannot account for variations in academic rigor and available opportunities, making it impossible to establish a shared starting point for all.

Instead, knowledge gains for this program are self-identified, aiming to measure differences and improvements in knowledge before and after program participation.

To measure and evaluate program outcomes, quantitative and qualitative data are collected throughout the internship. These include weekly evaluations of career competency skill training, end-of-program evaluations, and 6-month post-internship evaluations. Weekly blog reflections, end-of-internship presentations, and intern participation provide feedback on engagement and effectiveness. Surveys are IRB-approved and administered online through Qualtrics survey software.

A paired-samples *t*-test was conducted to compare the means of two related groups. This test was chosen because the same participants (or matched pairs) were measured under two conditions, making the data dependent (Field, 2018). Assumptions of the paired *t*-test, including normality of the difference scores and absence of significant outliers, were assessed before analysis. The test statistic (t), degrees of freedom, and corresponding p-value were reported to determine statistical significance, with an alpha level of $p < 0.05$ considered significant.

Results and Discussion

Career competency skills

One of the main focuses of the UME WFD internship was on career competency skills and enhancing the interns' skill level over the 10-week internship through a combination of professional development and real-world experiences. Survey results are presented as an average over three years of data (2022 - 2024). Career competency skills indicate a 21% increase in skill development across all eight measured skills (Table 2). All career readiness skills showed significant pre- to post-internship improvements, with the largest increases observed in career management (43%; $P < 0.001$), professionalism/work ethic (23%; $P < 0.001$), and information technology application (22%; $P < 0.001$).

Undergraduate interns enter the program with a wide range of prior experiences, from limited exposure through summer jobs on farms or in nurseries to more direct engagement in agricultural or natural resource fields. For many, this internship represents their first sustained professional experience with structured expectations and accountability. The significant increase in career management (43%) reflects the program's emphasis on navigating workplace responsibilities, setting goals, and managing tasks. Similarly, the gains in professionalism/work ethic and technology application suggest that the daily demands of the internship, which require consistent communication, time management, and use of digital tools, help interns transition from basic job experience to more advanced career readiness. These findings underscore the importance of providing structured opportunities for interns to build competencies experientially through both the program curriculum and hands-on skill-building.

Table 2. Pre- and post-internship evaluation results for career competency skills

Skill	Pre-Internship Mean Skill Development (2022-2024)	Post-Internship Mean Skill Development (2022-2024)	Three-Year Improvement (%)	*P*-value
Career Management	2.73	3.92	43%	<0.001
Information Technology Application	2.96	3.62	22%	<0.001
Oral/Written Communications	3.32	3.79	14%	<0.001
Leadership	3.15	3.78	20%	0.001
Global/Intercultural Fluency	2.82	3.21	14%	<0.001
Teamwork/Collaboration	3.25	3.83	18%	<0.001
Professionalism/ Work Ethic	3.29	4.07	23%	<0.001
Critical Thinking/Problem Solving	3.35	3.75	12%	0.004
Overall	3.07	3.72	21%	

Education Aspiration

The interns were asked to rate their future plans for graduation, higher education, and agricultural career options. When asked if they planned to graduate from their current degree program, 87% of interns responded, “definitely yes”, 4% “probably yes”, and 9% “possibly” (see Figure 3). When asked if they planned to continue with higher education, 61% of interns responded, “definitely yes”, 17% “probably yes”, 17% “possibly”, and 4% “probably not” (see Figure 4). When asked if they planned to explore agricultural career

options, 70% of interns responded, “definitely yes”, 17% “probably yes”, and 13% “possibly” (see Figure 5).

These findings suggest that the internship experience reinforced students’ commitment to completing their current degree programs and their interest in the agriculture and natural resource field. The majority also expressed strong interest in pursuing higher education, which highlights the potential of internship programs to serve as a pipeline for advanced study. The high percentage of students indicating definite interest in agricultural careers demonstrates that early exposure through internships can positively shape career aspirations and may help address workforce needs within the agricultural sector.

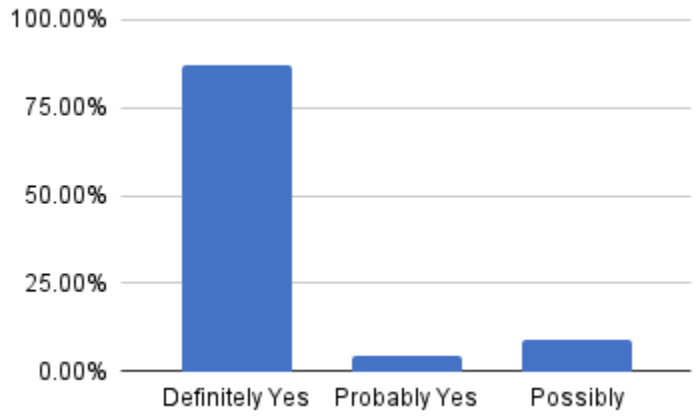

Figure 3. Intern responses when asked if they p*lan to graduate from their current degree program.*

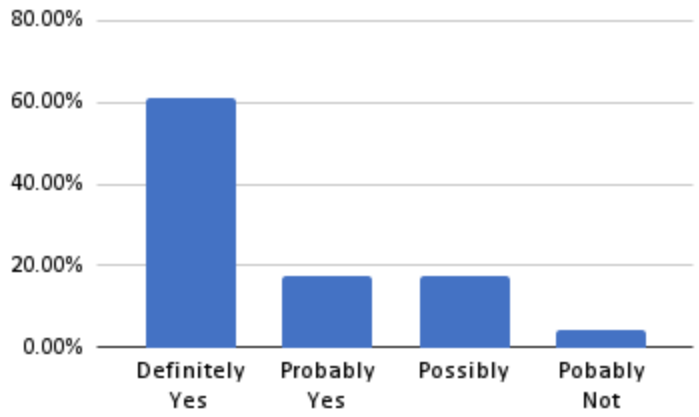

Figure 4. Intern responses when asked if they p*lan to continue with higher education.*

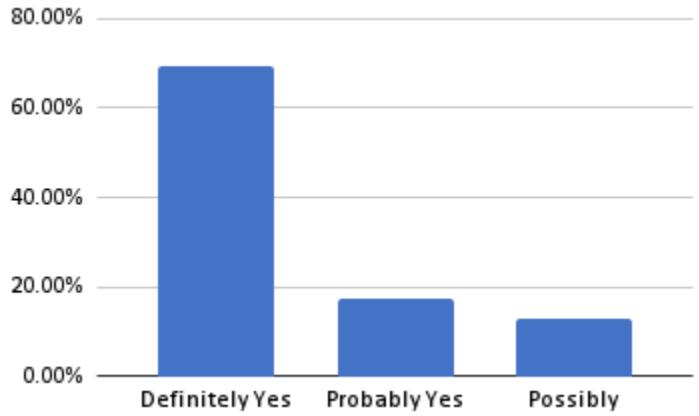

Figure 5. Intern responses when asked if they p*lan to explore agriculture career options.*

Qualitative Feedback: Weekly Connections Evaluations: 2022- 2024

When asked about the most effective aspects of the career competency training sessions, Interns provided various insights:

Interns emphasized the importance of communication, professionalism, and the effective use of technology. They appreciated weekly opportunities to engage in breakout rooms and preparing for weekly discussions. Reflections stressed the value of communication and professionalism, including:

- "learning how to communicate effectively"

- "learning about being professional and getting your message across to people in an effective way"
- "presentation about communication, tying into the idea of communicating the 'why'"

Other responses highlighted more technical and professional skills, such as:

- "how to be professional when sending emails"
- "learning how to use Google Drive"
- "hearing about all the resources available and how to use some technologies"
- "learning effective ways to navigate in and out of the workplace"
- "learning how to utilize the applications we need [in the workplace] and using those tools to set personal and professional boundaries, like through our Google Calendars"
- "the supportive reinforcement of the idea that you should ask for help"

Campus Residency and Research Tour

Participants described the experience as both engaging and educational. Interns shared:

- “It was super fun and educational. I feel like we really got to explore the different avenues that we could take in our future.”
- “I enjoyed hands-on activities.”
- “The campus residency experience was an enjoyable way to learn more about the other interns, myself, and research opportunities for the future.”

Other interns highlighted the value of the research tour, as well as conversations on networking, communication, and applying communication and networking tips at the lunch mixer as skills gained through the program.

Leadership development and interpersonal communication were also recurring themes. Participants noted that they found the leadership training activities and team building exercises to be beneficial, along with the importance of communicating with fellow interns and the development of team relationships. Several participants appreciated the opportunity to learn about future career options, noting that:

- “I liked being able to see different careers under UMD and what each individual does.”
- “I think it was beneficial for me to take a tour of the Ag side of campus versus just like a first-tour around campus since I am still trying to decide where I want to go to school.”

Blog quotes

The weekly internship blogs served as an important tool not only for intern reflection but also for regular feedback for the project team. Some meaningful quotes from the intern blogs included:

- “I feel that I am more aware of agricultural processes and business.”
- “I feel that I have learned a lot and gained perspective in the world of agriculture. I also feel that I am more prepared for the professional world.”
- “I feel more confident in pursuing a job after college.”
- “Because of this internship, I have continued to think about potential agricultural career options and how I can continue my education to reach my goals.”
- “So far, this internship has opened my eyes to some new opportunities for my future.”
- “Every day I get to see how people solve problems and work together.”

Relationship Building

With a focus on relationship building, mentors provide career mentorship to interns throughout the program. Mentors are encouraged to continue the intern-mentor relationship after the program in an informal mentor role. This relationship-building component facilitates a pipeline to future Extension or agricultural careers. From the three cohorts represented (2022-2024), seven interns continued working for Extension in part-time roles, and one intern was hired for a full-time position through the UMD application portal. Interns who continued part-time and full-time employment with UME are not from the land-grant network and may not have had exposure to Extension before the internship opportunity.

Incorporating a built-in network through academic and industry participation also increases exposure to career options and future opportunities for interns. Through the WFD program, additional (non-mentor) UMD faculty and Maryland's agriculture industry professionals can gain familiarity with the program, its objectives, and its interns. This serves as a valuable resource and networking opportunity for interns, potentially opening doors to future career opportunities.

Conclusion

To prepare the next generation of the agricultural workforce with the skills to address the complexities of the agricultural and natural resource industry, UME designed an interdisciplinary program that integrates Extension, Academics, and Career Competency Skills building. Using the National Association of Colleges and Employers (NACE) career readiness competencies as a framework for skills building, interns participated in a 10-week, full-time internship program. Interns were paired with an Extension faculty mentor or mentor team in a county office or Research and Education Center (REC) and worked to support applied research and Extension activities. Intern cohorts came together weekly for virtual or live program activities that centered on career competency skills training and career networking. Reflective activities, including

surveys, evaluations, and blogging served as both qualitative and quantitative data to measure and evaluate program outcomes. Program effectiveness evaluations demonstrated a statistically significant improvement in career competency skills, including skills in career management, information technology application, oral and written communications, leadership, global and intercultural fluency, teamwork and collaboration, professionalism and work ethic, and critical thinking and problem solving.

Short-term impact measures demonstrated increased knowledge of Extension, agriculture career options, and career competency skills. Additionally, growing recruitment from community colleges and non-land-grant institutions suggests that the WFD Program is reaching students who may not be aware of Extension services. It is still too early to measure the estimated longer-term impacts of interns' participation in the agriculture and natural resource field as a career choice. Still, data for the 2022-2024 intern cohorts indicated that 91% (definitely yes and probably yes) of interns plan to graduate from their current degree program, 71% (definitely yes and probably yes) of interns plan to continue with higher education, and 87% (definitely yes and probably yes) of interns plan to explore agricultural careers.

Relationship building is essential from recruitment through to career. Extension is well-positioned to expose students to career options and networks that enhance skill learning and opportunities during and after program participation.

Footnotes

NACE: What is Career Readiness? "Career readiness is a foundation from which to demonstrate requisite core competencies that broadly prepare the college-educated for success in the workplace and lifelong career management." (National Association of Colleges and Employers. (n.d.)

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