

Establishing a Statewide Agriscience Teacher Externship Program

Jonathan Moules
Cameron Standridge
Dr. Susan Pheasant
Kaitlynn M. Linderholm
Stacy VanScoy
California State University, Fresno

Dr. Nicole Ray
California Polytechnic State University, San Luis Obispo

Primary Author:
Jonathan Moules
5241 N Maple Ave
Fresno, CA 93740
559-278-4240
jmoules@mail.fresnostate.edu

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Introduction

Since the nationwide diffusion of Next Generation Science Standards (NGSS), California agriscience teachers have attempted to remain scientifically relevant by integrating the new standards and student-centered inquiry methods into classroom instruction. While pre-NGSS courses perceived content and application as separate entities, NGSS now provides a three-dimensional framework for students that address Disciplinary Core Ideas, Science and Engineering Practices, and Crosscutting Concepts (National Research Council, 2013). NGSS aims to produce college and career ready students who not only have strong science-based skills, but also critical thinking and problem-solving skills (National Research Council, 2013). However, as agriscience teachers serve as the instructional authority of NGSS for their students, do they possess the requisite experience to address all aspects of the framework?

Professional learning needs were identified in California agriscience teachers as educators struggled with the sensemaking and implementation of the science framework, standards, and instructional practices (Harris, 2018; Wilde, 2018). Through a USDA NIFA grant, the Next Generation Agricultural Science (NGAS) program established a statewide agriscience teacher externship program to increase awareness of agriscience industries and phenomena that can be integrated into their classes.

Agriscience externships are an avenue for teachers to build NGSS relevant industry experience. Teacher externships are not a novel concept; however, externships targeted for agriscience teachers are, especially when framing their experience around the NGSS motive. The literature agrees that externships are a highly beneficial approach for teachers to be exposed to workforce needs, particularly by demonstrating the need for collaboration and communication (Bowen & Shume 2018). Externs also reported on the innumerable real-world connections they engaged in (Luft & Vidoni, 2000; Conley, 2022). Curriculum and instructional methods were also influenced by externships to reflect industry trends. The increase in use of STEM learning concepts such as student-led discourse and engineering designing practices was thanks to teacher externships (Anderson, 1998; Hurley et al., 2023). Evidence strongly supports the utilization of externships as a professional learning vehicle for agriscience teachers, as they facilitate the connection between content, industry phenomena, and engineering practices.

How it Works

The externship program was implemented in 2023 after a pilot phase during the summer of 2022. NGAS staff established externship requirements and an application process for potential agriscience teacher externs. Eligibility focused on agriscience teachers who taught at least one agriscience course. Contact information and externship goals among other information was collected from applicants. Externs adhered to program requirements aligned with the grant's objectives. Under the direction of their externship host company, teachers completed 40 hours of experiencing company processes and operations. At the completion of their experience, externs submitted a survey and a written reflection. Externs also submitted an original lesson plan that aligned with NGSS and California Agriculture and Natural Resources Standards, focusing on a phenomenon they encountered during their externship. The externship program was marketed to agriscience teachers through social media, e-mail, and in person California Agriculture Teachers Association (CATA) events.

Potential host sites were selected based on each individual teacher's goals and application materials. Companies were briefed on objectives and requirements if they agreed to host. The specific tasks and experiences that teachers would engage in during the externship were agreed upon between the extern and the host organization.

Results to Date

The combined pilot and implementation years of the externship program surpassed the predefined grant objective with 35 agriscience teachers placed at 33 different agricultural company host sites. Teachers from the northern to the lowermost southern areas of the state participated ranging from 0 to 36 years of teaching experience ($\mu= 5.8$). Lesson plans highlighted diverse externship experiences, including the development of recyclable plastic clam shells for use in berry fields and the creation of integrated pest management plans. Externs valued the connection between agriscience programs and industry skills as one extern stated, "Starting at Driscoll's was a great opportunity for me as a teacher looking for connections in the local community that I could use in my classroom and in our program." Another extern stated, "On one of our tours of the various fields Antonio manages, he explained how important it is to make sure the math and science are accurate in relation to insecticide and herbicide application." Agricultural company externship hosts came from all AFNR sectors.

Future Plans and Advice to Others

Post-implementation of the two agriscience teacher externships phases, the NGAS staff advise to initiate externship coordination well in advance. Organizations differ in their non-employee human resource policies with those who engage in the company's operations for extended periods of time, which may prolong program coordination.

NGAS staff arranged the externships to be completed during the summer period of a typical school year: between June 1 and August 31. However, the summer months can still pose challenges for agriscience teachers in terms of availability and commitment to a 40-hour requirement. To address this, it is crucial to have constant contact between all involved parties. Communication is essential as applicants may withdraw from the program before being assigned to a host site. Committed applicants help maintain strong industry partnerships, which are vital to the success of the externship initiative.

The USDA NIFA grant funds the externship program through the summer of 2024 where a final cohort of 30-40 agriscience teacher externs will participate. Beyond the grant's life, the externship program is to be recognized as a regular form of Professional Learning through CATA where Continuing Education Units (CEU) will be housed by Fresno Pacific University. Industry sponsorships will be sought after to host a smaller group of 5-10 externs annually.

Costs and Resources Needed

Developing the agriscience teacher externship program was funded by a USDA NIFA grant. A \$1000 stipend and a \$300 CEU reimbursement for each teacher extern was provided after completion. Companies were awarded a \$200 honorarium. Engaging with an immense agricultural network to narrow down the selection to the required number of host sites is a taxing undertaking. Such responsibility was delegated to a paid independent contractor with vast agricultural connections associated with the California Agricultural Leadership Foundation. Teacher extern deliverables were collected by grant program staff. A digital platform, such as a database, is sought after to publicly organize externship and other grant objective materials.

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