Shop ‘til You Drop: Emphasizing Introductory Laboratory Management Skills Through a Field Trip Experience

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Introduction

Competence in various aspects of technical content areas, such as agricultural mechanics, is typically an expectation of school-based agricultural education (SBAE) teachers (Whittington, 2005). Moreover, competence in various areas of technical agricultural mechanics content (e.g., laboratory management, woodworking, welding, etc.) is often described as paramount for SBAE teachers (Burris, Robinson, & Terry, 2005; Saucier, Vincent, & Anderson, 2014). As a hands-on, engaging portion of the SBAE curriculum that is often popular with secondary students, a wide variety of technical agricultural mechanics knowledge and skill areas are regarded as important to teach (Shultz, Anderson, Shultz, & Paulsen, 2014). Such a wide range of topical areas can create a myriad of issues, including meeting tool and equipment needs (McCubbins, Anderson, Paulsen, & Wells, 2016; McCubbins, Wells, Anderson, & Paulsen, 2017), ensuring the availability of adequate work space (Phipps, Osborne, Dyer, & Ball, 2008; Saucier et al., 2014), and maintaining student safety as the top priority (Saucier et al., 2014). Thus, it is imperative that SBAE teachers be adequately prepared to thoroughly engage in the teaching and learning process and provide high-quality agricultural mechanics instruction (Shultz et al., 2014; Wells, Perry, Anderson, Shultz, & Paulsen, 2013).

As a portion of the teaching and learning process, prior preparation and laboratory management are essential to ensuring that agricultural mechanics instruction is of suitable and desirable quality (Saucier et al., 2014). Proper laboratory management skills (e.g., budgeting, ordering and stocking consumable materials, etc.) help to ensure that the learning environment is ready for students and that work (e.g., skill development exercises, student projects, etc.) can be completed in an efficient and effective manner (Saucier et al., 2014). As laboratory management skills are varied and may take considerable time for SBAE teachers to learn (Saucier et al., 2014), this process should, conceivably, begin during the teacher preparation phase of teachers' careers. Perhaps the use of a live exercise in selected laboratory management skills could serve to assist in developing this skill and knowledge base.

How it Works

During the Spring 2018 semester, the Methods of Teaching Agricultural Mechanics (AgEdS 488) course at Iowa State University (ISU) was delivered to 19 students. The course was focused on developing the technical agricultural mechanics, laboratory management, and pedagogical knowledge and skills of the students. As part of the course requirements as a teacher education course, the students were each required to deliver a 50-minute lesson to their peers that focused on a topic commonly taught in agricultural mechanics coursework at the secondary level (e.g., using a table saw, etc.). In addition to lesson objectives, an interest approach, and so forth, each lesson plan was mandated to have an operational theory related to the lesson's topic, a hands-on skill demonstration and evaluation component, a designated amount of time to practice the skill activity, at least five minutes of facility and equipment clean-up and care, and the materials and items needed to implement the lesson topic.

At least two weeks in advance of the first lesson to be taught, the AgEdS 488 course instructor allocated a two-hour in-class time block for the students to plan out the details of their individual lessons. This session provided the opportunity for the students to consult with each other, the course instructor, and the course teaching assistant to determine suitable approaches for their lesson as well as determine which specific consumable materials (e.g., lumber, pipe, electrical wire, etc.) would be needed. Each student was required to submit a list of consumable materials needed for his/her lesson. Both the course instructor and the course teaching assistant checked each list for accuracy. Additional adjustments were made as necessary.

During the following course meeting, the course instructor presented each student with a revised list of the consumable materials needed for his/her lesson as well as a budget cap for the lesson. The students were then informed that the next day's course meeting would take place at a local big-box hardware store. This visit to the hardware store was designed to serve two purposes: 1) to procure the consumable materials necessary for each lesson; and 2) to provide students with the opportunity to gain practical experience in locating, pricing, and allocating consumable materials from a retailer for an entire class of students. After all the students arrived at the hardware store, the entire class was first taken on a walking tour around the store to help familiarize them with the store's layout. Along the way, the course instructor and course teaching assistant provided additional explanations about specialized topics (e.g., power tools, lumber types, etc.) and answered questions. After the walking tour concluded, the students were divided into smaller groups of two or three and given one hour to price and procure all materials required for their lessons. After the one-hour timeframe had passed, the students met at the sales counter to count their materials. Several students had to return excess, exchange incorrect, or procure additional materials for their lessons. Afterward, the individual orders were combined into one large order and purchased with the course instructor's university purchasing card. The students, course instructor, and course teaching assistant then loaded the materials and finished the remainder of the course meeting at the usual course location.

Implications, Future Plans, & Advice to Others

A brief discussion about the hardware store visit was initiated upon its conclusion. The course instructor shared that the ultimate purpose of the exercise was to simulate the experience of procuring materials for an unfamiliar content area, thereby providing experience in an introductory laboratory management skill area (e.g., budgeting, procuring consumable materials, etc.). Most of the students remarked that they had never been inside a hardware store to purchase materials for themselves before, with some noting that they had never stepped into a hardware store before at all. They communicated that this approach was very useful and provided insight into a useful skill set practiced by SBAE teachers daily. We plan to continue using this teaching strategy and recommend that other agricultural teacher preparation programs consider doing the same within their coursework.

Costs

Besides fuel costs for traveling to the local hardware store, there were no atypical costs associated with implementing this teaching strategy in the AgEdS 488 course. The costs of the consumables were covered by the $250.00 course fee paid by each student.

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