INNOVATIVE IDEA

AGRICULTURAL MECHANICS FOR NON-TRADITIONAL STUDENTS

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Introduction

Agricultural Mechanics programs have "traditionally been a cornerstone in the secondary [School Based Agricultural Education (SBAE)] program" (Burris, Robinson, & Terry, 2005, p. 23) with enrollment in these programs at an all time high (Missouri Department of Elementary and Secondary Education (DESE), 2018). Tummons, Langley, Reed, and Paul (2017) noted that agricultural mechanics instruction provided a place for students to learn legitimate career skills in a supervised and protected learning environment. However, DESE (2018) found that 42% of students enrolled in a SBAE programs are female, only eight percent of those female students showed an interest in agricultural mechanics. In Texas, four year-long courses have a focus in agricultural mechanics subjects with 51,975 students enrolled in the courses across the state (Texas Education Agency, 2018). Overall, females comprise 43% of students in agricultural education classrooms (Texas FFA Annual Report to NFFA, 2018). Numerous studies indicated the benefits of agricultural mechanics in relation to the development of high order thinking skills, scientific inquiry, application, problem solving, and facilitative instruction (Baker, Thoron, Myers, & Cody, 2008; Osborne & Dyer, 2000; Parr, Edwards, & Leising, 2009), most female students are missing out on these valuable learning opportunities. This leads to a need for consideration on how to motivate female students to enroll in agricultural mechanics courses to obtain these values hands-on career skills. This innovative idea program addresses Research Priority 2, (Lindner, Rodriguez, Strong, Jones, & Layfield, 2016, p.19).

How it Works

SBAE is offered through a three-teacher program with an average of 12 courses taught annually. Two hundred thirteen students were enrolled in SBAE for the 2017- 2018 school year. Historically, around 30% of students in SBAE were enrolled in at least one of the agricultural mechanics classes offered with the Power, Structure, and Technical (PST) systems pathway. The PST pathway is the second most popular for SBAE students behind Animal Science. Despite a 60% female enrollment in SBAE classes, there has only been up to one female student enrolled in an agricultural mechanics class and only three current female students overall declaring the PST pathway. To better understand and cater to students, the idea was proposed to offer Agricultural Mechanics and Metal Technology for Non-Traditional students, specifically females. This class was taught by a female teacher in the three-teacher program. Eleven students enrolled in the class for the 2017- 2018 school year. Students were given a pre-assessment to gauge their previous interest and knowledge level of various aspects of the agricultural mechanics course work. It was found that, while a few of the students had previous experience with various aspects of agricultural mechanics, none choose to participate in these activities for fun and they displayed a low belief in their skills in these subjects. The class was taught in line with Texas Essential Knowledge and Skill (TKES) standards in the same agricultural mechanics laboratory as the other class. However, this class was taught at a time when no other classes would be sharing the laboratory as several of the students expressed a frustration with the commentary and critique of their male counterparts. All eleven students completed the course.

Results and Implications

All students who completed the Non-Traditional class expressed and displayed a high level of self-efficacy in their work in the agricultural mechanics laboratory, as well as an overall

comfort while using and being amongst the machinery. One student applied to a local junior college and was admitted in to their Welding Technology program with aspirations of becoming a Pipeline Technician. While five of the elven students were seniors and not able to enroll in a subsequent agricultural mechanics class, two of the six remaining students enrolled in Agricultural Structure and Design, the next class in the agricultural mechanics pathway. These two students have continued to display high levels of knowledge and competence in the agricultural mechanics lab. They have expressed they feel more confident in the laboratory and are often their first ones in the lab and the last ones to leave. While is it an improvement to year prior to the Non-Traditional class, only two more female students have chosen to start in the PST pathway with the Agricultural Mechanics and Metal Technology course. It is also important to recognize the importance of peers in students' self-efficacy due to model similarity. When students are unfamiliar with a task, or in this case the agricultural mechanics subject matter, learning with peers on a similar level, modeling their behaviors, and receiving positive reinforcement for their behavior all lead to higher self-efficacy (Pajares & Schunk, 2001). Female students in prior agricultural mechanics classes reported a low confidence in their skills and were not supposed by their male classmates. Bond, Cohen, and Sampson (1999) asserted some students learn better in collective forms of learning with students of like demographics rather than in traditional classroom settings.

Future Plans

Despite a desire to utilize a similar course in the future, however the school is currently without a female teacher willing to teach the course. As found in Tummons et. al (2018), there is a need for more pre-service training in agricultural mechanics for teachers. Additionally, more buy-in is needed from administration, but mostly counselors who advise students during enrollment. Wheelus (2009) found that counselors have the greatest impact on classes high school students enroll in. Additionally, counselors have a tendency to advise students on course selection based on overall course popularity, but also in line with the counselor's own preference on what classes the student should take. Without buy-in from key stake holders, such as counselors, that all classes should be available and advertised equally to all students, a decline in the number of female students in agricultural education classes might continue to see a decline. In addition, more research should be done on the overall implications of teacher gender demographics of teaching efficacy across various SBAE subject area. This sentiment was also noted by Langley, Kitchel, and Schumacher (2014, as cited in Tummons, et. al, 2017). Research is also needed into the exact number of female students enrolled across various SBAE subject areas have a better understanding of where students are are being served, but also underserved. Lastly, research int o the possible benefits of collective forms of learning with like peers to further support the link between similarity modeling and self-efficacy.

Resources Needed

There was no direct cost associated with this course as the school had an existing agricultural mechanics laboratory. Even when a school can provide an agricultural mechanics laboratory, many teachers do not report a high level of teaching efficacy in the array of content necessary to cover all of agricultural mechanics, but more specifically female agriculture education teachers (Tummons et. al, 2017). Additionally, support from administration and counselors is necessary to student enrollment in agricultural mechanics classes, but most importantly for non-traditional students.

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