

Learning By Doing: Increasing Self-Efficacy of Women Teaching Welding

Kacie Eshleman

Montana State University
230 Linfield Bozeman, MT 59717
Kacie.eshleman@montana.edu

Faith Droszcz

Montana State University
230 Linfield Bozeman, MT 59717
Faith.droszcz@montana.edu

Calla Donnelly

Montana State University
230 Linfield Bozeman, MT 59717
Calla.donnelly@student.montana.edu

Dr. Emily Sewell

Montana State University
230 Linfield Bozeman, MT 59717
Emily.sewell@montana.edu

Dr. Dustin Perry

Montana State University
230 Linfield Bozeman, MT 59717
Dustin.perry@montana.edu

David Cohenour

Gallatin College
david.cohenour@montana.edu

Introduction/Need for Innovative Idea

Research surrounding the successful development of women in school-based agricultural education (SBAE) has been conducted for decades (Baxter et al., 2001; Kelsey, 2007; Mumma et al., 2024). Women have been continually proving themselves as capable and confident in the profession, allowing them to overcome the stereotypes and challenges they have faced (Baxter et al., 2001). Opportunities to grow self-efficacy and overcome gender bias are needed for women in SBAE, as these experiences are consistently prevalent (Kelsey, 2007; Mumma et al., 2024). Further, this research is specifically relevant in the knowledge and teaching of agricultural mechanics (Granberry et al., 2022). Granberry et al. (2022) recommended supplemental vicarious experiences for women in post-secondary education studying agricultural education with women who teach agricultural mechanics to increase self-efficacy and competence.

The need for experiences to grow the self-efficacy of women in agricultural mechanics throughout the literature in SBAE informed the development of a Women in Welding experience between Montana State University and Gallatin College. The identified challenges of women in agricultural and technical fields highlight the critical need for innovative, inclusive educational opportunities. *Women in Welding* is a community-based program designed to equip adult women with practical skills in agricultural mechanics while simultaneously providing female pre-service SBAE teachers with meaningful, real-world teaching experience. By engaging with adult learners in a non-traditional instructional setting, pre-service teachers enhance their leadership abilities, instructional confidence, and adaptability. The goals and intended outcomes of this program align with the previous research to strengthen SBAE (Baxter et al., 2001; Granberry et al., 2022; Kelsey, 2007; Mumma et al., 2024).

How it Works

During the spring of 2025, Gallatin College invited undergraduate students studying agricultural education at Montana State University to serve as teaching assistants during a weekly class on welding and laboratory safety for women in the community. The intent of this partnership included opportunities for pre-service SBAE teachers to learn from and interact with current women teaching welding and laboratory safety courses, in addition to gaining practical teaching experience. For pre-service SBAE teachers to serve as teaching assistants, they were required to attend two three-hour training sessions and a minimum of two three-hour class meetings. Pre-service SBAE teachers who successfully completed the requirements for serving as a teaching assistant were compensated for their commitment.

The initial training for the teaching assistants was led by the instructors for the course. This training provided the pre-service SBAE teachers with the necessary tools to be successful when aiding the community participants. Topics for the training included: introductions, safety, machine set up and operation, and teaching strategies. During the course, the teaching assistants were encouraged to follow the lead instructor's guidance at the level they felt comfortable with. The second training was held at the conclusion of the course and included a panel with the lead instructors (n=2) and experienced SBAE/welding teachers (n=5). The following topics were discussed: conflict resolution, finding your voice, managing a career, whether to go or stay, when to start a family, handling students of the opposite gender, teaching something you do not know about, and open Q & A; all SBAE pre-service teachers and teaching assistants were invited.

Results/Implications

Teaching assistants (n=12) and pre-service SBAE teachers who attended the end-of-year forum (n=17) were asked to share their experiences. When asked why they wanted to assist with “Women in Welding,” participants overwhelmingly responded that it was for the *learning experience to become more comfortable in a shop as a teacher*. Pre-service SBAE teachers reflected on the opportunity to gain skills and knowledge through experience and discussion. One participant who just attended the forum reflected on the discussion on how to successfully work with the opposite gender in the shop. Another participant who served as a teaching assistant reflected on her experience learning how to help community participants, especially when she did not know the answer. When asked what the teaching assistants intend to do with their new/improved skills, responses reflected increased confidence and desires to be lifelong learners. Specifically, “be a better educator and continue growing my skills.”

Attendees were also asked what concerns they have about teaching welding as a female; responses reflected welding ability to consistently produce good beads and joints, and individual confidence regardless of skill. Participants indicated a fear of not being respected and of managing a safe environment. Lastly, when asked what their favorite part of Women in Welding was, participants noted the importance of introductions to learn the experiences of others. They relayed the importance of each person and how it “sets the tone” for “how much this topic matters.” Participants also appreciated the focus on the topic, keeping it simple and dialed into a specific challenge that women face in mechanical careers and experiences. Participants of the forum, both teaching assistants and pre-service teachers, were thankful for the opportunity to participate in the experience, at any level, regardless of their obligations throughout the semester.

Future Plans

Future plans include continuing this partnership with Gallatin College and Montana State University to increase confidence in agricultural mechanics among female pre-service SBAE teachers. Additionally, the two entities are continuing to work together in gender neutral spaces through grant projects that promote further education at Gallatin College and Montana State University. Specifically, a new program will be introduced in the fall of 2025 to recruit secondary students into agricultural mechanic training opportunities. Instructors from Gallatin College will travel with faculty and pre-service teachers from Montana State University to community high schools to share about educational experiences and teach lessons on agriculture, mechanics, and safety. This continued partnership seeks to promote educational opportunities for all potential learners in the community while increasing teacher self-efficacy among pre-service SBAE teachers.

Cost / Resources

The course was funded partially through a grant acquired by Gallatin College, which included a \$200 stipend for each pre-service SBAE teacher who served as a teaching assistant for the program. All expenses incurred by the project were sourced through Gallatin College.

Resources

- Baxter, L., Stephens, C., & Thayer-Bacon, B. J. (2011). Perceptions and barriers of four female agricultural educators across generations: A qualitative study. *Journal of Agricultural Education*, 52(4), 13–23. <https://doi.org/10.5032/jae.2011.04013>
- Granberry, T., Roberts, R., & Blackburn, J. J. (2022). “A challenge that I’m willing to take on:” The self-efficacy of female undergraduate students in agricultural mechanics. *Journal of Agricultural Education*, 63(3), 44–58. <https://doi.org/10.5032/jae.2022.03044>
- Kelsey, K. D. (2007). Overcoming gender bias with self-efficacy: A case study of women agricultural education teachers and preservice students. *Journal of Agricultural Education*, 48(1), 52–63. <https://doi.org/10.5032/jae.2007.01052>
- Mumma, K., Hartmann, K., & Martin, M. (2024). Gender bias experiences in school-based agricultural education. *Journal of Agricultural Education*, 65(4), 348–363. <https://doi.org/10.5032/jae.v65i4.2491>