Fostering Skilled and Self-Aware Welding Students: Integrating Reflective Practice into a Youth Welding Camp

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Introduction

Economic and technological advances in the 21st century, has pushed secondary and post-secondary educational institutions to innovatively enhance the way they deliver course concepts in order to meet the demands of this century (Hoffman, 2013). Hoffman (2013) further suggested that the desired outcome of gaining higher education is that students receive the ability to utilize critical thinking and assessment skills but also have the ability to apply their understanding of concepts. In agricultural mechanics, having the necessary technical skill is only half of the process. In order to meet a true understanding of the information presented, it is necessary that students are not just utilizing hands-on activity but also reflective practice (Figland et al., 2021; 2025). Therefore, reflection is a series of actions in which students utilize critical thinking to turn their experiences into purposeful insights. The use of reflective practices is a tool that can be used to gauge the effectiveness of an applied curriculum, along with the restructuring of upcoming lessons.

Within the broader image of agricultural education, reflective practices are used as a constant source of feedback. Educators frequently teach in classrooms and give lessons where it may be difficult for them to make note of issues and ineffective points within the curriculum. Using reflections from students is an effective way to document changes that may need to be made to future lessons (Sellheim & Weddle, 2015). When given the task of creating a personal understanding of the work that is asked, students will learn to compare these in lab applications to those of the real-world application (Ingles & Retallick, 2025). This idea explores how integrating reflective practices enhances not just the technical skills of students but also creates a more responsive and effective educational environment.

How it works

The reflective application portion was part of the NexGen welding camp, which was designed to administer a next-level learning experience to students within School-Based Agricultural Education (SBAE) welding programs. In this week-long workshop, students had the opportunity to learn the functions of AutoCAD, plasma cutting, and a variety of welding processes (i.e. SMAW, GMAW, and GTAW). To facilitate the reflection application, at the start of the camp, each student was given a KWL chart to record what they already knew, what they wanted to learn, and what they learned (KWL). Each morning, students were brought to the classroom and given the opportunity to complete the KW (what they knew and wanted to know) portion of their reflections based on the topic for the day. After a full day of classroom lectures and opportunities to apply the curriculum in the welding laboratory, the camp participants were asked to write about what they learned (L) that day and reflect on their experiences. In order to count as a reflection, students were required to complete a minimum of two sentences per reflection day in each category. Based on student responses, activities and learning objectives were tailored by the lead facilitator to meet the needs of the campers.

Results to Date

In the first year of the NexGen welding camp, 18 students participated. This group of campers consisted of 16 males and two females, from four different states. Of the 18 students who participated in the camp, 16 students completed all components of the KWL chart across all five days. In total, we collected 192 complete reflection statements. After collection, those statements

were then further examined to illuminate any themes. From the KWL reflection responses, three themes emerged, including: (a) technical skill development, (b) industry and career awareness, and (c) personal and professional growth.

Through the first theme, technical skill development, students expressed having a strong foundation in basic welding applications, like GMAW and SMAW. However, many of them wanted to learn more about advanced welding applications and processes (i.e. GTAW & underwater welding) and fabrication and design; specifically, blueprints and CNC plasma cutting. The second theme highlighted the students' awareness of the welding industry and related careers. Through the reflection process, students' thinking process shifted, and they were able to recognize the variety of opportunities the welding industry offered outside of traditional welding and began exploring educational pathway options (i.e. college versus trade school). Finally, through the third theme, personal and professional growth, students expressed they gained valuable skills in communication, teamwork, and overall work ethic. Thus, this portion of the reflection process highlighted students' pride in producing quality work and recognized that welding is not just a skill.

Future Plans

Utilizing the progression of KWL sheets and the overall themes through this week-long NexGen welding camp, we noted that students gained knowledge in the welding process, industry and career awareness, and developed in personal and professional aspects. Thus, for future NexGen welding camps, it is advised to enhance industry and career exploration for students by hosting colleges/trade schools and industry professionals, implementing career goal mapping, and providing off campus field experiences. Also, we advise embedding reflective practice throughout the application activities to reinforce the development of problem-solving skills, which further aids in developing the students cognitive and metacognitive functions. Furthermore, some suggestions could be made to create more effective data collection. While students were asked to fill out the charts on paper, other forms of data entry could be considered. There is potential in shifting from handwritten reports to electronic application usage. With this movement, there would be a decrease in physical paperwork that needs to be tracked and data loss due to illegible handwriting, spelling, or lack of response. Having an online KWL chart could help improve the efficiency of the collection process.

Cost & Resources

Aside from the cost of the camp, the cost to implement the reflective practice portion was minimal. The only expenses were those of printing out the KWL charts and providing the students with pencils, which Texas State University had on hand. However, it should be noted that by implementing the KWL charts, opportunity costs were lost, such as student time. Students participating in the camp were given 30 minutes in the morning and 30 minutes in the evening to complete their responses. While receiving this feedback from the students is crucial to analyzing the effectiveness of KWL charts and the camp, an hour of time was lost that could have been used either in the classroom learning the curriculum or time in the welding lab applying those skills.

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