# Combining Boy Scouts and Service Learning in Agricultural Mechanics

**Dr. Steven Boot Chumbley**

**Texas A&M University-Kingsville**
**700 University Blvd**
**MSC 228**
**Kingsville, Tx 78363**
**Steven.chumbley@tamuk.edu**

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## Introduction

Service learning is an instructional methodology that benefits a students' technical skills, social and emotional learning (Zins, et al., 2007). Empirical evidence has shown that well-designed, well-implemented, school-based youth development initiatives can influence a diverse array of social, health, and academic outcomes (Greenberg et al., 2003). Service learning experiences have an integrated student learning focus with a fundamental community focus (Bringle, Clayton, & Hatcher, 2013). Agricultural education applies these concepts and adopted an experiential approach to learning since its inception (Baker, Robinson, & Kolb, 2012).Within agricultural education exists the opportunity to produce students who are well prepared for college and careers (Baker & Robinson, 2016). Innovative teaching practices are needed, especially in agricultural mechanics, to instill a culture of safety in students early in their academic career (Chumbley, Hainline & Wells, 2018; Saucier, McKim, & Tummons, 2012).

## How It Works

Guided by the Boy Scouts of America's welding merit badge guidelines (BSA, 2018) the Texas A&M University-Kingsville agricultural mechanics club offered a 3 hour welding workshop once a week for the local boy scout troops. The following learning objectives guided this service learning event:

1. *Name the different mechanical and thermal cutting methods. Choose one method and describe how to use the process. Discuss one advantage and one limitation of this process.*
2. *Do the following:*
    a. *With your counselor, discuss general safety precautions and Material Safety Data Sheets related to welding. Explain the importance of the MSDS.*
    b. *Describe the appropriate safety gear and clothing that must be worn when welding. Then, present yourself properly dressed for welding—in protective equipment, clothing, and footwear.*
    c. *Explain and demonstrate the proper care and storage of welding equipment, tools, and protective clothing and footwear.*
3. *Do the following:*
    a. *Select two welding processes, and make a list of the different components of the equipment required for each process. Discuss one advantage and one limitation for each process.*
    b. *Choose one welding process. Have your counselor inspect and approve the area for the welding process you have chosen.*
4. *Use the equipment you prepared for the welding process to do the following:*
    a. *Using a metal scribe or soapstone, sketch your initial onto a metal plate, and weld a bead on the plate following the pattern of your initial.*
    b. *Cover a small plate (approximately 3" x 3" x 1/4") with weld beads side by side.*
    c. *Tack two plates together in a square groove butt joint.*
    d. *Weld the two plates together on both sides.*
    e. *Tack two plates together in a T joint, have your counselor inspect it, then weld a T joint with fillet weld on both sides.*
5. *Do the following:*
    a. *Find out about three career opportunities in the welding industry. Pick one and find out the education, training, and experience required for this profession.*
    b. *Discuss the role of the American Welding Society in the welding profession.* (Boy Scouts of America, 2018)

During the Fall 2017 semester advertisement for these workshops were distributed to local BSA troops. Also during this time, a designated undergraduate program leader worked with other Texas A&M University-Kingsville students to develop lessons for the workshop based off of

BSA guidelines. During this time those troops that wished to participate completed the necessary university liability waivers and the faculty project director took part in the BSA merit badge counselor training online.

During the Spring 2018 semester, the 3-hour long workshops (5:30 pm- 8:30pm) were held once a week for five weeks. Students in the AGSC 1352 welding course also took part in the workshops, with extra credit as an incentive for participation. Each undergraduate student was paired with two boy scouts. Undergraduate participants consisted of primarily agricultural education and general agriculture majors. The BSA participants had to be 12 or older and have parent permission to participate. Parents were invited to participate alongside their child. Each workshop started with classroom instruction combined with a meal. This lasted 25-30 minutes with the reaming time dedicated hands-on learning in the lab. Each lab time started with a 5-10 minute safety briefing. All materials were prepped before the workshop by university students.

Following the BSA learning objectives, each workshop focused on different welding skills sets. Table one provides each weeks skill focus.

*Workshop Weekly Skills*

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|---|---|
| Week One | Safety in the lab, mechanical (hydraulic iron worker) and thermal (plasma cutter) cutting |
| Week Two | Safety in SMAW, Performing a SMAW Butt Weld and laying a bead |
| Week Three | SMAW butt welds on plate & T-joint welds |
| Week Four | SMAW butt welds on plate & T-joint welds continued |
| Week Five | Using previous skills, construct foldable camp grill to take home |

## Results to Date

We solicited participation from three local BSA troops. This resulted in 28 middle school aged participants each week. On average five of the parents stayed for each of the 3-hour workshops and an average 18 university students assisted at each of the five "boy scout nights". These took place in late March, so that those in the welding class had enough instruction to feel comfortable assisting with the workshops. The BSA participants increased in their confidence each week, with many wishing that the project would continue beyond the 5-week model. All participants completed requirements for their merit badge. Parents were extremely pleased with the results of the project. Many of the university students expressed that their participation strengthened their understanding of welding and led to an increased appreciation for the skills necessary to teach agricultural mechanics.

## Future Plans

Our intention is to continue this service learning project similar workshops. We did a follow up this Spring with participants focusing on skills in GMAW and gave the students a chance weld a part metal eagle kit that they then took home. It is advised that this project last more than 5 weeks if possible and that training be given for university students at the beginning of the semester on teaching methods.

## Costs/Resources Needed

Costs included workshop meals ($930), lab consumables & PPE ($2,250) and a stipend for undergraduate project leader ($9 an hour @ 180 total hours). Total cost of this project ($4,800) was funded as one component of a USDA Non-Land Grant College of Agriculture (NLGCA) Capacity Building Grant.

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