

Timber... Practical Training for Real-World Applications

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Introduction

Career and technical education (CTE) is an ever changing field where practitioners need to maintain up-to-date technical skills, knowledge and training in order to prepare students with the career-readiness skills necessary to succeed (Rojewski, Asunda, & Kim, 2009). Drage, (2010) concluded that CTE teachers recognized the need for additional professional development to enhance their own knowledge and skills as life-long learners. Recent studies have noted the need for professional development initiatives in agricultural mechanics (McKim, Saucier, & Reynolds, 2010; Pate, Warnick, & Meyers, 2012; Peake, Duncan, & Rickets, 2007; and Saucier, Tummons, Terry, & Schumacher, 2010). Shultz, Anderson, Paulsen, & Shultz (2014) indicated that agricultural education teachers identified two-stroke engines as an important construct within the agricultural mechanics curriculum, yet indicated a low competence to teach said skills.

As important as professional development is to CTE teachers, it has been described as sit-and-get and limited in its effectiveness (U. D. Department of Education, 2005). To improve effectiveness of academic learning one must be provided opportunities to apply new knowledge in practical settings (Smith & Rayfield, 2016). Furthermore, Stimson (1919) advocated the use of the project method for students to apply the methods taught at school to practical problems. Additionally, Easterly and Myers (2017) reported teachers were more engaged in professional development programs that implemented active learning strategies which provided teachers opportunities to immediately apply what they had learned in a setting or to a problem important to them.

How it Works

Hosting industry-lead professional development workshops are nothing new to agricultural education. Agricultural mechanics workshops are offered throughout the United States annually hosted by both Industry and Post-Secondary Institutions. Stihl has been hosting a two-cycle engine training for Career and Technical Education teachers for over two decades. For this workshop, we followed the Stihl Silver training format as outlined in Table 1 below.

Table 1
Sample Agenda for Stihl Two-Cycle Engine Workshop

Day One	Day Two
Two & Four Cycle Engine Theory	Battery operated power units
Ignition Theory	Fuel Injection
Fuels & Oils	Stihl Small Engine Troubleshooting List
Specialty Tools	Four-mix troubleshooting
Carburetor theory & Testing	Engine Failure Analysis

To ensure authentic experiences for the participants, we added a capstone experience at the end of each day. On the first day, teachers were provided with carburetors that were actually submitted for warranty claims. The teachers had to determine if the carburetors passed or failed. If the carburetor failed, the teachers had to determine the cause of the failure (bad fuel, manufacturing defect or other issue) and submit a claims report. On day two, teachers were allowed to bring in personal power units (chain saws, line trimmers, etc.) that were not running or were not running correctly. After the teachers were lead through the Stihl Engine Check and

had completed the troubleshooting activity, they used their new skills to analyze the units that had been brought in to class. The workshop was capped off by demonstrating the two techniques Stihl recommends to properly fell a tree. The teachers were then able to operate Stihl's line of equipment including the battery-powered chainsaw.

Results to Date

We have hosted the Stihl Two-Cycle Engine workshop twice, once in the summer of 2017 & 2018 respectively. We have had twenty School Based Agricultural Education and Industrial Technology teachers from ten states participate in the workshops. All twenty teachers have rated the overall workshop and the instructor's knowledge as "Excellent" on a five-point scale. Several participants indicated a desire to repeat the workshop in the future. Between the two groups, six faulty power units (did not run) were brought in by the teachers to the workshop, all six power units left the workshop running.

Future Plans/Advice to Others

We plan to host the Stihl Two-Cycle Engine workshop annually. We are analyzing pre and post workshop evaluations to determine participant gaps in knowledge, performance, or competency. The teachers indicated they needed more training on carburetor theory and testing. We also collected data to determine interest in future programming. The findings from these surveys have led us to explore the opportunity to develop an advanced two-cycle engine workshop to complement the current workshop.

We recommend that institutions interested in hosting two-cycle engine workshops contact Stihl's corporate training center at least six months, and one year if possible, prior to the anticipated workshop date(s) to secure resources from Stihl. We also recommend working with Stihl to secure two instructors; the second instructor can be extremely helpful throughout the entire workshop. We also recommend reaching out to local small engine repair shops to secure faulty equipment that can be used for troubleshooting training. To ensure participants have base level knowledge, we recommend completion of Stihl's Bronze Certification online prior to attending the workshop. If teachers have an interest in the training, but are not affiliated with an institution that does not have the capacity to host the workshop, we encourage teachers attend the Stihl's Career and Technical Education Instructor Seminar hosted annually at Stihl's headquarters in Virginia Beach, Virginia. Finally, we recommend advertising nationally; approximately half of our participants have traveled from all over the United States.

Costs/ Resources Needed

The host institution must provide space for content delivery (I.E. Classroom) and experiential learning activities (I.E. Agricultural Mechanics Laboratory). We provided a light breakfast, lunch, and snacks at a total cost of \$25 per participant for the two-day workshop. We also provided certificates of completion, pens, and a tumbler at a cost of \$10 per participant. The college charges \$20 per participant to design workshop promotional materials, set up an online registration page, manage payments, and set up catering. Stihl provided an instructor, curriculum, tools, and training equipment at no cost to the host institution. If the host institution wants to demonstrate the proper techniques to safely fell a tree, the workshop organizer needs to identify a tree acceptable for removal and receive approval from all necessary parties (facilities, risk management, etc.). The teachers who provide faulty equipment are responsible for purchasing any replacement parts that are needed to repair the equipment.

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