

**A Different *Form* of Motivation: Using a Non-Traditional Application Approach to Teaching a Traditional Lesson in Concrete**

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## Introduction/Need for Innovation

Variability of instruction has been long identified as an essential characteristic of effective teachers (Rosenshine & Furst, 1971). This characteristic applies to instruction in laboratory settings, specifically in the context of agricultural mechanics (Burriss et al., 2005; Saucier et al., 2012; Wells et al., 2013). Considering the growing population of post-secondary agricultural education teachers who have limited experience with agricultural mechanics content and skill development (Wells & Hainline, 2021), it is vital agricultural mechanics instructors provide a variety of contexts for which agricultural mechanics principles can be applied to narrow the potential knowledge gap (Wells et al., 2013).

Coursework in agricultural mechanics is an integral component of the teacher preparation program for preservice agricultural education teachers at Oklahoma State University (Oklahoma State University catalog, 2020). Concrete is one of the agricultural mechanics competency areas built into the course curriculum for AST 3011 at Oklahoma State University. AST 3011 is designed to provide students the opportunity for skill and competency development in the field of agricultural structures through a variety of experiential learning opportunities (Oklahoma State University catalog, 2020). Historically, students would create a small concrete project (e.g., paver steps, dog water bowls) using traditional wood-framed concrete forms to obtain the desired competency skills for measuring, mixing, placing, and finishing concrete. Coupling basic concrete calculations skills (e.g., ratios, proportions, area, volume) with an experiential learning component, preservice teachers can broaden the context in which they apply STEM curriculum within their future classrooms. To increase the *relative advantage* (Rogers, 2003) of traditional concrete concepts for preservice teachers, a concrete jack-o-lanterns project was introduced as a non-traditional context for applying a traditional concrete lesson.

## How it Works

The non-traditional application of creating concrete jack-o-lanterns was conducted in addition to the traditional concrete project (i.e., a square paver step with boot scrape) during the concrete laboratory section for AST 3011. Students were paired in groups of two and tasked to create a wet concrete mix based on portions provided by the instructor. Ingredients were measured and mixed by students based on a 2-part large aggregate, 2-part small aggregate, 1-part cement recommendation in large plastic tubs with a hand trowel. Hand mixing allowed students a visual and tactile experience as the individual dry components change in color and composition as water is added. Once a proper consistency was met, students placed the wet concrete in both the traditional wood-framed form and the jack-o-lantern form. Utilizing appropriate concrete tools, students *worked* the concrete in both forms and placed the boot scrape in the traditional project and the metal stem piece in the jack-o-lantern project. On completion of both projects, students used the time remaining to observe the concrete hydration process their projects were exhibiting. Through their observations they were required to: a) determine the accuracy of their concrete mixture calculations and measurements, b) evaluate if the proper quantity of water was applied, c) evaluate the surface integrity change when metal components are added to the concrete, d) hypothesize how the water content and accuracy of dry ingredient portions will affect the finished texture and integrity of all surfaces once the forms are removed from both projects (AST 3011 course syllabus, 2020).

### **Results to Date**

The innovation was first introduced to the curriculum for AST 3011 during the fall 2020 semester. The class consisted of 20 students. The addition of a non-traditional application was added to increase student motivation and understanding of concrete concepts. When asked about their perception of the integration of the idea once the concrete jack-o-lanterns were completed, students affirmed their appreciation for the non-traditional project. Students were asked about their understanding of concrete concepts associated with measuring, mixing, placing, and finishing concrete because of the activity. One student said: "I was able to understand the concrete [lesson] more so because I was able to see why it's important to properly mix the ingredients." Last, students were asked if the concrete jack-o-lantern application impacted their motivation to participate in and learn concrete concepts? One student responded: "The pumpkins were definitely the motivator to participate." Another said: "It made me participate more because it was a fun activity verses doing the same thing over and over." The motivation to learn the skill and participate in the laboratory experience because of the concrete jack-o-lantern idea aligned with the need to provide variability (Roshenshine & Furst, 1971) to learning activities and instructional strategies.

### **Future Plans/Advice to Others**

This project was a welcomed addition to the concrete unit of the course. Students were excited for the opportunity to create a useful project with concrete instead of a project they did not regard to have intrinsic or tangible value. The timing of this project aligned with the Halloween season, making the availability of plastic jack-o-lantern buckets readily accessible. Because this course is taught in both fall and spring semesters, future plans include making this project's theme relevant to the season (i.e., Easter egg molds for the spring semester and Halloween jack-o-lanterns for the fall semester). In addition, students will be required to complete the project by painting and decorating the concrete jack-o-lanterns. Advice to others looking to implement this project is to use an alternative large aggregate in the concrete mix instead of gravel. A drawback to the project noted by the students was the overall weight of the jack-o-lanterns. The next student cohort will use a peat moss/perlite potting soil as the large aggregate to attempt mitigating the weight concern.

### **Cost/Resources Needed**

Equipment needed for this project include a large plastic bin and hand trowels for mixing the concrete. A water source is needed to obtain the proper wet consistency when mixing the dry ingredients of sand, all-purpose gravel, and Portland cement together. A plastic jack-o-lantern bucket is also needed for each student. Each jack-o-lantern costs ~\$7.50, but costs may vary due to the price of materials from state to state.

## References

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