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# Understanding Authentic Assessment in a Secondary Agricultural Mechanics Laboratory: An Instrumental Case Study

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# Understanding Authentic Assessment in a Secondary Agricultural Mechanics Laboratory: An Instrumental Case Study

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*The instrumental case study reported here adds to the literature on authentic assessment by illuminating how one secondary agricultural education instructor employed authentic assessment in the agricultural mechanics laboratory. The study was underpinned by the constructivist notion of authentic learning and assessment, or allowing students to perform what they can do. Multiple sources of data regarding assessment practices were collected from an exemplary secondary agricultural mechanics instructor who demonstrated model authentic assessment behavior by (1) setting high and fair expectations for students, (2) establishing a progressive hierarchy of skills for students to master, (3) providing continuous feedback so that students had knowledge of their progress, and (4) being committed deeply to students' success. The four themes resonated with previous literature and provided the foundation for a pragmatic model of authentic assessment in the secondary agricultural mechanics laboratory. Future research should focus on refining the model of authentic assessment in agricultural mechanics for a larger audience, as case studies are limited in their ability to generalize. Additionally, research should be conducted to determine how authentic assessment impacts student performance on Oklahoma Agricultural Power and Technology competency examinations.*

*Keywords:* agricultural education, authentic assessment, agricultural mechanics, pedagogy

## Vignette

*Joan and James, two freshmen students enrolled in introductory Agricultural Power and Technology at their respective schools are learning the process of Shielded Metal Arc Welding (SMAW). Both students previously mastered basic principles of safety, parts of the welding machine, electrode classification, and basic welding skills for starting the weld. It is test day for*

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*both students, and their teachers must have grades posted by the end of the week. Joan receives 10 participation points for doing "good work" during the week, and then is given a 25-point, multiple choice quiz over the content of the lesson. James is required to safely and accurately set up the arc welder and create a weld to the specifications provided by the instructor. Joan turns in her quiz and is off to her next class. James creates a weld that he believes meets the requirements and shows it to his teacher. The teacher assesses the weld via a rubric, offers compliments about what James did well, and also points out a few places where James could improve. James returns to the welder to improve his performance. Both teachers in this scenario have evidence that their respective students have learned the welding process, but were both assessments of equal educative value to Joan and James?*

## Introduction

Assessing student learning is one of the most important responsibilities of classroom teachers (Phipps, Osborne, Dyer, & Ball, 2008). Assessment refers to the comprehensive process of gathering information about holistic learning, including skill acquisition, knowledge, abilities, and providing feedback for learner improvement (Woolfolk, 2004). Assessments are also employed to measure and support student learning (Ercikan, 2006). Commonly, educators rely on pencil-and-paper forms of assessment to evaluate student learning, which most often assess the ability to recall information versus perform the learned skills (McCormick & Pressley, 1997).

Given the right situation, traditional forms of assessment can be very effective for evaluating student learning. Pencil-and-paper forms of assessment, however, may not contribute to deep and sustained learning (Marton & Säaljö, 1976). Phipps et al. (2008) discussed creating assessments that are a "valid and reliable representation of the types of knowledge, performance, or skills that a teacher wants to measure" or *authentic assessment* (p. 276). Instructors who teach material beyond recall may find traditional assessments lack the complexity to capture student learning. Authentic assessment is a strategy that embeds learning in real-world contexts and allows teachers to measure student performance in real-world situations (Custer, Schell, McAlister, Scott, & Hoepfl, 2000; Phipps et al., 2008).

## Conceptual Foundation

This study was underpinned by the constructivist concept of using authentic tasks to promote learning. Authentic learning supports students to construct knowledge, practice self-discipline, and understand the value of learning (Newmann & Wehlage, 1993; Wehlage, Newmann, & Secada, 1996). Authentic tasks connect real-world situations and problems students encounter in the present and future (Woolfolk, 2004). To better connect authentic learning to authentic assessment, teachers must determine learning objectives. Wiggins (1989) asked, "Do we judge our students to be deficient in writing, speaking, listening, artistic creation, finding and citing


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evidence, and problem solving? Then let the tests ask them to write, speak, listen, create, do original research, and solve problems" (p. 705).

Wiggins and McTighe (2008) outlined a concept of learning for understanding where high school instructors focus on three interrelated goals of "helping students (1) acquire important information and skills, (2) make meaning of that content, and (3) effectively transfer their learning to new situations both within school and beyond it" (pp. 36-37). Ideally, high school teachers should focus on helping students construct meaning from knowledge to prepare them for careers in all aspects of the schooling experience, including assessment (Wiggins & McTighe, 2008). For this to take place, authentic assessments must be used repeatedly and in numerous contexts to gauge performance, allowing teachers to "observe the *patterns* of success and failure and the reasons behind them" (Wiggins, 1989, p. 705).

Authentic assessment has been operationalized differently across disciplines. In an English class, assessment strategies may include asking students to demonstrate how to plan, write, and revise an essay, while a science teacher may require students to formulate hypotheses and conduct an experiment (McCormick & Pressley, 1997). The underlying principle of authentic assessments is to focus on real-world problems (McCormick & Pressley, 1997).

## Literature Review

Agricultural education has a long and successful tradition of embracing authentic learning and assessment to enhance student learning (Knobloch, 2003). Dewey (1938) called for educational experiences that enhanced learning for every student that are based on social interactions to allow students to learn from teachers and peers. Dewey (1938) described a connection that occurs naturally between experience and the educational process. Experience is an important part of education that provides relevance to the lesson and gives students the opportunity to use and apply classroom knowledge in realistic settings (Cheek, Arrington, Carter, & Randell, 1994). Agricultural education presents students the opportunity to learn not only in the classroom but also in various laboratory settings. Laboratory settings include agricultural mechanics, animal science, horticulture, or agriscience (Phipps et al., 2008).

Knobloch (2003) cautioned that the hands-on approach to teaching and learning may not always constitute authentic or experiential learning. Agriculture teachers excel at providing opportunities for students to learn by doing. To ensure authenticity in teaching, Knobloch (2003) encouraged teachers to "ensure that all learning is connected to thinking and knowledge that will be remembered and applied later in life" (p. 31). The three criteria of authenticity— constructing knowledge, disciplined inquiry, and value beyond school—are useful in determining the degree of authenticity of current assessment practices. To assist students in constructing knowledge, students should be challenged as if they were in adult roles (Wehlage et al., 1996). This may


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include written and oral communication, building or repairing objects, or artistic performance. The criterion of disciplined inquiry can be achieved by ensuring students connect new learning with prior knowledge to create deep understanding rather than superficial knowledge, such as recall (Wehlage et al., 1996). The final criterion, value beyond school, is achieved when students begin to value knowledge and skills because they connect the usefulness to their lives and not just to demonstrate competence (Wehlage et al., 1996).

Agricultural education has an experiential philosophy; however, students are not always assessed in this manner. This conflict of ideology versus practice is noted in the Oklahoma curriculum for Agricultural Power and Technology (APT). Minimal formative authentic assessments exist within the curriculum. The summative assessments consist of traditional paper-pencil tests and quizzes designed to measure students' ability to recall information. If laboratories in agricultural education are considered natural venues for students to apply knowledge in real-world settings (Phipps et al., 2008), then students should be assessed in a real-world manner that matches instruction (Anderson et al., 2001). Specifically, previous research recommends authentic assessments should be used as one strategy to evaluate students' learning experiences objectively (Baker & Robinson, 2011).

While many (Knobloch, 2003; McCormick & Pressley, 1997; Newmann & Wehlage, 1993; Wehlage et al., 1996) have touted the benefits of using authentic assessments, few studies have investigated how teachers conceptualize and employ authentic assessments in the agricultural mechanics laboratory. Therefore, the principle focus question for framing this case study was, how is authentic assessment used in an exemplary agricultural mechanics program?

Given the importance of authentic assessment in secondary agricultural education, the purpose of this instrumental case study was to better understand how an exemplary instructor employed authentic assessment in the agricultural mechanics laboratory. The following issue guided the study: *How does an instructor conceptualize and operationalize authentic assessment in the agricultural mechanics laboratory?*

## Methods, Trustworthiness, and Ethical Considerations

The study focused on a single, bounded instrumental case (Stake, 1995): a secondary agricultural education mechanics instructor, identified as Mr. Jones, in the context of assessment practices. Instrumental case study affords researchers the opportunity to gain a holistic understanding of a phenomenon and is most advantageous when the researcher seeks to understand a single issue within the context of the case (Creswell, 2007; Stake, 1995).

Purposive sampling procedures were employed to select one agricultural mechanics instructor at Smallville High School in Smallville, Oklahoma. Three agricultural education faculty members


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at Oklahoma State University identified the agricultural mechanics instructor as an exemplar at employing authentic assessment strategies. Purposefully choosing atypical cases, including exemplary cases, to study can aid in illustrating matters that may be overlooked in typical cases (Stake, 1995). After receiving approval from the Institutional Review Board (IRB), Mr. Jones agreed to participate in the research study during a telephone conversation, and a date for the site visit was determined.

I (the first author) spent eight hours at the high school collecting data. I conducted one in-depth, face-to-face interview with Mr. Jones, observed two 90-minute APT courses, and analyzed documents to draw my conclusions. The collection and analysis of multiple sources of data is a strategy used to enhance confirmability of the study, which increases trustworthiness (Tracy, 2010). To minimize the effects of researcher bias, I kept a reflexive journal throughout the research cycle, having taught the subject for a number of years in a different state. Reflexive exercises centered upon agricultural mechanics and student assessment. This allowed me to examine how my bias may influence data collection and analysis (Krefting, 1991).

To establish the interview protocol, I conducted a thorough review of literature regarding authentic assessment and performed a mock interview with a former secondary agriculture instructor to determine clarity of questions. During the face-to-face interview, I served as the instrument by asking a series of questions, allowing for free-flowing conversation and probing questions to clarify responses and deepen my understanding of the phenomenon (Guba & Lincoln, 1989). Once on site, I observed the advanced APT course, ate lunch with Mr. Jones, observed introductory APT, audiorecorded the interview, and collected documents for analysis. The semi-structured interview adhered to the IRB-approved interview protocol. It should be noted that some topics of discussion were emergent. The audiorecording was transcribed verbatim using ExpressScribe®, coded by hand, and analyzed using theme analysis (Creswell, 2007). Documents collected included 26 “one-sheeter” assignment sheets that Mr. Jones employed in his courses. Documents were reviewed and analyzed to “corroborate and augment evidence from other sources” (Yin, 2009, p. 103).

**Establishing Quality and Trustworthiness Within the Case Study**

Quality, whether the research results are trustworthy and plausible, is an important aspect of qualitative research (Tracy, 2010). Enhancing quality can be accomplished by providing thick descriptions throughout the report (Guba & Lincoln, 1989; Tracy, 2010). Within the research report, detailed, concrete examples and descriptions are provided to deepen the meaning of events. In addition, I analyzed multiple sources of data, including the interview, observations, and documents, to triangulate the findings and conclusions. Triangulation enhances quality and trustworthiness by showing the reader that multiple sources of data led to similar conclusions (Tracy, 2010).


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The interview transcription was sent to Mr. Jones for member reflection (Tracy, 2010). This allowed Mr. Jones to review the data for accuracy and context (Stake, 1995) and is one method of increasing trustworthiness of findings (Krefting, 1991). The final method used to enhance quality was multivocality and was achieved when differing views and opinions were given space in the research (Tracy, 2010). Specifically, I used the thoughts, ideas, and words of the participant through direct quotations and paraphrasing indicated in parentheses by line number.

I collected secondary data through observations and document collection. Observations were conducted in the advanced and introductory APT courses. During the advanced APT course, I acted as a participant observer, described by Yin (2009) as having the advantage of "producing an accurate portrayal of a case study phenomenon" (p. 112); however, this role has limitations. Bias could increase due to the researcher's manipulation of events. Also, the participant observer may not have the time to take quality notes or raise questions (Yin, 2009).

Initially, I began the observation of the advanced APT course as a nonparticipant observer, but transitioned into a participant observer. This was an upper-level class comprised of junior and senior students. All seven students in the course were working on the same assignment, creating saddle cuts in steel pipe. The students were expected to cut the pipe to exact specifications per a one-page rubric and assignment sheet. The instructor asked me to help evaluate a student's work, thus, transforming me into a participant observer. As a participant observer, I was able to interact with Mr. Jones and his students in their natural element and observe their interactions. In the introductory APT course, I acted as a nonparticipant, direct observer. Direct observation provides researchers with the ability to see actions in real time as well as situational context (Yin, 2009). This was a larger class than the advanced APT course and was comprised of freshmen and sophomore students. In this class, the students were welding a small piece of one inch diameter pipe perpendicular to a piece of flat steel to exact specifications provided by the teacher on a rubric and assignment page.

The focus of the case study was to gain a deeper understanding of the case and its interrelationships (Stake, 1995). Case study is not used to "optimize production of generalizations," rather to understand the particular (Stake, 1995, p. 8). Particularization is built by emphasizing understanding and occurs when researchers come to know the case well, how it is unique, and how it is similar to other cases (Stake, 1995). As such, no attempts have been made to generalize findings and conclusions past this case. Rather, it has been left to the reader to determine transferability of the findings to other situations.

**Ethical Considerations**

Because of the intimate nature of qualitative research, ethical considerations must be a top priority. Tracy (2010) discussed procedural, situational, relational, and exiting ethics as essential


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considerations for protecting the rights of human subjects. Procedural ethics refers to the researcher following set guidelines for conducting research that serve to ensure accuracy by reporting truthful, accurate results. Procedural ethics were addressed by securing IRB approval to conduct research prior to contacting the research subject. Situational ethics refers to practices used to deal with ethical situations while collecting data in the field. The central question of situational ethics is, "Do the means justify the ends?" (Tracy, 2010, p. 847). It is up to the researcher, ultimately, to make the judgment regarding what to report. Specifically, any data collected during the interview or observation that could cause potential harm to the subject were not reported. Relational ethics refers to treating research subjects with respect and avoiding coercion to gather information. Finally, exiting ethics refers to the impact of the researcher leaving the research site and the reporting of data. Exiting ethics were addressed in the design of the study as I agreed to leave the site after the school day ended as to not disrupt learning further. Additionally, I reported the subject's story as transparently as possible while protecting his privacy.

## Findings

### Theme 1: Teacher Sets High and Fair Expectations of Students

Upon entering the vestibule of the agricultural education building at Smallville High School, I was greeted with the sights and sounds one would expect from a typical secondary agriculture facility. As the seven students in the advanced APT course entered the classroom and took their seats, I witnessed the beginnings of the first emergent theme: Mr. Jones set high and fair expectations for all of his students. This theme became evident as the students were eager to receive their instructions for the lesson (Observation Notes). Mr. Jones discussed briefly the goals of the lesson and handed out the assignment page. This was my first view of what he called his "one-sheeters" (Interview, Line 42). This particular one-sheeter was comprised of instructions, a diagram of the assignment, procedures, and a rubric (Document 1). Mr. Jones had a file full of one-sheeters. He had created some, while others he had adapted from various Agricultural Mechanics Career Development Event (CDE) contests he and his students had attended throughout the years.

I later learned that four students were on his Agricultural Mechanics CDE team, and this assignment was very similar to what they would complete during competition. One goal of this assignment was to help train the CDE team, yet all students were expected to perform the assignment at a high level. Mr. Jones declared, "From day one, I just set really high expectations. My students know that I expect the best out of them" (Interview, Lines 88–89).

After the students received their instructions and assignment page, they proceeded to the agricultural mechanics laboratory to change into their Personal Protective Equipment (PPE) and


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begin working. The particular assignment required students to cut a six-inch section of pipe, then using the oxyacetylene torch, perform a saddle cut to specified dimensions (Document 1). The students worked diligently to complete the assignment, almost always on task. Mr. Jones declared "from day one you have to set the bar pretty high...if you start off easy and try to get hard, it doesn't work very well" (Interview, Lines 93–95). Having high expectations of students is a fundamental part of good teaching. Teachers must have expectations that are attainable, but challenging. Expectations should be increased gradually to ensure student success (Woolfolk, 2004). Mr. Jones expected the best of each student regardless of sex or membership on the Agricultural Mechanics CDE team. Teachers must have high and fair expectations of their students because students will rise or fall to the level of expectation (Newcomb, McCraken, Warmbrod, & Whittington, 2004; Woolfolk, 2004).

**Theme 2: A Progressive Hierarchy of Skills**

The second and third themes that emerged were intertwined. Mr. Jones used a progressive hierarchy of skills that he desired his students to obtain while enrolled in his courses. The students begin with fundamental skills needed in the agricultural mechanics laboratory, for example, striking an arc or lighting and shutting down the oxyacetylene unit safely, and ending with more complicated assignments, such as creating a saddle cut in steel pipe or welding various joints. Regarding assessing students' learning, Mr. Jones desired his students to have knowledge of their progress, building with each assignment, and cumulating to mastery of the course content. To ensure the students understood their progress in the course, Mr. Jones kept a progress chart on the wall of the laboratory that listed all assignments for the semester. When the students completed a task satisfactorily, Mr. Jones initialed the appropriate box. The assignments were arranged from simple to complex. As the students gained new skills, they were allowed to work on the various assignments on the progress chart. He stated, "we are going to start from easy to hard...something like running beads; I'll give them the page where it says you are going to get a grade on quality of weld, appearance, and different things like that" (Interview, 133–137).

**Theme 3: Knowledge of Progress**

Once the students completed the assignments on the progress chart, they engaged in project construction. This progressive hierarchy of skills allowed students to have transparent knowledge of their progress in the course. With this system, Mr. Jones was able to confirm what students had learned, including the fundamentals "of welding, fitting, and cutting" necessary to complete a larger project safely and accurately (Interview, 38–39). Additionally, he stated, "I expect when [the students] come in to the second APT course, we don't have to spend as much time on these skills, that it can be just a little refresher, and we can get into building some projects" (Interview, 149–151).


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By the time the students complete the sequence of APT courses, Mr. Jones believed they had acquired the skills and knowledge useful for entering the workforce or moving to higher education. Describing what he wanted his students to be able to do after completing his program, he said:

> When they are done with Ag Power and Tech III, I expect them to be able to go to a metal fabricating shop and be able to do anything that is asked of them to do...we have a number of our students that make their living as either a farm or ranch hand or welder or welder/fitter. Then, I have some students that go on to [City] Welding School and they make a career out of it. I want them to be as prepared as possible for the outside world (Interview, 102–107).

Discussing individual assignments, Mr. Jones said, "I try to use a rubric system as far as grading; that takes a project they are doing and basically dissects it down, and then, I actually have the students involved in their grading" (Interview, Lines 179–180). Mr. Jones' simple, yet effective, approach to grading students' work informed the conclusions and development of a model for authentic assessment. After receiving the assignment page and scoring rubric, students were asked to complete the assignment within the bounds of the 90-minute class. Mr. Jones gave individualized instruction to struggling students, but spent most of his time observing students as they worked. As each student completed the assignment, he or she brought it and the grading sheet to a table located near the center of the laboratory where Mr. Jones began the process of assessing the work in consultation with the student. During the process of students completing the assignment and seeking feedback, it became clear that this was the norm for the program versus a staged production to impress the visitor.

It would have been much easier for students to drop off their work and get on with their business while Mr. Jones graded. Mr. Jones, however, was genuinely concerned with student learning and took the necessary time to give each student highly detailed, individualized feedback on their performance face-to-face. As an observer, it was difficult to separate learning from assessment. Students performed their task, but they were not finished. Mr. Jones began each grading session by assessing the objective components of the project, such as dimensions. For every one-eighth inch a student was in error, he deducted one point. For more subjective components, such as appearance, shape, and fit, both he and the student talked through the project so the student could identify high quality work. "I want them to score their own [project], and I want to add credibility to their score. I want them to know what is a good weld, what a good project looks like versus a bad one" (Interview, 89–91). In nearly every instance I observed, the student was much more critical of his or her own work than Mr. Jones. He was quick to point out what he liked about the assignment before he offered constructive criticism for improvement. Additionally, if the students were not satisfied with their score, Mr. Jones allowed them to repeat the project to try to improve their score to a 90% or better. Encouraging students to score their own work promoted self-regulated learning, specifically self-observation (Schunk, 2008).


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Students who self-observe their performance as inadequate can then seek guidance in the form of Mr. Jones' feedback to improve (Schunk, 2008).

Mr. Jones' grading system allowed students to have opportunities to reflect on their performance and improve. Additionally, the use of a rubric and talking through each score with the students provided documentation in the event that a parent or administrator questioned the grade. Mr. Jones assigned at least one assignment per week to maintain fairness in assessing students (Interview, 44). "It is hard to keep graded, you know, how to score a student in the shop...in a production shop and you are building projects...it is hard to have an actual grade for a student if all they are doing is building projects" (Interview, 76–79). Students also receive a grade for larger completed projects. Mr. Jones made it clear, however, that grades are not given simply for participation.

These two themes, using a progressive hierarchy of skills and student knowledge of progress, align with Wiggins and McTighe's (2008) assertion that authentic assessments must be repeated measures to bring to light the patterns of success and failure, not one-shot assessments. Mr. Jones' use of a progressive hierarchy of skills forced students to transfer knowledge and skills from one assignment to another, a vital component of the learning process (Schunk, 2008). In addition, many students sought employment in the agricultural mechanics industry, transferring knowledge and skills from high school to the workplace, aligning with the third tenet of Wiggins and McTighe's (2008) conceptualization of an ideal secondary school experience.

**Theme 4: Teacher Commitment to Student Success**

The final theme that emerged from the instrumental case study was Mr. Jones' deep concern for student success in his program. In addition to allowing students to resubmit their projects, he believed his program was a home for students who did not find success in other areas of school. Mr. Jones was passionate in his description about working with students who were considered low achievers by other teachers. He said:

> I have had teachers tell me, you know this kid, he's terrible in class, can't get him to do anything, just one of those low-achieving students. When they get to my class, you will find out a lot of times those are my best students, which happens a lot. I mean, there are a lot of students you sit there and have do book work, and they are not going to be good students, but the minute they get out in the shop, their eyes light up. The minute they get to start doing hands-on things is when those students really start to achieve, which occurs daily over here in the Ag facilities (Interview, 121–127).

Mr. Jones also reported that many of his students were able to link core content within the context of agriculture. Specifically relating to mathematics, he stated, "Within the shop, there are all kinds of math and geometry examples. You would be amazed at how many students


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come to me and can't read a tape measure. Once they start reading that tape measure, fractions start making more sense to them" (Interview, 161–164). In addition to mathematics skills, Mr. Jones believed his students were better problem solvers because of their activities in the agricultural mechanics laboratory. He cited examples of students calculating board feet, yards of concrete, and using various tools to accomplish a task (Interview, 164–166). "A lot of those kids don't realize how much geometry they are actually doing until they actually do it themselves" (Interview, 166–167).

Mr. Jones' use of authentic assessment strategies that incorporated mathematics skills provided the context some students needed to understand a core content principle in addition to the agriculture content. Examples of his students understanding geometry better because of agricultural mechanics supports empirical evidence that agriculture can be used as context for learning without sacrificing the agriculture curriculum (Parr, Edwards, & Leising, 2008; Roberts & Ball, 2009; Young, Edwards, & Leising, 2009).

## A Model of How Authentic Assessment Can Be Implemented in the Agricultural Mechanics Laboratory

In the opening vignette, the arc welding knowledge of Joan and James was assessed by their respective teachers. Both educators had evidence that their respective students learned arc welding, and grades were entered into the grade book. If, however, the teacher's goal was to teach the students the welding process, the written test was not a valid measure of student knowledge. James knows what arc welding is, but because he was assessed authentically, he also knows how to arc weld. Based on the review of literature and the findings reported here, a pragmatic model of how Mr. Jones conceptualized and employed authentic learning and assessment in the agricultural mechanics laboratory is offered (see Figure 1 on the following page).

This model depicts the major tenets of authentic learning and assessment found in the literature and is further supported by the results of this case study. The model is shown as circular to demonstrate a continuous teaching-learning cycle. To begin the cycle, the teacher identifies knowledge and skills for students to master (Wiggins, 1989). If teachers desire to assess students authentically, they must teach students a progressive hierarchy of complex tasks to ensure students are evaluated on what was learned at each step in the process (Anderson et al., 2001; Phipps et al., 2008). This step allows students to construct meaning from the knowledge gained in a useful fashion (Newmann & Wehlage, 1993). During the first two phases of the model, the teacher sets high and fair expectations of students, partially through establishing a progressive hierarchy of skills. Additionally, students must inquire into a problem to produce additional meaning (Newmann & Wehlage, 1993), aligning with giving students an opportunity to demonstrate their knowledge or practice newly attained skills. Next, students are assessed at the


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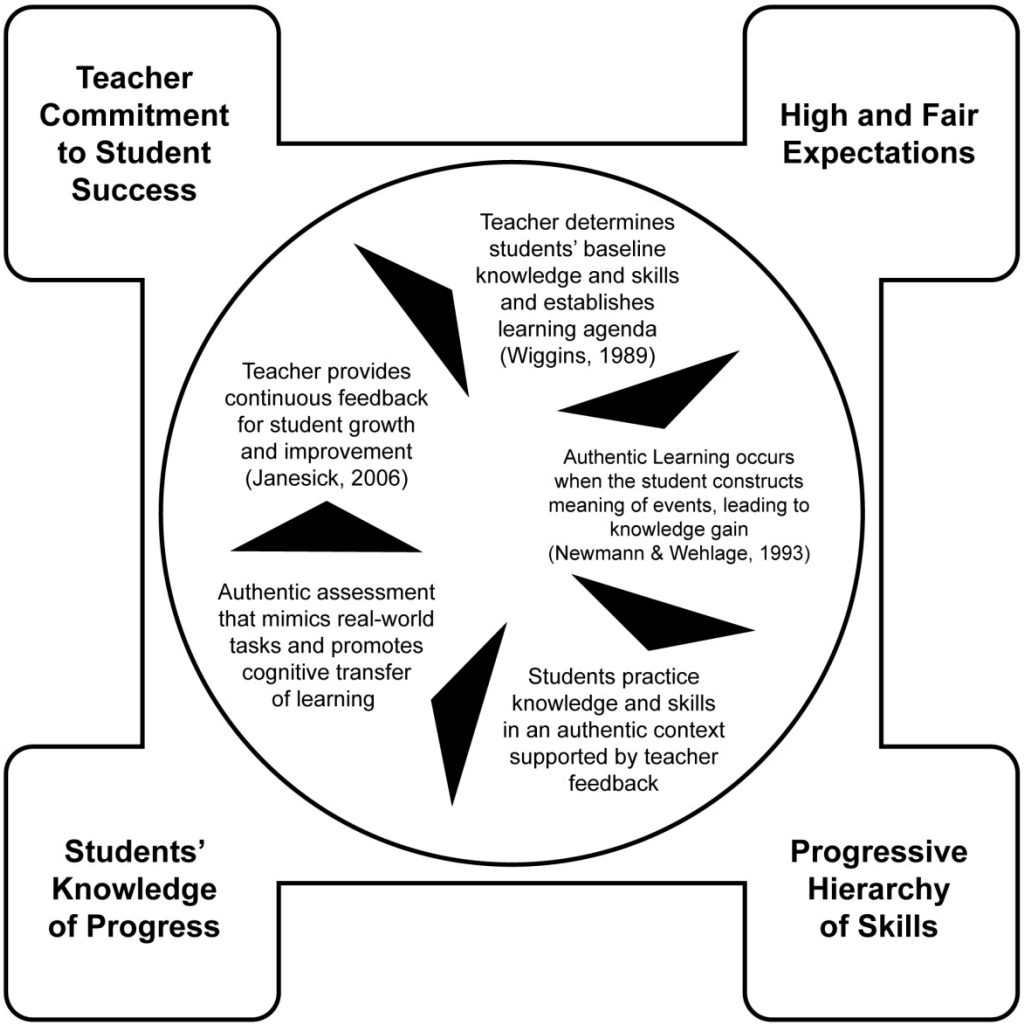
same level they were taught by asking them to demonstrate knowledge and skills attained. Both practice and assessment allow students to gather transparent feedback regarding progress in the course. The final step of the model is likely the most important, as the teacher reviews the work and provides the student with constructive feedback by focusing on what he or she did well and giving direction for improvement. This step exemplifies a teacher's commitment to student success.

***Figure 1. A Pragmatic Model of How Mr. Jones Conceptualized Authentic Assessment in Agricultural Mechanics***




## Conclusions and Assertions

The purpose of the instrumental case study was to understand how an instructor used authentic assessment in an agricultural mechanics laboratory. The findings added to the literature by revealing four themes regarding the successful implementation of authentic assessment: (1) the teacher had high expectations for his students, (2) a progressive hierarchy of skills was used,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(3) students had transparent knowledge of their progress, and (4) the teacher was committed to student success. These themes resonate with previous literature regarding authentic assessment. Mr. Jones utilized a progressive hierarchy of skills to teach students skills (Wiggins, 1989), providing them with knowledge and abilities that will be useful when solving problems in the workforce (McCormick & Pressley, 1997; Wiggins & McTighe, 2008). Employing authentic assessments in his courses is more than an action performed to simply have grades to enter. Mr. Jones truly cared for his students and their success and spent considerable time assessing student work and providing feedback for continuous improvement. Janesick (2006) identified feedback for improvement as a central concept of authentic assessment. Additionally, Mr. Jones employed authentic assessment strategies weekly in his program, allowing for multiple data points of student progress and areas in need of improvement (Wiggins & McTighe, 2008). Due to the nature of case studies, no generalizations are attempted beyond what readers can transfer to other similar situations (Stake, 1995).

## Recommendations for Practice and Research

Based on the findings, Mr. Jones should continue to serve as a role model for preservice teachers to be an exemplar of authentic assessment techniques through being a cooperating teacher and by offering professional development workshops to other teachers. The Oklahoma Department of Career and Technology Education should take advantage of Mr. Jones' expertise in employing authentic assessment in agricultural mechanics by inviting him to offer professional development activities based on his teaching methods. Additionally, Oklahoma State University agricultural education faculty should invite Mr. Jones to serve as a guest speaker regarding teaching and learning in the agricultural mechanics laboratory. Teacher education programs in other states should identify inservice teachers who are exemplars at employing authentic assessment and utilize them to teach preservice teachers how to implement authentic assessment at a high level. Educators in other disciplines, both formal and nonformal, should strive to employ authentic assessments in their respective programs to allow students to face real-world situations and solve problems (Woolfolk, 2004).

Wilson, Floden, and Ferrini-Mundy (2001) reported that pedagogical experiences at the preservice level helped teachers to engage students and deliver effective instruction. Courses in pedagogy help new educators "reorganize their subject matter knowledge into knowledge about how to teach" (Wilson et al., 2001, p. 15). Therefore, to encourage new agriculture teachers to employ authentic assessment in agricultural mechanics, the Oklahoma State University agricultural education program should require preservice teachers to plan facets of a laboratory-based, microteaching lesson, utilizing authentic learning and assessment. Preservice teachers' lessons should include the development of assignments that include clear directions, diagrams, and a scoring rubric to illustrate good practices for authentic assessment. In addition, preservice teachers should teach the lesson to their peers and complete an authentic assessment per the


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microteaching lesson. The preservice teachers should be afforded the opportunity to practice giving constructive feedback during the microteaching experience.

Future research should be conducted to evaluate and refine the pragmatic model of authentic assessment. Additional instructors who implement authentic learning and assessment strategies at a high level should be identified and interviewed to determine if the themes and assertions reported here are consistent in other agricultural mechanics programs. To further solidify the value of authentic assessment, research should be conducted to determine the effect of authentic learning and assessment on agricultural mechanics content knowledge using the Oklahoma end-of-instruction competency examination.

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