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The Effects of an Experiential Approach to Learning on Student Motivation

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Abstract

Student motivation is often an overlooked product of classroom instruction. Researchers have repeatedly called for broader measures to adequately assess and understand the effects of various instructional methods. This study sought to determine the effects of an experiential approach to learning on student motivation, as defined by Keller's (1987) ARCS model. Three research questions were established, and it was concluded that, (a) the type of instruction does not impact student motivation, (b) broad performance measures are not related to student motivation, and (c) learning style is related to student motivation. It was recommended that teachers vary their instruction to meet all learning styles, be purposeful in designing instruction as guided by Keller's (1987) process questions to embed motivation, be aware of preferred teaching roles to be mindful of meeting all learning modes, and include motivation as an educational outcome.

Keywords: agricultural education, experiential learning, direct instruction, successful intelligence, practical skills, creative skills, analytical skills

Introduction

Education in America is under constant duress to produce high quality, high achieving students who perform well academically (Furgeson, 2004). This expectation can become burdensome for teachers who are accused of producing underperforming, underwhelming students who simply are not equipped academically for life after high school (National Association of Secondary School Principals, 1996, 2004). Because of this pressure, the implication for teachers is to continue cramming additional information into the minds of their students in hopes that the tide will turn on their performance measures (Futrell, 2010). However, the fact that students underperform in school may have more to do with a lack of effort than a lack of ability. Legault, Green-Demers, and Pelletier (2006) stated, "one of the most prominent academic problems plaguing today's teenage youth is a lack of motivation toward academic activities" (p. 567). Lens and Decruyenaere (1991) argued secondary education students simply do not possess the necessary motivation to complete the schoolwork required of them.

Unfortunately, because students lack appropriate motivation to succeed in school, they have been dubbed underachievers (McCoach & Siegle, 2003). Although today's educational system is designed around measuring student academic performance, Dewey (1938) warned

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educators to not become overly fixated on performance measures to the point that they forget about the total student. To stress his point, he posed the question,

> What avail is it to win prescribed amounts of information about geography and history, to win ability to read and write, if in the process the individual loses his own soul: loses his appreciation of things worthwhile, of the values to which these things are relative; if he loses desire to apply what he has learned and, above all, loses the ability to extract meaning from his future experiences as they occur? (p. 49)

Students underachieve for a variety of reasons. Chief among them are a low self-perception to attain the requirements, a poor attitude toward the total educational system, and a general lack of motivation to perform (Dowdall & Colangelo, 1982; Reis & McCoach, 2000; Whitmore, 1982). However, the blame cannot be placed entirely on students. Teachers have a role to play regarding their students' motivation. Students in a secondary agricultural education program attributed their lack of motivation as apathy due to "mediocre teaching" and "the absence of learning purpose" (DeLay & Swan, 2014, p. 106).

Understanding what motivates students to perform is imperative to all secondary education teachers, administrators, and policy makers (Legault et al., 2006). In agricultural education, inquiry-based instruction (Thoron & Burleson, 2014), and active learning (Mueller, Knobloch, & Orvis, 2015) have yielded positive motivational outcomes. Chumbley, Haynes, and Stofer (2015) concluded that motivation to learn science was primarily prompted through the extrinsic motivation associated with grades. Though these studies have provided insight, a dearth of research related to motivational outcomes exists in agricultural education.

Although student intelligence (Sternberg & Gringorenko, 2004) and performance measures (Dweck, 1986) have received the bulk of the attention in the literature regarding student achievement in secondary education settings, motivation is an important construct that has been forgotten and overlooked (Steinmayr & Spinath, 2009). Though not one of the three core skills, student motivation has been discussed as a key product of teaching for successful intelligence. "Because teaching for successful intelligence reaches more students' patterns of abilities, the students are more likely to be intrinsically motivated to succeed in their own work" (Sternberg & Grigorenko, 2004, p. 277).

Most research on effective teaching and learning analyzes the performance of particular cognitive tasks and skills needed to complete those tasks (Dweck, 1986). This one-dimensional perspective, also referred to as a cognitivist view, fails to account for the notion that "almost all human activity, including thinking, serves not one but a multiplicity of motives at the same time" (Neisser, 1963, p. 195). Motivation is defined generally as, "that which accounts for the arousal, direction, and sustenance of behavior" (Keller, 1979, p. 27). Specifically, Steinmayr and Spinath (2009) shared that, "motivation is one of the constructs thought to cover a share of school performance variance not explained by intelligence" (p. 80). Therefore, the need to study the construct of motivation and its effect on student performance is both necessary and essential.

Theoretical/Conceptual Framework

Keller's (1987) ARCS Model of Motivation serves as the primary theoretical frame of this study. Kolb's (1984) Experiential Learning Theory (ELT) also plays an important role in setting the context for the treatment conditions in this experiment.

Keller's ARCS Model of Motivation

"Seldom do the arguments about the boundaries of teachers' responsibilities, or whether teaching is an art or science, become more animated than when discussing the motivation of students" (Keller, 1987, p. 2). The idea of motivation in the classroom is complex and educators, in general, struggle to move from theory to practice when seeking to improve motivation. As such, Keller (1987) asked two fundamental questions: (a) Is it possible to synthesize numerous concepts and theories of motivation into a simple, meaningful model or schema that would be useful to the practitioner? and (b) Is it possible to develop a systematic approach to designing motivating instruction? These questions led to the development of the ARCS Model (Keller, 1984) which sought to improve student motivation through the design of better instruction. ARCS represent the four conceptual categories of motivation: (a) attention, (b) relevance, (c) confidence, and (d) satisfaction (see Table 1). The ARCS model is based on the macro theory of motivation and instructional design developed by Keller (1979, 1984), and is grounded in the expectancy-value theory, as defined by Tolman (1932) and Lewin (1938).

Table 1

Keller's (1987) Motivational Categories of the ARCS Model

Categories and Subcategories	Process Questions
(A) Attention	
A.1 Perceptual Arousal	• Was student interest captured?
A.2 Inquiry Arousal	• Was an attitude of inquiry stimulated?
A.3 Variability	• Did instruction maintain student attention?
(R) Relevance	
R.1 Goal Orientation	• Were the learners' needs met?
R.2 Motive Matching	• Were learners provided with appropriate choices, responsibilities, and influences?
R.3 Familiarity	• Was instruction tied to learner's experiences?
(C) Confidence	
C.1 Learning Requirements	• Was a positive expectation of success built?
C.2 Success Opportunities	• Did instruction build or support students' belief in their competence?
C.3 Personal Control	• Did learners clearly know their success was based on personal efforts and abilities?
(S) Satisfaction	
S.1 Natural Consequences	• Were opportunities for learners to use their newly acquired knowledge/skill provided?
S.2 Positive Consequences	• Was adequate reinforcement of learner's successes provided?
S.3 Equity	• Was a positive feeling about their accomplishments anchored to the experience?

Expectancy-value theory (Eccles, Adler, Futterman, Goff, Kaczala, Meece, & Midgley, 1983) was built on the work of Atkinson (1957), Battle (1965), Crandall (1969), Feather (1982), and Wigfield and Eccles (1992), and has been one of the most important views on the nature of achievement motivation in the classroom (Wigfield, 1994). The theory explains that people are motivated to engage in an activity if it is perceived to be in alignment with their personal needs – the *value* aspect. In addition, students have expectancies for success, which is defined, as the individual's beliefs about how well he or she will perform on an upcoming task – the *expectancy* aspect. In the original ARCS model (Keller, 1979), *value* and *expectancy* framed the four conceptual categories. Subdividing the value category into two categories called *interest* and *relevance* further distinguished constructs dealing primarily with curiosity and arousal and those focusing on a need for achievement. Expectancy remained, and the final category was named *outcomes* referring to the reinforcing value of instruction. Each category was renamed in the modern ARCS model (Keller, 1984) as to strengthen the central feature of each component and to generate a useful acronym.

The ARCS model defines four major conditions that have to be present for people to become, and remain, motivated. Keller's (1987) operationalization of the four conditions is depicted in Figure 1. Attention is the first of these conditions and is a prerequisite for learning. The motivational goal is to not only obtain or acquire students' attention, but to sustain it over time. Relevance is the second condition in the ARCS model and is related to answering the question, why do we have to learn this? This condition can emerge from the way teaching transpires, and is not dependent solely on the planned curriculum. The third condition for motivation is confidence. It refers to the differences in students' belief that they can achieve success in the task at hand. This is connected tightly to Dweck's (1986) research related to entity and incremental beliefs of a person's ability. Confident students believe they can accomplish their goals by means of their actions (Bandura, 1977; Bandura & Schunk, 1981) while students who exhibit low confidence have more of an ego involvement leading to a desire to impress others and avoid failure (Dweck, 1986). The final condition is satisfaction, which incorporates the factors that make students feel good or bad about their accomplishments. Students are more satisfied if the task reward is clear and effective reinforcement is delivered.

Following the development of the ARCS model, Keller (2006) exerted two motivational measurement instruments – the Course Interest Survey (CIS) and the Instructional Materials Motivation Survey (IMMS). "Both surveys are situational measures of student motivation to learn with reference to a specific learning condition such as an instructor facilitated learning environment, a self-paced print module, or a self-directed e-learning course" (Keller, 2006, p. 1). The goal of these measures is not to capture students' generalized levels of motivation toward school learning, but rather to find out how motivated students are, were, or expect to be, in a particular course. Keller (2006) expected these measures to be effective in assessing the motivation of secondary education students within the ARCS framework. Student motivation is the final element that is associated with the broader view of achievement purported by Sternberg (1999a) in his theory of Successful Intelligence. These elements of performance are helpful in casting a broader net when seeking to understand the effects of instructional methods better.

Kolb's Experiential Learning Theory

Agricultural education has been uniquely situated to capitalize on learning through experience for well over 100 years (Baker, Robinson, & Kolb, 2012; Knobloch, 2003; Phipps, Osborne, Dyer, & Ball, 2008; Roberts, 2006). Though experiential learning holds a myriad of meanings, it is operationalized in this study through Kolb's (1984; 2015) Experiential Learning Theory, whereby all learning is experiential and includes four primary learning modes: (a) concrete experience, (b) reflective observation, (c) abstract conceptualization, and (d) active experimentation. Information is grasped through either apprehension or comprehension, and transformed through either extension or intention (Kolb, 1984; 2015). The resolution of this dualistic tension is the impetus of learning (Kolb, 1984; 2015).

Experiential learning theory is built on six propositions: (a) learning is a process, not a set of outcomes, (b) all learning is ultimately re-learning, (c) learning involves the resolution of conflicts, (d) learning is a holistic process, (e) learners learn when interacting with their environment, and (f) learning involves the process of creating knowledge (Kolb, 2005). Stable and enduring patterns of human individuality arise from consistent patterns of transaction between the individual and his or her environment resulting in learning preferences (Kolb, 1984; 2015). Individual preferences can be categorized as accommodating, assimilating, converging, or divergent based on preferences for the modes of transforming and grasping information.

Purpose of the Study

The purpose of this study was to examine the effects of an experiential learning approach to instruction, as compared to that of direct instruction, on secondary agricultural education students' motivation. Further, the study sought to examine the relationship between motivation and achievement in academic settings, as often discussed in the motivational literature (Dweck, 1986). This research aligns with the National Research Agenda of the American Association for Agricultural Education (Roberts, Harder, & Brashears, 2016) Priority Area 4 – Meaningful, Engaged Learning in All Environments. Most notably, the findings of this study further the examination of the role of motivation in developing engaged learning experiences across all agricultural contexts.

Research Question and Hypothesis

Three research questions framed this study:

1. What differences in student motivation exist, according to the ARCS conceptual framework, between experiential learning and direct instruction treatment groups?
2. What relationship exists between performance measures of successful intelligence and student motivation as defined by the ARCS conceptual framework?
3. What relationship exists between learning styles, as defined by Kolb's KLSI 3.1 (1999), and overall ARCS motivation for a course?

Following the conventions of experimental design (Kirk, 1995), one research hypothesis accompanies research question one:

H_O 1: There is no difference in students' levels of motivation between the experiential learning and direct instruction approaches to learning.

Methods and Procedures

The population of interest in this experimental design (Kirk, 1995) study was all students enrolled in secondary agricultural education at [City] High School in Oklahoma ($N = 120$). The agricultural education program in [City] is situated in a rural community with a population of approximately 46,000 people (*www.city-data.com/city/[city's name]-Oklahoma.html). The entire program was selected to serve as a representative sample of a typical agricultural education program in Oklahoma. Though this sampling decision is limiting in generalizability, it is intended* *to reduce bias by reducing the number of nuisance variables associated with varying social contexts of schools and communities. A sample of 87 students completed IRB consent and assent forms and participated in the full study. Through random assignment, 45 students were assigned to the experiential treatment and 42 were assigned to the direct instruction treatment.*

Wind turbine design served as the content for which the treatments were designed. This specific subject was chosen for three reasons: (a) it is aligned with current Agricultural Food and Natural Resources (AFNR) standards, (b) it included adequate agricultural and science, technology, engineering, and math (STEM) concepts, and (c) it had not been taught by the instructors of the [City] agricultural education program. To maintain experimental control, a full unit of instruction was delivered during a four-hour period, rather than the typical classroom delivery requiring five 45-minute sessions.

Instruction was purposefully designed to create two, high quality, instructional approaches true to both experiential learning and direct instruction practices (see Table 1). Direct instruction, known as the most longstanding and comprehensive instructional approach in schools today (Begeny & Martens, 2006), follows a very scripted five stage process intended to promote sequential development of student competencies (Becker, 1992; Gersten, Carnine, & White, 1984; Joyce & Weil, 2000; Moore, 2007; Pearson & Gallagher, 1983; Rosenshine & Meister, 1992; Vygotsky, 1978). The experiential learning approach to learning moved students through the four stages of ELT (Kolb, 1984) which included stations of experiences related to the course objectives, guided reflection related to the various experiences, abstraction guides that led students to the abstract concepts of interest, and opportunities for experimentation and evaluation of progress (Wurdinger, 2004).

Table 2

Brief Overview of Instructional Plan for Two Conditions of Instruction

Experiential Learning Instructional Approach	Direct Instruction Instructional Approach
Students interacted with six stations related to key concepts of blade design where instructors served as facilitators.	Students received three instructional sessions targeting specific learning goals.
Students were asked to reflect on each station using two questions: (a) What is happening? (b) What does this teach you as you build your own blade design? Instructors facilitated this reflection and provided content expertise.	Instruction was based on a scripted lesson plan focused on developing mastery of the objectives put forth in the plan. This plan included pre-planned discussion questions and learning activities.
Students utilized abstraction sheets to connect their reflective observations to abstract concepts outlined in the objectives. Instructors served as content experts.	Instructors provided critical information followed by a chance for students to apply their knowledge in a large group (N = ~5), smaller group (N = ~2), and then individually.
Students were allowed to experiment actively with their own conclusions by building and testing a number of blade designs. Instructors served as evaluators and coaches.	Instructors provided immediate and constant praise based on student performance.
	KidWind® materials were used to demonstrate key principles.

Successful Intelligence and Learning Style Measures

Though not the primary focus of this study, to provide context and confidence in analysis of research question two, brief descriptions of the measures of successful intelligence and learning style measures are warranted. Successful Intelligence, as purported by Sternberg (1999), is a more holistic measure of student achievement and includes three factors: (a) creative intelligence, (b) practical intelligence, and (c) analytical intelligence. Sternberg (1999) explained these four constructs should be measured in the context of which they occur. As such, measures were created to capture the three types of intelligence in the context of the wind energy unit of instruction.

The measurement of creativity followed Torrance's (1974) originality conventions. First, it was important to identify all ways students could be divergent in their blade design. Students could alter their designs by changing the blade length, blade pitch, blade shape, number of blades, and materials used to make the blades. An additional category of *elaboration* was included for divergent design elements not comprised within the five categories, making a sixth element. Two pictures were taken of each blade design created by the participants, which were assessed on the six divergent elements. The purpose of this assessment was to create a frequency of each design element choice, determine a percentage of designs sharing that choice, and create a divergent score for each blade design. Ultimately, a statistical scoring process was utilized to determine the level of divergence of each design. Each participant's design was scored on the six elements, and those scores were added to achieve the overall creativity score utilized in the analysis.

Sternberg and Grigorenko (2004) explained that practical knowledge requires students to apply, use, put into practice, implement, employ, and render practical what they know. The practical assessment used in this study was an authentic assessment that represented the most logical extension of the lesson – to design, build, and test a wind blade design using materials provided by the instructors. Each student was provided a universal hub and was asked to create a hub design in one hour intended to produce the most voltage possible using a common bank of materials. Each blade design was attached to a model tower containing a small generator, which was placed in front of a fan set at a constant speed. The voltage output was measured using a voltage meter. All variables, aside from the design of the blade, were held constant, and each voltage output was recorded.

Analytical intelligence was measured using a criterion-referenced test based on the selected objectives of the KidWind® blade design curriculum. The Analytical Wind Energy Assessment (AWEA) was created collaboratively by the research team and the KidWind® staff and consultants. The AWEA included 40 questions and was examined for face and content validity by a panel of experts including students, KidWind® staff, and expert educators (Creswell, 2008). The role of reliability indices in criterion-reference examinations has been described adequately in the literature (Kane, 1986; Lang, 1982; Popham & Husek, 1969; Wiersma & Jurs, 1990). The Kuder-Richardson 20 (*KR20*) formula (Cronbach, 1970), a test for internal consistency used commonly with criterion-referenced exams, yielded reliability coefficients of .82 for the pre-test and .90 for the post-test – both indices sufficiently exceeded the .50 benchmark set by Kane (1986).

Kolb's (1999) KLSI 3.1 is one of the most influential and widely distributed instruments used to measure individual learning preference (Kayes, 2005). The KLSI is based on Kolb's (1984) ELT, where learning consists of four constructs – CE, RO, AC, and AE. This instrument includes twelve sentence stems followed by four possible sentence endings. Subjects rank each of the four endings based on their preference for using the four modes. This procedure results in a 48-response instrument that is self-reported and self scored. A total score was tabulated for each learning mode, and then combined scores for each of the dialectically opposing modes of grasping and transforming (Kolb, 1984) were calculated. Kayes (2005) analyzed the current version, KLSI 3.1, for internal reliability and found Cronbach's alphas ranging from .77 to .82 for each of the four-dimensional constructs and .77 to .84 for the grasping and transforming constructs, respectively. Thus, it was determined that the KLSI 3.1 was a reliable and valid measure of learning style in this study.

Instructional Materials Motivation Survey

Keller (2006) developed the IMMS as a "situational measure of students' motivation to learn with reference to a specific learning condition" (p. 1). The instrument was designed in correspondence with the ARCS Model (Keller, 1987) based on current literature on human motivation (Keller, 1979, 1984). "The goal with these instruments is to find out how motivated students are, were, or expect to be, by a particular course" (Keller, 2006, p. 1). The IMMS can be used with adults, college students, and secondary students. The instrument contains 36 statements related to the four conditions that must be met for people to become and remain motivated: (a) attention, (b) relevance, (c) confidence, and (d) satisfaction. Subjects respond using a summated rating scale indicating that each statement is: (1) not true, (2) slightly true, (3) moderately true, (4) mostly true, or (5) very true. The scoring guide indicates which construct each statement measures and notes those statements that are reverse coded.

The instrument can be scored for each of the subscales or added for a total motivation score. Bivariate correlation analysis indicated high correlations between each subscale and the overall motivation score; so, it was decided to use the total motivation score as the indicator of motivation for statistical analysis. The reliability estimates of the attention, relevance, confidence, satisfaction, and total scores, as measured through Chronbach's alpha, were .89, .81, .90, .92, .96, respectively. Internal reliability was determined to be adequate.

Analysis of Data and Potential Threats to Validity

The first research question utilized an omnibus MANOVA to detect differences in motivation between the two treatment groups. The second and third research questions were analyzed as multiple correlation analysis (MCA), rather than multiple regression analysis (MRA), as described by Huberty (2003). The intention of the regression analysis was to identify the *relationship* between a system of variables that should help define a construct (Huberty, 2003). Though SPSS does not make the MCA-MRA distinction, attention to the differences are evident in the method of reporting and interpreting the analyses.

Data were analyzed using Statistical Package for Social Sciences (SPSS©) version 20 for Macintosh computers. Using histograms and P – P plots, as suggested by Field (2009), all dependent variables were normally distributed prior to analysis. Partial eta squared is the reported effect measure in this study. Cohen (1977) characterized $\eta_p^2 = .01$ as a small effect size, $\eta_p^2 = .06$ as a medium effect size, and $\eta_p^2 = .14$ as a large effect size. Campbell and Stanley (1966) identified four categories of threats: (a) statistical conclusion validity, (b) internal validity, (c) construct validity of causes and effects, and (d) external validity. Steps were taken to mitigate each of these threats. Each of the assumptions required when utilizing MANOVA were tenable as each observation was collected independently, data were normally distributed, and Levene's test for the equality of error variances yielded *p* values less than .05.

Findings

The mean motivation scores, with standard deviations in parentheses, for the experiential learning treatment (*n* = 45*)* were 3.41 (.59) for attention, 3.35 (.08) for relevance, 3.72 (.10) for confidence, 3.78 (.11) for satisfaction, and 14.26 (1.82) for aggregate motivation. The mean motivation scores for the direct instruction treatment (*n* = 42) were 3.37 (.54) for attention, 3.38 (.08) for relevance, 3.72 (.10) for confidence, 3.48 (.11) for satisfaction, and 13.96 (2.03) for aggregate motivation. The omnibus multivariate analysis (see Table 2) yielded no statistically significant differences of motivational measures between the experiential learning and direct instruction treatments. As such, we failed to reject the null hypothesis, and analysis related to research question one ceased.

Table 3

Summary of Omnibus MANOVA Analysis Testing for Main Effects of ARCS Motivational Subscales of the Treatment Conditions (*df* = 86)

Source of Variance	Λ	F	p	η_p^2
Treatment Group	.92	1.70	.16	.08

The MCA analysis for the second research question yielded a non-significant R^2 value with only seven 7% of variance in motivation explained by performance measures (see Table 3). However, one statistically significant low relationship (Davis, 1971) was found ($r = .22$, $p = .02$) between the practical performance measure and student motivation for the content. Semipartial correlations indicated a unique contribution of .18 ($r_{m(p.ca)} = .18$, $p = .11$) when controlling for both creative and analytical measures.

Table 4

Summary of Multiple Correlation Analysis for Successful Intelligence Performance Measures and Student Motivation

Coefficient of Determination	Performance Measure	*r*	Semipartial *r*
$R^2 = .07$; $p = .12$	Creative	.08	.09
	Practical	.22*	.18
	Analytical	.16	.15

* $p < .05$

The MCA analysis for the third research question yielded a significant R^2 value with 14% of the variance in motivation attributed to a linear combination of learning style measures (see Table 4). Further correlation analysis elucidated the relationship as the Active Experimentation (AE) learning preference was highly correlated to motivational measures ($r = .30$, $p = .00$). Semi-partial correlation analysis indicated a unique contribution of .20 ($r_{m(a.arc)} = .20$, $p = .06$) indicating that although AE was moderately correlated (Davis, 1971) to motivation measures, it was the collective system of variables that led to explaining of the motivational construct.

Table 5

Summary of Multiple Correlation Analysis for Learning Style and Student Motivation

Coefficient of Determination	Learning Style	*r*	Semipartial *r*
$R^2 = .14$; $p = .02$	CE	.17	.10
	RO	.07	.14
	AC	.07	.14
	AE	.30**	.20

** $p < .01$

Conclusions, Discussions, and Implications

Conclusion 1: Experiential learning and direct instruction approaches to learning produce similar student motivation outcomes.

This conclusion is inconsistent with existing literature regarding student motivation. Stout (1996), Weinberg, Basile, and Albright (2011), and Specht and Sandlin (1991) all found students involved in experiential instruction were more motivated by the course, had a more positive outlook on accounting careers, were more interested in the content, and had a salutary impact on career specialization. Keller (1987) purported, "relevance can come from the way something is taught; it does not have to come from the content itself" (p. 7). In this study that case was simply not true. Agricultural education often prescribes to the notion that experiential learning is somehow a superior approach. Though Mueller, Knobloch, and Orvis found gains in satisfaction when students are taught "actively," that was not the case in this examination. In reference to student performance measures, the superior notion would be true (Baker & Robinson, 2014a); however, in reference to motivation, educators who prefer a more directed and teacher led approach could find the same motivational outcomes as those employing experiential approaches.

Gay, Mills, and Airasian (2009) implied student motivation might be related to the novelty effect, which they defined as the, "increased interest, motivation, or engagement participants develop simply because they are doing something different" (p. 250). Though the clinical nature of the treatments provided a reduction of bias, it also could have created a synthetic learning environment. Perhaps being conducted in a context outside of the traditional school setting caused this unexpected equalization of motivational effect.

Conclusion 2: Successful intelligence performance measures, as a system, are not related to student motivation.

Though a number of studies have concluded that motivational measures are related to school achievement (Gose, Wooden, & Muller, 1980; Schicke & Fagan, 1994; Spinath, Spineth Marlaar, & Plomin, 2006), few have investigated the importance of motivation on measures beyond intelligence (Steinmayr & Pinath, 2009). In contrast, a number of studies have concluded that being a high achiever does not appear to relate directly to student motivation (Dweck, 1986). The conclusion of this study supports the latter in that, in this population, motivation does not relate to achievement as defined by Sternberg's (1999) triarchic approach.

At face value this conclusion seems to be an encouraging conclusion. In agricultural education, there are numerous opportunities for positive achievement affirmation through Career Development Events (CDEs), authentic assessments in classrooms and laboratories, proficiency award programs, and team projects. There also are an equal number of opportunities for students to experience obstacles, failure, and unrealized potential. In this population, either result should not affect students' motivation for the course. Another plausible rationale, as discussed by Dweck (1986), is that student motivation is more cumulative in nature. Though this one-day treatment had no effect on student motivation, what would prolong exposure to either academic success or failure have on these same ARCS measures? "Our experimental studies may create conditions that good students will encounter fully only in later years but that reveal underlying patterns" (p. 1044). Could it be that the statistically significant, but low, correlation between practical performance and motivation is just that – an indication of a trend that would be realized fully over time. If so, student success in practical tasks, such as supervised agricultural experience programs, independent projects, science projects, job interviews, and contest results, could be related to students' motivation for the course content – agriculture.

Conclusion 3: Kolb's learning styles, as a system, are related to student motivation.

JilardiDamavandi, Mahyuddin, Elias, Shafee, and Shabani (2011), in reference to studies of learning styles and performance, explained it was imperative to utilize measures beyond standard examinations because the differences between learning style products are not detectible without broader assessments. Based on the findings of this study, motivation is one such measure. The learning style scales, as a system of measures, explained 14% of the variance in motivation. Extrapolated to the context of this population, students entered the classroom with inherent learning preferences that did not affect their performance (Baker & Robinson, 2014), but did relate to their motivation for the course content. In a subsequent study of this same population, Baker and Robinson (2014) reported that over one-half of the students held an accommodating learning preference and 20% held a divergent learning preference. If this population is representative of the general makeup of secondary agricultural education students, a systematic motivational bias is embedded into the system. The implication of this finding points toward variability in instruction to ensure that students of all learning styles remain motivated.

The correlation between the AE learning style and student motivation also warrants discussion. Though the partial correlations seem to indicate all four scales explain a unique portion of variance, the AE scale is the highest performing subscale. One conclusion is that a student's AE score is most related to motivation. However, an additional explanation could be that there is a much larger group of students who prefer to transform via extension. As such, it makes sense that this largest subset of students would be motivated by the nature of both treatments. As discussed earlier, both treatments were designed to be polarizing approaches, but also were carefully crafted to be high quality and engaging. Though the opportunities for application and experimentation were quite different, both treatments included carefully planned and executed application pieces – a practice quite favorable for the AE learning style. Perhaps these students found both treatments a bit more engaging in this application dimension than their normal classroom experiences, and consequently, had a short-term spike in motivation resulting from these high quality instructional approaches. Once again, the concept of good teaching is good teaching seems to be a factor in this conclusion.

Recommendations for Practice and Research

First, it is important to note the limitations of this study. Though the clinical nature of this study strengthened the ability to identify causation, it also can limit generalization to a natural classroom setting (Creswell, 2008). This study also utilized a secluded population to reduce nuisance variables which can limit generalizability. As such, we encourage readers to interpret these findings with the clinical experimentation in mind.

Based on the findings of this study, a number of recommendations are made for secondary based agricultural educators and those training pre-service teachers. First, the results of this study seem to support the notion that good teaching, regardless of the approach, results in motivation for a given subject. As suggested by Rosenshine and Furst (1971), the elements of clarity, variability, enthusiasm, task orientation, and opportunities for application might be more important than the specific approach. Teachers and teacher educators should introduce various methods, but emphasis should be placed on quality delivery of the method.

Second, teachers should be aware of their preferred teaching roles and use that awareness to purposefully design instruction intended to target preferences of different learners. Results of this study indicated that a student's learning style impacts their motivation for a subject. Secondary based agricultural educators should be mindful about giving each mode of learning adequate attention to increase the chances of motivating all students.

Third, teachers and teacher education programs should utilize Keller's (1987) process questions, which are related to each of the ARCS elements, to design instruction that is motivational in nature regardless of the method selected. Careful attention was given to designing two high quality treatments that met the tenants of Keller's (1987) model, and as such, both methods were motivating. Finally, motivation should be an important product of interest when measuring the effectiveness of instruction. Assuming motivation for a given subject is related to performance indicators is erroneous, as they are two separate educational products.

Though this study provided conclusions related to the stated research questions, a number of additional research questions arose as a product of this research. These research questions include: (a) What motivational effects result from an experiential approach to learning in a typical school context over a longer period of time? (b) What are the cumulative motivational impacts of successes and failures over time? (c) Is there a systematic difference in agricultural educators teaching style that could thus affect student motivation?

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