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# Understanding Characteristics, Uses, Perceptions, and Barriers Related to School Farms in Oregon

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**Abstract**

*The relevance of experiential learning and opportunities a school farm can provide, along with the acknowledgment of potential barriers and the current deficit of research on school farms in Oregon make this study useful as a starting point in this line of exploration and in the preparation of teacher candidates. This study intended to gather descriptive data concerning school farms to gain a better understanding of the characteristics, uses, perceptions, and barriers to utilizing school farms as an experiential learning tool for students. Williams and McCarthy (1985) indicated utilizing school farms as a teaching-learning resource could benefit agricultural education programs, and Rose (2004) suggested we begin to reconsider how the school and workplace are connected. Approximately half of the agricultural education teachers in Oregon have access to a school farm. The primary facilities available on Oregon school farms were for equipment and tool storage and animal projects, with SAE and laboratory instruction being the main uses for students. Factors and barriers consist of the condition of the school farm, facilities, finances, and the ability of the teacher to oversee and to engage all students in the activity.*

**Keywords:** school farms; perceptions; barriers; uses; characteristics; theory of planned behavior; experiential learning

## Introduction and Review of Literature

"Due to the increasing gap between the general public and production agriculture there is an increasing need for agricultural education taught utilizing the experiential learning theory" (Gilbert, 2013, p. vi). Agricultural education teachers have utilized laboratories as a means to facilitate Supervised Agriculture Experience (SAE) programs and experiential teaching and learning since the inception of the Smith-Hughes Act of 1917 (Croom, 2008; Shoulders & Myers, 2013). It has been recommended teacher preparation and in-service teacher programs reconsider the breadth and depth of SAE and experiential learning education (Retallick, 2010; Shoulders & Myers, 2012). Williams and McCarthy (1985) indicated utilizing school farms as a teaching-learning resource could benefit agricultural education programs, and Rose (2004) suggested we begin to reconsider how the school and workplace are connected.

A national survey of NAAE members by Shoulders and Myers (2012) found agricultural laboratories and frequent utilization of those facilities to be prevalent in agricultural education programs. In addition, it was recommended teacher preparation programs create instructional

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strategies to expose pre-service teachers to varied agricultural laboratories prior to entering a teaching career (Shoulders & Myers, 2012). While previous state-specific studies have been done in Oklahoma (Young & Edwards, 2005), regionally in Arizona (Franklin, 2008), and across a sample of Texas teachers (Gilbert, 2013), no state-specific study of school farms had been conducted in Oregon. In fact, in recommendations for future research, Gilbert (2013) calls for this study to be replicated in other states to "build the knowledge… on school farms across the country" (p. 75). This study intended to gather descriptive data concerning school farms in Oregon, to gain a better understanding of the characteristics, uses, perceptions, and barriers to utilizing school farms as an experiential learning tool for students. We defined a school farm as any type of land laboratory and/or feeding facility, regardless of the size, including field crops, greenhouses, livestock facilities, orchards, and ponds.

Knobloch (2003) defined experiential learning as "learning in real-life contexts that involves learners in doing tasks, solving problems, or conducting projects" (p. 26). Experiential learning has historically been considered "a foundational tenet of agricultural education" (Baker, Robinson, & Kolb, 2012, p. 1). Additionally, Ramsey and Edwards (2011) indicated agricultural education programs are set apart from other programs because of the work-based learning experiences they can provide. Knobloch (2003) building on the work of Kolb (1984) found the four tenets of experiential learning in agricultural education to be: learning through real-life contexts, learning by doing, learning through projects, and learning through solving problems. In *The Handbook on Agricultural Education in Public Schools*, Phipps, Osborne, Dyer, and Ball (2008) explained the purpose of agricultural education as preparing people for agricultural occupations, job creation, and agricultural literacy. The literature base clearly highlights the importance of experiential learning in agricultural education programs.

Prior research has also indicated potential barriers to experiential learning in agricultural education, especially related to utilizing school farms and laboratories. Williams and McCarthy (1985) posited that providing practical learning experiences for a diverse group of students may be difficult, and Thompson and Balschweid (1999) identified barriers limiting the integration of academic and agricultural education. In addition, Retallick (2010) determined changing demographics and societal attitudes, structure of schools, available resources, image, and the agricultural education system as factors limiting SAE programming; while Shoulders and Myers (2012) reinforced the notion of situated barriers (e.g., teacher competency) to utilizing laboratories to improve the scientific inquiry and problem-solving abilities of students. Organizing, developing, managing, and maintaining facilities, were identified as problems or concerns facing pre-service, in-service, and beginning teachers (Myers, Dyer, & Washburn, 2005; Stair, Warner, & Moore, 2012); and Saucier, Vincent, and Anderson (2014) found teachers in need of continuing education related to laboratory safety. Likewise, Farrell (1983) acknowledged the amount of time required of the teacher as a significant drawback to utilizing a school farm.

Additional laboratory facilities offer students from diverse backgrounds, the opportunity for hands-on learning to apply classroom concepts and enhance their base agriculture knowledge (Shoulders, Wilder, & Myers, 2011). Retallick (2010) found agricultural education teachers to be very adept at conceptualizing SAEs and their place within an agricultural education program however, the data indicated teachers largely fail to implement SAE programs effectively, a disparity between theory and practice. Furthermore, Retallick (2010) discovered a disconnect between learning and experience in modern agricultural education, illustrating the lack of focus on student learning outcomes. Traditional agricultural education classrooms are seeing increasing numbers of urban raised students which is and should be causing teachers to change their teaching approach (Phipps, Osborn Dyer, & Ball, 2008; Shoulders, Wilder & Myers, 2011).

Supervised Agricultural Experience (SAE) programs have been linked to agricultural education since the Smith-Hughes Act of 1917 (Roberts & Harlin, 2007). Once referred to as the project method, SAE programs have become an important piece of the agricultural education model. There is no shortage of literature attesting to the importance of SAE programs and the opportunity to use innovative experiential learning activities to meet the needs of diverse populations of students (Williams & McCarthy, 1985). School farms may potentially offer a place for agricultural education teachers to expose their students to numerous experiential learning activities.

The purpose of this study was to identify characteristics and types of school farms in Oregon and identify factors and/or barriers to utilizing school farms for experiential learning and SAE projects. This research fits National Research Agenda priority number five with a focus on efficient and effective agricultural education programs (Roberts, Harder, & Brashears, 2016). This information will be used by teacher educators to provide support to inservice agricultural educators who have school farms, as well as to better prepare preservice teachers on how to utilize school farms to their full potential for experiential learning purposes. The results from the study can be shared with other stakeholders including the Oregon FFA, local and state FFA Alumni, school administrators, and school boards to provide support for agricultural educators and school farms.

## Theoretical Framework

In order to further explore how school farms are utilized for experiential learning in Oregon, we used the Theory of Planned Behavior (Ajzen, 1991) as a theoretical framework. Ajzen (1991) theorized that the intent to perform behaviors can be "predicted with high accuracy from attitudes toward the behavior, subjective norms, and perceived behavioral control" (p. 179). The resulting intentions, combined with perceived behavioral control, can account for variance in the actual behavior (Ajzen, 1991). Developed as an extension of the Theory of Reasoned Action (Fishbein & Ajzen, 1975), the Theory of Planned Behavior (see Figure 1) contains the central tenet that the intention to perform a behavior is an indication of how much effort someone may employ to perform a behavior.

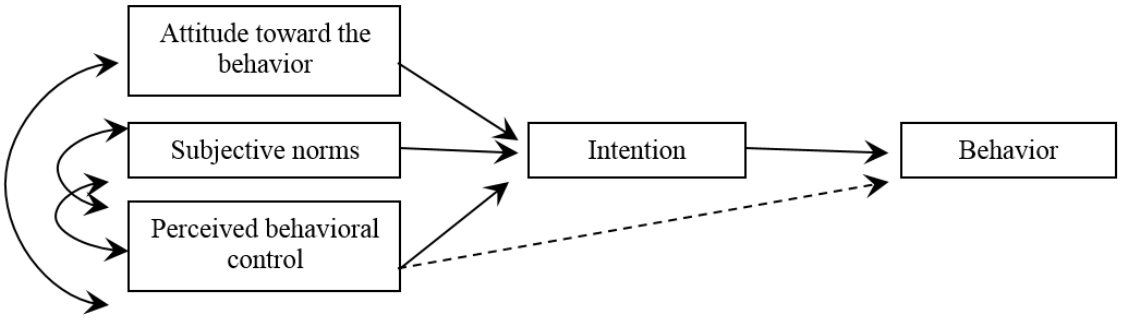


*Figure 1*. Theory of planned behavior by Ajzen (1991).

Rather than utilize the theory as a predictive model, we sought to use the Theory of Planned Behavior as a descriptive model to understand school farms in Oregon and identify the attitudes, subjective norms, and perceived behavioral controls related to utilizing school farms for experiential learning. Ajzen (1991) looks at attitude as whether individual considers an item favorable or unfavorable. In this study we operationalized that to mean attitudes toward utilization

of the school farm for teaching and learning. For example, how do teachers feel about the potential outcomes, benefits, and consequences offered by school farm? The subjective norms are social factors (expectations) that may influence the performance of the behavior (e.g. What am I expected to do and how will I be supported?). The third factor is perceived behavioral control which, in this case, refers to how agricultural educators perceive the ease or difficulty of utilizing the school farm for effective teaching and learning. As we begin to understand how agricultural education teachers perceive the utilization of and barriers to the use of school farms, we can also begin to understand, and perhaps predict, behaviors concerning the potential for school farms to serve as effective teaching and learning facilities. While there have been other studies concerning school farms and agricultural laboratories, there is no literature identifying a state-specific study in Oregon. Given the diversity of agricultural education programs within each state and across the nation, it is critical to pursue this line of inquiry.

## Purpose and Objectives

The purpose of the study was to explore the characteristics, utilization, perceptions, and potential barriers to using school farms for instructional activities, as an experiential learning tool. The objectives were:

1. To determine the characteristics of Oregon school farms (e.g. size, structures, location, management) including their enterprises and primary uses;
2. To identify teacher perceptions of school farms; and,
3. To identify factors and or barriers to using the school farm as an experiential learning tool for students.

## Methodology

In order to explore the research questions, data were collected from agricultural educators across the state to determine characteristics, use, perceptions, and potential barriers to utilizing school farms in secondary agricultural education programs. The study was designed to be descriptive in nature. Leedy and Ormond (2013) define descriptive quantitative research as a means to identify attributes of an observed phenomenon or explore potential associations among two or more phenomena. According to Fraenkel and Wallen (2006), descriptive research involves summarizing the characteristics of individuals, groups, or physical environments, in order to fully and carefully explain a phenomenon, and can be useful as a means to describe teacher behaviors or the physical capabilities of a school.

### Population and Sample

Guided by the assumption programs across the state are diverse, the target population for this descriptive research study was defined as a census of the agricultural educators in Oregon ($N$ = 114). The target population reflects the attitudes, behaviors, and perceptions of agricultural educators across this particular state, and should not be generalized to other populations. All agricultural educators in Oregon had the opportunity to participate in the study. Access to the listserv of secondary agricultural education instructors in the state was available from the Oregon FFA Executive Secretary, and verified by the Agricultural Teacher Education Program Director at Oregon State University. Teachers were contacted three separate times to encourage participation in the study. From the attempted census, the resulting sample was 67 respondents, 64 of which were usable responses, yielding a response rate of 56.14%. No further attempts were made to contact non-respondents, and we acknowledge the potential for nonresponse error. Data reported in these

findings represent the respondents and we caution against generalizing these results to other populations.

## Instrumentation

A survey instrument, developed in Qualtrics, was distributed to all agricultural educators in the state to explore the role of school farms in secondary agriculture programs. This study was modeled after one previously conducted in Texas, utilizing the same instrument with minor modifications to state-specific items. The original instrument was deemed valid by a panel of experts within agricultural education, familiar with the concepts and ideas of school farm use in secondary agriculture programs. Reliability of the original instrument was determined through an initial pilot test. Following minor adjustments, the researchers initiated an additional pilot test. The test-retest method resulted in a 73% agreement (Gilbert, 2013). Creswell (2014) indicated findings above 60% were acceptable. Since no major changes were made to the instrument from the Gilbert study, the researchers did not re-establish reliability for this study. Since none of the scales summate, measures of internal consistency are not appropriate and since we did not ask our respondents to take this instrument twice, we cannot report post hoc levels of test-retest reliability.

The questionnaire was designed to give the researchers a better understanding of characteristics, use, perceptions, and potential barriers to utilizing a school farm, as well as demographics of the agricultural educators (Gilbert, 2013). The first two questions were used to identify current facilities available to the teachers, and whether or not they have access to, or in the previous ten years had access to, a school farm. Respondents who had no experience with school farms ($n$ = 31, 46%) were not required to complete the remainder of the questionnaire. Characteristics identified by the instrument included available facilities, distance from the classroom, approximate size (in acres), approximate years of operation, and management arrangements. School farms were defined as any type of land laboratory and/or feeding facility regardless of the size. Facilities listed in the survey instrument included: classroom (indoor and/or outdoor), field crops, general shop (facilities used for all types of projects), greenhouses, hutches and/or other small animal housing, land laboratory/school farm, landscape facility, livestock housing, orchard, pasture land, and pond/tanks. Percentage of land dedicated to various enterprises, percentages of various livestock enterprises, structures and facilities available, primary use, utilization of time spent on the school farm, and courses in which students were taken to school farm were all assessed as uses of the school farm. To identify teacher perceptions and potential barriers, respondents were asked about planning for activities at the school farm, hours spent working at the school farm, whether or not there were fees and signed agreements associated with student use of the school farm, and community support availability.

## Data Collection and Analysis

Teachers were contacted by email, and invited to participate in the survey. A link to the instrument was included in the email invitation. The initial data collection was completed over a two-week period. A subsequent, follow-up email reminder was sent after two weeks. After two more weeks, participation was requested from non-respondents through a final reminder email. Usable responses were obtained from 64 of 114 teachers for a 56% response rate. The selection of data analysis procedures was guided by the research objectives. Frequencies, percentages, means, and measures of central tendency and variability, were used to describe the characteristics, uses, perceptions, and potential barriers to utilizing school farms in secondary agricultural education programs in Oregon.

## Results

Objective one sought to describe the characteristics of school farms in Oregon. The teachers in the present study who identified having a school farm ranged in age from 23 to 56 years old ($M$ = 36.06) and had an average of 10 years of experience (range from 1-28). The school farms ranged from 1-60 acres in size with an average of 10.43 acres ($SD$ = 14.47). For six teachers (18.18%), the school farm was connected to their classroom. For 13 teachers (39.39%), the school farm was within walking distance from their classroom. For 14 teachers (42.42%), the school farm was located between 5-10 miles away.

Teachers were asked about the management of the school farm. The teacher was identified as a manager 31 times while students were identified 21 times. The other groups identified as having management of the school farm included school personnel ($f$ = 4), contracted personnel ($f$ = 2), a community member ($f$ = 3) and other ($f$ = 3), which were subsequently identified as "4-H", "FFA alumni" and "nobody manages the school farm".

Level of community support for the school farm was measured with a sliding scale from 0-100. Teachers indicated a mean level of support of 67.52 ($SD$ = 19.84) with a range from 16-84. No one indicated zero support for the school farm while no one noted they felt 100% supported by their community in the efforts of the school farm. All of the teachers were asked to indicate the facilities they had available for teaching (see Table 1). They were provided a list of pre-populated choices and were allowed to mark all that applied. They were also allowed to add in additional facilities using an open-ended response. Surprisingly, one more teacher indicated having a greenhouse ($f$ = 62, 96.88%) than indicated having a classroom ($f$ = 61, 95.31%). The least common facility available was an orchard ($f$ = 5, 7.81%).

Those who indicated they had school farm facilities continued through the survey while those who did not were allowed to end their role in the data collection at this point. The most common permanent structures on school farms were tool storage ($f$ = 24), equipment storage ($f$ = 22) and greenhouses ($f$ = 22) (see Table 2). The most common temporary structures were a rabbit hutch and sheep barn ($f$ = 5, 15.15%).

Table 1

*Teaching Facilities Currently Available to the Agricultural Education Program* (*n* = 64)

| Facility | Available |
|---|---|
| Greenhouse | 62 |
| Classroom | 61 |
| General shop | 57 |
| Land Lab or school farm | 30 |
| Livestock housing | 26 |
| Pasture land | 21 |
| Hutches or small animal housing | 14 |
| Landscape facility | 13 |
| Ponds/tanks | 12 |
| Field crops | 11 |
| Orchard | 5 |

The next questions were about the percentage of the school farm dedicated to each of the uses and the total needed to summate to 100% (see Table 3). There were numerous teachers who were able to identify 100% of their school farm was in single use (i.e. livestock or crops). The largest average use of space was for livestock enterprises. Items which appeared in text after indicating "other" included greenhouses, open space, rental houses, and vineyard.

A follow-up question asked teachers to specify the breakdown of the livestock enterprises at the school farm. This information is also included in Table 3. Using percentages which totaled to 100%, some teachers with school farms in Oregon indicated their animal enterprises were 100% breeding while others indicated their operation was 100% market animals. On average Oregon school farms have one fourth of their animal enterprise dedicated to breeding livestock and two thirds of their operations dedicated to market animals with a small percentage of small and specialty animals.

Table 2

*Permanent and Temporary Facilities Available on School Farms (n = 33)*

| Facility | Permanent | Temporary |
|---|---|---|
| Tool Storage | 24 | 3 |
| Equipment Storage | 22 | 1 |
| Greenhouse | 22 | 1 |
| Pig Barn | 21 | 1 |
| Hay Storage | 18 | 1 |
| Sheep Barn | 17 | 5 |
| Cattle Barn | 14 | 1 |
| Goat Barn | 8 | 2 |
| Pond/Tanks | 8 | 0 |
| Horse Barn | 7 | 1 |
| Poultry Barn | 7 | 2 |
| Granary | 5 | 0 |
| Llama Barn | 2 | 0 |
| Rabbit Hutch | 2 | 5 |
| Shaded Nursery Production | 2 | 0 |
| Permanent Structure (other) | 2 | 1 |
| Cavy Cage | 0 | 1 |

Table 3

*Percentage of School Farm Dedicated to Various Enterprises (n = 33)*

| Enterprise | *Mean percentage* | *SD* | Range |
|---|---|---|---|
| Livestock | 48.48 | 36.90 | 0-100 |
| Breeding – Livestock | 23.91 | 30.96 | 0-100 |
| Breeding – Small Animals | 1.24 | 3.06 | 0-10 |
| Market Animals | 62.12 | 38.12 | 0-100 |
| Specialty Animal | 0.61 | 2.42 | 0-10 |
| Crops | 17.82 | 29.57 | 0-100 |
| Other | 10.85 | 25.73 | 0-100 |
| Agriscience Projects | 6.97 | 20.99 | 0-100 |
| Nursery | 5.45 | 12.83 | 0-50 |
| Small animal | 3.15 | 8.81 | 0-40 |
| Orchards/Citrus | 2.64 | 9.99 | 0-40 |
| Forestry | 1.88 | 7.38 | 0-30 |
| Wildlife | 0.61 | 3.48 | 0-20 |
| Aquaculture | 0.30 | 1.21 | 0-5 |

We further sought to describe the uses of the school farms. Table 4 represents, by percentage of total time spent at the school farm, how teachers indicated students spend their time on the school farm. We chose to measure this variable in percentage of time rather than pure hours to account for the varying length of class and course times for agricultural educators. Some teachers have students for more than two hours at time while others see their students for less than 30 minutes a day and others are on an every-other-day timeline. The largest use of student time on the school farm was, on average, for SAE activities ($M$ = 35.30, $SD$ = 27.98). Students were, on average, spending a quarter ($M$ = 24.09, SD = 17.39) of their time on laboratory instruction. The remaining time was split almost evenly, on average, among formal instruction ($M$ =17.12, $SD$ = 18.24) and maintenance and repairs ($M$ = 17.42, $SD$ =14.26).

Table 4

*Percentage Breakdown of How Students Spend Their Time on School Farm* (*n* = 33)

| Item | *Mean Percentage* | *SD* | Range |
|---|---|---|---|
| SAE Activities | 35.30 | 27.98 | 0-95 |
| Laboratory instruction | 24.09 | 17.39 | 0-60 |
| Maintenance and repairs | 17.42 | 14.26 | 0-50 |
| Formal instruction | 17.12 | 18.24 | 0-60 |

Objective two sought to identify teacher perceptions of a school farm and its uses (see Table 5). The strongest levels of agreement were with the items "All students have the opportunity to participate in hands-on activities at the facility" and "The facilities are an extension of the classroom" with 75% of respondents either agreeing or strongly agreeing with those statements. The largest disagreement from teachers seemed to occur with the statement "All students are included in the activities on the farm" with 51% expressing some level of disagreement with this statement. There was also disagreement among teachers about the statement "The primary purpose of the school farm is for formal instruction" with over one-third expressing some disagreement.

Table 5

*Teacher Perceptions of School Farm Use* (*n* = 33)

| | Strongly Disagree | | Disagree | | Slightly Disagree | | Slightly Agree | | Agree | | Strongly Agree | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Statement | *f* | % | *f* | % | *f* | % | *f* | % | *f* | % | *f* | % |
| The facilities are an extension of the classroom. | 0 | 0.00 | 4 | 12.12 | 1 | 3.03 | 3 | 9.10 | 8 | 24.24 | 17 | 51.52 |
| All students have the opportunity to participate in hands-on activities at the facility. | 0 | 0.00 | 1 | 9.10 | 1 | 9.10 | 5 | 15.15 | 12 | 36.36 | 14 | 42.42 |
| The instructional activities performed on the school farm are pre-planned. | 0 | 0.00 | 2 | 6.06 | 2 | 6.06 | 7 | 21.21 | 16 | 48.49 | 6 | 18.18 |
| The primary purpose is for SAE. | 1 | 3.03 | 3 | 9.10 | 3 | 9.10 | 10 | 30.30 | 12 | 36.36 | 4 | 12.12 |
| The primary purpose of the school farm is for formal instruction. | 2 | 6.06 | 7 | 21.21 | 4 | 12.12 | 10 | 30.30 | 9 | 27.27 | 1 | 9.10 |
| All students are included in the activities on the farm. | 0 | 0.00 | 6 | 18.18 | 11 | 33.33 | 5 | 15.15 | 5 | 15.15 | 6 | 18.18 |

Finally, objective three sought to determine teacher perceived barriers to the use of the school farm. Data appear in Table 6. When combining responses of important and very important, the top issues appear to be condition of the school farm (*f* = 31, 93.94), facilities (*f* = 29, 87.88), finances (*f* = 28, 84.85%), the teacher ability to oversee and help (*f* = 28, 84.85%), and the teacher ability to engage all students in the activity (*f* = 27, 81.81%). The time of the year and the student prior experience were identified as less important potential barriers.

Table 6

*Importance of Barriers as they Relate to Use of School Farm* (*n* = 33)

| | Not important | | Of little importance | | Somewhat important | | Important | | Very Important | |
|---|---|---|---|---|---|---|---|---|---|---|
| Barrier | *f* | % | *f* | % | *f* | % | *f* | % | *f* | % |
| Condition of the school farm | 0 | 0.00 | 1 | 3.03 | 1 | 3.03 | 21 | 63.64 | 10 | 30.30 |
| Facilities | 1 | 3.03 | 0 | 0.00 | 3 | 9.09 | 18 | 54.55 | 11 | 33.33 |
| Finances | 0 | 0.00 | 2 | 6.06 | 3 | 9.09 | 11 | 33.33 | 17 | 51.52 |
| Ability to oversee and help with the activity | 0 | 0.00 | 0 | 0.00 | 5 | 15.15 | 19 | 57.58 | 9 | 27.27 |
| Ability to engage all students in the activity | 0 | 0.00 | 1 | 3.03 | 5 | 15.15 | 12 | 36.36 | 15 | 45.45 |
| Availability of animals and crops | 1 | 3.03 | 3 | 9.09 | 8 | 24.24 | 14 | 42.42 | 7 | 21.21 |
| Distance | 3 | 9.09 | 2 | 6.06 | 4 | 12.12 | 11 | 33.33 | 13 | 39.39 |
| Time of year | 1 | 3.03 | 9 | 27.27 | 10 | 30.30 | 11 | 33.33 | 2 | 6.06 |
| Weather | 1 | 3.03 | 7 | 21.21 | 13 | 39.39 | 10 | 30.30 | 2 | 6.06 |
| Student prior experience | 7 | 21.21 | 9 | 27.27 | 12 | 36.36 | 5 | 15.15 | 0 | 0.00 |

## Conclusions, Implications, and Recommendations

### Objective one: Characteristics and Uses

Half of Oregon teachers indicated having a school farm and the average size was 10 acres, slightly smaller than the 13.8 acre average in Texas (Gilbert, 2013). Most immediately, this information is useful for teacher educators in the state as they prepare teacher candidates to replace the current teachers. An understanding of the facilities teacher candidates will likely be managing can only aid in their preparation. Half of teachers not having access to a school farm indicates there is room for growth if these facilities are believed to be a place for students to apply theories taught

in the classroom (McCormick, 1994). Of the teachers with school farms, 42% indicated the school farm was between 5-10 miles from school. While a majority of teachers indicated their school farm was attached to, or within walking distance from the classroom, there is definitely a shift in the usability of the school farm when this is not the case. Teachers should advocate to have the school farm facilities located close to their classroom to make the facility as useful as possible in connecting to classroom content. However, the teachers in this study were making multiple situations work for students SAE projects and for laboratory activities, suggesting a generally positive attitude toward utilizing these facilities for experiential teaching and learning regardless of perceived behavioral control. Data from this study could be used to provide evidence for the prevalence of these facilities as teachers advocate for adding additional facilities to an existing program or incorporating a school farm.

Multiple individuals were involved in the management of the school farm. Of 33 respondents, 31 indicated the agricultural educator was involved in the management of the school farm. However, many other individuals were also named including students, community members, school personnel, and even responses of 4-H or FFA Alumni. There was one very telling response that "nobody manages the school farm" because "not much is going on". It is a promising practice that multiple parties are taking responsibility for the events on the school farm grounds. In some cases, these were paid positions. In other cases, the school was renting land and/or facilities from a community member and that individual was helping to manage the property. Many indicated students were managing their own specific animal projects or all students with animal projects were sharing the workload. While Ferrell (1983) noted the required investment of teacher time was a drawback to the use of school farms, alternative systems of management and a continued division of labor helps to mitigate this factor and changing the overall perceived behavioral control related to the ease of utilizing the school farm for effective teaching and learning.

The primary facilities available on Oregon school farms were for equipment and tool storage and animal projects, consistent with the findings in Texas (Gilbert, 2013). More schools reported having a greenhouse than was found in the Franklin (2008) study in Arizona. Overall, the facilities available at the schools vary widely. Evidence of every facility category across the responding schools were found including ponds, orchards, goat and sheep barns, small animal cages and granaries. Some schools indicate the existence of facilities we did not think to include on the instrument, like a vineyard. These findings appear to represent the diversity of Oregon agriculture. The state is one of the most diverse in the nation, producing over 220 agricultural commodities (Oregon Farm Bureau, n.d.). This is also evidence teachers are using their available resources to reflect the agriculture around their area, perhaps influenced by the subjective norms and attitudes toward interactive learning experiences that relate to the local community. It is recommended teachers continue to use the facilities and resources to train students to work within the agriculture industry in their area. In fact, it is recommended they partner with local agribusiness to allow for the development of facilities which directly benefit the local communities.

**Objective two: Perceptions**

The perceived level of community support for the school farm was measured with a sliding scale from 0 to 100. Teachers indicated a mean level of support of 67.52 ($SD$ = 19.84) with a range from 16-84. This average is consistent with the value found by Gilbert (2013) in Texas of 66.36%. However, while Gilbert (2013) found a range of 0-100, the same was not true in the current study. No one indicated zero support for their school farm in Oregon while no one noted they felt 100% supported by their community either. While it is positive no one in this study felt 0% supported, there should be concern no teacher felt 100% supported either. Are teachers feeling a lack of monetary support? Or, perhaps, the lack of support is more in terms of community understanding.

Are teachers properly advertising what they do for students with their school farms? This leads directly to the next finding.

Directly relating to the attitudes portion of the theory of planned behavior (Ajzen, 1991) are the findings related to teacher perceptions. More teachers perceive the primary use of the school farm to be for SAE instruction and teachers indicate students spend a majority of their time at the school farm engaging in SAEs. According to Ajzen (2011), the foundational tenet of the theory of planned behavior is in the ability to predict intentions. In this case, teacher intention and attitudes are directly affecting their behavior. Students are primarily using the school farms in Oregon for Supervised Agricultural Experience projects, supporting the findings in Texas (Gilbert, 2013). The second most common use of the school farms in the present study was for laboratory instruction. Both of these uses are directly about student learning of career and/or technical skills. The direct application of classroom skills into either a student-centered project or into hands-on application of course content is admirable. Further investigation on how teachers form these beliefs related to school farms would result in a deeper understanding with regard to the use of these facilities. Additionally, Ajzen (2011) made the claim that the theory of planned behavior does not assume behavioral, normative and control beliefs are formed rationally or without bias, and therefore may not actually represent reality. It is possible teacher attitudes, perceived behavioral control, subjective norms, and intentions are being affected by some other variable not indicated in this study.

This idea of the primary use being SAE and the second most common use being laboratory instruction raises another critical point for discussion. The present study utilized an existing instrument created by Gilbert (2013). She had divided SAE and laboratory instruction into two different categories, and validated the instrument with teachers. It was not until after the data was collected that we began to question the validity of this implied dichotomy.

Are not SAE programs, as originally envisioned and as currently implemented, laboratory experiences which are personalized to the individual? As educators should we not use every opportunity to remind our teachers, administrators, students, parents and supporters that SAE projects ARE specialized laboratory experiences (Wardlow, 2016)?

We should determine what is happening in daily practice to reinforce the idea that SAE and laboratory practice are separate ideas. What should be occurring in teacher education programs to reinforce the idea of SAE as individualized laboratory experiences? How can our state staff support this integrated message?

Teachers also indicated the school farm was commonly used for maintenance and repairs. While ranked as the lowest use of student time, it still accounted for an average of 17% of their time on the school farm. While the question asked specifically about how students spend their time on the school farm, it remains unclear how the students are involved in this maintenance and repair and whether it involves learning and application of course content. While spending some time on maintenance and repairs is no doubt required and can be useful for students to both see and do, perhaps time spent in these facilities should be spent for both direct or indirect student learning when possible. However, it is important to remember, the researchers make no claim as to how much time teachers should be spending at the school farms nor in what areas they should focus the time. We merely present this as informational data. The fact teachers reported students spending more time on maintenance and repairs than on formal instruction is not surprising. McCormick (1994) indicated these facilities were designed for application and not necessarily for formal instruction. However, Parr and Edwards (2004) argued that, with the strengthening of inquiry-based

instruction and scientific integration, hands-on laboratories like school farms may serve as a place for students to learn new information.

Overall, the teachers indicated the school farm was an extension of their classroom and all students *have the opportunity* to be involved in hands-on activities at the school farm. However, they did not agree with the statement that all students *are* involved at the school farm indicating a disconnect between the opportunities presented to students and the number of students who take advantage of the opportunity. This may warrant further investigation, perhaps the students would have different perceptions of how their time is spent using the school farm, and the opportunities provided them.

**Objective three: Barriers**

There were many identified barriers for use of the school farm. The largest identified barrier was the condition of the school farm. While this may be financial in nature, there may be other reasons the school farm is not in the condition to fully support student learning. Ajzen (2011) stated the absence of the ability to actually control a behavior will likely reduce the predictive validity of intentions, therefore, more research should investigate these barriers. It is certainly likely teachers, in some instances, have little control over the location or use of the school farm. For instance, the same number of teachers who earlier indicated their school farm was 5-10 miles away from their classroom later indicated distance was a barrier to the use of the school farm. Teachers also indicated facilities, finances, and the ability to supervise and engage all students were potential barriers. Intentions may be determined by additional variables, which "are captured, at least in part, by measures of past behavior" (Ajzen, 2011, p. 1120). Teacher educators should work to educate teacher candidates about teaching methods in these non-formal settings to aid in the engagement and supervision of students while on the school farm, thus creating past experiences to help guide intentions and behavior. We suggest more opportunities to practice non-formal instructional methods are needed during preservice teacher preparation.

Ajzen (2011) also indicated there is significant empirical evidence to support the adage 'past behavior is the best predictor of future behavior', signaling the need for more in-depth training for teacher candidates concerning the facilitation of experiential learning. If properly advertised, perhaps the hands-on, application-based activities students engage in while on the school farm would make funding sources to improve facilities easier to obtain.

**Recommendations for further research**

We recommend this study be replicated in other states, if for no other reason than to establish baseline data that will allow you to know over time whether schools are adding or losing facilities. We were unable to find research supporting a gain or loss in these facilities nationally, and as previously indicated, studies related to school farms in general, are uncommon. Further investigation should pursue why students who have access to a school farm are choosing not to engage in the activities available. Lastly, we recommend further investigation into current funding models, and the potential for local, state, or federal funds to help offset costs of having and operating school farm facilities for student learning.

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