

North Dakota State University

The Impacts of Agricultural Literacy in North Dakota: A High School Youths Perception

By

Craig Askim

A RESEARCH PAPER SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE

Master of Education

APPOVED BY COMMITTEE:

Name, Title, Chair

Name, Title

Name, Title

Fargo, North Dakota

August, 2016

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Introduction

Agricultural education is important because of the impacts it has on our society, environment, economy, and our daily lives (Roberts & Lawer, 1995). A lack of literacy in agriculture can lead to public misunderstandings on the value that agricultural education provides to the well-being of all citizens of this nation (Colbath & Morrish, 2010). Agricultural literacy programs should be aimed at providing a more positive image of agriculture, a strong commitment in this area by secondary schools would be a significant step in the right direction to increase agricultural literacy awareness across this nation (Russell, 1993). “Men and women of all ages and ethnic groups have a vested interest in Agriculture.” (Frick, Birkenholz, Gardner, & Machtmes 1995, p. 1). “America’s food and fiber systems determine the nations’ general welfare and standard of living” (Pense, Leising, Portillo, & Igo, 2005, p. 107). As a result, an abundance of food is available in the United States which causes most citizens to generally not worry about where their food products come from (Blackburn, 1999).

Research indicates that 90% of the American population is at least two generations removed from production agriculture, a situation which many agricultural professionals consider potentially dangerous (Colbath & Morrish, 2010). Due to the successfulness of the American farmer, most citizens of the United States are not required to work in the production agriculture industry and as a result the general public is becoming undereducated in the agriculture industry (Balschweid, Thompson & Cole, 1998). A lack of youth agricultural education is causing major concern for the future growth of the United States. Riedel (2006) stated that only 10% of today’s students enrolled in agricultural education classes have a

farming background and only 21% of the United States citizens live in rural areas defined by the United States Census as of 2000.

The general public must have accurate perceptions about agriculture for several reasons some of these include: personal well-being, economic status, and buying power (Roberts & Lawer, 1995). The Food and Agriculture Organization of the United Nations estimate that the world will have to produce 70% more food by 2050 (Food and Agriculture Organization of United Nations, 2009) to keep up with the estimated population growth across the world. There is lack of agricultural literacy in America, with the majority of today's society not being engaged in the agriculture industry, which has caused a diminishment of agricultural knowledge, but supports the need for agricultural education in today's society (Gibbs, 2005).

Review of Literature

Brief History of Agricultural Education

The Morrill Act of 1862 established the importance of practical arts education to the welfare and economic prosperity of the nation (Phipps, Dyer, Osborne & Ball, 2008). This Act allocated each state land to develop at least one agriculture college (Phipps et al., 2008). The Smith-Hughes Act of 1917 was written to promote and develop vocational education programs in agriculture and provide dollars to pay for salaries for teachers to teach agriculture topics to youth. The Act had three main goals: To prepare students for employment, provide education for youth that were less than college age, and provide education to anyone who planned or were currently working in a farm setting.

The Vocational Education Act of 1963 was written to improve existing agricultural programs, develop new vocational agricultural programs, and provide funding to support all agricultural subjects. This act opened the door for education in horticulture, natural resources, agricultural mechanics, and others to grow (Phipps et al., 2008). “Federal legislation during the 20th century established agricultural education as a viable and valuable program in public schools” (Phipps et. al. p.37). Agricultural education historically has been viewed as a multidimensional educational program serving all students.

Agriculture Literacy

According to Holtz-Clause and Jost (1995) the main challenge for agriculture as it stands today is society as a whole doesn't have a full understanding of what agriculture really is. Less than two percent of the current United States population is involved in production agriculture (Colbath & Morrish, 2010). Alexander and Trexler (2011) stated, “Modern agriculture as it stands today poses ecological problems and opportunities which defy simple democratic reforms without an educated citizenry. Developing an educated citizenry can be accomplished by further developing agricultural literacy.” (p.1). There is a lack of agricultural literacy in America. The majority of the population in the United States does not live on a farm therefore, this has contributed to the diminishment of agricultural knowledge (Gibbs, 2005).

Bellah and Dyer (2009) discussed a lack of time, interest, and knowledge as reasons for why agricultural literacy programs have been lacking in schools. Additionally, accountability standard demands such as No Child Left Behind has caused educational literacy programs to fall

off the radar of many school's curriculum. Teachers are concerned not only with what to teach but what to teach in order to meet these required standards.

The level of knowledge to be functionally literate in agriculture does not imply a perfect level of understanding, rather a minimum level (Frick et. al, 1995). High school graduates of secondary schools should not be considered to have a well-rounded education if they lack an understanding of the significance of agriculture in their daily lives (Frick et. al, 1995). Agriculture is too important a topic to be taught only to the youth that show an interest in agriculture careers (Balschweid et al., 1998). Agricultural literacy is a concept founded on the premise that citizens of the United States should have some basic education/understanding in agriculture and food production (Frick et. al., 1995). Educators of today rely on their experiences as a context for teaching and this directly affects the information that is being taught to our students of today (Harris, 1996).

In a study on elementary teachers perceptions of agriculture on agricultural content, Bellah and Dyer (2009) concluded that many teachers' attitudes and perceptions were generally favorable toward agriculture. Historically, agricultural literacy studies have focused on assessing teachers and student's knowledge, as well as attitudes and barriers to curriculum design, but because of educational accountability for schools this currently is not occurring in many schools.

Frick, (1991) stated:

The failure of our secondary schools and liberal arts colleges to teach even rudimentary courses on agriculture means an enormous majority, even among well-educated

Americans, are totally ignorant of an area of knowledge basic to their daily life; to their family economics, and indeed to their survival (p.49).

The Colbath and Morrish (2010) study concluded that agricultural education literacy materials are available for teachers to use. The agriculture themes identified in Colbath and Morrish study are listed as understanding food and fiber systems, history, geography, culture of agriculture, applying science, technology, environment factors, learning agriculture business and economics management practices and understanding how food, nutrition, and overall health is related to agriculture production. The two main agriculture literacy programs are: Agriculture in the Classroom (AITC) and a Guide to Food and Fiber Systems Literacy (GFFSL). These provide standards for measuring agricultural knowledge based on five main themes, and summarize what United States youth should know in order to be agriculturally literate by the time they leave high school.

Changing the way individuals think on a subject requires a change in perceptions (Ricketts & Place, 2005). The general public must have accurate perceptions about agriculture for several reasons: agriculture impacts our society, environment, economy and health (Roberts & Lawer, 1995). Citizens in the United States generally perceive agriculture as only farming and ranching with little worry about the supply of high quality agricultural products (Blackburn, 1999). With each generation being more removed from the agrarian environment, the general public's perceptions of agriculture has been declining (Doerfert, 2003). "America's food and fiber systems determine the nations' general welfare and standard of living." (Pense, Leising, Portillo,

& Igo, 2005, p.107). Colbath and Morrish, (2010) warned that the apparent lack of agricultural literacy among the general population in the 21st century America is an ongoing concern.

Colbath and Morrish also indicated that 90% of the American population is at least two generations removed from production agriculture.

The first step in improving the agricultural literacy levels of any population is to study the present literacy levels of the population (Frick, Birkenholz, Gardner & Machtmes, 1995). “If educational initiatives designed to improve America’s agricultural literacy are to succeed, a bench mark that verifies the level of agricultural knowledge and perceptions should be determined” (Frick, Birkenholz, Gardner & Machtmes, 1995, p. 2). Literacy is not a set of skills or a finished state: it is an attitude toward the world. Therefore, literacy usually refers to a minimal level of understanding (Wright, Stewart & Birkenholz, 1994). Most Americans have no idea how their personal choices affect farming practices and literacy levels (Riedel 2006). People think of agriculture literacy as a social phenomenon, however their literacy level is based on their personal attitudes and their actions (Wright, Stewart, & Birkenholz, 1994).

Riedel, (2006) in her thesis, identified eleven specific subject areas within agriculture that would measure agricultural literacy levels of any age citizen. The subject areas are:

- 1) Agriculture’s important relationship with the environment.
- 2) Processing of agriculture products.
- 3) Public agricultural policies.
- 4) Agriculture’s relationship to the natural resources.
- 5) Societal significance of agriculture.

- 6) Production of animal products.
- 7) Production of plant products.
- 8) Economic impact.
- 9) Marketing of agriculture products.
- 10) Distribution of agriculture products.
- 11) Global significance of agriculture industry.

According to Fauske (2002), collaborations between cooperative disciplines and sharing of resources between agriculture education, science teachers, government agencies, and private enterprises is needed to become more efficient in addressing the knowledge level of agriculture education. An individual agriculture literacy level should be one that is able to analyze and communicate basic information about agriculture. (Colbath & Morrish, 2010). The overall population perceptions of agriculture in today's society will play a huge part in reaching this goal.

Population and Growth

The study of interactions between population growth and the environment has a long history. The current population is growing at a rapid rate and because of this need, people need to have an understanding of production agriculture. A growing population exerts pressure on agricultural land (Cropper & Griffiths, 1994). The human population will always increase until it reaches the limit set by the food supply. This limit is determined by the physical resources

available for agriculture (Revelle, 1976). Entering into the new millennium, stark contrasts are apparent between the availability of natural resources and the demands of billions of humans who require them for survival (Pimental & Wilson, 2004).

Society as a whole is distancing itself from agriculture (Jones & Perkins, 2005). Population pressures have a significant effect on environmental degradation (Cropper & Griffiths, 1994).

The structure of United States agriculture is changing, prompting a wide range of questions about the nature of the changes, their effects on agricultural communities, and on the United States society (Albrecht & Murdock, 1990). Global population has doubled during the last forty-five years. If the current growth rate of 1.3 percent per year persists, the population will double again within fifty years (Pimental & Wilson, 2004). Ultimately, what is at stake here is a population growing at a rate that the current agricultural production industry cannot support with enough food to meet the needs of the population demands (Samuel Roberts Foundation, 2014). If the growing population does not understand how to produce and process the food it needs for the future how will demand be met? Nutrition knowledge is necessary but not a good enough reason for changes in consumer's food behaviors (Worsely, 2002). Worsely states four reasons why nutrition education knowledge is needed in this country.

They are:

- 1) We need to pay better attention to the development of children's and adults knowledge frameworks.
- 2) There is an increase need for a renewed proactive role for the education sector.
- 3) We need to take into account of consumers personal food knowledge levels and define ways to educate them on the topics.

- 4) Research into ways people learn about food-related knowledge, develop experimental interventions, and research studies.

From the time period of 1930 to 1985 the population of the United States as doubled, however the farm population has declined by 82% (Albrecht & Murdock, 1990). In 1987, the number of farms in North Dakota was recorded as 35,289 with a decline every year bottoming out in 2002 at 30,619. In 2007, the number rose to 31,970 the most current data from 2014 is recorded at 30,300. Nationally the total number of farms in 2007 was listed at 2.21 million in 2014 the number dropped to 2.09 million. (USDA National Agricultural Statistics Service -North Dakota Field Office (2014).

Food Knowledge

For centuries farmers have bred crops for desirable traits. Domestication and breeding of plants began 2,000 years ago (Federation of American Scientists, 2010). Genetic engineering provides a quicker and more passive way to achieve new genetic trait offspring in a single generation rather than taking over twenty years to achieve the same desired outcome. The application of biotechnology to food production offers great promise in increasing crop production through development. (Metcalf 2003). More than 80 percent of the current United States production of corn, soybeans, cotton, and sugar beets are genetically modified. Whereas United States regulation of genetically modified foods is based on the product (Federation of American Scientists, 2010.) The benefits of having genetic engineered technology is greatly misperceived by the general public.

Baker and Burnham (2001) stated:

Over the past decade or so, United States consumers have exhibited a high level of interest regarding the safety of the food supply. Consumers and consumer activist groups increasing called for assurances that food is free from substances such as chemical additives, hormones, and antibiotics. The threat of foods that are the product of genetically modified organisms (GMO) has been the source of consumer fears in the United States and Europe. (p.1.).

Agriculture Biotechnology in food production provides an opportunity to increase food production through development of plants that have superior genetic materials in them. (Metcalf, 2003) yet public misperceptions persist.

Genetically modified plants and foodstuff, were introduced to the marketplace in the 1990's, and economic theory assumes consumers have perfect information about what they consume.

(Phillips & Isaac, 2002). However, reality is that consumers will never accept that they have sufficient information on food products. Without sufficient information many consumers lack the educational knowledge to make rational consumption decisions (Phillips & Isaac, 2002).

Frick, Birkenholz, Gardner, & Machtmes, (1995) defined, three areas that should be stressed in secondary agricultural education programs.

These are:

- 1) Understanding of the applied processes or methods of agriculture.

- 2) The basic vocabulary of agriculture terms.
- 3) Impacts of agriculture on society.

Initiative agriculture literacy programs should be aimed at providing a more positive image of agriculture, a strong commitment in this area by secondary schools would be a significant step in the right direction to increase agricultural literacy programs (Russell 1993). "Agricultural Literacy is a working concept with considerable range in meaning and impact. An overview of agricultural literacy curricula shows complementary deductive and inductive approaches to the systematic incorporation of agricultural education in K-12 classrooms" (Powell, Agnew, & Trexler, 2008, p. 85).

Statement of Problem

Agricultural education can provide a level of functional knowledge in agriculture to address food production requirements in the future (Frick et. al, 1995). High school graduates of secondary schools should not be considered to have a well-rounded education if they lack an understanding of the significance of agriculture in their daily lives (Frick et. al, 1995).

According to the 2014 Samuel Roberts Noble Foundation Report, too many people of the general public feel food is a cheap resource that is always available at any time and is taken for granted. However, the demands on the roughly 2% of the current U.S. population that produces food has grown greatly. Ultimately what is at stake here is a population growing at a rate that the current agriculture production industry will not be able to support because of the current

population growth and the decline of the number of people in the food production industry. While the current agriculture industry status seems to be only a concern to a small group of agriculture professionals/researchers, it should in fact be of concern to every citizen of this nation. One logical way to address this growing issue is through the advancement of agricultural education literacy programs.

Purpose and Objectives

The main purpose of this action research paper is to examine agricultural literacy levels of youth in the area of agriculture topics and concepts. The focus will be centered on the perceptions youth have towards agriculture. In order to fulfill the intentions of this study, a survey was used to determine the knowledge levels of these high school students' agricultural knowledge and perceptions on the agriculture industry in a real situation.

Objectives

- 1) Describe self-reported agricultural literacy level of students at Beulah and Hazen High Schools located in North Dakota.
- 2) Describe student perceptions of agriculture at Beulah and Hazen, North Dakota High Schools Districts.
- 3) Compare self-reported agricultural literacy levels of students who have and have not enrolled in agricultural education courses at Beulah and Hazen High Schools, during the 2015-2016 school year.

Answer the question of:

- 4) Based on students' perspectives, does Agricultural Education have value?

Methods

This section describes the methods and procedures used in conducting this study. The methodology of this study was descriptive survey research. This method of research will depict a real situation that is currently present in two high school settings that conduct agricultural education within their school districts. The data/findings will then be used to make comparisons between the two different populations that we will be conducting research on.

The population of this action research study will include two high schools that offer agricultural education courses within their school districts in Mercer County, North Dakota. The study will be broken down into two different groups. The first group will be of students that currently are enrolled in or have taken at least one agricultural education class who are currently at Junior or Senior statuses during the 2015-2016 school year. The second group will be of any youth that are Junior or Seniors during the 2015-2016 school year that have never taken an agricultural education class as of the date the survey was conducted.

By having these two different groups to collect data on, we will be able to draw conclusions on the over-all climate of the need for agricultural education and the general perceptions of Agriculture as a whole based on their knowledge on agriculture topics. The survey results also allow us to gain an understanding if youth are putting the knowledge gained to use in their personal lives. The results allow for evaluation of how their education has impacted their

perceptions of agriculture. The number one industry in Mercer County is agriculture, within Mercer County 455 farm operations are located and the average size farm is 1120 acres (North Dakota Agricultural Statistics Report, 2013). The results of the research explain how agriculture can be misunderstood even in a county in North Dakota where agriculture is present on a daily basis, by showing the differences in youth with a secondary instruction in agriculture and those without instruction in agriculture.

Demographics

The two school districts involved in the research on are the Beulah and Hazen, North Dakota School Districts. Together these school districts represent all the land that makes up Mercer County, North Dakota. Mercer County has about 9000 residents presently living within its borders. A total of 101 students were enrolled in the agriculture education program at both schools in the Spring Semester of 2016. A total of 173 students from both schools were registered for the spring 2016 semester. Data was collected from 143 students of which 59 were female and 84 were male. 156 surveys were handed out to students during the time the surveys were conducted on May 4, 2016 in Beulah and May 12, 2016 in Hazen. Out of the 156 surveys returned 143 of them were determined to be of value in which data could be used. Thirteen surveys were disregarded because of lack of information provided. Six students provided verbal out options due to other class conflicts at the time the survey was conducted. Therefore, 143 students provided data which was collected and viewed which is 82.6 percent of the possible total of 173. Fifty-nine of the students were female 41.3% and 58.7% (n=84) were

male. The ethnicity of these students were: 90.2% (n=129) White, 2.1 % (n=3) Hispanic, 2.8% (n=4) Native American, 1.4% (n=2) Asian and 3.5% (n=5) other. All the students that took part in the study were either of junior or senior statuses during the spring 2016 semester in their respective schools. Of the students that participated 53.8% (n=77) were juniors and 46.2% (n=66) were seniors as of the time the survey was conducted while 29.4% (n=42) stated they were currently enrolled in the 4-H program and 34.3% (n=49) stated they were currently enrolled in their schools respective FFA organization. 21.7% (N= 31) said that they can see themselves pursuing a career in agriculture after high school and 26.6% (n=38) stated that at least one of their parents is currently working in an agricultural business or industry, out of a total of 143 (N) students that participated in the survey. Permission/Consent form letters were emailed to all youth's parents within the district explaining the study. (Appendix D) Parents of the students' were notified to request a copy of the survey if so desired before the survey was conducted. Both principals and agriculture education advisors were presented a copy of the survey before it was presented to the students.

Instrumentation

In 1995, Frick, Birkenholz, Gardner, and Machtmes employed an instrument which measured high school-aged youth perceptions and general knowledge of agriculture. The instrument was titled the Agricultural Awareness Survey and was a cooperative project of the University of Missouri, Lincoln University, Michigan State University, and Purdue University. In 2006, Jodi Riedel used the instrument to conduct her thesis study titled Effects of an Introductory

Agricultural Education Course on Agriculture Literacy and Perceptions of Agriculture in Urban Students.

Frick, et. al (1995) reviewed the reliability and validity of the instrument. The purpose of the study was to assess the level of agricultural knowledge and perceptions, among rural and urban inner city school students of Midwestern states, and compare results of these two sub-groups. The instrument used was divided into three sections: knowledge, perception, and demographics. Seven agricultural literacy concepts areas were evaluated which included; Societal and Global Significance, Public Policy, Agriculture Relationships, Plant Science, Animal Science, Processing of Agricultural Products and Marketing and Distribution. College students were used as pilot study respondents. Reliability was assessed by calculating a Kuder-Richardson 20 (KR-20) coefficient for overall knowledge statements. The KR-20 computed for the knowledge section of the instrument was .85. The perception section of the instrument was tested for reliability by using a Cronbach's alpha coefficient, the Cronbach's coefficient for this section was calculated at .90. A national panel of experts reviewed the instrument for validity and in their judgement the instrument was considered valid to determine agricultural literacy among the two different sub-groups which the researchers wanted to explore in the study.

The first 35 questions in section one related to general information about agriculture and were answered simply by answering "True", "False" or "Don't Know." Questions in section one of the survey were designed to gain knowledge in the areas of: General Agricultural Knowledge, Agricultural Career Literacy, Agricultural Policy, and Environmental and Natural Resources Agricultural Literacy. Section two of the survey, "perception" used a five point Likert –scale to

evaluate responses. The respondents could answer as such: Strongly agree, slightly agree, neutral, slightly disagree and strongly disagree. Thirty-five questions were listed in this section. The general information about agriculture and perception sections of the study will be used by the research in this study. However, this study will include an additional nine questions to give the researchers more information to evaluate “personal perceptions” relating to agricultural education in general within the two schools. While these questions were not tested for reliability measures, validity was established by the committee. The demographic section (part 4) was used to determine variables such as race, gender, home location, population (rural vs. urban), parents who farm, parents whom do not farm, agricultural course taken, agriculture organization involvement, and grade level. Parts of the demographic study were the same as the Frick et. al and Riedel study while parts were reworded to better explain the overall demographics of Mercer County, North Dakota.

Data Collection and Analysis

Both the Beulah and Hazen school district officials were directly contacted in person to explain the study and the potential outcomes. The two vocational agriculture instructors (two Beulah, one Hazen) were also contacted in person, by the researcher to obtain permission and gain support for the study. The vocational instructors collaborated with the researcher to obtain permission from the two school districts and help with the demographics of conducting the survey. Prior to conducting the survey the two vocational instructors were given the survey to

review and provide feed-back, they were also provided information that described the format of the survey, the objectives, and possible outcomes.

The survey was conducted on May 4, 2016 at 10:40 am in Beulah and on May 12, 2016 at 11:15 am in Hazen. A total of 89 students took the survey in Beulah and a total of 70 students took the survey in Hazen. The researcher was present while the survey was being conducted in both locations to provide answers to any questions the students may have had. Students were asked to answer each question independently and were informed that there were no right or wrong answers to the questions. The students were also told that they did not have to answer all the questions if they felt some questions were uncomfortable to answer for any reason. No personal information was listed on the survey so no identifiable information on the students was available when conducting the survey.

Once the surveys were collected they were recorded by my Advisor and myself, data was entered into a (SPSS Software program) to process data and design readable graphs of outcomes. The data was entered by each individual question results of the survey into an Excel computer software program. Then the data was divided up by using the demographic section of the survey, in which the data was sorted out by using current class rank of either junior or senior. The data then was broken down further by sex, to determine if trends of the results could be more closely evaluated. Descriptive statistics were used to evaluate perceptions and differences between the two groups identified in the study.

In the study, 41.3 % (n=59) of the students were female and 58.7% (n=84) were male. The ethnicity of these students were: 90.2% (n=129) White, 2.1 % (n=3) Hispanic, 2.8% (n=4) Native American, 1.4% (n=2) Asian and 3.5% (n=5) other.

All of the students that took part in the study were either of junior or senior status during the spring 2016 semester in their respective schools. Of the students that participated 53.8% (n=77) were juniors and 46.2% (n=66) were seniors as of the time the survey was conducted while 29.4% (n=42) stated they were currently enrolled in the 4-H program and 34.3% (n=49) stated they were currently enrolled in their schools respective FFA organization. Out of a total of 143 (N) students' that participated in the survey, 21.7% (N= 31) said that they can see themselves pursuing a career in agriculture after high school and 26.6% (n=38) stated that at least one of their parents is currently working in an agricultural business or industry.

Findings

Table 1
Number of Agricultural Class Taken through High School Career (n=143)

<u>Ag. Classes Taken</u>	<u>Number of Students (n)</u>	<u>Percentage of Total</u>
0	42	29.4
1	32	22.4
2	11	7.7
3	15	10.5
4	15	10.5
5 or more	28	19.6

Table 1 gives a detailed breakdown number of students and the percentages of the students that have enrolled in agricultural education classes throughout their high school career. This table is to show the current interest in agricultural education of the students of Beulah and Hazen high school before the survey was conducted. The table gives a base-line to the researcher to better analyze the data for the objectives listed. When the survey was conducted 101 of the students reported that they have been enrolled in at least one

agricultural education course in their high school career, while 42 students reported that they never have taken an agricultural education course.

Many of the students that took part in this study live within the county limits of Mercer County, North Dakota and have either directly or in-directly been exposed to either agricultural education or have lived on a farm. The results of the survey expressed that 61.5 % (n=88) have never lived on a farm while 26.6% (n=38) expressed that they lived on a farm for a time period of 1 to 15 years and 11.9% (n=17) expressed that they have lived on a farm 15 plus years.

Objective One Results

Describe self-reported agriculture knowledge level of students at Beulah and Hazen High Schools, North Dakota.

To analyze students’ Agricultural Literacy Knowledge levels, 35 questions were asked of the students in four construct focus areas. The four areas were General Agriculture Knowledge, Agricultural Career Literacy, Agricultural Policy Literacy, and Environmental and Natural Resources. The minimum/maximum range, mean and standard deviation is listed separately for each of the four construct items in Table 2.

Table 2
Agricultural Knowledge Scores of Beulah and Hazen Junior and Senior Students (N=143)

<u>Construct Scores</u>	<u>(n)</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Mean</u>	<u>SD</u>
General Agriculture Knowledge	143	1.0	12.0	7.87	2.61
Agricultural Career Literacy	143	1.0	5.0	1.59	1.12
Agricultural Policy Literacy	140	1.0	10.0	6.46	2.24
Environmental and Natural Resources	142	1.0	7.0	5.12	1.56
Overall totals	143	2.0	32.0	20.86	5.93

Note: Maximum score= 35. Students were ask to answer A-true (yes), B- false (no) or C- Don’t know to a total of 35 questions relating to the four construct listed in Table 1. Students were

given one point for answering yes or (A) to a question and zero points for responding B or C – False or don't know to a question.

The general agriculture knowledge section of the survey was used to measure students' basic knowledge level on agriculture; the questions were questions that the researcher felt that students of junior and senior status should easily be able to answer correctly. Twelve questions were written into the survey to collect data on this topic. The average mean was 7.87 (n=143). This indicates that overall students have moderate levels of general agriculture knowledge which results in (65.5%).

Five questions were used to measure agricultural career literacy. This section measured a students' ability to understand the overall climate of agriculture by using statistical data type questions relating to trends of populations of people in the agricultural industry. The student's overall mean to these five questions was 1.59 (n=143). The results show that students have a very low level of understanding 1.59 out of 5 or (31.8%) on the topic of agricultural career literacy.

The agricultural policy literacy section of the survey was made up of ten questions. The questions were focused on rules and regulations of the agricultural industry to determine the students' level of understanding of how these rules/laws of agricultural effects agricultural professionals. The students mean score in this section of the survey was 6.46 (n=140), showing a moderate level of understanding on this topic with an average rating of (64.6%).

The environmental and natural resources agricultural literacy section of the survey was made up of ten questions. The questions asked, in this section focused on farming practices used in the current agricultural industry. The students mean score for this section was 5.12 (n=142), resulting in an average overall rating of (51.2%) which is on the low level of

understanding on this topic. The mean score for all students on all topics reviewed in the study was 20.86 (59.6%) out of a possible 35 (100%). The highest rating received was a (91.4%) 32 out of 35 the lowest was 2 out of 35 (.05%) expressing that the overall level of agriculture literacy is low for all students that took part in the study regardless if they have taken any agricultural education courses or not.

Objective Two Results

Describe student perceptions of agriculture at Beulah and Hazen High Schools, North Dakota.

The perception portion of the instrument used was to determine responses to questions relating to agricultural statements. Participants could respond to the questions by using a Likert scale. The Likert scale was constructed in a letter format and based on the letter the response received, a numerical measurement was given. The scoring system that was used is as follows: (A) Strongly Agree = 1 point, (B) Agree= 2 points, (C) Neutral= 3 points, (D) Disagree = 4 points and (E) Strongly Disagree = 5 points.

Lower perception scores reflect a more positive perception of agriculture. The higher the score reported the more negative an individual's perception was on agriculture. Questions 36 to 70 on the survey were used to determine a student's personal perception score. The instrument range to determine these perceptions would be a possible score of 35 to 175. For example a student that answered all 35 questions as strongly agree (A) would score 35, while if a student response to all 35 questions as (E) strongly disagree they would score a maximum 175. The range breakdown for this instrument section of the study is as follows:

Table 3
Overall Student Perceptions of Agriculture (n=143)

<u>Range</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Mean</u>	<u>SD</u>
51.0	61.0	112	89.40	10.75

Minimum score= 35
Maximum score= 175

Table 3 range of results of a minimum 61 to a maximum of 112 shows that students of junior and senior status of Beulah and Hazen high school have a perception rating of agricultural from extremely positive to neutral. The overall mean score of 89.40 (n=143) indicates that many of the students have at least a neutral perception towards agriculture in general.

Objective Three Results

Compare self-reported agricultural literacy levels of students who have and have not enrolled in agricultural education courses at Beulah and Hazen High Schools, North Dakota.

For students that have taken at least one agricultural education course to the date the survey was conducted, we can see that their perceptions resulted in a mean average score of 88.25 while students that have not taken at least one agriculture class resulted in an mean average of 92.16. Students’ perception of agriculture is more positive after taking at least one agricultural education course which is detailed in Table 4.

Table 4

Students' Perceptions based on agricultural education courses taken (n=143)

<u>Findings</u>	<u>N</u>	<u>Range</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Mean</u>	<u>SD</u>
Students' that have taken at least one course	101	50	61	111	88.25	10.71
Students' that have Not taken an Ag. course	42	43	69	112	92.16	10.44

Note. Minimum Score=35, Maximum Score=175

To test for statistical differences between the two groups of students, a t-test was used for both sections of the instrument. No statistical difference was found ($p > .05$) between the two groups' Agricultural Knowledge mean scores ($t = -.950$, $df = 89.54$). However, for these two groups, enrollment in at least one agricultural education course in high school produced a significant difference ($p = .047$) in the student's perceptions of the industry of agriculture ($t = 2.023$, $df = 78.58$).

Table 5

Agricultural Literacy Differences Among Students Enrolled and Not Enrolled in Agricultural Education Courses (N = 143)

Ag Literacy Component	Student Type	n	Mean (SD)	t	df	Sig. p (2-tailed)
Knowledge	No Ag Classes	42	20.19 (5.26)	-.940	89.54	.350
	At Least 1 Ag Class	101	21.15 (6.19)			
Perceptions	No Ag Classes	42	92.17 (10.44)	2.023	78.58	.047*
	At Least 1 Ag Class	101	88.25 (10.72)			

Note. * $p < .05$

Item Four Question Results

Nine questions were constructed in the survey to give the researcher data to analyze the question of “*Does agricultural education have value.*” This was to give the researcher some clarification to determine if agricultural education is valued by students in a high school setting and to see if any trends, either positive or negative, appear. The questions were also asked to provide some data findings to the researcher to relay to agricultural professionals, Extension professionals and the general public.

Table 6

Individual response perceptions to agricultural education questions among High School Juniors and Seniors. (n=143)

<u>Question</u>	<u>Mean</u>	<u>SD</u>
Agriculture has no effect on me.	4.14	1.24
I’m confident agriculture doesn’t impact my life in some way.	4.21	1.05
I know agriculture can influence my life.	2.05	1.03
Having basic education of agriculture will provide me with knowledge to make financial decisions in the future.	2.25	1.01
I can see myself working in an agricultural career.	3.16	1.29
Agricultural knowledge will provide me with needed skills to be able to get a job.	2.83	1.16
Agricultural Education is important to me.	2.69	1.16
It is important to have agricultural education courses available in high school.	2.25	1.13
All high school students should have the opportunity to take basic Agricultural education courses if they so choose.	1.99	1.05

Note: Questions were measured on a scale from 1-Strongly Agree, 2 – Agree, 3- Neutral, 4- Disagree, 5- Strongly Disagree.

In the other sections of the survey the research was grouping responses together. This section was used to try to get a better understanding of an individual’s perception on agriculture. The researcher was attempting to collect data that was more direct to an individual perception on how agriculture may affect them personally in their daily lives and future. Each of the nine questions is listed in table 6 with each questions findings results listed separately.

The highlighted findings in Table 6 indicate that students disagree that *“Agriculture has no effect on me”* and disagree that *“agriculture doesn’t impact their life in some way.”* Results of these two questions show that many students feel agriculture to this point in their life does play a role in their overall well-being. When students’ were asked if *“all high school students should have the opportunity to take basic agricultural education courses if they so choose.”* The data results indicate that overall students agree this should be an option for them in high school. When asked if they *“can see themselves working in an agricultural career,”* the data results indicate a neutral rating expressing that many of the students are at least open to the idea of having a job/career in the agriculture sector after they complete their educational desires.

Conclusions

In objective one, it can be concluded that the 101 students (70.6%) that took part in this study have taken at least one agricultural education course though their present high school career while 42 students (29.4%) have never taken any agricultural education course though their present high school career. When we compare these results to the results listed in table two we can conclude that overall the students agriculture literacy knowledge levels to the four main topic areas that were focused on in this study to be very low with an overall average mean score of 20.86 out of a possible 35.0 or (59.6%). In objective two, the results on student perceptions towards agriculture resulted in a mean score of 89.40 out of a possible 112 or (79.8%), expressing that perceptions of the students that took part in the study to have a positive perception towards agriculture. In objective three, the researcher broke the findings

into to two groups: students that have taken at least one agricultural education course, to those students' that have never taken an agricultural education course.

The findings conclude in the t-test of table 5 that there is no significant results differences.

Expressing to the researcher that agricultural literacy knowledge levels changed based on the amount of agricultural education courses a student has or has not taken in their high school careers. The mean score of 20.19 for students that expressed in the survey that they haven't taken any agricultural education course compares to a mean score of 21.15 for those students that expressed in the survey that they have taken at least one agricultural education course.

However, when the researcher ran a t-test for the differences in perceptions towards agriculture for the two different populations listed the results show that a significant difference did take place based on the data results mean score of 92.17, from students who have never taken an agricultural education course to a mean score of 88.25, from students that have taken at least one agricultural education course, resulting in a significant change of .047.

The findings to question of *"Does agricultural education have value? Based on a student's perception."* The results of these findings conclude to the researcher that students do value agricultural education and agricultural education has great value/meaning to them. This provides more opportunities to learn and advance their agriculture literacy levels and increases their personal over-all perceptions towards agriculture.

Implications to Practice

The results of the study show that while agricultural education courses are being offered at both the Beulah and Hazen high schools the agricultural literacy level scores are still low in the

overall scores based on the questions asked in this research study. This should provide valuable findings to the two school districts to see where the differences lie in what is currently being taught in the agricultural education courses being offered at the two schools when compared to the questions being asked on the survey by the researcher. The good news is that the data indicates that students have an overall better perception of agriculture if they have experiences towards agriculture by taking agricultural education courses or being involved in agricultural youth based organizations like 4-H and FFA. Therefore, it provides us with factual information to support and to consider new opportunities in agricultural education programs and to focus on new subjects areas, and to offer new opportunities for students, regardless of their agricultural literacy knowledge levels. This then will provide more exposure to the opportunities and careers that they may obtain. Youth that have positive perceptions of agriculture should carry these positive perceptions with them when they become adults. This will impact adult agricultural education classes and workshops relating to agriculture. This will provide support for the needed continuous support and function of the Land Grant University Extension System and continue to support the function of the Morrill Act of 1862 and the Smith-Hughes act of 1917.

The findings are interesting in that students with agricultural education experience and those without both have low agricultural literacy levels, these implications show that while the agricultural education that is currently in place is important, it provides support that agricultural education for youth and adults will continue to be important in the future and work still needs to be done to help close the gap in the lack of agricultural literacy knowledge. These findings bring up additional questions of what is missing. Is the support for agricultural

education at levels they need to be at to make sure students are receiving and retaining the information that is being provided to them? Are we providing them with useful information so it can be put to use in their daily lives and increase their personal over-all well-being? The results show that agriculture education of any kind for youth or adults is greatly needed and has significant merit when looking into the future of agricultural education programs.

In objective one, the researcher addressed the areas of General Agriculture Knowledge, Agricultural Career Literacy, Agricultural Policy Literacy, and Environmental and Natural Resources Agricultural Literacy. The findings concluded that while agricultural education classes are being conducted in both the Beulah and Hazen high schools there is room to evaluate the agricultural course offering that is currently being provided to the students to see what type of content is not being retained within the students based on the questions that were asked in section one of the survey and expressed in table 2 in this paper. The overall mean score of 20.86 out of a maximum of 35 which is listed in table 2 indicate that there is a low level of agriculture literacy occurring and there is room for improvement in all four areas that were evaluated in section one of the survey, with attention being placed on Agricultural Career Literacy mean score 1.59 out of 5 maximum and Agricultural Policy Literacy mean score 6.46 out of a maximum of 10. These results are consistent with Riedel- Songer (2006) findings and re-enforces the Holtz-Clause and Jost (1995) discussion of the main challenge for agriculture as it stands today is a society as a whole doesn't have a full understanding of what agriculture really is. Having a better overall agriculture literacy understanding could translate to increased agricultural education literacy standards for youth in the future. The findings in objective one of this study echo that high school graduates of secondary schools should not be considered to

have a well-rounded education if they lack an understanding of the significance of agriculture in their daily lives (Frick et. al, 1995). The first step in improving the agricultural literacy levels of any population is to study the present literacy levels of the population (Frick, Birkenholz, Gardner & Machtmes, 1995).

Therefore, in Mercer County, North Dakota the results show that while agricultural education programs are in place in both the Beulah and Hazen school systems there is room for improvement in that the results of table 2 express that the level of agriculture knowledge is still low even in a county where a major economic impact is based on the agricultural industry. These results throughout this research shows that educational education is needed in Mercer County because the score levels are below what the research was estimating. The findings show where improvements should be made in the areas of agricultural career and policy literacy in both school systems. An overview of agricultural literacy curricula shows complementary deductive and inductive approaches to the systematic incorporation of agricultural education in K-12 classrooms” (Powell, Agnew, & Trexler, 2008, p. 85).

In objective number two, the researcher’s intentions were to evaluate a student’s perceptions of agriculture. Thirty-five questions were designed by the researcher to help define student’s perceptions on a wide range of agriculture topics such as: income, employment, production, costs, technology, government, transportation, and nutrition management. The instrument range score was a low of 35 to a high of 175. The mean score from the students of Beulah and Hazen high school that took part in this survey was 89.40 (n=143) Table 3. This indicates that the overall perceptions of students that took part in this study to be positive for agriculture. This shows support from the students perspective is positive for developing new agricultural

education courses, and provides opportunities for adult agricultural education courses that can be offered by Universities and the University Extension Service programs.

Directions for Future Research

Additional research studies are needed to gain a better understanding of what our current agricultural literacy levels of youth are across North Dakota and this Nation that come from different agricultural environments. Research in the areas of adult agricultural literacy levels could also help provide more information to determine the gaps and perceptions of agriculture from a totally different population. Questions of adult perceptions towards agriculture would be interesting to reflect on and to see if that influences high school student's perceptions towards agriculture.

When the researcher analyzed objective number three, the overall t-tests scores of students that have taken at least one agricultural education course vs. students that have never taken an agricultural education course were not significantly different. The finding results were: 21.15 (n=101) that have taken at least one agricultural education course versus 20.19 (n=42) that haven't taken an agricultural education course. However, there was a significant difference in perceptions ratings with a mean score of 88.25 for those that have taken an agricultural education class versus a mean score of 92.17 for students that have never taken an agricultural education class showing a significant difference of .047.

The researcher concludes that students that have at least a minimal amount of educational experiences to agricultural education have a greater overall positive perception of agriculture.

The researcher would anticipate that youth that have had some exposure to agricultural education would be more receptive to agricultural as a whole and, therefore, they would be more open to educational workshops relating to agricultural topics in high school, college, and as adults. This is where Extension Service systems that are currently in place become even more important for the future. In that students of this age reported that they have positive perceptions towards agriculture (89.40) Table 3 results indicated that they value this type of education and would support this type of education once they become adults.

This finding is consistent with Balschweid et. al., (1998) discussion that agriculture is too important a topic to be taught only to the youth that show an interest in agriculture and agricultural careers. Incorporating agricultural education opportunities within Mercer County to all ages could translate to the over-all well-being of citizens that live within the county borders. These findings help support the maintaining of agricultural education opportunities that are currently present within Mercer County.

These opportunities for individuals to grow in their agriculture literacy knowledge can be provided by University Extension Services, County Extension Services, Land Grant Universities, Community Colleges, private agricultural industries, and agricultural based organizations. Presently youth's exposure to agricultural education opportunities is provided through youth agricultural organizations like 4-H and FFA. The researcher would conclude that this exposure affects one's overall perceptions of agriculture based on the data results received. The research findings conclude that 42 of the students were exposed to 4-H programs presently provided within Mercer County, while 49 stated they are currently members of either the Beulah or

Hazen high schools FFA chapters. "Changing the way individuals think on a subject requires a change in perceptions (Ricketts & Place, 2005).

This would be interesting to see if these perceptions increase or decrease if the same survey was given to students' across North Dakota that live in larger urban settings. However, these students would still have been exposed to agriculture in general but in some cases would not have access to agricultural education courses within their school systems, showing that perceptions will change based on education exposure to agriculture, and indicating that agricultural education has great overall perceptions to students that are given the opportunity to this type of education. Students whom have not been involved in agricultural education still feel that agricultural education has value and is important to them even though they don't have a clear understanding of the overall agriculture industry and the personal effects it may have on their daily lives based on the results in this study.

The questions then that need to be addressed is how do we give students (youth) the opportunity to learn about agriculture? To provide outcomes that will increase overall youth's agricultural literacy knowledge levels? The answer is not an easy one for the questions but the researcher feels education is a step in the right direction. Requiring all youth to have at least some type of introductory basic agricultural education course in order for a student to graduate from high school would potentially increase a student's agriculture literacy level which the study findings will support. One other advance of data that would be interesting to gather for a possible future study is to collect data from an adult's perception on agriculture and to tie it with the students' perceptions to try to find the gaps in the overall perceptions based on age, exposure, and demographic backgrounds.

Question 72 = I'm confident agriculture doesn't impact my life in some way."

The mean score for this question was 4.21 (n=143) with a maximum of five with five meaning rated as strongly disagree. Indicating to the research that what-ever the student agricultural literacy level is many students feel that agriculture will have an effect on them personally through-out their life. These finding to these questions is encouraging to the researcher in that the overall perception and impact of the agricultural industry is one that is of importance to them and gives the researcher support to keep looking for new adult agricultural education topics that can be provided though university Extension service programs. The results follow the same outcome trends when we compare the results to *Question 79 = "Too me all high school students should have an opportunity to take basic Agricultural Education courses."*

Results to this question presented an overall mean score of 1.99 (n=143) with a maximum score of five. This shows that this topic of agricultural literacy is important to them and needs to be looked at more closing by the researcher and school professionals to try to determine how to keep the interest levels high. Therefore, an opportunity presents itself to the researcher to provide more education in the areas of career agricultural literacy. Some ideas that could provide educational opportunities for students to learn more in the agricultural career literacy section is for agriculture educators to provide more educational workshops, agricultural career fairs, or working with high school agricultural education advisors more closely. Secondly, the researcher could help promote better communications and working agreements with private agricultural business and owners to promote more agricultural education programs within the county. This then would hopefully provide new educational opportunities to the students,

where they can define what they are learning in the agricultural class and how they can obtain the educational foundation material and work it into a career opportunity.

Students' reply to the question would indicate that the majority of them feel agricultural education is important and they should be given an opportunity to take part in agricultural education, so this would be a way to expand agricultural education to youth in a non-classroom setting.

While *Question 77= Agricultural Education is important to me* had an overall mean score of 2.69 (n=143) out of five, and *Question 78 = to me it is important to have agricultural education course available in high school* mean score 2.25 out of a maximum of five (n=143). This shows that agricultural education has value and giving great data collection to the overall question the research was attempting to explore within the objectives listed in this study.

So why the differences in results? Of course it could be an error by the researcher in that the questions were too hard for the students to understand, or could it be that perceptions of agriculture that our students feel is that agriculture will always be present and available to them so it is not something they must worry about? Because when students were asked *question 73 = I know agriculture can influence my life* the overall mean score was 2.05 out of a maximum of five in *Question 74= Having a basic knowledge level of agriculture will provide me with knowledge to make financial decisions in the future* mean score was 2.25 out of five maximum (n=143). In *Question 76 = "Agricultural knowledge will provide me with needed skills to be able to get a job"* mean score 2.83 out of five (n=143).

The results indicate to the researcher that the students feel that agriculture does indeed have influences on them as they grow older and experience new things. In *Question 75 = "I can see*

myself working in an agricultural career” the mean score was 3.16 out of a possible five. This indicates that while many of the mean scores to the nine questions counter each other out the overall perception on agriculture for students taking part in this study still feel agriculture is important to them and see that agriculture will indeed be a part of their personal life on a daily bases to some degree.

This researcher showed the overall importance of agricultural education courses provided to 2016 junior and senior students of Beulah and Hazen High Schools in North Dakota. Being that North Dakota is the number one producer of at least ten cash crops across this nation. North Dakota Agricultural Statistics Report (2013). North Dakota plays a huge role in food production and the economic status of the United States. This research shows that while on a small scale students’ value agricultural education as a whole and can see the impact it has on their daily lives and future, while the overall content levels of agricultural education literacy is not at the high levels the researcher was expecting to see but we can still see that agricultural education is providing students with knowledge and experiences that they can use throughout their lives. Most Americans have no idea how their personal choices affect farming practices and literacy levels (Riedel-Songer 2006). Perceptions towards agriculture are usually based on a person’s personal exposure to agriculture. Most people think of agriculture literacy as a social phenomenon, however their literacy levels are based on their personal attitudes and their actions (Wright, Stewart, & Birkenholz, 1994).

Research of this kind should be completed to compare perceptions and knowledge literacy levels of agricultural education throughout North Dakota and the United States. One of the major economic powers of the United States is food production and processing, but if our

current youth do not have the opportunities and exposure to agricultural education will this hold true for the future generations?

Future research on ways to provide agricultural education to not only the youth of this nation but also adults needs to be further explored. Agriculture literacy programs should be aimed at providing a more positive image of agriculture. A strong commitment in this area by secondary schools would be a significant step in the right direction (Russell 1993). The researcher of this study believes that the findings of this study conclude that agricultural education is still valued and needed in today's society for the youth of this nation.

Additional studies of this kind could help explain the successfulness and failures of agricultural education programs across this nation, and hopefully express the overall need and future financial support for these types of educational opportunities to both youth and adults. Having a better understanding of agricultural literacy levels and perceptions of a small population of high school students within the Beulah and Hazen North Dakota, school systems will hopefully provide direction and reference for future studies and provide opportunities to increase agricultural literacy levels and perceptions for future generations.

Study Limitations

After reviewing the findings the researcher developed some personal questions to help him determine the differences in the findings of the study. Questions that the researcher would ask to help explain the outcomes would be: Were the survey questions to in-depth or not clear enough for the students to understand? Did students have a clear understanding of how they

should response to the questions? Were the student's agricultural literacy knowledge levels too low to be able to answer the questions correctly on the survey? Did the researcher write the survey questions at a higher level than what a high school student should be able to understand in the area of agriculture literacy? Should the researcher have done a better job of asking for a review of the questions from the current agricultural instructors of the two schools before the survey was given to the students? Regardless of the answers to these questions the study met the overall objective in that it provides a foundation of data to work off of to see where improvements can be made to our current agricultural education programs.

Recommendations

The results of this study indicate to the researcher that citizens within Mercer County, North Dakota should be thankful for the opportunities that the Beulah and Hazen school districts provide for the high school youth of this county. The results indicate that students' perceptions towards agriculture is positive. This provides opportunities for both school districts to look at the current agricultural education programs and to see where improvements can be made. The areas of agricultural career literacy and policy rated the lowest in the results findings expressing an area that could be focused on by both schools for improvement. The researcher recommends that the school districts develop agricultural education review committees to provide input on the type of agricultural education materials/class offering that both school districts could provide. School districts may have to look at outside resources to provide education that agricultural education instructors do not have the knowledge to teach. The

findings hopefully will provide opportunities to network with agricultural business and organizations to help with educational opportunities. The County Extension Service could also provide resources and materials to help aid in the agricultural education process. The findings of this study express to the researcher that more networking opportunities, workshops, and programs to youth and adults in areas of career, policy, natural resources and environment agricultural literacy knowledge topics are a good place to start.

Additional research on this topic should be done within school districts that do not offer agricultural education programs within their schools. The results could be compared to see what the differences in knowledge levels and perceptions on agriculture would be. The data would be interesting to review to see if students across different environments and populations have different perception and knowledge levels.

The results of this study even from a small rural population show that there are differences in perceptions and knowledge levels; therefore, agricultural literacy levels need to increase because currently students' levels are sub-par when looking through this research paper results.

The researcher would hope that an increased in agricultural literacy levels of any age citizen would result in an increase in a person's over-all well-being and economic power. The researcher says this because with education comes knowledge; the more agricultural knowledge a person has the greater the ability they have to make day to day decisions on food purchasing, while like it or not, it will, be a part of their daily life.

The overall results of the study express to the researcher that agricultural literacy levels of youth can be improved and agricultural education is needed and valued by both students that have taken and have not taken agricultural education courses. The overall perceptions of

agricultural education from the students responses, express to the researcher that even if students have not taken or been exposed to agricultural education they still seem to be interested in agricultural to some degree, showing the researchers that the opportunity is present to continue to offer agricultural education programs opportunities to all ages. Educating youth in agriculture is a good starting point and educating youth on agricultural literacy knowledge topics should provide results that will increase agricultural literacy knowledge levels and perceptions towards agriculture. This, in return, should remain with them throughout their adulthood and empower them to pass this increased level of agricultural literacy on to their children in the future, ultimately resulting in increased support for agricultural education programs for both youth and adults.

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NDSU NORTH DAKOTA
STATE UNIVERSITY

April 13, 2016

Dr. Adam Marx
Agricultural Education

IRB Approval of Protocol #AG16216, "The Impacts of Agricultural Literacy in North Dakota: A High School Youths Perception"

Co-investigator(s) and research team: Craig Askim

Approval period: 4/13/2016 to 4/12/2017

Continuing Review Report Due: 3/1/2017

Research site(s): Hazen and Beulah High Schools Funding Agency: n/a

Review Type: Expedited category # 7

IRB approval is based on the revised protocol materials (received 4/13/2016).

Additional approval is required:

- o prior to implementation of any changes to the protocol (Protocol Amendment Request Form).
- o for continuation of the project beyond the approval period (Continuing Review/Completion Report Form). A reminder is typically sent 4-6 weeks prior to the expiration date; timely submission of the report is your responsibility. To avoid a lapse in approval, suspension of recruitment, and/or data collection, a report must be received, and the protocol reviewed and approved prior to the expiration date.

A report is required for:

- o any research-related injuries, adverse events, or other unanticipated problems involving risks to participants or others within 72 hours of known occurrence (Report of Unanticipated Problem or Serious Adverse Event Form).
- o any significant new findings that may affect risks to participants.
- o closure of the project (Continuing Review/Completion Report Form).

Research records are subject to random or directed audits at any time to verify compliance with IRB regulations and NDSU policies.

Thank you for cooperating with NDSU IRB procedures, and best wishes for a successful study.

Sincerely,



Digitally signed by Kristy Shirley
DN: cn=Kristy Shirley, o=NDSU,
ou=Institutional Review Board,
email=kristy.shirley@ndsu.edu,
c=US
Date: 2016.04.13 14:58:42 -0500

Kristy Shirley, CIP, Research Compliance Administrator

For more information regarding IRB Office submissions and guidelines, please consult www.ndsu.edu/irb. This Institution has an approved FederalWide Assurance with the Department of Health and Human Services: FWA00002439.

INSTITUTIONAL REVIEW BOARD

NDSU Dept 4000 | PO Box 6050 | Fargo ND 58108-6050 | 701.231.8995 | Fax 701.231.8098 | ndsu.edu/irb

Shipping address: Research 1, 1735 NDSU Research Park Drive, Fargo ND 58102

NDSU is an EO/AA university.

Appendix A

Goals of the Project:

The overall goal of this research project is to examine a youth's perception of Agricultural Education and to explore their outcomes/values of being able to gain educational knowledge by taking agricultural education in a high school setting. The goals are:

- 1) To increase knowledge level of Agriculture topic areas
- 2) Personal impact on daily lives does Agricultural Education have an influences on:
 - a. Youth currently enrolled in agricultural education courses
 - b. Youth not enrolled in agricultural education courses
- 3) Personal perception on Agricultural Education
- 4) Do perception over time change
- 5) Does Agriculture Education have value for all students

Methods:

"Citizens of the United States generally do not worry about where their food products come from." Blackburn (1999). "A situation which many agricultural professionals consider potentially dangerous." Colbath & Morrish (2010). Today's society seems to value agriculture education less than it did three to four generations ago. However; the demand for food is increasing daily because of the increase in population. How does one try to look at solutions to address these statements above? The key is youth agricultural education opportunities.

Education that has an impact on a youth can give that individual knowledge to teach others in the future. In this research study we will focus on conducting research to examine different populations. Which are:

- 1) Youth currently enrolled in an Agricultural Education curriculum
- 2) Estimate value of an Agricultural Education to one-self

Students will be asked to fill out a survey that should take about 30 minutes to complete. The study will be three- folded in that we will be collecting data from students that are exposed to agricultural education, estimating education level increases, and determining educational value of the importance of agricultural education has on their personal current lifestyle.

Background

A 1988 National Research Council report on agricultural education concluded that agricultural literacy in the United States was low and recommended providing all K-12 teachers with the training resources and support needed to modify curriculum and incorporate agriculture into

their classrooms (NRC) report (2014). Years have passed since this was published, however; agricultural education programs, literacy levels, and perceptions have decreased even more over this period of time and a qualitative study of elementary and middle school teachers in Michigan found teachers' perceptions of the food and fiber system were mostly shaped by the media (Trexler, Johnson, & Heinze, (2000). This leads to questions of where we are today. Take note that the State of Michigan is a state that is a major producer of agriculture products. This study has merit to expose the populations involved to express outcomes based on perceptions of what agricultural education has provided the youth that have taken part in agricultural education programs, and to express the gaps of knowledge levels between the different populations on this topic.

This concern has been addressed in many research papers in the past, but little action has taken place in this area to address this issue. The issue at hand is increasing in importance because the amount of people in production agriculture is decreasing yearly, while the World population is increasing. These trends alone should be a reason for concern. The best personal way to address this issue in my mind is through education of our youth. The youth hold the key for a successful outcome to this issue.

Perception on agricultural education at the present time is viewed in a negative light in my view, but education provides an opportunity for this view to be reversed. When we educate students/adults with correct sound education knowledge they/we will have the knowledge to reverse this current trend of literacy and have the opportunity to make a better lifestyle for all of us.

Risks

Confidentiality will be of importance, throughout this study and no answer to any questions will be singled out or quoted individually. All student information will be confidential. However, with this said there is no guarantee that information could be identifiable.

The survey will be broken out into sub divisions based on sex, grade level, and agricultural education student vs. nonagricultural education student, because of these subdivisions identifiable tract markers while rare will be present. The data could possibly be published and the school system that these participants attend may be identified.

The survey will utilize constructionist epistemology in that the environment these students have been exposed to will have a reflection on their responses. For example a student that has family members involved in agriculture will more than likely have a different perception on agriculture than a student not exposed to this type of environment. Therefore; pre – perception can be ruled in either direction. The surveys will be all voluntary in focus and no monetary gain will be given to participants that take part in this study.

Delimitations:

The agricultural education curriculum is not standard in all schools across the State of North Dakota so the study will be limited in the overall focus, because not all factors can be addressed. However; the general findings on the perceptions and values of agricultural education will be in line with the rest of the state based on the sample size that is present.

Limitations

If the school districts that I'm targeting, are not be open to this type of study, we may have to look to alternative school districts or look at different focus groups/populations to take part in the study such as 4-H, FFA, farm organizations, church groups etc.

Benefits:

This research should provide an opportunity to expose agricultural education in a way that can be measured either positivity or negatively and identify the gaps if any are presented in the current agricultural education curriculum of these schools. The study will give students an opportunity to express themselves in a safe environment with no reprobation on how they answer the questions. The study will expose agricultural education to parties that currently do not understand or are currently under educated in the subject matter at the present time.

Potential Outcomes:

- 1) Provide an agricultural education curriculum that is focused on current issues.
- 2) Provide new agricultural education opportunities to students and communities.
- 3) Provide input for needed improvements.
- 4) Provide support.
- 5) Give an opportunity for student input on how to address these issue.
- 6) Provide a line of communication on this topic.
- 7) Provide support of the program currently in place and provide an opportunity to reach new goals in agricultural education programs.
- 8) Provide data to support program to government agencies and funding outlets.

Appendix B

Pre-notification Letter

To whom it may concern:

You have been selected to take part in a research study on the value of youth agricultural education in a high school curriculum. The study is being conducted to measure agriculture literacy levels from two groups of youth. Youth that are currently enrolled in an agricultural high school education program, to youth that are not.

The survey will be conducted by myself, Craig Askim a graduate student at North Dakota State University. My master education paper topic is youth agriculture education programs do they have value in the development of a youths education. The survey will be of 95 questions and will take about 30 minutes to complete.

You are currently enrolled in High School at either Beulah or Hazen this year at a Junior or senior level. Therefore; you have been selected to take part in this research survey. By taking part in the survey you will be providing research data that can be analyzed against your counter-parts. Your responses will help identify the gaps in agriculture literacy between the two different groups, and hopefully show value of the importance of high school agricultural education courses.

This survey will provide you with an opportunity to show the importance of agricultural education to school professionals, parents, and your peers. The results of the survey may be published and presented to the school board and any other school within the state that has an interest. However; you identity will not be given out at any time. Your participation in this survey is vulnerary and will have no effect on your current class standing or grades.

Sincerely

Craig Askim
Graduate Student

Appendix C

Invitation Letter

Dear Parent of a student enrolled in the Beulah/ Hazen High School Agricultural Education Program

My name is Craig Askim. I'm a graduate student in the Agriculture Education Department at North Dakota State University in Fargo, North Dakota. I'm conducting a master research paper as part of the requirements of a Master of Agriculture Education degree, and I would like to extend an invitation for your child to be a part of the study.

I am researching the overall education value of students that are enrolled in a high school agricultural course/program. If you allow your child to take part in this research survey, your child will be asked to fill-out the 95 question survey fully on his/her own with no help from others. The survey is not to measure his/her personal knowledge level on the topic of agriculture, rather it is to develop measurements and comparisons of the gaps in the current agricultural programs being offered, and to compare them to a group of students that take part in the study. The survey will take place @ (time, date, location) and will require 30 minutes or less to complete.

Your child's participation in this survey is totally on a volunteer basis. Your child does not have to take part in the study or can simply just answer the questions they feel comfortable in answering. The survey will not be individually scored, their score will be combined with all other participants score to come up with an average. All information will be kept confidential and once all the survey data has been collected they will be destroyed.

The results of the study may be published or presented at professional conferences or journals, but your child's identity will not be given out personally to anyone. Participation is once again anonymous, with no-one knowing their personal answers to the survey questions.

There will be no reimbursement to your child for taking this survey. Taking part in this study is both you and your child's decision. Participation in this study will have no effect on your child's current grades. They may also quit taking the survey at any time.

I will be happy to answer any questions that you may have on this research study. You may contact me at 701-331-1083 or email me at craig.askim@ndsu.edu. If you have any questions about your rights as a research participant, you may contact the Office of Graduate School at 701-231-7033.

Thank you for your consideration, and if you would **not** like to participate in the study please fill-out the attached form at the bottom of this letter and return to me by May 1, 2016.

Sincerely,

Craig Askim
1323 Central Ave N.
Beulah, ND 58523
701-331-1083
Craig.askim@ndsu.edu

Appendix D

Description of Study/Consent Form

North Dakota State University
Department of Human and Community Education
P.O. Box 6050
EML 155
Fargo, ND 58108
701- 231- 7101

Title of Research Study: The Impacts of Agricultural Literacy in North Dakota: A High School Youths Perception

This study is being conducted by: Craig Askim, graduate student @ North Dakota State University 701-331-1083. Adam Marx, Advisor

Reasons for the study? The main focus of the study is to examine youth's perception of agricultural education and to explore their knowledge level to see if outside perceptions is influencing their current knowledge level.

Where will the study take place: The study will take place at either Beulah or Hazen high school that is in a rural setting with both schools currently having an agricultural education curriculum? The data collected will be analyzed based on the results of students that are enrolled in an agriculture program with ones that are not enrolled. The survey will ask questions to students in grades 9-12. The entire survey will take about 30 minutes to complete.

Risk/Discomforts: All possible risks of confidentiality will be used and all responses will remain anonymous. However; it is not possible to ensure all forms of risks can be eliminated. The researcher and advisor have put into place safeguards to minimize risk to all participants.

Benefits to people that take part in the study: The goal of the study is to see if differences in knowledge levels exist with-in the two different youth groups which may encourage and support agricultural curriculum in high schools within the state.

Benefits to others: We hope the study will provide insight on the need for agricultural education programs and provide support for agricultural education programs that are currently being conducted. This may help provide communication opportunities for non-agricultural minded individuals to see the value in this type of education.

Do I have to take part in this Study? Your participation is your personal choice. You can start and stop anytime while taking this survey or choose not to take part in it altogether.

Costs: There is no financial costs for you to take this survey

Who will see the information that I give? All research data collected will be kept private, your information that is gathered will be judged against the other group's data to define trends. When we write about the results we will write about the findings and differences from the answers that are gathered. The results may be published, but no individual information will be recorded in the study that could be traced back to a single individual's responses.

No names will be listed and no recorded of results will be given of individual responses, the results will all be combined per questions to come up with one given value for the total number of responses gathered.

Compensation – There will be no compensation given to your child for participating in this survey.

Questions – Before you determine whether or not to take part in this survey, please feel free to call 701-873-5195 or email me at craig.askim@ndsu.edu. Or feel free to call my advisor.

Documentation of Informed Consent:

By signing below you are making a decision to not take part in this research study and you have read and consented to understanding the information.

Signature (Student) Date

Signature (Parent/Guardian) Date

Thank you!

Appendix E

High School Agriculture Education Perception Survey

This survey is made up of four sections. Section I relates to the general information about agriculture, food, and food production. Section II relates to your general perceptions of agriculture, food, and food production. Sections III requests your personal perceptions about agriculture. Section IV requests demographic information on the participants.

Responses to the survey will be kept confidential and should be recorded on the computer answer sheet provided. Use a #2 lead pencil to darken the circle corresponding to your response to each statement. After completing each of the four sections, please return the answer sheet and the survey form. If you need to change one of your answers, erase the first mark completely from the answer sheet before filling in the new answer.

Section I

Directions: Read each statement and mark “**A**” if you think the statement is TRUE or mark “**B**” if you think the statement is FALSE. If you DON’T KNOW whether the statement is true or false, then mark “**C**” on the answer sheet.

A-True

B- False

C- Don’t Know

Statements

1. There are more farmers in the U.S. then there were 10 years ago. – **G**
2. Less than 3 percent of the U.S. gross national product is from agriculture. - **C**
3. Soil erosion does not pollute U.S. lakes and rivers.-**E**
4. The use of pesticides has increased the yield of crops. **E**
5. Animal health and nutrition are important to farmers. **G**
6. Food safety is a major concern of the food processing industry. **P**
7. Processing increases the cost of food products. **G**
8. U.S. research has improved farming methods in other countries. **P**
9. One of every five jobs in the U.S. is related to agriculture. **C**
10. Many farmers use tillage practices that conserve the soil. **E**
11. Plant products are the main source of human foods. **G**

12. Animals can be a valuable source of medical products. **G**
13. Homogenization kills bacteria in milk with heat. **G**
14. The U.S. does not sell its feed grains on the world market. **P**
15. Thousands of people in the world die of starvation each year. **G**
16. Local laws and regulations have little effect on farmers. **P**
17. Farming and wildlife cannot survive in the same geographic area. **E**
18. Biotechnology has increased the pest resistance of plants. **E**
19. Animals eat foodstuffs that cannot be digested by humans. **G**
20. New products have been developed using surplus grains. **G**
21. Grain exports are usually transported between continents by airplane. **G**
22. The average U.S. farm is larger than 500 acres. **C**
23. U.S. agricultural policies influence food prices in other countries. **P**
24. Animal wastes are used to increase soil fertility. **E**
25. Profits increase as farmers strive for the maximum crop yields. **C**
26. Biotechnology has increased animal production in the U.S. **G**
27. Pasteurization kills bacteria in milk with heat. **G**
28. An efficient food distribution system is essential to the agricultural industry. **P**
29. Several countries depend on U.S. agricultural exports for food and fiber. **P**
30. Government subsidy payments to farmers are used to stabilize food prices. **P**
31. Water, soil, and minerals are important in agriculture. **E**
32. Very little of the grain produced in the U.S. is exported. **P**
33. Hamburger is made from the meat of pigs. **G**
34. Using grain alcohol for fuel reduces the U.S. dependence on foreign oil. **P**
35. Transportation and storage affects the supply of agricultural products. **G**

G= General Agricultural Knowledge

C= Agricultural Career Literacy

P= Agricultural Policy Literacy

E= Environmental and Natural Resources Agricultural Literacy

Section II

Directions: Read each statement completely. Darken the circle under the letter which corresponds to your response to each statement on the answer sheet provided. Use one of the following letters to represent your response.

- A- Strongly Agree**
- B- Agree**
- C- Neutral**
- D- Disagree**
- E- Strongly Disagree**

Statements

36. U.S. citizens spend a higher percent of their income on food than in other countries.
37. Agriculture employs a large number of people in this country.
38. Pesticides can be used safely when producing food.
39. Organic production methods are a realistic alternative to using pesticides.
40. Confinements is an acceptable practice when raising livestock.
41. Consumers prefer processed foods to raw products.
42. Developing countries need help to be able to store food safely.
43. People are moving away from rural areas due to changes in agriculture.
44. Farmers earn too much money.
45. Not all land is suitable for farming.
46. Biotechnology has increased the yield of crops in developing countries.
47. Farmers take good care of their animals.
48. Processing adds value to farm products.
49. Farmers should develop new and innovative marketing strategies.
50. A strong agricultural industry is more important than military power.
51. Agricultural exports help to reduce the U.S. trade deficit.
52. Agricultural practices are harmful to the environment.
53. Raising hybrid plants results in higher yields.
54. Farmers are concerned about the humane treatment of animals.
55. Processing food products is a benefit to consumers.
56. The U.S. should allow free trade with other countries for food products.
57. The world food supply has increased as a result of improved technology.
58. The U.S. needs a steady supply of food and fiber products to remain strong.
59. Only organic methods should be used to produce food.
60. Farmers should not use chemicals in crop production.
61. Animals have the same rights as people.
62. Processing adds more to the cost of food than the raw product.
63. Farmers have no control over food prices.
64. Developing countries lack the ability to produce enough food.
65. The government should exert more control over farming.
66. Agriculture is the greatest polluter of our water supplies.
67. Agriculture has become too mechanized.
68. Animals should not be used for food.
69. Farm grains are becoming an important energy source in the U.S.
70. Developing countries need help in distributing food among needy people.

Section III

Please respond to your overall perceptions to the following statements:

Please circle only one response for each question.

- A- Strongly Agree**
- B- Agree**
- C- Neutral**
- D- Disagree**
- E- Strongly Disagree**

- 71) Agriculture has no effect on me.
- 72) I'm confident agriculture doesn't impact my life in some way.
- 73) I know how agriculture can influence my life.
- 74) Having a basic knowledge level of agriculture will provide myself with knowledge to make financial decisions in the future.
- 75) I can see myself working in an agricultural career.
- 76) Agricultural knowledge will provide myself with needed skills to be able to get a job.
- 77) Agricultural Education is important to me.
- 78) To me it is important to have agricultural education courses available in high school.
- 79) To me all high school students should have the opportunity to take basic Agricultural Education courses if they so choose?

Demographics

To enable us to better analyze the results please provide us with the following demographic information. Please indicate the following:

80) Gender (Circle One)

- Male
- Female
- Chosen not to answer

81) Please select your current class standing (Circle One)

- Junior
- Senior

82) The current number of Agricultural Education Courses that I have taken in my high school career are? **(Circle One)**

- A) 1
- B) 2
- C) 3
- D) 4
- E) 5
- F) More than 5

83) Ethnicity

- A) Asian
- B) Native American
- C) African American
- D) Hispanic
- E) White
- F) Other

84) How long have you lived on a farm?

- A) Never
- B) Used to
- C) Currently

85) IF you lived on a farm for how long? **(Otherwise answer zero to this question)**

- A) zero
- B) 1-5 years
- C) 6-10 years
- D) 11-15 years
- E) 15 plus years

86) Do you know people that farm to make a living?

- A) Yes
- B) No

87) Do your parents presently work for an agriculture business or industry?

- A) Yes
- B) No

88) Do you have relatives who work in an agriculture career?

- A) Yes
- B) No

89) Do you see yourself pursuing an agriculture career after high school/college?

- A) Yes
- B) No

90) Based on your current knowledge level of agricultural education do you feel you could confidently talk to and non-agriculture educated group of people about agriculture topics.

- A) Yes
- B) No

91) Have you ever heard of the 4-H organization?

- A) Yes
- B) No

92) Have you ever been enrolled in 4-H?

- A) Yes
- B) No

93) Have you ever heard of the FFA organization?

- A) Yes
- B) No

94) Are you currently a member of your high school FFA organization?

- A) Yes
- B) No

95) Do you feel 4-H and FFA organizations have value?

A) Yes

B) No

Additional comments: