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ABSTRACT

Internationalizing education in the United States has been a topic of increasing interest because of the connections between countries and people around the world. Studies suggest that students will need specific skills to help them work in this global environment in the future. Agriculture is an area where there has been a large amount of globalization. People are becoming more aware of this because of the news coverage lately about the current world food crisis. Currently there are limited international topics taught in education and in agricultural education.

The purpose of this study was to learn the current perceptions and knowledge of high school agricultural students regarding international agriculture concepts. The study demonstrates the effect of an international curriculum intervention on these perceptions and knowledge of students. Students’ perceptions of international agriculture were specifically examined compared to the number of semesters of language classes they had taken and previous international experiences they had. Students’ demographics were also compared with their perceptions and knowledge of international agriculture concepts.

Five agricultural education teachers with an interest in international agriculture were selected to present a curriculum on international agriculture to their students in the Fall semester of 2007. This research had a quasi-experimental pre-test/post-test design. Eighty-Six Pennsylvania high school students completed both the pre-test and the post-test in the study. The students were asked to complete likert type questions about their perceptions of international agriculture. The survey also included a series of multiple choice questions regarding their knowledge of international agriculture concepts in
general and specific questions related to the curriculum. The final section of the survey was a demographics section. Students were in grades 10-12 and were currently taking an agriculture class.

The student respondents in this research study were typical high school students in the United States. The students had limited international experiences in the past but a majority had taken a foreign language class at some time during their education. Overall, student perceptions of international agriculture were positive but there were no significant differences in their mean perceptions scores from the pre-test to the post-test. Student knowledge scores did show over a 20% increase from the pre-test to the post-test.

Based on the results of this study, there is a need to include international experiences in agricultural teacher education. Curricula in international agriculture should also be developed for agricultural teachers. Secondary agricultural education can have an important role in internationalizing education. The looming world food crisis shows that there is not a more appropriate time to address international problems in agriculture classes. Students need to be aware of world problems and explore ways to solve them by partnering with other people from around the world. Internationalizing the high school agriculture curriculum will strengthen students’ skills to deal with these issues and make them better prepared global citizens.
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Chapter I

INTRODUCTION

Background/Statement of the Problem

Education has long been tied to the ideals, values, and needs of a local population or society. In modern times, most educational systems are dictated by the central government of nation states. Relatively few major changes affect a nation’s education system and those that do tend to be gradual (Gardner, 2004). Major movements in history have altered the way that children are educated, such as the industrial revolution, modernization of agriculture, and scientific discoveries. Globalization can be considered one of the major historical movements that are changing the way that students are educated in current times.

Globalization is a phenomenon that has been happening for hundreds of years. People are more aware of the occurrence of globalization after its coverage in the wake of recent international tragedies such as September 11th and the Asian tsunami. Globalization refers to the movement of people, goods, and ideas around the world. This narrow definition is economically focused but the term can have several other meanings. Suarez-Orozco & Qin-Hillard (2004) suggested four major areas of globalization:

1. Post national production and distribution of goods and services stimulated by international trade
2. Communication technology that connects people around the world and focuses on knowledge intensive work
3. World migration
4. Cultural transformations in countries that have high rates of migration into and out of the country

Globalization is a trend that is spreading once isolated economic, social and cultural practices throughout the world and making people and societies more homogenous. Children around the world must be open to change and adapt their actions to continue to be a part of a productive world with a forward looking agenda (Suarez-Orozco & Qin-Hillard, 2004). Gardner (2004) suggested that one of the greatest difficulties the education system will face while adapting to globalization is the slow pace of change of educational systems.

Global education was defined in the 1991 Association for Supervision and Curriculum Development Yearbook, *Global Education: from Thought to Action* (As cited in Tye, 2003) as:

- learning about those problems and issues which cut across national boundaries and about the interconnectedness of systems – cultural, ecological, economic, political, and technological….learning to understand and appreciate our neighbors who have different cultural backgrounds from ours; to see the world through the eyes and minds of others; and to realize that other peoples of the world need and want much of the same things. (p. 165)

Most importantly, educators need to develop students’ knowledge and skills for dealing with change and teach them how to adapt and function in an environment that has an uncertain future. The lack of research in internationalization of education is one barrier to speeding up the widespread practice of teaching global issues (Suarez-Orozco & Qin-Hillard, 2004).
International education is crucial for students because there is demand for internationally competent employees in the workforce. Students encounter increased diversity in all areas of their lives and they have to learn to be culturally accepting. The future workforce that students will be a part of will be asked to solve national security challenges (The Asia Society, 2008b). Students need to be well versed in areas of world regions, languages and problems so that they will be able to solve the complex global problems facing society in the future.

Agriculture has been a major part of globalization. As companies look for the most cost-effective ways to grow crops and produce goods, more and more products are being imported from other countries. More food is being exported from the United States as well. Many American farmers now plant as much as 1/3 of their crops to be exported (The Asia Society, 2008b). Agriculture provides for basic human needs of food, clothing, and shelter. The world is becoming interdependent for these basic needs, so it is vital that all people have an understanding of international agriculture and how it influences their lives (Finley & Price, 1994).

Many agricultural businesses now rely on the rest of the world for inexpensive labor, materials, and agriculture. According to Schuh, most students interested in working for companies that have global interests or working for a company that has international competition, will eventually be expected to understand global affairs (as cited by Finley & Price, 1994). Workers are increasingly being expected to understand different cultures, speak more than one language, and be aware of political, geographical, and technological conditions around the world (Brown, 1997). It is especially important for agricultural students who will be owners and managers of global companies in the
future to understand global agricultural economics, outsourcing, and other complex global agribusiness concepts before they deal with these issues on a daily basis.

As globalization has accelerated over the past several years, it has become evident that strategies must be developed and implemented to increase the teaching of global concepts in education; this is especially important in the field of agriculture where globalization is a dominating force in agricultural markets, research, and practices used around the world. Students need to understand how global forces affect agriculture in their local areas as well as how a specific area can affect markets and agriculture around the world (Finley & Price, 1994).

**International Agricultural Education in Secondary School Agricultural Programs**

Currently few secondary agricultural education programs in the United States have international components. Although curriculum has been developed in international agricultural education (Moore, 1989), updated studies show that international concepts are not being included in the high school agricultural curriculum (Elliot & Yanik, 2004). Agricultural students need to have an understanding of how interdependent the world is for food and the effects of this interdependency on food production, distribution, and consumption in the United States (Ibezim & McCracken, 1994). Ibezim & McCracken stated that “for a student to be considered educated in agriculture he or she must be cognizant of the interrelationships of various agricultural systems and the governments, cultures, and societies in which they function. It is no longer sufficient to only know how to produce food and fiber” (p. 10).
In some places international curricula have been integrated into high school agricultural classrooms. A majority of agricultural education instructors feel that an international aspect should be added to the curriculum (Hossain, Moore, & Elliot, 1995). Benefits to students receiving international components in agricultural education include an increased understanding of:

A basic geography of the world, global agricultural and its effects on the United States… future changes in global agriculture, interactions with people from other countries, international marketing systems, the culture…standard of living, economy, and politics…global perspectives with respect to career opportunities, and international interdependency (Hossain et al., p. 63).

McCracken (1995) stated five reasons why international topics should be taught in agricultural education: agricultural education students should be up to date with global issues; the importance of international trade to the United States agricultural economy; understanding relationships in an interdependent world; awareness of other cultures in business relationships; and the realization that much of the world lives in conditions with little food, overpopulation, and poverty.

A study by Harbstreit & Welton (1992) surveyed agricultural education students for their awareness of global issues. They found that the students had limited knowledge of international agricultural concepts. Students with better grades, higher class standing, involvement in an agricultural program and Supervised Agricultural Experience program had higher knowledge of these concepts. Some agricultural education programs that included international aspects have been studied in recent years. A study by Williams, Moore & Elliot (1992) showed that an international agricultural curriculum increased
students’ knowledge of international agricultural concepts. Agricultural students do have a positive attitude toward international concepts and they feel that they do need instruction in international agriculture topics according to Radhakrishna, Leite & Domer (2003).

The student youth organization of agriculture education, the National FFA Organization (2006), stated that students in grades 9-10 should “become more comfortable with cultural issues…begin to be exposed to more cultural activities and a better understanding of these areas” and students in grades 11-12 should “gain appreciation for other cultures, …begin to travel internationally and actually gain some global experience…[and] can also expand international knowledge with others at home and prepare for a career in international agriculture” (p. 2).

**Purpose of the Study and Research Questions**

The purpose of this study was to measure the scope of knowledge and perceptions of high school agricultural students toward international agriculture. The objectives of the study were to:

1) Describe high school agricultural students’ demographics in relation to prior international experiences, number of years in a language class, age, gender, number of agriculture classes taken, and grade in school.

2) Describe the perceptions of high school agricultural students toward international agriculture and determine if their perceptions change following an international curriculum intervention.
3) Determine if number of language classes taken or past international experiences of high school agricultural students are related to their international agriculture perceptions.

4) Determine if an international curriculum intervention with high school agricultural students positively changes the knowledge levels in international agricultural concepts of participants.

The following research questions guided this study:

1) What do high school agricultural students know and perceive about international agriculture and will an international curriculum intervention positively change their perceptions and level of knowledge?

2) Do previous international experiences or number of language courses taken relate to high school agricultural students’ perceptions of international agriculture?

**Significance of the Study**

In reviewing the associated literature, there were very few studies found that addressed the issue of international topics in secondary education. This study was designed to determine if a curriculum intervention in international agriculture would improve the knowledge and perceptions of high school agricultural students. The study also was designed to explore the factors that relate to international agriculture knowledge and perceptions of high school agricultural students. The findings of this study will help to determine students’ perceptions about international agriculture. The study will show if the type of curriculum model that was used in the intervention was positively or negatively related to the students’ perceptions of international agriculture concepts.
Increased research activity related to international concepts and secondary agriculture education may help to spark interest in this area on state and national levels. More focus on globalization and secondary education will hopefully instigate some action in this area. If people see that a curriculum intervention in this area improves the perceptions and knowledge of students, there may be a push to include that curriculum in more secondary schools across the nation. Heightened interest may increase the amount of research that is done in the area of global agricultural education along with more discussions about the benefits of including international topics in schools.

**Limitations of the Study**

This study was exclusively conducted with high school agriculture programs in Pennsylvania. Agricultural education is a type of career and technical education (CTE) program and programs vary around the state and nation. The results of this study can only be considered significant to the schools that participated in the study. Other high school agriculture programs in Pennsylvania may also consider these results useful to their programs. The results of this study may be of limited importance to other high school agricultural education programs around this country.

A major limitation of this study was that only schools with agriculture instructors who had previous experience with international agriculture were used. Other schools with teachers who did not have international agriculture experience were not used because of the lengthy approval process before beginning research and time that it would take to complete the intervention and research study. It was concluded that teachers who did not already have an interest in international agricultural education would not be as
enthusiastic about the study and may not have agreed to participate or complete the intervention as written.

Also, there was no control group included in this study. If there had been a control group, it would have included schools that did not receive the curriculum intervention. Again, because of the lengthy approval process that would have been required, it was concluded that teachers would not agree to participate when they and their students would not be receiving the benefits of the curriculum.

**Operational Definition of Terms**

*Agricultural education programs:* Agricultural education programs in the United States are primarily conducted in secondary schools and career and technical schools. All of the schools in this study are public secondary schools. Most of the agricultural education programs in Pennsylvania and all of the programs in this study, are for students in grades nine through twelve. The subject matter covered in agricultural education programs in Pennsylvania varies by the needs of the area, the interests of the students, and courses that are traditionally offered in each school. The number and variety of courses offered by the agricultural education programs in the study had a very wide range.

*Globalization:* “The flow of technology, economy, knowledge, people, values and ideas across borders” (Knight, 2003, p. 3). This concept affects each individual country differently. Globalization impacts internationalization but it is not considered a part of internationalization in the context of this document.
**Internationalization:** “Internationalization at the national, sector, and institutional levels is defined as the process of integrating an international, intercultural, or global dimension into the purpose, functions or delivery of … education” (Knight, 2003, p. 2).

**International agricultural education:** The inclusion of international topics related to agriculture, in an agricultural education program. The type and amount of inclusion of international agriculture topics vary significantly between the schools in this study. One school had a whole course on international agriculture. Other schools integrated the curriculum into other courses as a unit, or spread throughout the other content in a course.

**International curriculum intervention:** A short curriculum that is a general overview of international agriculture using a development approach. The curriculum is integrated in the current studies in agricultural education programs as part of a course. The international curriculum intervention that was used in this research study was used as a unit in a course, or the content was spread out among the other content in the course.

**Assumptions of the Study**

The following assumptions were made when conducting the study:

1. Instructors that agreed to teach the international curriculum intervention either had previous international experience through taking college level courses, traveling, and/or had an interest in international agriculture by being a part of internationally oriented programs in the United States.
2. Instructors had administrative approval from their school districts to conduct the research project in their classes.
Summary

Internationalizing education in the United States has been a topic of increasing interest because of the connections between countries and people around the world. It has been suggested that students will need skills to help them work in this global environment in the future. Agriculture is an area where there has been a large amount of globalization. Currently only limited international topics are taught in education and in agricultural education.

This study was developed to learn about the current perceptions and knowledge of high school agricultural students of international agriculture concepts. The study demonstrates the effect of an international curriculum intervention on the perceptions and knowledge of students. Students’ demographics, previous international experiences, and number of semesters of language classes taken are compared with their perceptions and knowledge of international agriculture concepts. This study was conducted to increase interest in inclusion of international topics in education. In the following chapter internationalization and its importance are examined. Internationalization in education and agricultural education is discussed along with the state of agricultural education and prior research suggesting the benefits of an international agriculture curriculum is examined.
Chapter II
REVIEW OF LITERATURE

The purpose of this literature review is to provide basic conclusions from the literature to support the internationalization of agricultural education through an examination of previous research. International concepts are crucial for student to know and understand for many reasons. The United States economy is firmly tied to the rest of the world. “A global marketplace demands an internationally competent workforce…Already, one in six of the nation’s jobs is tied to international trade” (Engler & Hunt, 2004, ¶ 3). Also, Americans that participate in government and are politically active need to have an understanding of the world. This country has long been called “a melting pot” and students will see people of cultures from around the world in schools and in their communities (Engler & Hunt). This type of education is so important that twenty states have issued resolutions making a commitment to including international education in their educational systems (NAFSA: Association of International Educators, 2008).

The agriculture industry in the United States has been tied to the global community for as long as it has been in existence. “In 2006, $68.7 billion worth of American agricultural products were exported around the globe” (American Farm Bureau, 2007, p. 16). The United States controls a significant amount of the world market in many commodities, including 39% of the corn, 38% of the soybeans, 22% of the veal, 20.9% of the cotton, 19.4% of the milk, 9.3% of the wheat, and 9% of the eggs
(American Farm Bureau). In total, 16% of the agriculture products produced in the United States are exported to other countries (American Farm Bureau).

In addition to the exports that the United States produces, the country is also importing a large amount of food products. The country imports a total of $64 billion in agriculture products leading to a positive trade balance in agriculture for the country. Many of the products imported into the United States are important in the typical American diet. Bananas, coffee, tea, cocoa and spices amount to $8.1 billion in agricultural imports (American Farm Bureau, 2007).

World food levels have become critical in the past few months indicating an even greater need for students to understand changes that are impacting people around the world, including in the United States. Many factors are causing food prices to rise, and this crisis is affecting other international issues. There has been a recent spike in violence and protests around the world in response to the food crisis. People in the poorest countries are some of the hardest hit. Food prices, in some cases doubled in the past two years, have increased partly because of rising demands for high quality food in some Asian countries. Fewer people in that part of the world are growing food, but, many individuals have increased incomes with which to buy food. The increase in the cost of oil and the demand for biofuels produced from traditional food crops is also increasing the food prices (Walt, 2008).

When reviewing literature on the internationalization of education, it is evident that this is becoming a trend in post-secondary institutions around the United States. There is a growing body of research on the internationalization process and its effects on college students. This trend has not yet become popular in secondary schools so the
research is somewhat limited. The research that is available often is very specific to an area such as student exchange or cultural awareness. Literature related to internationalizing education is presented here along with that describing the current state of career and technical education (CTE) and specifically agricultural education. In particular, literature in the following three areas was reviewed:

1. Internationalizing education in the United States: post-secondary institutions, public schools, areas of internationalization, and private non-profit efforts in internationalizing education
2. Career and technical education: current trends, the future of the subject area, and agricultural education
3. Internationalizing a curriculum: curriculum reliability, program integration factors, and efforts in internationalizing agricultural education

Internationalizing Education in the United States

Post-Secondary Institutions

The internationalization of post-secondary institutions in the United States has become a common goal at many individual schools and for the nation as a whole since the ending of the cold war. Institutions use this word in many different ways to define the changes that are being made at their schools.
A working definition of internationalization related to post-secondary institutions has been proposed as: “the process of integrating an international, intercultural or global dimension into the purpose, functions or delivery of post-secondary education” (Knight, 2003, p. 2). Knight (2004) suggested that the words used to make up this definition were chosen very deliberately. Process is used to suggest that internationalization is developed overtime and does not happen all at once at a university. The terms international, intercultural and global are used to describe the breadth of issues that internationalization covers spreads across nations, cultures, and worldwide. Integration implies that these concepts should be spread throughout the programs and policies at the institution, not just treated on the surface. Finally, this integration should extend into the overall purpose, function, and delivery of information at the university. Many universities are not only including international components in curricula taught in the classroom, but also in student organizations, special programs, and in their decisions to hire new faculty and staff members.

The internationalization of a post-secondary institution can take many forms and usually covers a variety of areas. One of the most common areas where international programs are added to a university is in its academic programs. Study abroad is becoming an increasingly popular program for students in the United States. Many universities now require students to complete a foreign language study as part of their degree or before their admission. Also, both students and visiting professors from abroad are increasing on college campuses around the country. Internationalization is also incorporated into many extra curricular opportunities offered on campuses (Knight, 2004).
In one survey of university administrators, faculty, and staff, the group was asked what they thought were the most common types of internationalization on their college campuses. Almost all of the respondents indicated that study abroad was key. The other top responses to this question included faculty going abroad, a major including study of international content, international students at the college as a cultural resource, and international modules or units in general education courses (Schneider, 2003). Brooks, Frick & Bruening (2006) completed an analysis of internationalization in agricultural colleges at land grant institutions. They found seven major areas in which international topics were being integrated into university programs. Those areas were study abroad, faculty research, graduate research, training, international students on campus, foreign agreements and contracts, and curriculum and course content.

Study abroad is one of the most widely known post-secondary programs with a significant international element. “Over the past decade the number of US students studying abroad has increased by 150%” (Institute of International Education [IIE], 2007). Most students study abroad in their junior years of college. Since 1995, females have made up around 65% of students who study abroad while males make up around 35% (IIE). The top three majors of students who studied abroad since 1995 are social sciences, business and management, and humanities. In the 2005-2006 school year, education majors made up 4.1 percent of all American study abroad students and agriculture majors made up 1.3 percent of study abroad students (IIE). To address the gender gap in study abroad Marcum (2001) suggested offering more short-term study abroad programs for male students who may have to deal with more inflexible curricula.
in the areas of science and math. Marcum also suggested having a greater variety of programs for students who are in the hard sciences.

Research is another area where internationalization is happening at universities. Research is pursued across country borders to solve global problems with shared resources and expertise. Research conferences and presentations are being held around the globe to share the outcomes of research more efficiently. Universities are including an international component in both their governance and general operations as well. International components are being added to university-wide planning and policies by faculty and administration (Knight, 2004).

It is common for universities to have external relations with an international component such as partnerships and networks with other colleges or organizations. Colleges have become more internationally oriented in their services offered. They will often have support services specifically for international students coming in, staff services, and international libraries among other services. Human resources is one area where universities are making an effort to internationalize their faculty and staff. Institutions are doing this by hiring staff with international expertise, providing support for staff professional development and allowing for international sabbaticals (Knight, 2004). In a university survey, 83% of respondents said that faculty were the most important group of people responsible for internationalization of a post-secondary institutions (Schneider, 2003).

The charge to internationalize post-secondary institutions has gone beyond individual universities and is on the national agenda for several different organizations. The United States Department of Education has an International Education Programs
Service Division that helps universities to plan, develop policies, and write grants related to international education (United States Department of Education, 2008). Other groups such as the North American Colleges and Teachers of Agriculture [NACTA], have an international committee that is designed to funnel international agricultural information from the national organization down to universities and individual professors (NACTA, 2008). State organizations and governments are involved as well. Thirty states have either passed resolutions on including international education initiatives in the state, or were actively seeking this type of resolution in the state government as of May 2008 (NAFSA: Association of International Educators, 2008).

Many government organizations and non-profit groups are invested in the task of internationalizing universities because they are stakeholders for these colleges. The students who graduate from universities are future employees and stakeholders for these national groups and they need to be well trained and aware of international issues. National groups such as those described above can have an effect on the internationalization of universities in many ways. Often they will provide grants or funded programs to support international activities at universities. Groups often develop rationales, policies, and other support for the concept of internationalization. The internationalization of institutions of higher education is often part of the national strategy to achieve international policy and development objectives (Knight, 2004).

The education programs at universities, especially the training of secondary educators, have often lagged behind the internationalization of other areas of the university. A recent survey showed that current teachers thought they did not get a lot of international content in the courses and at their universities when they went through
school (Schneider, 2003). In the same study, administrators cited the urgency to train teachers quickly and meet the increasing criteria students need to have to become certified as reasons why more international content is not included in their studies. International components are not part of the current certification standards in most states (Schneider).

Current education students and graduates of these programs commented in the survey that they were interested in study abroad programs but that there were many difficulties in participating in this type of experience. Students said that many of the study abroad programs were not appropriate for an education major or the credits did not transfer. Many students thought that there were too many restrictions on their schedule because of other requirements for their majors so they would not be able to participate. Other students said that faculty and advisors did not promote study abroad programs to education majors and had little appreciation for the benefits they could give an education major (Schneider, 2003).

Currently most certification requirements do not allow teacher education students to complete their pre-service internships or student teaching experiences outside of the country. Also, a language is not required for an education major to graduate and achieve certification in most states. Eighty-eight percent of the current teachers surveyed reported that they thought there should be increased foreign language requirements for education students. Administrators and faculty did indicate that it was possible for education students to pursue a foreign language or a study abroad as part of their college experience but that it was important for students to plan for this early so that they would have enough time to complete all of their requirements (Schneider, 2003).
The American Council on Education [ACE] (2008) surveyed college-bound high school students on their interests in study abroad and other international activities. They found that 55% of students surveyed are fairly certain that they will participate in study abroad at college. The students who were surveyed had many previous international experiences. Ten percent of students in the survey had hosted an exchange student, 20% had traveled to another country with a school group, 51% had close friends or family in another country, 61% had traveled to another country with family, and 95% of students surveyed had studied a foreign language (ACE). Over 40% of student respondents in this survey indicated that it was very important that the college they attend offer opportunities to interact with students from other countries, study a foreign language, study abroad, participate in international travel programs and tours, and to have an internship abroad (ACE).

**Internationalization of Secondary Schools**

Public education has been slower in adopting an international focus in the current school model. Secondary schools have seen more of these changes than primary schools in recent years but there are few examples of schools that have been internationalized around the United States. There are many objections to including such material in the curriculum. Much of this opposition stems from the current school mandates and the standards set by the No Child Left Behind law that schools are required to meet. The standards leave little time for schools to introduce new curriculum that is not necessary under the law.
Morris (2006) described three ways that secondary schools are internationalizing their curricula: advanced placement courses, Model United Nations clubs, and curricular reform and innovation. The advanced placement program offers students the opportunity to take a comparative politics course or American government, both of which would include some international topics. These courses are offered in few schools and they are not mandatory; students usually use them as a way to help get into college. Model United Nations clubs are an extracurricular activity for students to learn more about how the United Nations works and the issues that the group faces. This club is not part of any mainstream curriculum and there are few clubs compared with the number of secondary schools in the United States. State and national regulations and standards make reforming curriculum a very difficult process in most secondary schools. There are few efforts to introduce new courses in subjects such as international topics because of the tough requirements to put these new courses into place.

Efforts are being made to work through the issues of internationalizing secondary schools. Many non-profit groups, universities, government organizations and individual schools are trying to promote internationalization. There are some general things that people are doing to try to include more international aspects in secondary schools. Universities can have a major influence on the internationalization of secondary schools because they have so many experiences and resources already. Post-secondary institutions could serve as resources for local high schools developing international programs (Morris, 2006). Many schools and teachers are trying to internationalize by adding international modules and topics to courses that are already in place. This is easier than trying to develop new courses because there are fewer restrictions related to
adding content to existing courses. Also, teachers are finding a multitude of resources online to help them internationalize. There are resources to help teachers develop course content and special programs for students to communicate with other students around the world through the internet (Morris). Often, time and funding are large barriers to internationalizing public schools.

Internationalization was common in social studies curriculum because this discipline already included many concepts related to international issues. Social studies teachers have been incorporating global concepts in their lessons to give students a view of the world and the United States that is not biased toward Americans. Some goals of a new nationally recommended social studies curriculum included helping students to see events that affect America also have an impact on other nations as well and showing students whose historical interpretations of events are often tainted by national interests. Some of the new social studies curricula focused not on changing the whole curriculum but allowing students to think more broadly about topics already in current curriculum encouraging critical thinking, and looking at different perspectives on events rather than specific details of the events (Garii, 2000). It is important that teachers realize that internationalization needs to happen in many disciplines, and not just social studies where it is currently a common practice.

Collins, Czarra, & Smith (1995), developed an overview of scholar and educator recommendations of what students should know about the world. Their list included three broad themes of Global Issues, Problems and Challenges, Culture and World Areas, and The United States and the World: Global Connections. They go on to describe specific knowledge objectives, skills objectives, and participation objectives for
students. Their recommendations covered eleven specific subject areas that they thought should be studied by school age children. These areas were “(a) conflict and control; (b) economic systems; (c) global belief systems; (d) human rights and social justice; (e) planet management: resources, energy, and environment; (f) political systems; (g) population; (h) race and ethnicity; (i) the technocratic revolution; (j) sustainable development; and (k) globalization” (Collins et al., p. 2). Although students would be unable to thoroughly study all of these areas, it is important for them to have an overview and working knowledge of the subjects. A systems approach to teaching about international topics was recommended because of the connectedness of the world; it could show how the above issues are related to each other, and to the students who are studying them.

One initiative found to be growing in force around the country was the creation of international high schools. These schools focus on developing an international component to their curriculum and mission as a school. Most schools integrate academics and extracurricular activities to create a full program of study with an international theme connecting all areas. These initiatives allow high school students to strengthen their skills and a working knowledge of international issues. In the process, teachers learn innovative ways to include international concepts into their curriculum (Hewitt, 2008).

**Areas of Internationalization**

There are several common areas in which high schools and public education programs in general do have international components. In most areas, foreign languages
are offered at least at the high school level and many also have middle school courses. Along with foreign languages, many schools offer exchange trips either as a stand alone activity or in partnership with a language program. More and more schools are celebrating cultural awareness days to let students of different cultures share their heritage and to learn about cultures around the world. Also becoming more common are schools partnering with sister schools in another country to communicate, assign international pen pals, or do joint projects.

Several organizations were found to help support collaboration between schools in different countries. One such program was the “ePALS” program which connects classrooms worldwide for cross-cultural learning experiences. Schools around the world participate in e-mail sharing, collaborative projects, and exchange ideas (ePALS Classroom Exchange, 2006). Another online collaborative program is the International Education and Resource Network. This global organization allows students to use the Internet to collaborate on projects with other students around the world. The network currently has 20,000 schools participating in online projects, professional development, and special events (iEARN-USA, 2008).

The Council on Standards for International Educational Travel is a non-profit organization that facilitates exchange opportunities between high school students and communities. The Council stated that exchange experiences helped students to learn about other cultures, make friendships, gain worldly perspectives, understand the interconnectedness of the world, and realize the importance of knowing other languages (Education First Foundation for Foreign Study, 2006). Even though it may not be possible for all students to participate in exchanges because of funding, these studies
illustrate the advantage of having a personal relationship with international partners and the benefits on learning about international cultures.

**Private Non-profit Efforts in Internationalizing Education**

Along with schools and public institutions there are numerous private non-profit organizations that are interested in the internationalization of education. These groups are interested in both formal and non-formal education settings and they work with a variety of groups such as religious organizations, humanitarian organizations, and organizations that are promoting a specific message. These organizations have a variety of strategies to support the internationalization of education including developing curriculum and websites, advocating their cause, hosting special events, and developing centers with international themes where guests can come and learn.

One organization, the Asia Society, is a non-profit organization that builds relationships and an understanding between people of Asia and the United States. This organization is pursuing a variety of initiatives including the Asia and International Studies in Schools initiative. It promotes teaching specific international subjects in schools such as history, culture, and current events. It is also trying to build partnerships between schools, universities, business leaders, and the media to increase this type of learning in public schools (The Asia Society, 2008a).

Another organization that has a large international component to its mission is Heifer International. This group is primarily focused on preventing world hunger by providing needy people with livestock and training to help them out of poverty. The organization realizes that education of people in the United States, especially in schools,
is key to resolving that problem. It has learning centers throughout the United States for children and adults to learn about world hunger issues. It has also developed several levels of curriculum to be used in schools to educate students about world hunger. Often this curriculum is paired with a fundraising activity for the organization so that it turns into a small service learning project for the students (Heifer International, 2008a).

**Career and Technical Education**

*Current Trends*

Modern career and technical education began in the early 20th century with the passing of the Smith-Hughes Act in 1917. The purpose of this legislation was to prepare youth for careers in response to the increase in jobs resulting from the industrial revolution. Originally called vocational education, these programs first focused on the areas of industrial arts and home economics. Other industrial areas have been added including business and marketing education, health occupations, and technical education. Career and technical education is offered at a number of levels that usually start in high schools and specialized at career and technical centers. Currently, one or more courses identified as vocational in nature are offered at 93% of the nation’s comprehensive high schools. These courses are usually general, such as typing, and could prepare students for a number of different occupations. In addition, nearly 75% of the nation’s high schools offer at least one specialized course in a career and technical area. In recent years, the structure of CTE has been changing to meet the needs of students and our rapidly changing society. Modern career and technical programs focus more on teaching general occupational competencies that could be used in a variety of jobs, integrating
academics with career focused education, and developing new structures for administering career education including career pathways and magnet schools (Wonocott, 2003).

The National Association of State Directors of Career and Technical Education Consortium states five key principles of current career and technical education:

1. Draws its curricula, standards, and organizing principles from the workplace.
2. Is a critical and integral component of the total educational system, offering career-oriented benefits for all students.
3. Is a critical and integral component of the workforce development system, providing the essential foundation for a thriving economy.
4. Maintains high levels of excellence supported through identification of academic and workplace standards, measurement of performance (accountability), and high expectations for participant success.
5. Is robust and flexible enough to respond to the needs of multiple educational environments, customers, and levels of specialization.

(National Association of State Directors of Career and Technical Education Consortium, 2001, p. 4-6)

Career and technical education provides many benefits to American students. Recent studies by the Association for Career and Technical Education (2006a) showed that low student motivation may have a large impact on the high school dropout rate, along with low academic achievement. Career and technical education increased student motivation for being in school because it provides real world learning. By keeping
students engaged in learning through involvement in career-related courses has led to reduced student absenteeism and dropout rates (Association for Career and Technical Education [ACTE], 2006a).

In recent years CTE has become more rigorous and students who are in these courses are also taking more and higher levels of math and science courses. These students learn math and science skills in a context that is more relevant to them because of the “real” learning that CTE provides. Students in CTE courses were also enrolling in post-secondary education at the same rates as all high school students (ACTE, 2006a; ACTE, 2006b).

Career and technical education is meeting the needs of America’s workforce by training students in specific technical areas where they can work right away. Students often learn skills and certifications that can directly be used in the workforce. Also, internships, career and technical student organizations, and school-based enterprises help students learn workplace skills that make them more employable than their peers. Studies showed that CTE students earn 8-9% more over their career than students who took a general academic track in high school (ACTE, 2006a; ACTE, 2008b).

Career and technical education is an appropriate place to include international concepts in education. This type of education prepares students for work; by including global concepts into these classes students would be better prepared to work in an international environment. Concepts including international communications and business would be complementary to the current curriculum taught in CTE (Brown, 1997).
The Future of Career and Technical Education

To keep up with changing trends in education and workforce development, CTE has had to adapt over time. In the future as career skills change more rapidly, these programs will have to continue to be flexible in training future workers. Students will have to learn a variety of skills that will make them adaptable to different jobs and be able to update their skills rapidly as needed (Wonacott, 2003). There were four major forces that are making it necessary for career and technical education CTE to change significantly in the coming years. These forces include the new economy, public expectations for students, new research on student learning and motivation, and reform of American high schools (Lynch, 2000).

The workplace is changing rapidly in modern times and it requires employees to adapt at a quick pace. Technology, international business, a diverse workforce, and changing economies are all characteristic of a current workplace. Therefore employees must know how to learn fast, work with others, have communication skills, and be flexible to be effective in this new environment. A recent study showed that fewer than 20% of the jobs in the United States were still considered to be unskilled (Lynch, 2000).

The public has been very opinionated about education in recent years as schools have been on a rollercoaster of standards and reform. Data collected by Lynch (2000) about the public opinion of education in the United States showed that people want CTE to be included in schools and that people think children should be going to college after high school. The public wanted youth to attend college but they thought students also need to be prepared for the workforce. Data showed that many students are not prepared for college and drop out before finishing (Lynch).
The workforce has called for students to learn higher levels of thinking to make them more adaptable and efficient when they reach employment. Higher order thinking can include creativity, decision making, problem solving and analysis. Approaches to learning these types of skills have long been used by CTE. The real world environment used by these education programs helps students to develop higher level thinking skills (Lynch, 2000).

School reform has been a major issue in America in the last several years, especially since new standards have been required under the No Child Left Behind law. Many different models of school reform have been suggested and experimented with to find a successful way to achieve these new standards without having a negative effect on some areas of education not guided specifically by the standards such as the arts and CTE. The *High Schools that Work* model initiated by the Southern Regional Education Board has been effective in reform. Key practices that are recommended by this model include:

- High expectations for learning, rigorous career and technical courses, more required academic courses, learning in work environments, collaboration among academic and career and technical teachers, an individualized advising system, active encouragement of students’ interests, extra help outside of school and in the summer, and use of assessment and evaluation data to improve students’ learning (Lynch, 2000, p. 8).

Considering the forces that are changing CTE, there are several recommended practices to be included in this type of education so that it will maintain a place in the American education system and turn out successful graduates in the future. High school
majors would help students by guiding them in a specific direction toward a career path, but not locking them in to an exact job. It is recommended that contextual learning be continued to help students have a practical application of their academics, and real world problems to demonstrate how skills are used. Work based learning is an activity that allows students to experience a workplace while learning skills and career practices that will be useful to them in the future. Most students’ progress is currently measured by standardized tests but authentic assessments are recommended in the future to really demonstrate how each student is working through their studies in their own way and specific progress they are achieving. It is proposed that career and technical centers should begin to change into career academies where academics is a larger part of the curriculum, where students choose career majors, and work-based learning is part of their experience. This will help students have a better understanding of the current workplace and what will be required of them as future employees. Tech prep is a program that provides students with both academics and technical courses that will help them transition into post-secondary education. This curriculum helps students move into higher education after high school so that they can enter higher wage occupations that require higher degrees. All of these strategies will help CTE maintain its place in education and continue to help students be successful in the workplace. Many schools are already on their way to implementing some of these suggestions and ensuring that their career and technical programs will be needed in the future to prepare students to work in a global environment.
Agricultural education was one of the first CTE areas that was initiated after the passing of the Smith Hughes Act. It is one of the largest areas of CTE in the country and it has been one of the most consistent areas of education because agriculture is needed to sustain society. The National Council for Agricultural Education oversees this entity of CTE in the United States. The mission of agricultural education in this country as stated by the National Council for Agricultural Education (2008) is:

Agricultural education prepares students for successful careers and a lifetime of informed choices in the global agriculture, food, fiber, and natural resources system. (About Agricultural Education, ¶ 3)

There are many levels of agricultural education in the United States from local agriculture literacy organizations such as Agriculture In The Classroom, to sophisticated university research programs around the nation. Instruction in this area is very systematic and can cover many areas such as science, business, and technology in the plant, animal, environmental, and natural resource areas. Student instruction in agricultural education at the high school level generally has three components for an integrated approach. Students receive classroom and laboratory instruction as part of a classroom program, a work-based learning aspect called Supervised Agricultural Experience, and a student leadership organization called the National FFA (The National Council for Agricultural Education, 2008).

There were around 775,547 high school agricultural students in 2006. They were a part of 7,784 programs in the United States and Puerto Rico. The population of FFA members is relatively balanced with 27% of members coming from rural, farming areas,
39% from rural non-farm areas, and 34% from urban areas. Females were only allowed to be in the FFA and many agriculture education programs starting in 1969. Membership has increased rapidly since then. In 1988, it was reported that only 15% of FFA members were female (National Research Council, 1988). In 2007, 37% of FFA members were female while 63% were male. There are currently over 11,000 agricultural teachers in the Unites States. Teachers cover a wide range of subject areas in agriculture programs. Ninety-two percent teach agri-science, 71% teach biotechnology, 59% of teachers offer agricultural mechanics, 49% of teachers have horticulture in their curriculum, 43% have animal science courses, and 24% of teach environmental topics (National FFA Organization, 2006).

The National FFA Organization is interested in providing students with international experiences. One program objective of the global division of this organization is to “allow participants to develop a global perspective and become more culturally aware of the diversity in agriculture around the world” (National FFA Organization, 2008, FFA Global Program Objectives, ¶ 1). There are two international programs currently offered by this organization. One is a travel seminar for state officers. Usually this trip is to several European countries where the officers tour different agricultural industries. The other trip offered is for national award winners to go to Costa Rica and explore different sectors of that country’s agricultural industry (National FFA Organization, 2008).
Internationalizing a Curriculum

Curriculum Reliability

The first areas that need to be assessed when introducing a new curriculum, or altering a curriculum, is whether it meets the state standards and if the curriculum is effective. This is necessary because schools must follow state and local curriculum guidelines while teaching effectively. This stems from the fact that students need to pass national tests in reading, writing, science, and math. There are many ways to assess a new curriculum to determine whether or not it is reliable and whether or not students are learning specific standards and meeting the objectives that are set out for the curriculum.

It has been possible to introduce curriculum aspects in international education to students in the past few years because some state standards specifically support this type of learning. Students have been held responsible for global awareness through academic standards in some states. In Pennsylvania, academic standards for grades nine and twelve state specifically that students should have an international awareness. Students were expected to have international knowledge in the areas of civics and government, economics, environment and ecology, and geography. Standard 6.4.12 E in economics for grade twelve states that students should have skills to “analyze how United States consumers and producers participate in the global production and consumption of goods and services” (Pennsylvania State Board of Education, 2006, Chapter 4, Appendix C, p. 7). Standard 6.4.12 G in economics for grade twelve that states students should be able to “evaluate characteristics and distribution of international economic activities including primary extractive industries (i.e. farming, fishing, forestry, mining)” (Pennsylvania State Board of Education, 2006, Chapter 4, Appendix C, p. 8). Standard 4.4.10 A in
environment and ecology for grade nine states that students should be able to “determine the importance of agriculture to society and compare and be able to contrast the influence of agriculture on a nation’s culture, standard of living and foreign trade” (Pennsylvania State Board of Education, 2006, Ch 4. Appendix B, p. 10).

Curriculum evaluation determines if students taught a curriculum are gaining knowledge from that curriculum. Specifically, it is important for students to be learning what is required by their state standards. It is unlikely that curriculum alone will improve students’ learning but an effective curriculum can have a positive effect on student learning (Stern & Roseman, 2004). There are several models for testing curriculum to determine whether or not it is effective and students are learning. Some curriculum testing consists of giving students a standardized test to determine what knowledge they have in a specific subject. Standardized tests have several problems and are not the best way to test whether or not a curriculum is effective. One major problem is that these tests do not show if students have increased their knowledge or skills as a result of a curriculum. They simply show a student’s level of knowledge at a point in time related to other students of the same age or grade level (Deno, 1992).

One curriculum evaluation model that has been proven to be effective is the curriculum based measurement (CBM) system. With this type of evaluation teachers can test the impact of different types of curriculum and instruction on individual students. Data is taken over a period of time measuring different forms of the same information to determine if the student reacts to one type of learning or another. A benefit of this type of assessment is that it can be used with many different curricula, since it was not created for a specific curriculum (Deno, 1992). Another curriculum testing model that has been
in place for several years is *Project 2061*, which is overseen by the American Association for the Advancement of Science. This project evaluates the ability of a curriculum to contribute to student understanding of specific national standards and objectives of the curriculum. This curriculum evaluation system uses criteria such as how the curriculum builds on prior knowledge, if the curriculum guides students through learning experiences, and how it represents abstract ideas (Stern & Roseman, 2004).

When doing research that tests the effectiveness of a curriculum, Little & VanTassel-Baska (2002) recommended procedures for a good study. After determining the research questions for the study, one should determine the scope of the assessment that will be carried out. Evaluation of a specific curriculum is often part of a curriculum effectiveness study and research questions related to the evaluation of a curriculum should be included. Examples of such questions include: “To what extent are the learning goals and outcomes of the curriculum addressed and fulfilled in classroom implementation?” and “What evidence exists to document positive student performance trends for students participating in specialized curriculum?” (p. 2). This pair of researchers recommends identifying specific curriculum outcomes or perspectives that will be tested. One of the most efficient research designs for this type of study is a pre-test, post-test, quasi-experimental design. In most studies, two groups of students are identified; one group is a treatment group that receives the curriculum and completes the assessments, and the other group is a control group that just participates in the pre- and post-test assessments. Strong studies included multiple data sources and an instrument that is reliable and valid (Little & VanTassel-Baska, 2002).
The Center for Gifted Education at the College of William and Mary has conducted research projects doing curriculum evaluation and it has found several elements that have consistently made a curriculum more effective in increasing student knowledge. These types of curricula have an emphasis on: “learning concepts, higher level thinking, inquiry and problem-based learning, and the use of technology as a learning tool” (VanTassel-Baska, 1998).

**Program Integration Factors**

There are many factors that help to determine if a program is implemented at the school and classroom level. Some of these factors are related to specific teachers while others are factors such as higher-level regulations that are mandatory for teachers. In general change is usually initiated in schools through professional development for teachers. Many times professional development events are mandatory for teachers, but their motivation for participating in professional development is more intrinsic. In Guskey’s research on teacher change teachers wanted to help their students learn better and be more successful; and improving their teaching skills through professional development was one way they achieved that (1986).

Unfortunately, many professional development opportunities that are offered are not helpful to teachers. Typically these events try to change the attitudes and beliefs of teachers right away without any supporting proof of the new techniques, and teachers resist the changes. These efforts often end in failure and Guskey suggests that the order in which actions were taken to change teacher behavior may be the issue (2002).
Guskey (2002) developed an alternative model showing how teachers change over time (Figure 1). He hypothesized that teacher change is an experiential process. After learning about an innovation, teachers first need to implement the change in their classrooms. After seeing firsthand the results of the implementation teachers will determine which changes are successful and which do not make a difference in student learning. After the teachers have made this judgment their attitudes and beliefs about a new innovation will then change and become more permanent.

![Figure 1: (Guskey Model of Teacher Change, p. 383, 2002)](image)

Guskey (2002) recommended that when attempting to implement changes in the classroom, schools need to recognize that change is slow and complicated for teachers to integrate in their existing programs. Teachers need to receive some sort of feedback such as tests, surveys, or student perceptions to help them determine if the innovation was successful. Finally, schools should provide follow-up support for teachers that are implementing new changes, continuing to help facilitate the change process and making sure that it lasts over time.

The internationalization of a curriculum is a significant change and involves many factors determining how teachers react to this process. Infusing more international
concepts into education can be considered a social movement because these ideas are moving the educational system and community that they affect toward social changes. Tye and Tye (1992) stated that four assumptions need to be made when discussing effective change in schools, especially related to internationalizing a curriculum. Timing is important when initiating change. Now is a good time for internationalizing education because changes are happening so rapidly around the world and connecting people. The second assumption that needs to be made is that changes happen at individual schools rather than higher levels of organization and teachers at the school need to be involved in making these changes. The third assumption when dealing with internationalizing a curriculum is that changes require people to redefine some of their roles. Teachers change the way that they present their curriculum and conduct other activities around schools. Other personnel at the district, county, and state levels also have to change how they work with the teachers initiating the change. They need to help facilitate the changes rather than being overly authoritarian and inhibiting progress. Finally, the fourth assumption that needs to be made in this situation is that it is likely an outside agency will have to be involved in the internationalization to help teachers make the linkages with new knowledge that they will need to be effective (Tye & Tye).

Tye and Tye (1992) suggested five conditions that promote the inclusion of a global education in schools:

An increasing awareness of the worldwide, systemic interdependence, the promotion of the movement by agencies which are viewed by practitioners as legitimate, and which possess knowledge and resources needed by those practitioners, the existence of a few people in the schools who already believe in
the movement, a significant number of people who feel that global education holds promise to develop cross-cultural understanding in school settings, which are becoming more and more ethnically diverse, and/or the presence of at least a few people who are disenchanted with the present system and who see global education as having some possibility of serving as a vehicle for change. (p. 54)

Social movements in schools have several characteristics that usually make them successful. These include legitimization, knowledge flow, resource generation, team focusing, and professionalization (Tye & Tye, 1992). Legitimization is important for the schools to buy into a controversial, new subject such as internationalization. It is helpful for a proven organization such as a business or university to lead this movement so that school personnel feel like they will be supported. The outside organization mostly assists the school in acquiring knowledge to support internationalization or by supplying this knowledge to them. Knowledge includes curriculum, workshops, and other strategies like newsletters. Teachers need to have other resources as well if they are going to help make the movement successful. Teachers already have little access to resources, so bargaining to allow them to have more time to work on this project, or providing special funds to assist them, will increase the number of teachers that can afford to be a part of a program and the quality of work that comes out of the internationalization. Team focusing is bringing a small group of people together to work on a project. This acts as a support structure for those involved where they can encourage each other, talk about problems they are having in the classroom, and bounce ideas off each other. Professionalization is necessary because so much power and management have been taken away from teachers and given to upper level personnel that often they no longer use
these planning and management skills. Teachers need to be an active part of internationalization and they need to be involved in developing this movement. The changes in schools start at the classroom level and teachers must be in charge of this (Tye & Tye).

There are many negative factors that affect how internationalization of a curriculum is carried out in a school. The culture of the school has a major impact on how teacher react to changes. The support of leadership in the school and the morale of the staff in general have an impact on new programs. Each school has its own culture and is unique. Individual teachers are also resistant to change and adopting new programs for a variety of reasons.

In a Tye and Tye (1992) study of how teachers implement global education in schools they found a continuum of participation and resistance among teachers from those that are very involved and want to lead the movement to those teachers who want nothing to do with it. Some common reasons teachers do participate include being open to global education and wanting to be involved with new initiatives. Some teachers that are interested in teaching global concepts may be reluctant because they want to first be shown how they could be involved or see how global concepts relate to their subject areas. Teachers that do not participate may be too busy with other innovative programs, don’t understand global education, or believe that traditional subjects should take precedence (p. 192).

Many teachers are labeled as being resistant to change and new ideas such as internationalizing a curriculum. Often the teachers themselves are not resistant to the new ideas but they face many barriers to participation. Time is a major barrier to
teachers participating in any new program. Teachers seem to have increasing obligations and requirements that are standard in their jobs, leaving little room to participate in optional programs. Getting together and working with other teachers is also a barrier. The school day is not set up to be conducive to teachers working collaboratively on projects. Many barriers to new programs come from the state and district levels. New standards and testing are constantly required by the state and individual districts often add their own demands to each teacher’s agenda. Teachers also have to balance their personal lives with the amount of time that they chose to spend on new programs since most school time is already used up with mandatory duties (Tye & Tye, 1992).

Efforts in Internationalizing Agricultural Education

Teaching international concepts in high school curricula has been increasingly common in recent years (Elliot & Yanik, 2004). However, it is still not a widespread practice in agricultural education. Several studies have been completed showing the effects of an internationalized curriculum on agricultural students but these studies tend to be small and not very generalizable. Teachers have also been surveyed to determine factors related to their teaching of international concepts.

Elliot & Yanik’s (2002) study of high school freshmen who had not received any international instruction showed that students did not place high value on international agricultural concepts and issues. They only agreed with two-thirds of the attitude and belief statements related to international concepts in the study and were undecided on many others. Elliot & Yanik (2002) stated that “without a constant effort to keep an international focus within the realm of what teachers teach, students’ attitudes and beliefs
about international agricultural issues are marginal at best” (p. 500). Radhakrishna, Leite & Hill (2003) found in a study of high school students attending the Pennsylvania Governor’s School for the Agricultural Sciences that female students and students who came from urban schools had more positive attitudes and beliefs toward international agricultural concepts than students who were male and who were from rural schools.

Several factors impact whether an educational innovation such as an international agricultural curriculum is initiated in an existing program. The following factors were specifically identified in a research study related to secondary agricultural programs: the program needs to have support from the school and state, which may include funding or permission for such a program; the program should be organized by a teacher with sufficient knowledge, training and materials; and the teacher is obligated to plan, structure and involve participants in such a program for it to successfully initiate an international aspect into the agricultural education program (Ibezim & McCracken, 1994). Many teachers who are supportive of teaching international concepts in agricultural education programs do not know which concepts should be included in a program according to Davis (As cited by Ibezim & McCracken). Ibezim & McCracken found that teachers that had administrative support for an international agricultural curriculum were more likely to add this type of curriculum to their teaching.

A study by Hossain et al. (1995) documented that teachers who had received curriculum plans on internationalizing agricultural education had more positive attitudes toward additional materials to help teachers integrate such a curriculum than teachers that did not receive any initial international curriculum plans. Teachers were also more interested in students’ participation in international FFA programs and in having their
FFA chapters host international students if they had received plans on internationalizing their curricula. This study also showed that providing a curriculum to teachers gave them more positive attitudes toward certain aspects of internationalizing agricultural education programs.

Peuse & Swanson (1980) found that teachers who had been involved in international programs themselves were more likely to incorporate international agricultural concepts and curriculum into a secondary agricultural education classroom than teachers with no international experiences. Reaman (1990) also stated that educators who had previous international experiences had more positive perceptions of implementing international programs. Hossain et al. (1995) found that teachers who were members of professional societies, participated in national seminars, read *Agricultural Education Magazine*, and had a worldly attitude free of prejudices had more positive attitudes toward internationalizing their agricultural education curricula.

In a comprehensive review of literature there was almost no evidence of curricula available to teachers related to international agricultural education. One curriculum was found on the topic of world hunger and agriculture produced by the National Council for Agricultural Education and the Bread for the World Institute. Curriculum themes included “Hunger is more than lack of money;” “International partnerships in agricultural trade and investment;” and “Careers in international agriculture;” (National Council for Agricultural Education, 1998). This curriculum would benefit teachers, especially those without prior international experiences. It did, however, lack any component to integrate experiential learning or cultural experiences into the lessons. Also, the curriculum is becoming outdated considering that it is ten years old.
In recent years, Heifer International has been making an effort to develop relative curriculum in international agriculture that would be appropriate for agriculture students. Currently this organization has curriculum for students in grades 3-6, and a separate curriculum for grades 6-8. These curricula address international agriculture and sustainable development while giving students the opportunity to help by raising money for Heifer International. The organization is in the process of developing a curriculum for high school students. The Heifer International learning centers give students and adults a firsthand look at international agriculture. People can participate in single day tours and activities or multi-day experiences including an overnight in a simulated village site of a country that is experiencing severe poverty. These experiences at Heifer International centers expand student knowledge by allowing them to be involved in learning through hands-on activities and putting their new knowledge into context through simulations (Heifer International, 2008b).

White, as cited by Ibezin & McCracken (1994), stated that “internationalizing agricultural education sparked students’ interests and revitalized agricultural education programs” (p. 44). Harbstreit & Welton (1992) recommended that efforts to teach international concepts in agricultural education should be pursued and teachers should explore ways to increase student retention in their programs so they can teach international awareness. Egelund, Sleight, Miller & Straqadine as cited by Elliot & Yanik (2004) produced a study on recruitment and retention of students in international agricultural activities. Strategies for these activities included developing a country and student information guide that included geographic, demographic and economic
information; creating an international agricultural student organization; and providing mentoring and networking services.

Beyond classroom study, actually participating in an international trip or experience also improves student knowledge and attitudes relating to international concepts. Students involved in the National FFA Costa Rica Travel Seminar had very positive attitudes toward international agricultural education. Most of the students in a study completed by Connors (2003) stated that they had little to no previous instruction in international agriculture, but a majority of the student participants thought that it should be taught in secondary agricultural education. Sixty-five percent of the respondents had never traveled abroad prior to their experiences in Costa Rica. The students in the study answered knowledge questions prior to traveling there, averaging 68% correct answers about Costa Rica (Connors). While this number was impressive and showed that the students had a good understanding of the country to which they were traveling, the students’ international knowledge likely increased because of participating in a seminar. It is important to note that the students traveling on this trip had all won national recognition for agricultural programs through the National FFA Organization. It can be assumed that these students had good academic and extra-curricular records before going on this trip.

Radhakrishna, Leite, & Hill (2003) found that international activities influenced students’ knowledge of international concepts. They found that activities such as knowing exchange students and participating in the 4-H International Youth Exchange increased student scores on an international knowledge test. Radhakrishna, Leite, & Hill recommend that, “Efforts should be made to provide opportunities for greater
participation in international activities such as study abroad programs, internships, exchange programs, field trips, cultural immersion experiences, and other experiential learning experiences. Further research should be conducted to provide additional insights into relationships between involvement in international activities and global awareness” (p. 558).

**Summary**

Globalization is changing how people in the United States interact with others around the world. This is especially important in the agriculture industry, where a large portion of the food grown is exported to other countries and, in return, other types of foods are imported to the United States. Many colleges and universities have taken it upon themselves to internationalize their schools and programs. Public education has just started initiating this as well but it is a slow process.

Career and technical education (CTE) is a type of education where students are prepared for the workforce and future careers. Agricultural education is one type of CTE. This is a discipline where internationalization would be very effective because students need to learn skills to work in the global marketplace. Some curricula and programs have been developed for students in public education related to international issues but there are still many problems. Schools and teachers face a variety of barriers and issues when implementing such programs including being overworked and having to train students to do well on standardized tests. Despite all of the issues, there has been some evidence of successful internationalization of agriculture programs. These programs are not common yet, but it is obvious that the world is growing closer together, and countries are increasingly linking their food supplies to other countries. As this happens, schools and
especially agriculture programs are making it a priority to teach international concepts in their classrooms.
Chapter III

RESEARCH METHODOLOGY

This chapter describes the methodology that was used in this research study, outlining specific procedures used. The following sections will be described: purpose and objectives of the study, population and sample, curriculum development, instrument development and testing, methods and procedures, and data analysis procedures.

Purpose and Objectives of the Study

The purpose of this study was to evaluate the scope of knowledge and perceptions of high school agricultural students toward international agricultural concepts using an international curriculum intervention. The objectives of the study were to:

1) Describe high school agricultural students’ demographics in relation to prior international experiences, number of years in a language class, age, gender, number of agricultural classes taken, and grade in school.

2) Describe the perceptions of high school agricultural students toward international agriculture and determine if their perceptions change following an international curriculum intervention.

3) Determine if number of language classes taken or past international experiences of high school agricultural students are related to their international agriculture perceptions.
4) Determine if an international curriculum intervention with high school agricultural students positively changes the knowledge levels in international agricultural concepts of participants.

**Population and Sample**

The population for this study was selected students enrolled in agricultural education classes at public high schools in Pennsylvania. In the school year 2005-2006 there were 166 agricultural education programs and 9,024 agricultural students in the state of Pennsylvania at the high school level according to the National FFA Organization (2007). This number has been relatively consistent in the past few years. These programs offer a variety of courses, some of the most common being agricultural mechanics, agribusiness, horticulture, and animal science. The departments mostly have one or two teachers running them but there are also several multi-teacher departments around the state. On a nation-wide basis sixty-seven percent of the agricultural education programs have FFA chapters associated with them (National FFA Organization, 2007).

There was specific school selection criteria used for this study. A list of agricultural teachers in the state was examined to determine which teachers had prior international experiences, or had a strong interest in international activities and had participated in international programs. A list of ten teachers was generated for prospective agriculture programs to participate in the study.

The rational for asking teachers that had previous international experiences was because it was thought that these teachers would be more likely to participate in the study since they already had an understanding and an interest in international topics. The level
of past international participation of teachers was obtained by personal recommendations from professors in the Department of Agricultural and Extension Education at The Pennsylvania State University that work with the teachers in the field. Most of the teachers had received their degree from the university and had many of their international experiences while a student at The Pennsylvania State University.

The prospective teachers were given an initial e-mail in the spring of 2007 informing them that they would be invited to participate in a special program and a time was set up to call each teacher on the phone to personally talk to them and describe the project. Using direct contact allowed the researcher to talk to each teacher personally. Teachers were told of all the benefits of the project and what they would have to do as a participating agricultural program in this initial telephone call. It was also determined during this telephone call if the teachers had a an adequate population of students to participate in the survey. The researcher specifically asked for the research group to be students in upper level high school grades (10th-12th). Also, the teacher needed to have an appropriate class in the fall of 2008 in which to deliver the curriculum that would be presented.

After the telephone call, one teacher declined to participate in the study because they were retiring before the next school year. Another teacher declined to participate but recommended an alternative teacher that might be interested. The rest of the teachers showed interest in the project and were willing to begin the process of obtaining authorization to participate.

The authorization process had a major impact on the sample used in this study. The university required that the researcher get permission from several levels of
authorities in each school before allowing the schools to be a part of the project. The first level required teachers to obtain administrative approval. Some teachers found this very easy and already had an administration that was supportive of the agricultural department’s participation. Other teachers found it more difficult to obtain administrative approval. Administrative approval could come from a building principle, district superintendent, or school board depending on the district policies. Two teachers did not go past this initial step in the process because they could not obtain their administrators approval. One school was not able to complete this step and ended their participation because their administrator refused to approve their participation.

After the approval process four schools remained in the project. Figure 2 shows the location of the schools in Pennsylvania and table 1 shows the participant distribution. One of the schools had two teachers participating for a total of five teachers. By chance, all of the schools were clustered in the south and south eastern part of the state. There were 86 students in total that participated in the project. Each teacher had one class of students who participated in the program, with the exception of one of the teachers in school four that had two classes of students participating in the project. The classes of students who participated in the project were chosen by the teacher because of relevance of international agriculture to what they were studying and grade level to meet the specifications of the researcher. The titles of classes that participated were: International Agriculture, Agriculture Science II, Agribusiness (three sections), and Agro ecology.
Figure 2: Location in Pennsylvania of agriculture programs in the study

<table>
<thead>
<tr>
<th>School:</th>
<th>Number of Teachers:</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>School 1</td>
<td>One Teacher</td>
<td>7 students</td>
</tr>
<tr>
<td>School 2</td>
<td>One Teacher</td>
<td>13 students</td>
</tr>
<tr>
<td>School 3</td>
<td>One Teacher</td>
<td>10 students</td>
</tr>
<tr>
<td>School 4</td>
<td>Two Teachers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Teacher One:</td>
<td>Section One: 14 students</td>
</tr>
<tr>
<td></td>
<td>Teacher Two:</td>
<td>Section Two: 18 students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>26 students</td>
</tr>
</tbody>
</table>

Table 1: Number and distribution of students in the study
Curriculum Development

The curriculum that was used for the intervention in this research study was developed in a unique way and the process that was used is described in this section. As indicated in the literature review section, research shows that more active, inquiry and problem-based curriculum tends to be more effective in helping students learn (VanTassel-Baska, 1998). With relatively few international agriculture curricula available, a curriculum was developed specifically for this project to meet the needs of the research. The curriculum was ten lessons in length but it was designed to be very flexible to meet the needs of the different schools and classes that were participating. The curriculum was developed with the goal that it would be taught over ten, 45 minute periods. Extensions of each lesson were developed so that each lesson could last 90 minutes for schools in the project with block scheduling.

The curriculum used for the project was put together using a development model. Students first learned about broad world agriculture issues and examined major topics such as world hunger. Then the lessons featured information regarding specific world agriculture practices and international trade. After the first few lessons, students began to learn about the eastern European region of the world and then specifically Moldova. Moldova was selected because the researcher has a unique opportunity to work with a university professor and head of a development organization to gather information for the curriculum there.

Students then learned about the culture, history, government, and agriculture in the country of Moldova. The curriculum then became more focused and introduced a specific beekeeping project that impacted school children in Moldova. Students learned
specific information about this project and how the Moldovan school children were affected. Finally, students reflected on the experience and development projects around the world. The last lessons examined service learning and how students in the United States could take action to help solve international issues.

The beekeeping project studied in the curriculum involved orphan students who learned how to take care of bees and produce honey in classes and in an extracurricular club at their schools. They also were able to obtain practical experience by actually working with bee colonies at their school. Moldovan students benefited by increasing their knowledge, having a skill that they could use in a job, and being able to supply honey to the children in their school to improve health and nutrition.

Oleg Stiopca, the professor and coordinator of the beekeeping projects was a Fulbright scholar at The Pennsylvania State University Department of Agricultural and Extension Education from September 2004 to May 2005. There has been an ongoing relationship between the department and Dr. Stiopca who is now an associate professor at the State Agricultural University of Moldova in Chisinau, Moldova. One student group from Penn State visited Moldova and worked with him in the past. Dr. Oleg Stiopca is one of the directors of the Organization for Reform and Development of the Educational System (ORSDE) a non-profit organization dedicated to improving education in Moldova. The ORSDE initiated and manages the Moldova beekeeping project. This made the project easily accessible. Dr. Oleg Stiopca was supportive of the curriculum project and he provided numerous resources to the researcher.

This curriculum model was used to attempt to make American students feel like they were connected with students on the other side of the world. It was hypothesized
that if the students were able to understand and relate to these other students, they would be able to better understand how agriculture affected the students in Moldova and have a better view of world agriculture including a specific examples of how the agriculture industry works in other countries.

To create such a curriculum it was necessary to gather numerous sources of information. Specifically, information was needed to help American students feel like they understood the students in Moldova and what their lives were like. This required the researcher to travel to Moldova to gather information so that a first hand view of the students could be obtained.

The researcher traveled to Moldova for one week to collect data for the curriculum in May 2007. Data was collected in the form of field notes, interviews, video, pictures, written information, and artifacts. There were opportunities to explore many aspects of the country in general and specifically a variety of agricultural enterprises and places related to beekeeping. Some of the specific areas that were explored included: the National Ethnographic Museum, a farmers market, a beekeeping museum, a meeting with Heifer International Moldova representatives, local/regional extension representatives, USAID representatives, Peace Corps Moldova, young women’s beekeeping classes and projects, student beekeeping projects, and the State Agricultural University of Moldova.

After the travel to Moldova, the information was adapted for a United States high school level curriculum. A lot of research was done related to the curriculum on aspects besides the Moldova piece. Many aspects of the curriculum was material taken from existing lesson plans and curriculum published on international topics including
international agriculture. The curriculum development process occurred during the summer of 2007.

Most of the information from Moldova was developed into a series of videos for the curriculum. One video was developed that outlined different USAID projects that were being carried out in Moldova. Two other videos were developed showing the Moldova school beekeeping projects that the ORSDE was overseeing. These two videos showed the students working on the beekeeping projects and explained how the projects worked. These short videos were developed to help the American students to better understand how Moldovan youth lived and how an agriculture development project was changing their lives. The videos were each under five minutes in length.

When designing the actual lessons that were used in the unit the time that teachers had to present the material was taken into consideration. School one had a 45 minute period each day. School two had a 90 minute period each day. School three had a 120 minute period each day. School four taught the curriculum once or twice a week during a 90 minute period. The lessons were based on a 45 minute time slot and there were supporting activities that were added into each lesson to add up to around 90 minutes. These supporting lessons were added to better suit the teachers with the longer teaching time but they did not take anything away from the teacher who taught the 45 minute periods.

The title of the curriculum was *Youth to Youth International* (Sanborn, 2007). The curriculum package that was delivered to the teachers had several components. The main component was the teacher handbook that contained all of the lessons, worksheets for students, power points, and teacher handouts to make copies from. Also included in
the binder was a CD with all of the material on it in electronic form so the teacher could open it on the computer and a DVD that contained the three videos. Each teacher received a student notebook for each student with many of the worksheets and papers that students would need in the curriculum. The teachers also received a large world map, several smaller wipe off maps, several American Farm Bureau *Farm Facts* publications, dry beans for one of the activities, and note cards used in the lessons. The researcher also signed each teacher up to receive a DVD and curriculum produced by Heifer International. The DVD was used in one of the lessons. The teachers were also sent information on how to receive a world hunger map.

A comprehensive lesson teaching plan was discussed with each teacher. Beyond that, each teacher needed to read over the activities and lesson components to choose which ones worked best for them and their students. They were told that there was more material under each lesson heading than they could ever use and the curriculum was designed so that teachers had the option of setting up the best activities for their individual students.

The titles of the lessons that were used in the curriculum were:

1. Lesson One: Introduction to International Agriculture
2. Lesson Two: Lack of food, how does this happen?
3. Lesson Three: World Agriculture Production
4. Lesson Four: Modern Agricultural Influences
5. Lesson Five: Agriculture Development
6. Lesson Six: Agricultural Development continued
7. Lesson Seven: Case Study: Moldova
Instrument Development and Testing

A quantitative research method was used in this study. The research design was a quasi-experimental pre-test-post-test design. The survey instrument was based upon an existing survey used in a similar study testing the knowledge and perceptions of high school agriculture students in international agriculture concepts by Elliot and Yanik (2004). Some of the questions were changed to be geographically relevant or altered to fit this unique research. There were three sections of the survey including respondents’ demographic information, attitudes and perceptions regarding international agriculture, and knowledge of international agriculture. The knowledge section covered four topic areas: international agriculture, Moldova, beekeeping, and the Moldova school beekeeping projects. These areas were directly related to the topics that would be covered in the curriculum intervention. The instrument can be found in appendix B.

In the perceptions section of the survey a Likert scale was to measure the perceptions of respondents toward a variety of international agriculture questions. The measurement scale was: 1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree, and 0 = don’t know. In the knowledge section of the survey the questions were multiple choice and there was one correct answer for each question. The demographic section of the survey was used in both the pre-test and the post-test. The questions in this section
were changed slightly from the pre-test to the post-test version to get more accurate answers from students.

The instrument was examined for face validity through a panel of experts. This panel consisted of four faculty members and four graduate students in the Department of Agricultural and Extension Education at The Pennsylvania State University. Revisions of the instrument were made after receiving comments from the review experts. The research protocol, consent and assent letters, cover letter, and instrument were approved by the Office of Research Protections of The Pennsylvania State University (appendix A-B).

The instrument was tested through a pilot test to determine the reliability of the instrument. One agriculture program in Pennsylvania not in the research group agreed to participate in the pilot study. Forty-five students completed the survey in this portion of the research and 23 of the responses were complete and used in the reliability testing. The Cronbach’s alpha for the forty-four perception items in the survey was .687. Several changes were made to the instrument after the responses of the respondents in the pilot test were reviewed.

**Methods and Procedures**

Once the agricultural teachers agreed to participate in the program, communication continued with them throughout the summer of 2007. During this time the teachers sent to the researcher, letters of approval from their administration to be filed with the Office of Research Protections. After the approval had been received, each of the teachers in the program completed the Office of Research Protections Internal Review
Board Basic Training on the Protection of Human Participants online. This was required because teachers would be administering the curriculum intervention and some of the surveys.

Teachers provided information to the researcher before the start of the school year in the fall of 2007 about which classes would be receiving the curriculum and how many students were in each class section. Teachers were sent a consent form at the beginning of the school year for students to bring home to their parents explaining the project. Parents needed to sign and return the form only if they did not want their child to participate in the project. Teachers also received assent forms for each student. These forms also explained the project and students signed and returned the forms if they agreed to participate.

A date was scheduled with each of the teachers to deliver the curriculum and administer the pre-test to the students in September 2007. In two instances, this happened in October 2007. The pre-tests were given by the researcher to the students in their normal class period. During this visit, the researcher explained the curriculum, resources, and protocol with the teachers. A deadline was set in the initial visit for the researcher to come back and have the students complete the post-test.

It was explained to the teachers that the actual dates the curriculum was completed was flexible as long as it was completed by the deadlines set by the researcher. The researcher received e-mail updates from the teachers on their progress throughout September and October. A date was scheduled and the researcher returned to complete the post-test survey with the students in each school in November 2007. School four joined the project late and was on a slightly later time frame so they could not complete
their post-tests until January 2008. The students were still in the first semester of school at the time the post-tests were completed. At this school, the researcher was unavailable to administer the post-tests so the surveys were sent to the school, the teachers administered them, and then they were sent back to the researcher for analysis.

In total, 86 student surveys were returned from the pre-test and post-test. Students who were absent the day that the surveys were given had the survey administered to them by their teacher at a later time. These surveys were returned by mail to the researcher. After each of the schools had completed the project, each teacher received a qualitative survey to gather more information about their specific experience and how they taught the curriculum.

**Data Analysis**

Quantitative data that was gathered from the surveys was analyzed using the Statistical Package for Social Science (SPSS). Items on the perceptions portion of the survey were grouped into categories for further analysis. Four graduate students analyzed the items and determined that they fit into five categories. The specific items in each category are described in Appendix C. The following statistics were used to analyze data:

1. Frequencies and distributions were used to describe respondents’ demographic characteristics.
2. Descriptive statistics including means and standard deviations were used to assess the respondents’ perceptions toward international agriculture.
3. Percentages were used to describe the change in student knowledge levels before and after the curriculum intervention.

4. Reliability of the groupings of perception items was assessed using a Cronbach’s alpha.

5. Paired T-tests were used to compare the groups of similar perceptions from the pre-test and post-test.

Qualitative data was obtained from the teachers involved in the research using an informal survey about the curriculum and the research. This survey asked questions about how the teachers taught the curriculum, any problems they had during the process, and if they liked the curriculum. The comments from this survey were taken into consideration when developing conclusions about this research.

**Summary**

This research was designed to determine the knowledge and perceptions of high school agriculture students regarding international agriculture before and after an international agriculture curriculum intervention. This study was quasi-experimental with a pre-test/post-test design. There was one study group that participated in the research. The sample consisted of 86 students of five preselected agricultural teachers in Pennsylvania that had previous international agricultural experiences. Data was collected using a survey based on previous research. Descriptive and inferential statistics were used in the SPSS program to summarize the data and display the results of the research. These results will be presented in chapter four.
Chapter IV

RESULTS

The purpose of this study was to measure the scope of knowledge and perceptions of high school agricultural students toward international agriculture using an internationalized curriculum intervention. This chapter summarizes the results from the data analysis of this research.

Demographic Information of Respondents

Objective 1: Describe high school agricultural students’ demographics in relation to prior international experiences, number of years in a language class, age, gender, number of agriculture classes taken, and grade in school.

There were 86 students respondents that completed the pre-test and post-test in their agriculture classes. Multiple students were absent from their class either during the pre-test or post-test and only completed one survey. All of the pre-test surveys were useable while one of the post-test surveys was removed as it was not completed as directed. In regards to gender, 51.8% of students were male while 48.2% of students were female. Most of the students were in 10th grade (41%) and 11th grade (42.2%), while 16.9% of students were in 12th grade. None of the students who participated in the study were in 9th grade.

All students had been previously enrolled in an agriculture course. There was a large variety in the number of semesters of agriculture courses students had taken in the past ranging from one to eighteen semesters as shown in figure 3. More than 68% of the
students reported that they had previously taken three to six semesters of agriculture classes.

Figure 3: Number of semesters of agriculture classes taken (n=83)

Figure 4 shows the percentage of students who reported having been previously involved in international experiences. The majority of students (69.4%) listed no previous international experiences from the choices available. In addition to these international experiences, 31% of students said that they had a pen pal or corresponded regularly with someone in another country in some media format. Nearly 70% of students surveyed did not correspond with another person in a foreign country (n=84).
Figure 4: Previous International Experiences (n=85)

Figure 5 shows the number of semesters that students reported having taken a foreign language class during their education. More than 73% of students indicated that they had taken a foreign language class, while 26.5% of students had not taken a language class. Forty-one percent of students stated that they were currently enrolled in a foreign language class while 59% indicated that they were not currently enrolled in that type of class. There was a large variation in the number of semesters that students had taken a foreign language class at some time during their education. The most common answer reported was zero semesters (20.5%), followed by four semesters (16.9%), six semesters (15.7%), and two semesters (14.5%).
Figure 5: Number of Semesters Students Took a Language Class (n=83)
Perceptions toward International Agriculture

Objective 2: Describe the perceptions of high school agricultural students toward international agriculture and determine if their perceptions change following an international curriculum intervention.

When analyzing individual items in the perceptions section of the survey there were several trends found in the data. Table 2 shows the means and standard deviations of the perception items in the first four groups: world knowledge, economics and business, cultures and politics, and world impact on my community. Many of the items had means of 3.00 or above showing that students agreed with the statements. For the pre-test, 31 items had a mean of over 3.00 out of thirty-three items. Thirty-one items also had a mean above 3.00 in the post-test out of the total 33 items.

Several of the items had a mean score of over 3.50 showing that the respondents strongly agreed with these items. In the pre-test, the item “knowing agriculture’s importance to the world economy” had a mean score of 3.54. The item “global agriculture allows me to eat various food products year round” had a mean score of 3.58. In the post-test, “knowing agriculture’s importance to the world economy” had a mean score of 3.55. “Global agriculture allows me to eat various food products year round” had a mean score of 3.59. Additionally, in the post-test, two other items; “Pennsylvania citizens eat food products that are produced around the world” (3.53), and “natural disasters can have an effect on the price of food in my local grocery store” (3.56) also showed students strongly agreed with these statements.

The mean scores of the items did not increase or decrease by large amounts from the pre-test to the post-test. From the pre-test to the post-test, 10 items showed an
increase in the mean score of .01-.05, three items showed an increase of .06-.10, five items showed an increase of .11-.15, and three items showed an increase of .16-.20.

Decreases in the mean scores from the pre-test to the post-test of .01-.05 were found in three items, three items showed decreases of .06-.10, one item showed a decrease of .11-.15, and one item showed a decrease of .16-.20. Also, three items showed no increase or decrease from the pre-test to the post-test. With regards to items in a specific group, the mean score for all of the items in the world knowledge group increased except for one item that the score stayed the same. One mean score in the culture and politics group decreased, two item means stayed the same, and the rest of the mean scores increased. The mean for all of the items except one in the world impact on my community group increased. The means of the items in the economics and business group both increased and decreased.
Table 2: Means and standard deviations regarding student perceptions toward international agriculture

<table>
<thead>
<tr>
<th>Group/Item:</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n  Mean*</td>
<td>SD  n  Mean*</td>
</tr>
<tr>
<td><strong>Economics and Business (11)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Know agriculture’s importance to the world economy</td>
<td>83</td>
<td>3.54 .53</td>
</tr>
<tr>
<td>Know more about other countries as markets for U.S. agricultural products</td>
<td>72</td>
<td>3.14 .61</td>
</tr>
<tr>
<td>Know more about Pennsylvania agriculture’s connections to world trade</td>
<td>82</td>
<td>3.33 .74</td>
</tr>
<tr>
<td>Know Pennsylvania export agriculture’s impact on the Pennsylvania economy</td>
<td>80</td>
<td>3.23 .59</td>
</tr>
<tr>
<td>It is important for me to know how world agriculture affects food prices in the local grocery store</td>
<td>85</td>
<td>3.42 .61</td>
</tr>
<tr>
<td>Know how marketing U.S. agricultural products to other countries will help the U.S. economy</td>
<td>80</td>
<td>3.10 .69</td>
</tr>
<tr>
<td>I will know more about global agriculture if I learn about how the U.S. works with other countries on economic issues</td>
<td>77</td>
<td>3.25 .61</td>
</tr>
<tr>
<td>Competition with other producers worldwide helps keep food prices affordable for the average U.S. consumer</td>
<td>72</td>
<td>3.11 .68</td>
</tr>
</tbody>
</table>

* Mean compounded on a scale for 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree.
Table 2: Continued

<table>
<thead>
<tr>
<th>Group/Item:</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean*</td>
</tr>
<tr>
<td>Global agricultural marketing systems</td>
<td>83</td>
<td>3.24</td>
</tr>
<tr>
<td>Future changes in global agriculture</td>
<td>85</td>
<td>3.36</td>
</tr>
</tbody>
</table>

**World Knowledge (5)**

Know the differences between developing and developed countries

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Mean*</th>
<th>SD</th>
<th>n</th>
<th>Mean*</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>84</td>
<td>3.25</td>
<td>.51</td>
<td>84</td>
<td>3.41</td>
<td>.59</td>
</tr>
</tbody>
</table>

It is important for me to be taught about various aspects of countries that Pennsylvania agriculture products are sold to such as:

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Mean*</th>
<th>SD</th>
<th>n</th>
<th>Mean*</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Their infrastructure</td>
<td>81</td>
<td>3.01</td>
<td>.75</td>
<td>81</td>
<td>3.07</td>
<td>.72</td>
</tr>
<tr>
<td>The standard of living in those countries</td>
<td>81</td>
<td>3.06</td>
<td>.71</td>
<td>84</td>
<td>3.21</td>
<td>.68</td>
</tr>
<tr>
<td>Their natural resources</td>
<td>84</td>
<td>3.30</td>
<td>.58</td>
<td>84</td>
<td>3.30</td>
<td>.64</td>
</tr>
<tr>
<td>The agriculture that exists in those countries</td>
<td>84</td>
<td>3.27</td>
<td>.68</td>
<td>85</td>
<td>3.32</td>
<td>.56</td>
</tr>
</tbody>
</table>

**Cultures and Politics (8)**

Have a better knowledge of how politics impact world agriculture

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Mean*</th>
<th>SD</th>
<th>n</th>
<th>Mean*</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>74</td>
<td>3.16</td>
<td>.60</td>
<td>82</td>
<td>3.29</td>
<td>.66</td>
</tr>
</tbody>
</table>

Know more about the cultures of other countries

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Mean*</th>
<th>SD</th>
<th>n</th>
<th>Mean*</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>80</td>
<td>3.14</td>
<td>.68</td>
<td>84</td>
<td>3.13</td>
<td>.76</td>
</tr>
</tbody>
</table>

* Mean compounded on a scale for 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree.
<table>
<thead>
<tr>
<th>Group/Item</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean*</td>
</tr>
<tr>
<td>How the U.S. works with other countries on charitable issues</td>
<td>77</td>
<td>2.91</td>
</tr>
<tr>
<td>It is important for me to be taught about the various aspects of countries that Pennsylvania agriculture products are sold to such as: the cultures in those countries</td>
<td>83</td>
<td>3.00</td>
</tr>
<tr>
<td>The U.S. should give food aid to countries when people are starving</td>
<td>81</td>
<td>3.19</td>
</tr>
<tr>
<td>When learning about international agriculture in class it is important for me to learn about: Being a better citizen in a global society</td>
<td>75</td>
<td>2.96</td>
</tr>
<tr>
<td><strong>World Impact on My Community (9)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learn the agricultural products from other countries that are consumed in Pennsylvania</td>
<td>82</td>
<td>3.11</td>
</tr>
<tr>
<td>Know how world events affect local agriculture in my community</td>
<td>82</td>
<td>3.24</td>
</tr>
<tr>
<td>Know how coming changes in world agriculture will have an impact on me in the future</td>
<td>84</td>
<td>3.33</td>
</tr>
</tbody>
</table>

* Mean compounded on a scale for 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree.
Table 2: Continued

<table>
<thead>
<tr>
<th>Group/Item:</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean*</td>
</tr>
<tr>
<td>Pennsylvania citizens eat food products that are produced around the world</td>
<td>83</td>
<td>3.47</td>
</tr>
<tr>
<td>Natural disasters can have an effect on the price of food in my local grocery store</td>
<td>82</td>
<td>3.44</td>
</tr>
<tr>
<td>I will know more about global agriculture if I learn about:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major agricultural products that are produced in the United States</td>
<td>84</td>
<td>3.06</td>
</tr>
<tr>
<td>What happens to local products once they leave my country</td>
<td>78</td>
<td>3.08</td>
</tr>
<tr>
<td>Other countries that are competing with Pennsylvania’s major agricultural product</td>
<td>79</td>
<td>3.19</td>
</tr>
</tbody>
</table>

* Mean compounded on a scale for 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree.
A section of this survey was used to determine the perceptions of students regarding the processes used to educate students about international agriculture. The means and standard deviations for each item in this section are reported in table 3. Nine of the items had mean scores of over 3.00 in pre-test out of 11 total items. Five of the eleven items had means of over 3.00 in post-test. This shows that students agreed with these items.

Two items showed mean scores lower than 2.80. “World agriculture is covered extensively in my agriculture class” had a pre-test mean of 2.71, and a post-test mean of 2.76. The item “I can learn about world agriculture by listening to the radio” had a score of 2.55 in the pre-test and 2.63 in the post-test. One item has an increased mean score of .05 from the pre-test to the post-test. The rest of the items showed a decrease in the mean score from the pre-test to the post-test. One item decreased by .05, three items decreased by .06-.10, one item showed a decrease of .13, one item decreased by .18, and four items decreased by over .20.
Table 3: Means and standard deviations of student perceptions regarding processes used to educate people about international agriculture

<table>
<thead>
<tr>
<th>Group/Item: Processes Used to Educate People About International Agriculture (11)</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean*</td>
</tr>
<tr>
<td>I would like to participate in various FFA international programs</td>
<td>74</td>
<td>3.16</td>
</tr>
<tr>
<td>World agriculture is covered extensively in my agriculture class</td>
<td>80</td>
<td>2.71</td>
</tr>
<tr>
<td>It is important for my agriculture teacher to incorporate world agriculture into lessons</td>
<td>75</td>
<td>3.06</td>
</tr>
<tr>
<td>Hosting an agricultural exchange student from another country in my community would help me learn more about world agriculture</td>
<td>77</td>
<td>3.17</td>
</tr>
<tr>
<td>It is important for my agriculture teacher to use a variety of resources when teaching about world agriculture such as:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guest speakers</td>
<td>82</td>
<td>3.26</td>
</tr>
<tr>
<td>Audio-visual materials</td>
<td>82</td>
<td>3.44</td>
</tr>
<tr>
<td>Internet</td>
<td>84</td>
<td>3.43</td>
</tr>
<tr>
<td>Maps</td>
<td>83</td>
<td>3.25</td>
</tr>
</tbody>
</table>

* Mean compounded on a scale for 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree.
<table>
<thead>
<tr>
<th>Group/Item:</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean*</td>
</tr>
<tr>
<td>Listening to the radio</td>
<td>76</td>
<td>2.55</td>
</tr>
<tr>
<td>Attending an international event/fair</td>
<td>82</td>
<td>3.34</td>
</tr>
</tbody>
</table>

* Mean compounded on a scale for 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree.
The individual perception items were grouped into categories of similar items. The scores for each item were added together to get a compounded group mean. These groups were then compared from the pre-test to the post-test and the results of this comparison are shown in table 4. The reliability of these groupings was all good and ranged from a Cronbach’s alpha of .708-.833. The results of a paired sample t-test on each of the groupings show no significance from the pre-test to the post-test.

Table 4: Means, standard deviations, and paired sample t-test regarding groups of perception items

<table>
<thead>
<tr>
<th>Group:</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>t value</th>
<th>sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean*</td>
<td>S.D.</td>
<td>n</td>
</tr>
<tr>
<td>World Knowledge (5)</td>
<td>67</td>
<td>16.09</td>
<td>2.19</td>
<td>67</td>
</tr>
<tr>
<td>Economics and Business (11)</td>
<td>43</td>
<td>35.63</td>
<td>4.13</td>
<td>43</td>
</tr>
<tr>
<td>World Impact on My Community (9)</td>
<td>56</td>
<td>29.61</td>
<td>3.44</td>
<td>56</td>
</tr>
<tr>
<td>Cultures and Politics (8)</td>
<td>46</td>
<td>24.33</td>
<td>3.06</td>
<td>46</td>
</tr>
<tr>
<td>Processes Used to Educate People about International Agriculture (11)</td>
<td>51</td>
<td>34.27</td>
<td>4.91</td>
<td>51</td>
</tr>
</tbody>
</table>

Number in ( ) indicates # of items in each scale. Mean values for world knowledge could vary from a low of 5 to a high of 20. Mean values for economics and business and processes used to educate people about international agriculture could vary from a low of 11 to a high of 44. Mean values for cultures and politics could vary from a low of 8 to a high of 32. Mean values for world impact on my community could vary from a low of 9 to a high of 36. * Mean compounded on a scale for 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree.
There were gender differences related to the student perceptions of international agriculture before and after the curriculum intervention as shown in figure 6. The student perceptions for both male and female students were similar before the curriculum intervention. After the international agriculture curriculum was presented male student perceptions changed very little. There were small decreases in the male students’ perceptions of international agriculture after the curriculum intervention. Female student perceptions of international agriculture became more positive after the international agriculture curriculum intervention.

Figure 6: Mean perceptions scores of respondents, by gender
There were also differences reported in student perceptions related to the correspondence demographic (figure 7). Student that reported having corresponded with someone from another country had similar perceptions of international agriculture as those who had not corresponded with someone from another country, before the curriculum intervention. After the curriculum intervention, students who had corresponded with a person from another country had more positive perceptions of international agriculture. Students who had not corresponded with a person from another country showed little changes in their perceptions of international agriculture. Those small changes were lower perceptions than before the curriculum intervention.

Figure 7: Mean perceptions scores of respondents, by correspondence demographic
When looking at all of the perceptions items together, the mean scores were consistently above 3.00 showing that students agreed with the international agriculture perceptions statements. Figure 8 shows that each school had similar overall mean scores for the perceptions section. There were few changes in the mean perceptions scores from the pre-test to the post-test.

Figure 8: Mean perceptions scores of respondents, by school
Past International Experiences and Language Classes Related to Perceptions of International Agriculture

Objective 3: Determine if number of language classes taken or past international experiences of high school agricultural students are related to their international agriculture perceptions.

Respondents mean perceptions scores varied in relation to the previous international experiences that they have had. Figure 9 shows the mean scores regarding perceptions for each of the previous international experience choices students had on the survey. The mean group score increased for the students who had two or more international experience and slightly increased for students who had hosted an exchange student and respondents that had no previous international experiences. Student perceptions of international agriculture decreased for students who had only traveled internationally or attended an international presentation or event.
Students’ mean perceptions scores by group also varied in relation to the number of semesters of language students had taken. Figure 10 shows the mean scores regarding perceptions listed by the number of semesters of languages students have had. Students mean perceptions of international agriculture increased for students who had taken two or more semesters of language. Respondent perceptions decreased for student that had taken only one semester of language or had not previously taken a language class.
Figure 10: Mean perceptions scores compared to the number of semesters of language taken by respondents
Objective 4: Determine if an international curriculum intervention with high school agricultural students would positively change the knowledge levels in international agriculture concepts of participants.

Student knowledge scores were evaluated before and after the curriculum intervention. Table 5 shows the frequencies and percentage of respondents that answered each question in the knowledge section of the survey. The mean knowledge score of the respondents in the pre-test was 4.69 out of 17 questions or almost 28% correct. This score went up considerably and the mean score was reported as 8.16 in the post-test results or 48% correct. This is a 20% increase in the mean knowledge score of students after the curriculum intervention.

On the pre-test, eight questions had over a 30% correct response rate. The question “what percentage of Moldova citizens work outside of the country?” had over a 46% correct response rate. The question “what percent of people in Moldova are living in poverty?” had a 6.8% correct response rate on the pre-test; while the question “many orphans students in Moldova suffer from what health issue?” had a 5.7% correct response rate.

On the post-test, eight questions had over a 55% correct response rate. The question “what is the primary religion in Moldova?” had the highest correct response rate with over 73% of students answering this question correctly. The question “what percent of people in Moldova are living in poverty?” (28.7% correct) and the question “what is a
problem with the local honey market in Moldova?” (29.9% correct) had the lowest correct response rates on the post-test.

Four of the questions showed an increase in correct responses of 0-20% from the pre-test to the post-test. Eleven questions showed an increase in correct responses by students of 20-40% from the pre-test to the post-test. The question “what is the primary religion in Moldova?” showed an increase of almost 43% of the students getting this question correct. The questions “how many people live below the poverty line?” (-15.7%) and “what is not a reason young queen bees are more effective?” (-2.1%) both showed decreases in the percentage of students who answered those questions correctly.

Table 5: Frequencies of respondents’ answers to knowledge questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>Change</th>
<th>%</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the world population?</td>
<td>30</td>
<td>55</td>
<td>.34.1</td>
<td>51</td>
<td>35</td>
</tr>
<tr>
<td>What is the most prevalent form of malnutrition?</td>
<td>30</td>
<td>54</td>
<td>.34.1</td>
<td>56</td>
<td>30</td>
</tr>
<tr>
<td>How many people live below the poverty line?</td>
<td>28</td>
<td>57</td>
<td>.31.8</td>
<td>14</td>
<td>72</td>
</tr>
<tr>
<td>What percent of people in Moldova are living in poverty?</td>
<td>6</td>
<td>79</td>
<td>.6.8</td>
<td>25</td>
<td>61</td>
</tr>
<tr>
<td>What is the primary religion in Moldova?</td>
<td>27</td>
<td>59</td>
<td>.30.7</td>
<td>64</td>
<td>21</td>
</tr>
<tr>
<td>Question</td>
<td>Pre-test Correct</td>
<td>Pre-test Incorrect</td>
<td>% Students Correct</td>
<td>Post-test Correct</td>
<td>Post-test Incorrect</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>------------------</td>
<td>--------------------</td>
<td>--------------------</td>
<td>-------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>What is the official language in Moldova?</td>
<td>22</td>
<td>64</td>
<td>25.0</td>
<td>44</td>
<td>41</td>
</tr>
<tr>
<td>What percentage of Moldova citizens work outside of the country?</td>
<td>41</td>
<td>45</td>
<td>46.6</td>
<td>57</td>
<td>28</td>
</tr>
<tr>
<td>What is the GDP in Moldova?</td>
<td>35</td>
<td>50</td>
<td>39.8</td>
<td>52</td>
<td>30</td>
</tr>
<tr>
<td>Many orphan students in Moldova suffer from what health issue?</td>
<td>5</td>
<td>80</td>
<td>5.7</td>
<td>31</td>
<td>52</td>
</tr>
<tr>
<td>Beekeeping is also called what?</td>
<td>21</td>
<td>64</td>
<td>23.9</td>
<td>35</td>
<td>49</td>
</tr>
<tr>
<td>What is not a reason young queen bees are more effective?</td>
<td>15</td>
<td>70</td>
<td>17.0</td>
<td>13</td>
<td>73</td>
</tr>
<tr>
<td>What is not a source of nectar for bees in Moldova?</td>
<td>26</td>
<td>59</td>
<td>29.5</td>
<td>52</td>
<td>34</td>
</tr>
<tr>
<td>Most bee hives in Moldova are what type?</td>
<td>23</td>
<td>63</td>
<td>26.1</td>
<td>50</td>
<td>35</td>
</tr>
<tr>
<td>What is a major hazard of producing honey in Moldova?</td>
<td>28</td>
<td>58</td>
<td>31.8</td>
<td>49</td>
<td>36</td>
</tr>
<tr>
<td>Why is the Acacia tree honey favored in Moldova?</td>
<td>12</td>
<td>74</td>
<td>13.6</td>
<td>32</td>
<td>53</td>
</tr>
</tbody>
</table>
Table 5: Continued

<table>
<thead>
<tr>
<th>Question</th>
<th>Pre-test Correct</th>
<th>Pre-test Incorrect</th>
<th>Pre-test % Students Correct</th>
<th>Post-test Correct</th>
<th>Post-test Incorrect</th>
<th>Post-test % Students Correct</th>
<th>Change In % Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is a problem with the local honey market in Moldova?</td>
<td>25</td>
<td>61</td>
<td>28.4</td>
<td>26</td>
<td>56</td>
<td>29.9</td>
<td>+1.5</td>
</tr>
<tr>
<td>How much honey does an average orphan student consume in the Moldova beekeeping projects in schools?</td>
<td>29</td>
<td>57</td>
<td>33.0</td>
<td>51</td>
<td>33</td>
<td>58.6</td>
<td>+25.6</td>
</tr>
</tbody>
</table>
All of the schools showed an increased mean knowledge score from the pre-test to the post-test (Figure 11). School 3 had an increase in the mean knowledge score of just over 3%; the lowest of the four schools. School 4 had an increase in the mean knowledge score of 26.3% making it the largest increase of the group.

Figure 11: Mean pre-test and post-test knowledge scores of respondents by school
There were large differences in the mean student scores for the post-test knowledge section between male and female students. The mean scores were very similar for males and females on the pre-test. The female respondents’ mean scores increased much more than the male respondents’ scores on the post-test as shown in figure 12.

![Figure 12: Mean pre-test and post-test knowledge scores of respondents by gender](image)

Figure 12: Mean pre-test and post-test knowledge scores of respondents by gender
Teachers’ Comments

Each teacher responded to a series of questions about their experience with the research after it was completed. Teachers were asked about the timeframe that they taught the curriculum and usefulness of the curriculum. These surveys showed a mixed response to the curriculum that was presented during the research. Teacher one reported starting the curriculum on October 1, 2007 and finishing it on November 6, 2007. Teacher two started the curriculum on October 8, 2007 and finished teaching it on October 31, 2007. Teacher three started the curriculum on October 2, 2007 and reported that they did not completely finish the curriculum. Teachers in school four stated that they started the curriculum in early December and finished it on January 24, 2008.

All of the teachers indicated that they did not teach the curriculum during consecutive days. Each teacher chose a different lesson that they felt was most effective and least effective. Teacher one felt that the lesson on cultures was the most effective, while the beekeeping lesson was not as useful in their class. Teacher two chose lesson seven, about Moldova as the best, and lesson five about development projects as the worst lesson for their group of students. Teacher three thought that all of the first three lessons were the most effective because there were PowerPoint slides with each lesson. The teachers in school four found lesson three on world hunger to be the most effective. Teacher three and the teachers in the fourth school did not find any area of the curriculum less effective. Three of the teachers said that they added many of their own personal experiences, stories, and discussion points to the lessons as they taught them.

Teacher three reported that they did not finish the last three lessons completely because of lack of time. The teachers in school four also stated that they did not
completely cover all of the lessons because of time constraints and other competing activities. Teachers one and three reported that the students were engaged throughout the curriculum. Teacher two and those in school four stated that their students got bored of the lessons and were ready to be done with the unit at the end. Teachers one, two, and three responded that students asked questions about issues such as development, poverty, and countries such as Sudan as a result of teaching these lessons.

The teachers all used the materials that came with the curriculum but none of them were able to use the DVD because it would not work with the computers in their schools. All of the teachers stated that they would use parts of the curriculum in the future. Teachers one, two, and three said that they would recommend the curriculum to other teachers in Pennsylvania. Teachers in school four stated that they would recommend some of the components to other teachers but not the whole curriculum.

**Summary**

Over 51% of students in this study were male while over 48% were female. Most of the students were in 10th and 11th grade but almost 17% of students were in 12th grade. All of the students had taken an agriculture course in the past and more than 68% of the students had previously taken three to six semesters of agriculture classes. The majority of students had not had any previous international experiences, yet over 73% had taken a foreign language class. These students had positive perceptions of international agriculture both before and after the curriculum intervention. Paired t-tests of groups of items showed no significant difference from the pre-test to the post-test. Respondent perceptions of international agriculture became more positive in the post-test if the
students were female, corresponded with someone from another country, had two or more semesters of foreign language, or had two or more previous international experiences compared to students who did not fit into one of the above demographics. In the knowledge section of the survey, the mean score of the respondents in the pre-test was 4.69 or almost 28% correct. This score went up considerably in the post-test and the mean score was reported as 8.16 or 48% correct. Teachers reported few problems with the curriculum and had positive comments about their experience with it.
Chapter V

SUMMARY, RECOMMENDATIONS AND CONCLUSIONS

Internationalizing education in the United States has been a topic of increasing interest because of the connections between countries and people around the world. Numerous studies suggest that students will need specialized skills to help them work in this global environment in the future. Global agriculture is becoming a larger issue in the news lately because of the current world food and energy crisis.

Currently there are limited international topics taught in education and specifically in agricultural education. This study was developed to learn about the current perceptions and knowledge of high school agricultural students regarding international agriculture concepts. The study demonstrates the effect of an international curriculum intervention on the perceptions and knowledge of students. Students’ perceptions of international agriculture are specifically examined compared to the number of semesters of language classes they have taken and previous international experiences they have had. Students’ demographics were also compared with their perceptions and knowledge of international agriculture concepts.

Procedures

The population in this study was selected students in agriculture classes at four public secondary schools in Pennsylvania. Teachers were selected from a recommended list of Pennsylvania agricultural teachers who had previously traveled internationally or had related international experiences. A ten-lesson curriculum intervention was
developed around an international agriculture development project. The teachers presented the curriculum to selected agriculture classes in their program. A survey was developed to collect data from the students. The questionnaire had three sections: a 44-item perceptions section, a 17-question knowledge section, and a demographics section.

The validity of the instrument was established by a group of professors and graduate students at The Pennsylvania State University. The reliability of the survey was evaluated during a pilot test with agriculture students at a non-study site high school in Pennsylvania. The perceptions items in the instrument had a Cronbach’s alpha of 0.687. The study and curriculum intervention were executed during the fall semester of classes in 2007. The survey was administered before and after the curriculum intervention at each school.

**Summary of the Results and Discussions**

The results were summarized according to the research objectives. A discussion follows the summary of each objective.

**Objective 1:** Describe high school agricultural students’ demographics in relation to prior international experiences, number of years in a language class, age, gender, number of agriculture classes taken, and grade in school.

The student respondents in this research study were typical high school students in the United States. Over 51% of students surveyed were male while over 48% were female. Most of the students were in 10th and 11th grades but almost 17% of students were in 12th grade. All of the students had taken an agriculture course in the past and more than 68% of the students had previously taken three to six semesters of agriculture
classes. The majority of students had not had any previous international experiences, yet over 73% had taken a foreign language class.

These results are similar in some ways to those found by the American Council on Education (2008) in its study of college-bound students interests in international learning activities. This previous study also found that a high percentage of students had studied a foreign language. The American Council on Education study did find that students surveyed had more previous international experiences than the students in the current study. Students in this study were not asked about their plans after high school while the students in the other study were all planning on going to college; this may be a factor in the differences seen with this variable.

Students in agriculture courses used to be predominantly male, but now females and males enroll in more equal numbers, as shown in the survey (National FFA Organization, 2006; National Research Council, 1988). Most colleges now have a foreign language requirement that students have to complete before or during college (Knight, 2004). In response to this, many high schools now strongly recommend or require students to take a certain number of language classes. Respondents were typical students who will need to have skills to work in a global environment in the future (Brown, 1997). International education should be a part of their curriculum in high school and especially in agriculture education, where they have already found an interest (Collins, Czarra, & Smith, 1995; Ibezin & McCracken, 1994).
**Objective 2:** Describe the perceptions of high school agricultural students toward international agriculture and determine if their perceptions change following an international curriculum intervention.

Overall, student perceptions of international agriculture were positive. The students agreed or strongly agreed with all of the statements except for two in the first four groups of the survey: *world knowledge, economics and business, cultures and politics, and world impact on my community*. There were positive and negative changes in student perceptions of these items from the pre-test to the post-test but these changes were small. All of the means of individual items in these first four groups changed less than .20. When comparing the means of the groups as a whole from the pre-test to the post-test, no significant difference was found between the mean scores of the respondents.

Results of this study suggest that students already had a favorable opinion about international agriculture before being a part of the study and receiving the international agriculture curriculum. These results are similar to those found in a study by Radhakrishna, Leite & Domer (2003). All of the teachers that were a part of the study and teaching the curriculum had previous international experiences. It appears that teachers likely included international content in their classes and added a global component to many of their lessons outside of this curriculum study. The teachers stated that they included some of their own personal stories and discussion points in the curriculum intervention, which supports the supposition that they likely incorporate international content in their normal lesson plans and classes. This is consistent with
research that shows agricultural educators with international experiences are more likely to include international concepts in their teaching (Peuse & Swanson, 1980).

Another possible reason that students’ perceptions did not change a lot from the pre-test to the post-test is that the curriculum was delivered in a short period of time. All of the teachers delivered the curriculum intervention in less than two months. This may have not been enough time to significantly change student perceptions about international agriculture. If the curriculum had lasted a whole semester or a year it may have made more of an impact on the perceptions students had about international agriculture.

Eleven statements in the perceptions section were separated out into the processes used to teach people about international agriculture group. These statements dealt with how students were taught about international agriculture rather than just their perceptions about international agriculture. Students agreed with all but two of the eleven statements in this group in the pre-test. There were small changes in the mean score of items in this group but all of the means went down from the pre-test to the post-test except for one. Students only agreed with five of the eleven statements in the post-test. When comparing the group as a whole, there was no significant difference in the group mean from the pre-test to the post-test.

The results of the student perceptions of the process statements may suggest that students were tiring of such a focused curriculum on international agriculture by the end of the unit. The one statement in this section that went up was “world agriculture is covered extensively in my agriculture class.” This indicates that students noticed a change in the amount of content they were getting in world agriculture. Since all of the
other statements in this category went down, it shows that students may have been getting worn down by learning so much about international agriculture in a condensed format.

Female students showed more positive changes in perceptions from the pre-test to the post-test. Male students showed no increases or slight decreases in perceptions from the pre-test to the post-test. These results are consistent with literature that states more females typically go on study abroad experiences in college and are interested in living in an international setting for a short period of time (Institute on International Education, 2007). Students in social science, business, and humanities majors go on study abroad experiences much more often than students in hard sciences. Typically, more male students are in majors in the hard sciences (IIE; Marcum, 2001). Radhakrishna, Leite & Domer (2003) in a study of high school students participating in the 2002 Pennsylvania Governor’s School for the Agricultural Sciences also found female students had more positive attitudes and beliefs about international agriculture than male students.

Overall, the students who had communicated with a person from another country consistently showed more positive perceptions from the pre-test to the post-test. Students who did not have these experiences often showed more negative perceptions of international agriculture from the pre-test to the post-test. These results suggest that students who have a personal connection with someone from another country are more receptive to learning about the agriculture of other countries in general. Avenues should be explored to allow students to have more direct personal experiences with people from other cultures.

This study shows results consistent with those found by Radhakrishna, Leite & Hill (2003). They found relationships between global awareness and student
participation in international activities including knowing other foreign students in school, watching international news on TV, and work experience abroad. Radhakrishna, Leite & Hill recommended providing more opportunities for student participation in international activities to help increase their global awareness.

**Objective 3:** Determine if number of language classes taken or past international experiences of high school agricultural students are related to their international agriculture perceptions.

The results of this section of the study indicate that students who have had two or more international experiences in the past or more than two semesters of a foreign language, consistently had more positive perceptions of international agriculture after the curriculum intervention. Students who had only one past international experience, or only one or two semesters of foreign language showed more negative perceptions of international agriculture after the intervention.

These results show that once students become invested in an international topic like a foreign language, or have begun to understand more of the world through multiple international experiences, they are more receptive to learning about international agriculture. Students who have a connection with a person or a place somewhere else in the world are more likely to want to learn more about that place and other places around the world. This suggests that students who already have a context for understanding the world can understand how international agriculture fits in. These results support the findings of Radhakrishna, Leite & Hill (2003) that suggest there is a relationship between
participation in international activities and awareness of international concepts and issues.

The results of this study also complement the findings of Connors (2003), who found that students who were a part of an educational travel seminar had positive attitudes toward learning about international agriculture and believed that it was an important subject. In contrast, Elliot & Yanik (2002) reported low perceptions scores of international agriculture by freshmen students who had no previous international agriculture education.

Radhakrishna, Leite & Hill (2003) suggested a conceptual framework for high school agricultural students knowledge and perceptions of international agricultural concepts (figure 13). The framework implies that previous international experiences relate to student awareness of international agriculture, which in turn relates to their attitudes and beliefs about international agricultural concepts. This study supports their contention and proposes that all students could benefit from direct exposure to international agricultural concepts.
Objective 4: Determine if an international curriculum intervention with high school agricultural students would positively change the knowledge levels in international agriculture concepts of participants.

The student knowledge scores in the survey increased by 20% from the pre-test to the post-test. Even so, students still on average had less than half the questions correct on the post-test. Females increased their knowledge scores more than males from the pre-test to the post-test. Also, students in lower grades and with less experience with a foreign language generally had larger increases in their mean knowledge scores. Each school showed moderate increases in its mean knowledge scores from the pre-test to the post-test. The exception is school four, where the mean knowledge score more than doubled.
The results for this objective indicate several things. The knowledge section of the survey was very focused on specific knowledge students could learn in the curriculum. The teachers stated that they often had to be selective and many times did not get to teach all of the information in each lesson. This may have been one reason why the students did not achieve a score above 48% on the knowledge section for the post-test. Also, all teachers said that they were not able to run the DVDs in their computers. These educational videos contained a significant amount of educational content that was tested in the post-test.

School four had the highest number of participants in the study. It also had two different teachers and three classes of students who were involved. The increased number of participants at this school may have had an impact on the large increases in knowledge scores. Since there were more students in the group to start, they had a better chance of showing increases because of the larger population. The large population of this group compared to the other schools allowed this school to have more of an average distribution of student knowledge scores. The sample size in the other schools was so small that it may not be an accurate representation of the knowledge levels of students in the agriculture programs at those schools.

The rigor of the courses and type of students in the agricultural programs at each of the schools may also have had an effect on the knowledge scores. Agriculture courses are an elective at schools one and two. At school three, agriculture courses are a significant part of the curriculum, but students take separate science courses. Only at school four can students receive science credit for being in some of the classes in the agriculture department. This science credit goes toward the four science credits a student
needs to graduate in that school. In school four, the classes that the curriculum intervention was taught in could not be taken for science credits. The students who took part in the research did take other courses in the agriculture department that were worth science credit. These students may have initially been higher achieving because they were expected to learn more challenging material in their agriculture courses than students at the other schools. These students may also have had higher personal standards for their achievement in classes because their enrollment in the agriculture program was a part of their core curriculum and was not just an elective course.

**Recommendations**

Based on the results from this study, internationalizing agricultural education has a positive effect on students. Teachers with previous international experiences favorably impact the international content their students receive in their classes. Students who have a personal connection internationally respond better to international agricultural education. Specifically, recommendations regarding teachers and curriculum are suggested in the following paragraphs.

1. **Teachers**

   The results from this study cannot be generalized to a larger population since the teachers were recommended and chosen for the study because of the previous international experiences that they had and they were not randomly selected. These teachers’ students already had very favorable perceptions of international agriculture, before they were given the curriculum intervention. Potential teachers of agriculture should take advantage of international short and/or long term travel opportunities because their future students could greatly benefit from their international experiences. Teachers
should receive more international experiences while they are in college and training to be teachers as well as through professional development. Teachers should also receive instruction and materials about including international agricultural concepts in their teaching so that they can supplement the discussion points and information they have with personal experiences.

Agricultural teachers should collaborate with university staff and professors to develop in-service activities and curriculum for agricultural education (Radhakrishna, Leite & Domer, 2003). Universities have been focused on internationalization longer and have resources to help secondary schools develop international curriculum (Knight, 2004; Morris, 2006). This in turn would help universities by getting more students interested in international topics before college. Students are interested in study abroad and international programs at universities, but if they have international content in high school, they may be more likely to participate in these programs in college (ACE, 2008).

Agricultural teachers should collaborate with language teachers and other teachers who address international topics to develop instruction and units that link both classes. Many students had taken language classes and these students had positive changes in their perceptions of international agriculture after the curriculum. These students may excel even more if what they learn in language classes is supported in their agriculture classes and vice versa.

It was mandatory for all of the teachers in this study to have administrative support for the project because it was required by the Office of Research Protections. This may have been a factor in the implementation and effectiveness of the curriculum. It has been found in previous studies that teachers that work with their administrators and
other personnel to develop an international agriculture curriculum are more successful in its implementation and longevity of the program (Tye & Tye, 1992; Ibezim & McCracken, 1994).

2. Curriculum

Curriculum and supporting activities should be developed on international agriculture for high school teachers to use in their courses. Students perceived that world agriculture was being covered better in their classes after having the curriculum. This shows that it is helpful for teachers to have a curriculum to teach international agricultural concepts, even if they have personal international experiences. Teachers that are shown how to teach a new concept or curriculum may be more comfortable teaching it on their own. Teachers are more likely to include international concepts in their teaching if they attend conferences and are involved in professional organizations (Hossain et al., 1995).

International agriculture curriculum should be tested for its effectiveness before it is released to a large group of teachers. This study shows that students had lower perceptions of processes used to teach people about international agriculture after experiencing the curriculum. This may show that one large unit is not the best way to teach international agriculture. Other methods of teaching an international agriculture curriculum such as inserting discussions and small objectives into other technical agriculture lessons, should be explored.

A curriculum on international agriculture should also be aligned with state and national academic standards and other areas including history, geography, and citizenship. International agriculture is a good way to bridge agriculture classes and other
high school classes and illustrate the importance of agriculture in the world. Agriculture classes are very relevant to other high school classes and give students a place to apply technical knowledge they are learning. International agriculture is an excellent vehicle for demonstrating the relationship between agriculture and civics, history, geography, and business.

Connections should be developed with existing community and school organizations that have an interest in international agriculture and agricultural education. This will bring together existing resources and personnel to develop and release an international agriculture curriculum. Organizations such as Heifer International already have many educational resources in the form of curriculum and learning centers throughout the United States that would be useful in developing an international agriculture curriculum appropriate for high school students. The National FFA Organization and its partners have access to agricultural teachers throughout the country and work with developing and releasing curriculum to this group of teachers on a regular basis.

Students who had personal international experiences increased their perceptions of international agriculture after the curriculum intervention more than students who did not have such experiences. International experiences should be offered to students so that they can develop these personal global connections early in their lives and have a better understanding of international concepts learned through education.
Future Research

Future research in internationalizing agriculture education should focus on two main areas: teacher preparation and curriculum development. Research needs to be undertaken to determine which international experiences are best for teachers to participate in to help them include these concepts into their future classes. International agriculture curricula also need to be tested to determine what information needs to be included, what format is best, and when it should be delivered.

Research should be conducted in the future with preservice agricultural teachers to determine the type and amount of international experiences they are having while in college. Research should expand upon that of Schneider (2003) to determine why the pre-service agricultural teacher program is not giving students enough time to have international experiences. Schneider also recommends including international components in the requirements for certifications, allowing students to do part of their student teaching or an internship in another country, and having trainings on international issues for current teachers.

It should be determined which international experiences have the most impact on preservice agricultural teachers. A threshold number of international experiences needed to make difference on a preservice teacher could also be measured. Longitudinal studies could be conducted to see if there is a relationship between international experiences of preservice agricultural teachers and the inclusion of international agriculture concepts in their future lessons.

International agriculture curriculum needs to be tested with different groups of students and larger populations. This study used a very small group of students for the
population and the teachers were hand-chosen for this experience. To make the results more generalizable, similar studies should be conducted in other areas of the country and with more students and teachers. These students should be diverse to show how different types of students react to this type of curriculum. Radhakrishna, Leite & Domer (2003) also recommend further research in this area with larger groups of students to examine the relationships between demographics and students knowledge and perceptions of international agriculture. Research would also be merited in the types of activities and curriculum used to teach international agricultural concepts to high school students.

One other research initiative in international agriculture curriculum would be to test this type of curriculum with teachers who have not had previous international experiences. All of the teachers in this study had previous international experiences, showing that they were interested in this topic (Peuse & Swanson, 1980). All of the teachers agreed to teach the curriculum and some even added their own experiences and information to the material given. This curriculum needs to be tested with teachers who have not had international experiences to see what types of activities and lessons they are most likely to use, if they will use this type of curriculum, and if students of these teachers show differences in perceptions and knowledge in a similar study.

**Conclusions**

This study supports existing literature showing that students’ knowledge of international agriculture concepts increase when they are taught an international curriculum intervention. Student perceptions of international agriculture were already high before the curriculum intervention and they stayed at similar levels after the intervention. There were groups of students who showed more positive perceptions of
international agriculture after the curriculum intervention, including those who had previous international experiences, those with multiple semesters of foreign language, and females that showed more positive perceptions of international agriculture after the curriculum intervention. New studies are needed to provide a greater understanding of how international experiences help students learn international concepts. The teachers all had previous international experiences, but they thought the curriculum added to their own knowledge and they planned on using parts of it in the future.

Results of this study show that students who have an existing context to assimilate information about international agriculture are more likely to have positive perceptions of international agriculture after a curriculum intervention. Students who have teachers with previous international experiences already have positive international agriculture perceptions. More teachers should get international experiences while they are in college so that they have that background to share with their students later in their teaching career.

A curriculum on international agriculture focused on development should be created and tested in various regions of the United States. Various activities and types of curriculum should be tested to see which strategies work best to teach students about international agriculture. Teachers without previous international experiences should use an international agriculture curriculum to make up for their lack of experiences. International agriculture concepts should be incorporated into high school agriculture classrooms around the United States to increase the levels of knowledge and perceptions that students currently have about international agriculture.
Today’s children, the future citizens of the 21st century, will have to face complex issues such as environmental protection, energy use, and arms control. If students...learn to think with a global perspective, they will be better equipped to cope with tomorrow’s dilemmas. (Mulloy, 1990, p. 41)

To address the issues students will face as global citizens, the secondary agricultural education needs to include more international agricultural concepts in its curricula. This research shows that it may also benefit students to have interactions with people in other countries and participate in exchange experiences so that they can see other cultures first hand. The looming world food crisis shows that there is not a more appropriate time to address international problems in agriculture classes. Students need to be aware of world problems and explore ways to solve them by partnering with other people from around the world. Internationalizing the high school agriculture curriculum will strengthen students’ skills to deal with these issues and make them better prepared global citizens.
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APPENDIX A
Hi Melanie,

The Office for Research Protections (ORP) has reviewed the above-referenced study and determined it to be exempt from IRB review. You may begin your research. This study qualifies under the following category(ies):

**Category 1:** Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods. [45 CFR 46.101(b)(1)]

**COMMENT:** As other teachers are identified, a modification will need to be submitted to add them to the study.

**PLEASE NOTE THE FOLLOWING:**

- Include your IRB number in any correspondence to the ORP.

- The principal investigator is responsible for determining and adhering to additional requirements established by any outside sponsors/funding sources.
• **Record Keeping**
  
  o The principal investigator is expected to maintain the original signed informed consent forms, if applicable, along with the research records for at least three (3) years after termination of the study.

  o This will be the only correspondence you will receive from our office regarding this modification determination.

  ▪ **MAINTAIN A COPY OF THIS EMAIL FOR YOUR RECORDS.**

• **Consent Document(s)**

  o The exempt consent form(s) will no longer be stamped with the approval/expiration dates.

  o The most recent consent form(s) that you sent in for review is the one that you are expected to use.

• **Follow-Up**

  o The Office for Research Protections will contact you in three (3) years to inquire if this study will be on-going.

  o If the study is completed within the three year period, the principal investigator may complete and submit a **Project Close-Out Report**.

    (http://www.research.psu.edu/orp/areas/humans/applications/closeout.rtf)

• **Revisions/Modifications**

  o Any changes or modifications to the study must be submitted to the Office for Research Protections on the **Modification Request Form - Exemption** available on our website:

    http://www.research.psu.edu/orp/areas/humans/applications/exemptmod.rtf

  o Modifications will **not be accepted unless the Modification Request Form is included with the submission.**
Please do not hesitate to contact me if you have any questions or concerns.

Thank you,

Jodi

Jodi L. Mathieu, BS, CIP
Research Compliance Coordinator
Office for Research Protections
The Pennsylvania State University
201 Kern Graduate Building
University Park, PA 16802
Phone: (814) 865-1775
Fax: (814) 863-8699
http://www.research.psu.edu/orp/
Ms. XXXXXXXX
XXXXXX High School
Agricultural Education Department
XXXXXXXXXX St.
XXXXXXX, PA 12345

March 7, 2007

Dear Ms. XXXXX,

My name is Melanie Sanborn and I am a masters of science candidate working with Dr. Bruening and Dr. Scanlon at The Pennsylvania State University in the Agricultural and Extension Education department. We are working on a project that involves measuring knowledge and perceptions of secondary agriculture students toward international agricultural concepts. I am writing to ask if you and some of your students would be willing to participate in this research project.

The research will begin this spring in April with a pre-test of the students’ knowledge and perceptions about international agriculture. Early next fall teachers will receive a curriculum to present to their students on international agriculture. At the conclusion of the international agriculture unit students will receive a post-test.

The first step of the process in this research would be to confirm that you are willing to participate with your students in this project. I will also need a letter of permission from the principal of your school or the superintendent of your school district. After you commit to the project, I will assist you in any way possible to help you get permission from your supervisors. I would like to have third and/or fourth year students participate in the project so they would currently be sophomores or juniors. Each student that would be involved in the research would need to have a letter of parental consent signed in order to participate in university research. The students also need to sign a statement saying that they are willing to participate in the research. After all the letters are received, I will administer or send you the pre-test for the students who participate, later this spring. In the fall I will distribute a two-week curriculum on international agriculture to be taught as a part of your agricultural classes. This curriculum is the intervention in this research. A possible service learning activity may also be conducted in the fall as part of the research. After the curriculum has been administered and the activity is completed there will be a
post-test conducted to finish the collection of data for the research, and your commitment to this project. *(See the attached time line)*

I will be developing the curriculum this summer from data and first hand information gathered in Moldova. I will set up an in-service activity so that you understand all aspects of the program. I will come to your school to do this in late summer or early fall.

The service learning project that goes along with this research would also tentatively be conducted next fall. The students would be raising money to support animal projects in Moldova so that students there can learn about agriculture, earn money, and be more sustainable through owning animals. Pennsylvania students would be able to receive updates from the international students and form a bond with the people they are helping.

I appreciate your willingness to participate in this project. If you have any questions about the research or what will be involved in doing the research with your students please feel free to contact me at the above address or via e mail at mas831@psu.edu. I do need confirmation of your participation in this activity by April 1st so that my research stays on schedule. Thank you again for your time and consideration, I look forward to working with you more in this exciting project.

Sincerely,

Melanie Sanborn
Masters of Science Candidate

Thomas H. Bruening, Ph.D
Professor of Agricultural and Extension Education

Dennis C. Scanlon, Ph.D
Professor of Agricultural and Extension Education
Youth to Youth International Timeline:
International Agricultural Education Program

March 2007 – Initial contact with teachers

April 1, 2007 – Deadline for teacher commitment to the project

April 2007 – Seek permission from school administrations
   Hand out information letters to student for themselves and their parents
   Collect signed student letters of assent
   Collect signed parent letters only if they do not give permission for their
   child to participate

May 2007 – Administer the pre-test to the students at the end of the month

August 2007 – Teacher in-service training on using the international agriculture
   curriculum

September/October 2007 – Teachers present the international agriculture two week unit
   in their classes

October 2007 – Possible service learning activity is presented

November 2007 – Administer post-test to students in early to mid November
March 7, 2007

Dear Administrator,

My name is Melanie Sanborn and I am a master’s degree candidate in Agricultural and Extension Education at The Pennsylvania State University. I am writing to you to ask permission to complete a research project with a population of students in your school. I have contacted Ms. XXXXXXXX, the agriculture educator in your school and she has agreed to participate in an international agricultural education project if you and the district also agree.

The project involves the teacher presenting a curriculum on international agriculture in their classroom. Students would also complete a service learning project with students in Moldova through the internet and e-mail. The students would take a test before and after the curriculum was given to test their knowledge and perceptions of international agricultural concepts. I am asking for permission to use the results of the tests that these students take as a normal part of the curriculum.

The students will benefit from this project by being exposed to global agricultural concepts. They will learn more about globalization and civic engagement. The teachers that are involved with this project will gain experience with international concepts and have a curriculum that they can use in future years.

Students will not have any risk by participating in this project because all the activities will be a part of their regular agriculture class. All the data will be kept confidential and at no time will the students be identified.

I have enclosed the letter and timeline sent to teachers so that you can examine the specifics of completing this project.

In order to comply with research guidelines at The Pennsylvania State University if you approve the study please write a short memo stating your approval of this project. You may give this memo to the agriculture teacher or you may send it directly to me at the following address.
Melanie Sanborn  
424 Agricultural Administration Building  
University Park, Pa 16802  

If you have any further questions about the research or the procedures that will take place during this research please do not hesitate to contact me. My office number is (814)863-0416 and my e-mail address is mas831@psu.edu. Thank you for agreeing to participate and promptly responding to this matter.

Sincerely,

Melanie Sanborn  
Masters of Science Candidate
October 3, 2007

Dear Parents,

Your student will be participating in a special project in their agriculture class in partnership with The Pennsylvania State University Department of Agricultural and Extension Education called Youth to Youth International. The students will be learning about international agriculture as part of their curriculum this fall. The curriculum will be a part of a two week unit that includes a total of 10 hours of instruction on this topic. Around the time that the curriculum is being taught, students will be participating in a service learning project to raise money for agricultural development projects.

Students will be tested on their perceptions and knowledge about international agriculture before and after the curriculum is taught. Students will benefit from this project by learning more about globalization. They will be taught about civic engagement and benefit from being a part of a service learning project. The service learning activity will benefit students by extending the lessons they learn in class and applying them to real world situations. Your student’s decision to be in this research is voluntary and they can stop at any time if they decide that they no longer want to participate. The students may also choose not to answer certain questions on the tests.

Teachers will not take any time out of the classroom to engage their students in this project because the curriculum will be a part of the class. The information that would be collected for research would be taken from the perceptions and knowledge test given with the curriculum. All information will be kept confidential and the students will never be identified. The data will be secured in room 424 in the Agricultural Administration Building at University Park. The research data will only be able to be accessed by the primary investigator, her advisors, and your student’s own agriculture teacher. A copy of the knowledge and perceptions test can be obtained by contacting the researcher working on the project, Melanie Sanborn, at mas831@psu.edu.

Thank you,

Melanie Sanborn
If you give permission for The Pennsylvania State University to use the results of the test your child will complete in conjunction with this curriculum unit you need to take no further action.

If you **do not** give permission for The Pennsylvania State University to use the results of the test that your child will complete in conjunction with this curriculum unit please sign and return this form to your child’s agriculture teacher.

**I DO NOT** give permission for my child, ____________________________, to participate in this research.

____________________________________  ____________
Parent Signature  Date

**If you have any questions about this project feel free to contact the principal investigator, Melanie Sanborn, at mas831@psu.edu or contact your child’s agriculture teacher.**

Please retain this form for your records. If you are returning the form, a copy of the signed form will be returned to you.

Melanie Sanborn
424 Agricultural Administration Building
University Park, PA 16802
814-863-0416
Dear Students,

You will have the opportunity to participate in a special project in your agriculture class in partnership with The Pennsylvania State University Department of Agricultural and Extension Education called Youth to Youth International. You will be learning about international agriculture as part of your curriculum this fall. The curriculum will be a part of a two week unit that includes a total of 10 hours of instruction on this topic. Around the time that the curriculum is being taught, you will have the opportunity to participate in a service learning project to raise money for agricultural development projects.

You will be tested on your perceptions and knowledge about international agriculture before and after the curriculum is taught. Research volunteers are being sought to allow the results from these tests to be used in a study. Benefits from this project include learning more about globalization and being a part of a service learning project. Your decision to be in this research is voluntary and you can stop at any time if you decide that you no longer want to participate. You may also choose not to answer certain questions on the tests.

Your teacher will not take any time out of the classroom for this project because the curriculum will be a part of the class. All information will be kept confidential and you will never be identified. The data will be secured in room 424 in the Agricultural Administration Building at University Park. The research data will only be able to be accessed by the primary investigator, her advisors, and your own agriculture teacher.

Thank you for your time and participation,

Melanie Sanborn

If you agree to participate in this project and have the results from your tests used confidentially for research in conjunction with The Pennsylvania State University please sign and return this form to your teacher.

__________________________________________  ____________
Student Signature                              Date
If you have any questions about this project feel free to contact the principal investigator, Melanie Sanborn, at mas831@psu.edu or contact your agriculture teacher.

A copy of this signed form will be returned to you for your records.

Melanie Sanborn  
424 Agricultural Administration Building  
University Park, PA 16802  
814-863-0416
APPENDIX B
Youth to Youth International
Agricultural and Extension Education Department

November/December 2007
Student Survey
Perceptions Section:

Directions: For each of the following items related to international agricultural concepts, please circle only one response that best represents your perceptions. Use the following scale for your response to each of the items. An example question is given below to show how to complete this portion of the survey.

Survey Scale:
SD = Strongly Disagree  D = Disagree  A = Agree  SA = Strongly Agree  DK = Don’t Know

Example:
A. I enjoy learning about animals  SD  D  A  SA  DK
The individual strongly agreed with Example A so they circled “SA”

It is important for me to:

1) Know agriculture’s importance to the world economy.  SD  D  A  SA  DK
2) Know the differences between developing and developed countries.  SD  D  A  SA  DK
3) Know more about other countries as markets for U.S. agricultural products.  SD  D  A  SA  DK
4) Have a better knowledge of how politics impact world agriculture  SD  D  A  SA  DK
5) Know more about the cultures of other countries.  SD  D  A  SA  DK
6) Know how the culture of other countries impact agriculture in those countries.  SD  D  A  SA  DK
7) Know more about Pennsylvania agriculture’s connections to world trade.  SD  D  A  SA  DK
8) Learn the agricultural products from other countries that are consumed in Pennsylvania.  SD  D  A  SA  DK
9) Know Pennsylvania export agriculture’s impact on the Pennsylvania economy.  SD  D  A  SA  DK
10) Know how world events affect local agriculture in my community.  SD  D  A  SA  DK
11) It is important for me to know how world agriculture affects food prices in the local grocery store.

12) Know how marketing U.S. agricultural products to other countries will help the U.S. economy.

13) Know how coming changes in world agriculture will have an impact on me in the future.

14) I will know more about global agriculture if I learn about:
   a. Major agricultural products that are produced in the United States.
   b. What happens to local products once they leave my community.
   c. Other countries that are competing with Pennsylvania’s major agricultural products.
   d. How the U.S. works with other countries on economic issues.
   e. How the U.S. works with other countries on political issues.
   f. How the U.S. works with other countries on charitable issues.

15) It is important for me to be taught about various aspects of countries that Pennsylvania agriculture products are sold to such as:
   a. The cultures in those countries
   b. Their infrastructure (educational system, transportation system, major industries, etc.).
   c. The standard of living in those countries
   d. Their natural resources
   e. The agriculture that exists in those countries

16) Global agriculture allows me to eat various food products year round.

17) Pennsylvania citizens eat food products that are produced around the world.
18) Natural disasters can have an effect on the price of food in my local grocery store.  
19) The U.S. should give food aid to countries when people are starving.  
20) Competition with other producers worldwide helps keep food prices affordable for the average U.S. consumer.  
21) When learning about international agriculture in class it is important for me to learn about:  
   a. The mutual dependency of nations around the world.  
   b. Future changes in global agriculture.  
   c. Global agricultural marketing systems.  
   d. Being a better a citizen in a global society.  
22) I would like to participate in various FFA international programs.  
23) World agriculture is covered extensively in my agricultural class.  
24) It is important for my agricultural teacher to incorporate world agriculture into lessons.  
25) It is important for my agricultural teacher to use a variety of resources when teaching about world agriculture such as:  
   a. Guest speakers  
   b. Audio-visual materials  
   c. Maps  
26) Hosting an agricultural exchange student from another country in my community would help me learn more about world agriculture.
27) I can learn about world agriculture by:

a. Watching television

b. Listening to the radio

c. Attending international events/fairs

d. Searching the internet

Knowledge Section:

Directions: Please answer the following questions on international issues, the country of Moldova, and the Moldovan beekeeping project to the best of your ability. Circle the best choice.

International Issues:

1) What is the current population of the world?

   A. 5.5 billion people
   B. 6.1 billion people
   C. 6.5 billion people
   D. 7.2 billion people
   E. None of the above

2) What is the most prevalent form of malnutrition world wide?

   A. Iron deficiency
   B. Protein deficiency
   C. Zinc deficiency
   D. Vitamin A deficiency

3) Currently, how many people in the world live below the international poverty line, earning less than $1.00 a day?

   A. 500 million people
   B. 1 billion people
   C. 25 million people
   D. 3.2 billion people

Moldova:

4) What percent of people living in Moldova live in poverty?

   A. 20% of people
   B. 50% of people
   C. 70% of people
   D. 80% of people
5) What is the primary religion practiced in Moldova?
   A. Roman Catholic
   B. Eastern Orthodox Christian
   C. Protestant
   D. Muslim

6) What is the official language in Moldova?
   A. Russian
   B. Romanian
   C. Moldovan
   D. Ukrainian
   E. B and C
   F. None of the above

7) What percentage of working age Moldavians are employed outside Moldova?
   A. 50%
   B. 25%
   C. 8%
   D. 1%

8) What is the Gross Domestic Profit (GDP) in Moldova per person on a purchasing power parity (PPP) basis (in US dollars)?
   A. $2,000.00
   B. $43,500.00
   C. $8,800.00
   D. $21,200.00

9) In Moldova, 49% of students who live in orphanages suffer from what?
   A. Malnutrition
   B. Anemia
   C. AIDS
   D. Vitamin A deficiency

The Moldovan Beekeeping Project:

10) Beekeeping is also called:
    A. Entomology
    B. Vermiculture
    C. Apiiculture
    D. Ornithology
    E. None of the above
11) What is NOT a reason that young queen bees are more effective than older queen bees?

A. They are less likely to swarm
B. The hive produces more honey
C. They lay more eggs
D. They attract more drones

12) What is NOT a primary source of nectar for honey production in Moldova?

A. Sunflowers
B. Acacia trees
C. Red clover
D. Wildflowers

13) Most bee hives in Moldova are what type?

A. “Long Hive”
B. “Langstroth Hive”
C. “Top Bar Hive”
D. “Movable Comb Hive”

14) What is one major hazard of participating in high scale honey production in Moldova?

A. High taxes
B. Nowhere to sell the honey
C. Not enough places to put the hives
D. Risk of hives being stolen

15) Why is Acacia tree honey favored over other types of honey?

A. Long shelf life
B. Flavor
C. Color
D. Frequency of the trees
E. C and D
F. None of the Above

16) What is a major problem with the local honey market in Moldova?

A. Most of the honey is exported
B. Honey is very expensive
C. There are no food regulations
D. Honey products are often poorly packaged
17) How much honey does an average student involved in the beekeeping project in Moldova consume?

A. .27 lbs  
B. 20 lbs  
C. .6 lbs  
D. 4 lbs

**Demographics:**

**Directions:** Please answer the following questions about yourself.

1) What is your gender?  
   - Male  
   - Female  
   (Please Circle)

2) What is your grade?  
   - 9  
   - 10  
   - 11  
   - 12  
   (Please Circle)

3) What is your age?  
   - 13  
   - 14  
   - 15  
   - 16  
   - 17  
   - 18  
   (Please Circle)

4) How many semesters (half years) were you enrolled in at least one agriculture course?  
Write in the number of semesters:____________________________________________

5) Have you had any previous international experiences?  
   - A. Yes  
   - B. No  
   
   If you answered yes to question five please circle all of the types of international experiences you have been a part of:  
   
   A. I have traveled internationally outside of school  
   
   B. I have hosted a foreign exchange student  
   
   C. I have attended a presentation on international experiences  
   
   E. I participated in a foreign exchange trip with school to another country

6) I have written to a pen pal from another country or correspond regularly with someone from another country (letters, phone conversations, e-mail, instant messaging).  
   - A. Yes  
   - B. No
7) I am enrolled in a foreign language class.  

A. Yes  

B. No

8) I was previously enrolled in a foreign language class.  

A. Yes  

B. No

If you answered yes to question seven and/or eight, how many total half years of language did you complete?

Ex: If you completed one full year of language class, you would put two half years completed.

Write in the number of half years of language classes you have completed including the current semester:

________________________________

Thank You for Your Time!
The 44 perceptions items were grouped into five categories for analysis purposes.

Listed below are the groupings of the items and the reliability of each grouping.

<table>
<thead>
<tr>
<th>Group:</th>
<th>Group Reliability:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economics and Business Group:</strong></td>
<td>.833</td>
</tr>
<tr>
<td>Question #:</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Know agriculture’s importance to the world economy</td>
</tr>
<tr>
<td>3</td>
<td>Know more about other countries as markets for US agricultural products</td>
</tr>
<tr>
<td>7</td>
<td>Know more about PA agriculture’s connections to world trade</td>
</tr>
<tr>
<td>9</td>
<td>Know PA export agriculture’s impact on the PA economy</td>
</tr>
<tr>
<td>11</td>
<td>It is important for me to know how world agriculture affects food prices in my local grocery store</td>
</tr>
<tr>
<td>12</td>
<td>Know how marketing US agricultural products to other countries will help the US economy</td>
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<tr>
<td>14D</td>
<td>I will know more about global agriculture if I learn about how the US works with other countries on economic issues</td>
</tr>
<tr>
<td>20</td>
<td>Competition with other producers worldwide helps keep food prices affordable for the average US consumer</td>
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<td></td>
<td>When learning about international agriculture in class it is important for me to learn about:</td>
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<tr>
<td>21A</td>
<td>The mutual dependency of nations around the world</td>
</tr>
<tr>
<td>21B</td>
<td>Global agricultural marketing systems</td>
</tr>
<tr>
<td>21C</td>
<td>Future changes in global agriculture</td>
</tr>
</tbody>
</table>

| **World Knowledge:** | .769               |
| Question #:          |                    |
| 2    | Know the differences between developing and developed countries |
|      | It is important for me to be taught about various aspects of countries that PA agriculture products are sold to such as: |
| 15B  | Their infrastructure |
| 15C  | Their natural resources |
| 15D  | The agriculture that exists in those countries |
| 15E  | The standard of living in those countries |

| **Cultures and Politics:** | .720               |
| Question #:               |                    |
| 4    | Have a better knowledge of how politics impacts world agriculture |
| 5    | Know more about the cultures of other countries |
| 6    | Know how the culture of other countries impacts agriculture in those countries |
I will know more about global agriculture if I learn about:

14E How the US works with other countries on political issues
14F How the US works with other countries on charitable issues

It is important for me to be taught about various aspects of countries that PA agricultural products are sold to such as:

15A The cultures in those countries
19 The US should give food aid to countries when people are starving

When learning about international agriculture in class it is important for me to learn about:

21D Being a better citizen in a global society

World Impact on My Community:  .708

Question #:

8 Learn the agricultural products from other countries that are consumed in PA
10 Know how world events affect local agriculture in my community
13 Know how coming changes in world agriculture will have an impact on me in the future

I will know more about global agriculture if I learn about:

14A Major agricultural products that are produced in the US
14B What happens to local products once they leave my community
14C Other countries that are competing with PA’s major agricultural products
16 Global agriculture allows me to eat various food products year round
17 PA citizens eat food products that are produced around the world
18 Natural disasters can have an effect on the price of food in my local grocery store

Processes Used to Educate People about International Agriculture:  .829

Question #:

22 I would like to participate in various FFA international programs
23 World agriculture is covered extensively in my agricultural class
24 It is important for my agricultural teacher to incorporate world agriculture into lessons

It is important for my agricultural teacher to use a variety of resources when teaching about world agriculture such as:

25A Guest speakers
25B Audio-visual materials
25C Maps
26 Hosting an agricultural exchange student from another country in my community would help me learn more about world agriculture

I can learn about world agriculture by:

27A Watching television
27B Listening to the radio
27C Attending international fairs/events
27D Searching the internet