

**MEASURING KNOWLEDGE GAIN AND CUSTOMER SATISFACTION OF IRAQI
EXTENSION AGENTS**

A Thesis

by

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ABSTRACT

The purpose of the research was to measure knowledge gains and customer satisfaction of Iraqi extension educators who participated in a five-day workshop through the IAER Project.

Measuring knowledge gain and customer satisfaction has a twofold benefit of identifying areas of focus for future training based on knowledge of extension educators and evaluating teaching effectiveness of course instructors.

Eighty-three Iraqi extension educators attended a five-day workshop at one of the Extension Centers in Dohuk, Erbil, or Slemani in northern Iraq in the summer of 2012. Quantitative data were collected using a two-part questionnaire at the end of the course. One section included a customer satisfaction survey made up of 12 close-ended questions with a five-point ordinal scale to determine the satisfaction of participants with the course. The second section of the instrument was a retrospective pre-post evaluation tool to gather data about the change in participants' knowledge in the competency areas of program planning, needs assessment, teaching methods, evaluation, and youth development.

The study found that Iraqi extension educators were somewhat to mostly satisfied with the five-day workshop. The participants gained knowledge in each of the competency areas covered during the course. Further, the study found that extension educators with the highest satisfaction also indicated the highest knowledge gains.

DEDICATION

To my friends in Iraq, I am humbled by your passion for your work and your desire to improve your country.

And to my parents, thank you for your constant love and support.

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All work for the thesis was completed independently by the student.

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NOMENCLATURE

IAER: Iraq Agricultural Extension Revitalization

USDA: United States Department of Agriculture

FAS: Foreign Agricultural Service

NIFA: National Institute for Food and Agriculture

KRG: Kurdistan Regional Government

MOA: Ministry of Agriculture

MOAWR: Ministry of Agriculture and Water Resources

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CHAPTER I

INTRODUCTION

Iraq, known as the birthplace of civilization, is a land steeped in ancient history and culture that hosted the first known farmers (Polk, 2006). The rich land, known as the Fertile Crescent in Mesopotamia, is thought to be the first area where wheat was cultivated and domesticated approximately 10,000 years ago (Araus, Ferrio, Buxo, & Voltas, 2007). Though embroiled in decades of conflict, Iraq is also a land of warm, hospitable people, delicious Middle Eastern cuisine, and beauty.

Iraq has a total area of 438,320 square kilometers and is bordered by Turkey to the north, the Islamic Republic of Iran to the east, the Persian Gulf to the southeast, Saudi Arabia and Kuwait to the south, and Jordan and the Syrian Arab Republic to the west (Frenken, 2009). While many think of Iraq as vast, sandy deserts, the country is home to four geographic regions defined by their climatic differences. The northeastern part of the country is highlands; the uplands region lies in the north between the Tigris and Euphrates; alluvial plains in the central part of the country; and deserts in the south and west regions (Iraq, 2014).

The alluvial plains and deserts of Iraq are hot and arid with cloudless summers lasting from May to October. Summer temperatures reach as high as 50°C. Rains come in the winter months with an average rainfall of 100 to 180 millimeters. Temperatures in the winter months range from 1-15°C (Iraq, 2014). The northeastern region of the country has a slightly shorter and cooler summer lasting from June to September with temperatures 2-4°C cooler than the southern part of Iraq. Winter brings more rain and snow in the northeastern foothills and highlands. Precipitation ranges from 300 to 560 millimeters annually in the foothills, and the mountains may get as much as 1,020 millimeters of precipitation.

Iraq is divided into 18 governorates, or provinces. The three northeastern provinces make up the Kurdish Region, an autonomous region with its own governing body. The majority of the population of Iraq, roughly two-thirds, is Arab; Kurds make up one fourth of the population; and small minority groups such as Turks, Turkmen and Assyrians make up the rest of the population. Approximately 60-65% of Iraq is Shia Muslim and 32% is Sunni Muslim (Iraq, 2014).

Agriculture has a rich history in Iraq and serves as the second largest employer, employing 21.6% of the population (Iraq, 2013). Iraq's diverse climate permits a variety of crops to be grown including: wheat, barley, rice, pulses, forage, vegetable crops (cucumber, tomatoes, onions, potatoes, etc.), and fruit crops (dates, apples, pomegranates, grapes, etc.) (Omer, 2011). Instability, conflict, and economic sanctions in recent decades all led to a decline in the agriculture sector. This decline still affects food security, rural livelihoods, resource management and economic growth. Once a net exporter of food, Iraq now imports 80% of its food (Abi-Ghanem et al., 2013).

Iraq has a network of agricultural extension offices that are organized by the Ministry of Agriculture and spread across the provinces. Agricultural extension systems often provide the underpinning for a sustainable agriculture sector by providing farmers with information about improved varieties and research-tested farming methods. Over the last two to three decades, extension has become less relevant to Iraqi farmers because extension educators lack knowledge and resources.

In late 2006, the United States Department of Agriculture/Foreign Agriculture Service (USDA/FAS) and United States Department of Agriculture/National Institute of Food and Agriculture (USDA/NIFA), and the United States Department of State formed a partnership to facilitate Iraqi rural economic development by revitalizing their agricultural extension system.

This partnership funded a project, the Iraq Agricultural Extension Revitalization (IAER) Project, to work with the Iraqi Ministry of Agriculture and Colleges of Agriculture to train and equip extension educators with updated knowledge and skills to address needs in the agriculture sector. The IAER Project was executed by five US land-grant universities: New Mexico State University, University of California-Davis, Utah State University, Washington State University, and Texas A&M University as the lead.

The IAER Project worked with the Ministry of Agriculture (MOA) in the Federal Iraq Government in Baghdad and the Ministry of Agriculture and Water Resources (MOAWR) in the Kurdish Regional Government (KRG), headquartered in Erbil, to provide a series of technical training sessions for Iraqi extension educators in dryland agriculture, water resources and irrigation, horticulture, agriculture communications, agribusiness, and livestock. The IAER Project also provided training for extension educators to help them effectively transfer new technology to the Iraqi farmer. Topics included needs assessment, program planning, youth development, and evaluation.

Purpose Statement

The purpose of the research was to measure knowledge gains and customer satisfaction of Iraqi extension educators who participated in a five-day workshop through the IAER Project.

Measuring knowledge gain and customer satisfaction has a twofold benefit of identifying areas of focus for future training based on knowledge of extension educators and evaluating teaching effectiveness of course instructors.

Objectives

The study consists of four specific objectives:

1. Identify knowledge gains of extension educators in regards to:
 - a. Program Planning
 - b. Needs Assessment
 - c. Teaching Methods
 - d. Evaluation
 - e. Youth Development
2. Identify knowledge gain of extension educators as a result of the five-day workshop.
3. Identify level of extension educator satisfaction with the five-day workshop.
4. Compare customer satisfaction and knowledge gain of participants by location of training course.

Method

Participants

Study participants included Iraqi extension educators who attended an IAER Extension Methods Course. Weeklong courses were held in the KRG at Extension Centers with one in Dohuk, one in Erbil, and two in Slemani. Twenty-five extension educators attended the course at the Erbil Extension Center; 14 extension educators attended the course at the Dohuk Extension Center; and 22 extension educators attended each of the two sessions at the Slemani Extension Center. Two courses were offered in Slemani to reduce the number of participants per course. Since only selected extension educators attended the course, the sample for the study is a sample of convenience.

Multiple individuals served as instructors and used a predetermined outline and curriculum to teach the courses. All Iraqi participants work as extension educators and have a technical or bachelor's degree in an agricultural-related subject or extension education.

Instrumentation

The instrument was composed of two sections. One section included a customer satisfaction survey. This section was made up of 12 close-ended questions with a five-point ordinal scale. Participants were asked to rank their satisfaction on a scale of one to five with one being "not at all" satisfied and five being "completely" satisfied.

The second section of the instrument was a retrospective pre-post evaluation tool used at the conclusion of a program to gather data about the change in participants' knowledge, attitude or skills. When using this form of evaluation, participants first report on their current level of knowledge, attitude or skills. Using the same questions, participants are then asked to report on the perception of their level of knowledge, attitude or skills before initial program participation (Pratt, McGuigan, & Katzev, 2000).

An Extension Specialist from Texas A&M AgriLife Extension and the IAER Project Director developed the instrument. The statements used in the instrument were based on program objectives for the course. The instrument was reviewed by experts in the field for content validity. The instrument was tested for reliability using Cronbach's alpha. Cronbach's alpha measures homogeneity on items with a scale of possible answers (Ary, Jacobs, & Sorensen, 2010). The instrument has a Cronbach alpha score of .85. After the instrument was developed, a translator from northern Iraq translated it to Arabic. A native-Arabic speaker who is an expert in the subject matter verified the translation.

The instrument did not include any personal identifying information. Participants were asked to complete the survey at the conclusion of the course, but it was not mandatory. The researcher does not have a list of participants, so the data was completely anonymous.

Analysis

The data from the instrument was analyzed using SPSS version 22. First, the study examined knowledge gains of extension educators in regard to program planning, needs assessment, teaching methods, evaluation, and youth development. The study described the average knowledge gained by participants along each construct by comparing self-reported knowledge before and after the course.

Second, the study identified how much knowledge extension educators gained overall because of the course.

Third, the study described the level of extension educator satisfaction with the five-day workshop. The participants responded to 12 close-ended questions with a five-point ordinal scale to indicate their satisfaction with the quality of the instructors and course.

Fourth, the study compared customer satisfaction and knowledge gain of participants by location of the training course. The study examined and compared scores at each location to understand possible differences.

Limitations of the Study

There are four limitations to study:

1. The evaluation data was self-reported data that may not reflect the participants' actual knowledge gain. The retrospective pre-post instrument was designed to avoid a

response-shift bias; nevertheless, the data was still self-reported and may not be an accurate representation of knowledge gained.

2. The Iraqi culture places high value on hospitality and respect, particularly for instructors or faculty in a classroom, as well as foreign visitors. The participants in the course may have indicated higher rates of satisfaction for foreign instructors as a sign of respect and honor.
3. Three of the courses were offered concurrently at provincial Extension Centers in Erbil, Dohuk, and Slemani with two instructors at each course. The instructors used the same schedule and curriculum, but were free to adjust the materials to respond to questions and discussion from the participants. Tours offered during each course to various farms and agriculture facilities provided different points for discussion between participant groups in the different provinces. Variations in the course presentation might account for differences in customer satisfaction and knowledge gain.

The fourth course was taught in Slemani in the following week. Slemani has more district offices and a larger number of participants. To maintain a good class size, half of the Extension participants from Slemani Province attended the first week, and the other half attended the second week. The instructors adjusted the curriculum for the second week based on the feedback from participants and Iraqi Extension administrators from the first week. The adjustments in the content and delivery of course materials might contribute to the higher levels of knowledge gain and customer satisfaction of the second group in Slemani.

4. In the summer of 2012, Extension educators worked in relative security in Kurdistan, compared to other areas of Iraq. The biggest threats to the success of Extension educators were budgetary concerns. The Director of Extension & Research at the

Slemani Extension Center shared that he had not received a budget for the first six months of the year, but then received the full annual budget that was to be spent within just a few months. The gaps in funding made it difficult for his staff to plan and conduct Extension programs.

Additionally, Extension salaries were low and most Extension educators had a second job to add to their income. Regular working hours for Extension were 8:00 am to 2:00 pm, and most employees worked their second job in the afternoon.

During conversations and interviews with Extension educators, many shared stories of going above and beyond their duties to ensure successful Extension programs, often working longer hours or contributing their personal funds for equipment and supplies. These staff were eager to learn at the IAER training program and demonstrated a great attitude about moving forward with Extension programs. Other staff, however, viewed their government position only as a semi-stable source of income, and their attitudes did not reflect much interest in learning. Participant attitudes, whether positive or negative, may have affected their perceptions and satisfaction with the course and knowledge gains.

Assumptions

There were two basic assumptions within the study:

1. Participants in the five-day extension methods workshops were practicing extension educators with at least a technical degree or higher in agriculture subject matter.
2. The workshops were taught four times in three different locations by different groups of instructors with the same curriculum and teaching plan. The study assumed that each group of participants received similar instruction.

CHAPTER II

LITERATURE REVIEW

The Beginnings of Agricultural Advisory Services

Evidence of the first known example of agricultural extension was unearthed in Mesopotamia around 1800 BC. Archaeologists found clay tablets inscribed with advice on watering crops and getting rid of rats, two problems found in many modern-day extension publications, although extension publications are somewhat easier to carry now. The dissemination of agricultural information was not limited to Mesopotamia; artifacts recovered from China, Egypt, and ancient Rome indicate a similar distribution of agricultural information (Jones & Garforth, 1998).

The agricultural extension systems established today find their roots during the Renaissance in the 14-15th centuries in Europe and North America. The first book on agriculture was printed in the mid-fifteenth century, and Francis Bacon's 17th century writings are proof of the beginnings of the application of scientific method to agriculture. As modern science progressed in the mid-eighteenth century, landowners and leading farmers became known as "improvers." These men formed societies and clubs to exchange ideas and information, and to discuss methods to improve farming to increase their yields and the value of their estates. Further, the "improvers" and other "men of science" pursued methods to change the traditional farming methods by initiating experiments, conducting demonstrations, disseminating information, and promoting the adoption of innovations (Jones & Garforth, 1998).

In the 1820's another piece of the agricultural advisory services was added. The improvers needed a method to share information and advice with the general farmer, so itinerant agricultural advisors were hired. The first examples of the itinerant agriculturalists were found in parts of New England, New York, and France. Within 20 years, agricultural societies, shows,

publications and schools were established and flourishing. Trained agriculturalists were employed as estate agents and teachers to improve farming methods (Jones & Garforth, 1998).

Agricultural Extension in the United States

In the early 1800's, the United States was largely a frontier nation with a poorly educated citizenry. Changes in industry in the mid-1800's brought to light a growing need for scientific and practical education to meet the demands of the fledgling nation. Educational proponents campaigned for a practical, academic education that was available to the general public, rather than a privileged few (Dethloff & Shurgin, 2012).

The movement for workingman's colleges gained steam in the mid-1800's with men such as John S. Skinner, Professor Jonathan Baldwin Turner, and Representative Justin Smith Morrill taking up the mantle. These men championed science programs with classes in agriculture and mechanic arts. They hoped to provide a liberal education to farmers, manufacturers, and laborers who made up the 99 percent that were ignored by universities (Cross & Cross, 1999).

In 1856, Morrill took the first official step towards a practical education for the working-class by offering a resolution to the Committee on Agriculture to establish national agricultural schools on naval and military academies with scholarships for some students. When this resolution failed, Morrill introduced a bill in 1858 to grant public land to each state to establish colleges for agricultural and mechanical arts. The bill was vetoed by President Buchanan, and the lack of support required Morrill to wait until the 1860 presidential election to try again (Cross & Cross, 1999). The War Between the States delayed the introduction of a revised bill, but in 1861, Morrill again took up the charge. On July 2, 1862, President Lincoln signed the Morrill Land-Grant College Act into law to grant public lands to the states for building colleges that would provide instruction in agriculture and mechanical arts, military tactics, science, and classical

studies for the working-class. By 1885, 85 land-grant colleges had been established in the United States (Dethloff & Shurgin, 2012). Congress approved the Second Morrill Act in 1890, which established land-grant colleges and universities for African American students (Cross & Cross, 1999).

As the land-grant colleges progressed in their mission to provide education to all, farmers began to request demonstrations of new technologies. Land-grant colleges in several states began model farms and demonstrations that evolved into research facilities for agricultural experiments. In 1875, Connecticut established the first state agricultural experiment station, with thirteen other states soon following suit. In the early 1880's, farmers and college faculty were clamoring for a permanent source of funding for agricultural experiment stations. Seaman A. Knapp, professor at Iowa State College, proposed a bill to Congress to establish an agricultural experiment station in each state. Representative William H. Hatch of Missouri took up the bill, and President Cleveland signed into law March 2, 1887 (Morrison, 2012).

The Hatch Act established the agricultural experiment stations in connection with the land-grant institution in each state. Federal funding was provided based on the number of small farmers in the state, and a major portion of the federal funding was to be matched by the state (National Association of State Universities and Land-Grant Colleges, 2008). The Hatch Act was valuable to the development of agricultural extension because it provided investment and focused advancement in agricultural science and technology directly related to the “varying conditions and needs of the respective states” (Morrison, 2012).

In the late 1800's and early 1900's, far-sighted leaders recognized that the learning and scientific advancement taking place at the land-grant colleges and experiment stations were not always transferred to the farmers and people in rural areas. Seaman Knapp was one of the first to begin

organizing federal and private funds to hire “field agents” and start on-farm demonstrations. George Washington Carver is another extension pioneer who put agricultural information in the hands of the farmers to increase productivity on the farm (Gould, Steele, & Woodrum, 2014). In 1914, Congress voted the Smith-Lever Act into law to provide funding for a cooperative extension service. The Cooperative Extension Service was associated with land-grant institutions in each state and required matching funds from counties and states. The stated purpose of the Smith-Lever Act was,

to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture, uses of solar energy with respect to agriculture, home economics, and rural energy, and to encourage the application of the same, there may be continued or inaugurated in connection with the college of colleges in each State, Territory, or possession... (Gould et al., 2014)

The Smith-Lever Act brought together a unique system of cooperative funding to support the ongoing extension education work begun by Knapp, Carver and their contemporaries. The model of cooperative extension brought the research and technology developed at the land-grant universities and agricultural experiment stations to the people in local communities by way of a professional educator (Gould et al., 2014).

International Agricultural Extension

Agricultural extension systems are not a product of the United States alone. During the same time period the United States was developing the land-grant colleges, experiment stations, and

cooperative extension service, Canada and Britain developed their own agricultural advisory services to improve production (Jones & Garforth, 1998).

Many nations in the Southern Hemisphere were influenced by British and American examples and also began extension work. In the late 1800's, Australia developed agricultural societies and departments of agriculture to improve agriculture in their territories. Traveling dairy schools and state exhibitions encouraged farmers to try new technologies and demonstrated potential improvements (Jones & Garforth, 1998).

Japan also followed suit in developing agriculture advisory services by opening agriculture colleges, starting government farms, and conducting experiments. By the turn of the twentieth century, agricultural societies in local Japanese communities were providing technical guidance and recommendations to farmers (Jones & Garforth, 1998).

Agricultural extension work was developed in many tropical countries, particularly in colonial territories. Demonstration and experiment farms provided a source of agricultural knowledge, which created an interest in agriculture societies and instruction. Some missionaries developed school and church farms to provide agricultural education along with their religious work (Jones & Garforth, 1998).

Iraq Agriculture and Extension

Agriculture in Iraq has declined over the last few decades. Once an exporter of food, Iraq has become a net importer of food due to sanctions, war, and bad agricultural policies. A USAID report from 2004 attributes the root cause of agricultural problems to policies developed by the Iraqi government in the late 1960's. The policies neglected agriculture relative to other sectors of the economy and set up a socialistic centrally planned approach that set official prices,

determined major crops to be grown, heavily subsidized inputs, and created government-owned processing industries. The government programs and state-owned companies provided technically sound information and services, but the heavy government control suppressed private initiative (USAID, 2004).

Since the 1980's, wars and sanctions have further deteriorated the agriculture sector in Iraq. The sanctions made it impossible to import necessary agricultural inputs and spare parts, and farmers saw a sharp decline in production. Simultaneously, the purchasing power of Iraqi families dropped, leading to a low demand for products (USAID, 2004). As deprivation and hunger became severe, the United Nations initiated the Oil for Food program to open channels for importing food and agricultural inputs. The program provided staple food products for Iraqi families, but it decreased even more the demand agricultural for products produced in Iraq. Further, the Oil for Food program was rife with corruption, and it caused further distortion in the agriculture sector (Price, King, & Whitney, in press).

As the agriculture sector became increasingly subsidized and controlled by the government, agricultural extension offices in the provinces became centers for implementing government priorities and distributing agricultural inputs. The extension service became the farmers' link to state-owned seed companies, fertilizer, grain warehouses and mills, cotton ginning and oilseed processing, veterinary services, cold storage, slaughterhouses, and other state-run services (Price et al., in press).

After 2003, violent conflict and political instability throughout Iraq disrupted agriculture even more. Extension offices in the provinces faced a difficult time fulfilling their primary role as input distributors. Further complicating the situation, extension staff faced competing messages about their role in agriculture (Price et al., in press). As part of the rebuilding efforts in Iraq,

international organizations began working with the Ministry of Agriculture to reorganize and rebuild the agriculture sector. The overarching aim of the reorganization was to strengthen the private sector to lead to a market-based agriculture economy with strong government support (USAID, 2004). With this goal in mind, extension priorities moved from distributing inputs to also providing technical advisory services to farmers (Price et al., in press).

Extension in Iraq exists in multiple government agencies. The State Board of Extension operates a federal-level extension system, and the 18 provinces in Iraq also have provincial Extension employees with department and sub-department offices operating at a local level (Price et al., in press). In addition to this multi-level system, the Ministry of Agriculture operates State Boards for Industrial Crops, Animal Resources, Horticulture and Forestry, and Veterinary Services. Each of these State Boards plays a role in technical advisory services for farmers (USAID, 2004).

Extension educators in Iraq face many difficulties due to instability, sanctions, and conflict over the last several decades. Discussions with extension educators reveal that they have been isolated and are 15-20 years behind on scientific and technological advances (USAID, 2004). Additionally, many extension workers went long periods of time without pay and had little, if any, program support funds. Weak communication networks made it difficult for extension educators to share knowledge or build professional networks, both vital components of a successful extension program (Price et al., in press).

The US Government implemented several projects in Iraq to strengthen the agriculture system and build capacity within the Ministry of Agriculture, particularly within the extension service. The USAID Agricultural Reconstruction and Development for Iraq program (ARDI), focused on forming farmers' organizations, strengthening the private sector, and building capacity within

the extension service (USAID, 2004). The Department of Defense initiated Agricultural Teams within the Task Force for Business and Stability Operations to assess the agriculture situation in key provinces and implement select projects to disseminate needed technology and information (Price et al., in press).

In late 2006, the United States Department of Agriculture/Foreign Agriculture Service (USDA/FAS) and United States Department of Agriculture/National Institute of Food and Agriculture (USDA/NIFA), and the United States Department of State formed a partnership to facilitate Iraqi rural economic development by revitalizing their agricultural extension system. This partnership funded a project, the Iraq Agricultural Extension Revitalization (IAER) Project, to work with the Iraqi Ministry of Agriculture and Colleges of Agriculture to train and equip extension educators with updated knowledge and skills to address needs in the agriculture sector. The IAER Project was executed by five US land-grant universities: New Mexico State University, University of California-Davis, Utah State University, Washington State University, and Texas A&M University as the lead.

The IAER Project worked with the Ministry of Agriculture (MOA) in the Federal Iraq Government in Baghdad and the Ministry of Agriculture and Water Resources (MOAWR) in the Kurdish Regional Government (KRG), headquartered in Erbil, to provide a series of technical training sessions for Iraqi extension educators in dryland agriculture, water resources and irrigation, horticulture, agriculture communications, agribusiness, and livestock. The IAER Project also provided training for extension educators to help them effectively transfer new technology to the Iraqi farmer. Extension administrators expressed a need for their extension educators to improve their skills related to program planning, communication, and youth development.

Extension Competencies

Strong agricultural extension systems are important in advancing the goal of increasing farm income and improving rural livelihoods in developing countries. Improving the skills and competencies of extension personnel are essential to reach these goals (Swanson & Rajalathi, 2010). Stone and Bieber (1997) describe competencies as the application of knowledge, technical skills, and personal characteristics that lead to outstanding performance. Competency models are built around the skills needed by individuals and groups to be effective in their work. Cooper and Graham (2001) demonstrated that Extension agents should develop a set of competencies that are essential skills and abilities used to successfully disseminate information to the public. These core competencies aid Extension agents in directly transferring technology to the people they serve.

In their study, Cooper and Graham (2001) surveyed Extension agents and supervisors to identify the competency areas that are important for successful Extension agents. The results were summarized into seven competency areas: program planning, implementation and evaluation; public relations; personal and professional development; faculty/staff relations; personal skills; management responsibilities; and work habits. Along with the technical agriculture knowledge, Extension agents should develop these competency areas for effective transfer of technology to their clients.

The Cooperative Extension System in Texas developed a similar set of competencies for their professional development program entitled You, Extension and Success (YES!). Stone and Coppennoll (2004) describe the core competencies of the YES! Program in six broad categories: subject matter expertise; organizational effectiveness (program development and evaluation); involvement of others; communications; action orientation; and personal effectiveness.

These competencies for Extension are reflected in undergraduate and graduate level programs for Extension Education. In 2006, Scheer, Ferrari, Earnest and Connors outlined the ten core competencies for the Extension Education Program at Ohio State University. These ten competencies are based on the essential skills required for state Extension employees and research literature. The competencies include: Extension knowledge, leadership and management; technology; communications; program planning, implementation and evaluation; applied research; diversity and pluralism; marketing and public relations; theories of human development and learning; risk management; community development process and diffusion (Scheer et al., 2006). Michigan State University identifies very similar competencies for the Michigan Cooperative Extension Program (“Core Competencies,” 2010).

Harder, Ganpat, Moore, Strong, and Lindner (2013) assessed self-perceived extension competencies in selected Caribbean countries to determine the competencies for which professional development is needed among extension officers. The study focused on four competency areas: program planning; interacting with learners; teaching tools and methods; and program evaluation areas. The greatest needs observed in the study were in the areas of program planning and evaluation. The results of the study indicate that extension officers felt confident about their abilities to teach programs, but were less equipped to design and evaluate programs (Harder et al., 2013).

When the competency areas in extension research are compared, five themes emerge for the purpose of this study: program planning, needs assessment, teaching methods, evaluation, and youth development. These five areas signify where Extension agents spend much of their time and efforts in their outreach programs.

Program Planning

Douglah (1968) describes program planning as an essential process for developing educational programs, activities, or events. Sometimes program planning is as simple as planning a lecture, but it can also include planning a long-range comprehensive plan for social and economic development for a community. The importance of program planning in extension is highlighted in the opening lines of Scholl's (1989) article, "Somewhere, right now, a major Extension program is being planned. A group of community leaders are meeting to make recommendations. Someone is tabulating evaluations to improve their efforts. New resources in the community are being sought to alleviate an old problem."

Texas A&M AgriLife Extension Service (2014) describes program planning as a process by which community leaders work with Extension educators to identify issues and needs, establish program plans and implement education to help people reach their goals. Local level planning groups are often used in extension program planning to ensure that programs to be delivered are relevant and timely for the audience. Program planning groups might include farmers, community leaders, input suppliers, and specialists (Sharma, Swanson, & Sadamate, 2001).

Planning competencies include specific skills such as understanding stakeholders, adapting to changing needs, and effectively using program funds and personnel (Harder, et al., 2013).

Needs Assessment

Extension educators are tasked with providing relevant research-based and unbiased information to farmers and rural communities to help improve production and rural livelihoods. In the developing world, the challenges in agriculture development are immense, and extension educators must find an approach that is effective and efficient. Identifying specific needs in this

context is vitally important (Duvel, 2002). Ghimire and Martin (2011) focus on several skills necessary for extension educators to be competent in needs assessment: situational analysis of a community; using committees to identify clients' problems; and setting priorities and goals.

Mudukuti and Miller (2002) emphasize the importance of extension educators helping their clients to accurately identify their education needs. Once the needs are identified, relevant and timely educational programs can be developed for the most effective impact. Furthermore, a needs assessment should identify the specific audience and their demographics so the program delivery is designed to meet the needs of that group.

Extension educators can find a wide array of tools to aid in the identification of needs in a community. Ripley (2011) identifies options for identifying issues such as an issue identification forum where community leaders identify and prioritize needs using a nominal group technique; a needs assessment survey that targets the opinions of the community leaders or the public; and stakeholder groups who meet regularly to identify and discuss local needs. Scholl (1989) found a variety of tools used by extension educators to identify needs and understand the target audience: organizational and census data; input from individual community members; current research; and political, economic, or social trends in the community.

Teaching Methods

Harder et al. (2013) identify teaching methods as a primary competency for extension educators. Skills within this competency focus on subject knowledge and interpersonal communication. Ghimire and Martin (2011) also include teaching and learning methods as a main competency area for extension educators. Specific skills listed within their model are principles of learning; identifying learning styles and factors influencing learning of clientele; matching learning to individual needs; and group learning techniques.

Quality teaching and delivery strategies should not be undervalued in agricultural extension programs. Spindler and Ogwo (2014) found that quality instruction helps learners understand and apply information. Additionally, robust outreach programs help reduce knowledge gaps in agricultural subjects.

Evaluation

Competencies in evaluation are increasingly emphasized as stakeholders demand more and more accountability in extension programs. Evaluation competencies both determine program impact and identify areas for improvement (Harder et al., 2013). Ghimire and Martin (2011) identify several specific foci for evaluation competencies: evaluating one's own performance; developing and conducting evaluation surveys; analyzing and interpreting results; assessing client expectations; identifying problems for further research; assessing client learning experiences; and identifying program results, outcomes and impacts.

Extension educators should plan to evaluate for short-term and longer-term impacts. Learning outcomes will include clients' knowledge gained, skills acquired, or attitudes changed. These are relatively immediate impacts that are measured through surveys and audience response. Longer-term impacts will require measuring behavior change and adoption of a new technology or best practice (Ripley et al., 2011).

Youth Development

Youth development programs are shown to help youth thrive; contribute to enhanced self-concept, school performance, and aspirations for higher education; improve career attainment; improve leadership skills; and increase involvement in civic activities in youth and adulthood (Borden, Perkins & Villarruel, 2004). Data from a 4-H Youth Development program in Iraq

indicates youth embraced ideas of democracy, shared new ideas, and hoped for change in the future as a result from their participation in the program (Kock, Haynes & Smith, 2014).

Extension educators play a significant role in youth development. In the United States, Cooperative Extension employs a program called the 4-H Youth Development Program to provide educational experiences for young people, particularly related to agricultural education, and many other countries have adopted this model. The US 4-H Youth Development Program (2004) developed a set of competencies for youth development professionals, the 4-H Professional Research, Knowledge and Competencies (PRKC). This model contains six domains for youth development programs: youth development; youth program development; volunteerism; equity, access and opportunity; partnerships; and organizational systems. These competencies focus on skills required to create environments to help youth reach their full potential and plan programs to deliver effective programs to youth audiences.

Customer Satisfaction

Public institutions and businesses share a common need to ensure their clients or customers are happy with the product or service they receive. When clients are satisfied, they tend to become loyal customers who will tell others about the good service or product they received (Ganpat, Webster & Narine, 2014). As publicly funded agencies, extension organizations have seen an increased emphasis on measuring the quality of their programs through customer satisfaction surveys. Data from customer satisfaction surveys offers the client's perspective on services provided by extension educators. Additionally, it provides better understanding of a customer's expectations and how well extension is meeting the needs of that customer (Radhakrishna, 2002).

High measures of customer satisfaction indicate that the client is pleased with the quality and relevance of extension programs. Agholor, Monde, Obi, and Sunday (2013) state that customer satisfaction feedback also helps to identify gaps in an educational program. Meaningful input from clients provides an opportunity to identify gaps in a program delivery and ways to address or eliminate the gaps.

Knowledge Gains

For decades, Extension practitioners have used Bennett's (1975) seven step hierarchy to evaluate educational programs. These seven steps include inputs, activities, people involvement, reactions, KASA (knowledge, attitudes, skills, aspirations) change, practice change, and end results. The model was modified in 1995 and 2000 by Bennett and Rockwell, becoming the TOPS model, to provide a link between program evaluation and program development. The changes to the model helped program developers understand that evaluation should be part of the planning process and not an after-thought for the end of the program (Radhakrishna & Bowen, 2010).

In Bennett's (1975) evaluation hierarchy, the knowledge, attitudes, skills, and aspirations of participants will improve as a result of program activities. Evidence of change is provided in both hard and soft evidence. Hard evidence would be changes in scores on validated measures of KASA, while soft evidence might be expressed in participant opinions or self-reported evidence.

Knowledge gain is frequently used as a performance measurement in Extension programs because it is relatively simple and demands few resources. Improvements in knowledge gains are frequently measured by participant tests. Participants might be given a pre-test before an educational program, then a post-test following the program to determine if there is a difference

in the two measures (Pratt, 2000). An alternative to a pre-test/post-test design is the retrospective pre-post design. When using this form of evaluation, participants first report on their current level of knowledge, attitude or skills. Using the same questions, participants are then asked to report on the perception of their level of knowledge, attitude or skills before initial program participation (Rockwell & Kohn, 1989).

One concern for using changes in participants' knowledge as an indicator for program success is that KASA is only a mid-level indicator on the evaluation hierarchy. The objective of Extension programs is to help individuals adopt practices that will improve their lives. Showing a change in knowledge of participants might not satisfy stakeholders who expect high-level impacts.

Research in many fields indicates knowledge change as a reliable impact indicator of potential behavior change. In their study, Jayaratne, Harrison and Bales (2009) found that increases in participant knowledge about food safety were linked to positive changes in their food safety behavior. Similarly, in an analysis of research results, Hornik, Cherian, Madansky and Narayana (1995) found consumer knowledge to be a strong predictor for the propensity to recycle.

Agricultural extension has served farmers throughout the world for hundreds of years by advancing new technologies and farming methods to improve farmer livelihoods. Extension in Iraq served farmers for decades before war and sanctions crippled the agriculture sector and led to a decline in services offered by extension departments in Iraqi provinces and communities.

To rejuvenate the extension system in Iraq, professional development workshops were conducted to improve the knowledge and skills of Iraqi extension professionals in specific competency areas: program planning; needs assessment; teaching methods; evaluation; and youth development. Customer satisfaction and knowledge gains are two methods used to understand how valuable the training is to the participant and how much the participant learned from the

training. Further, these two measures provide feedback to instructors for areas of improvement in future training programs.

CHAPTER III

METHODS

Evaluation of educational programs is increasingly important for accountability and improvement of programs. This study used a survey research design with a two-part questionnaire to measure participant knowledge gain and satisfaction.

In compliance with human subject research requirements, a research proposal and a copy of the research instrument were submitted to Texas A&M University's Institutional Review Board (IRB) with reference number IRB2014-0804. The study received IRB approval (See Appendix A).

Participants

The sample population for the study included Iraqi extension educators who attended an IAER Extension Methods Course. Weeklong courses were held in the KRG at Extension Centers with one course in Dohuk, one in Erbil, and two courses in Slemani. Two courses were offered in Slemani to reduce the number of participants per course. The KRG Extension administrators wanted extension educators from each office to receive professional development training. The Extension Department is divided into four Directorates, one for each of the KRG provinces. Each Directorate is divided into smaller sub-departments. The Extension Department requested two extension educators from each sub-department office to attend the IAER Extension Methods Courses. Twenty-five extension educators attended the course at the Erbil Extension Center; 14 extension educators attended the course at the Dohuk Extension Center; and 22 extension educators attended each of the two sessions at the Slemani Extension Center.

Only two extension educators from each sub-department attended the course, so the sample for the study is a sample of convenience. Ary et al. (2010) describe convenience sampling as using

available cases for a study. Convenience sampling is considered a weak sampling procedure because the findings cannot be generalized to the entire population. The study was an evaluation of students' knowledge gain and satisfaction, so a convenience sample was both practical and necessary.

All participants in the study worked as extension educators in Kurdistan. The participants had a technical or bachelor's degree in agricultural-related subject matter or extension education. Demographic data was not collected during the study, but the researcher observed that the participants were early- to mid-career extension educators. The majority of each group of participants was male, but female participants were included.

The evaluation survey did not include demographic questions, nor were the participants asked to provide identifying information. The survey was anonymous, and the researcher does not have any means to link the surveys to the participants.

Instrumentation

An Extension Specialist from Texas A&M AgriLife Extension Service and the IAER Project Director developed the instrument (See Appendix B). Experts in the field reviewed the instrument for content validity. A translator from northern Iraq translated the instrument to Arabic. A native-Arabic speaker who is an expert in the subject matter checked the translation (See Appendix C).

The instrument is composed of two sections. The first section of the instrument is a retrospective pre-post evaluation tool used to measure knowledge gains. A retrospective pre-post evaluation instrument is used at the conclusion of a program to gather data about the change in participants' knowledge, attitude or skills. When using this form of evaluation, participants first report on

their current level of knowledge, attitude or skills. Using the same questions, participants are then asked to report on the perception of their level of knowledge, attitude or skills before initial program participation (Pratt, 2000).

The evaluation statements used in this section of the instrument were based on the five educational objectives, or constructs, for the course: program planning, needs assessment, teaching methods, evaluation, and youth development. Thirteen statements were used in the instrument to measure knowledge gain in these constructs.

A retrospective pre-post evaluation is convenient for Extension programs because it is a simple method to assess changes in self-reported knowledge, attitudes and skills. Additionally, the retrospective pre-post instrument must only be administered one time, compared to a pre-test post-test design, which saves valuable time that might be used for instruction (Rockwell, 1989). Another benefit of only administering one instrument at the conclusion of a program, rather than a pre-test and separate post-test, is that the tests do not have to be identified to be matched together. The instrument used in this study was anonymous because no identifying information was collected to match the tests together. Further, the retrospective pre-post avoids a response shift bias that can occur in a more traditional pre-test post-test design because it allows participants to reflect on their change in knowledge, attitude or skills from the same frame of reference (Pratt, 2000).

The second section of the instrument is a customer satisfaction survey that is made up of 12 close-ended questions with a five-point ordinal scale. Participants were asked to rank their satisfaction on a scale of one to five with satisfaction levels 1 = not at all satisfied; 2 = slightly satisfied; 3 = somewhat satisfied; 4 = mostly satisfied; and 5 = completely satisfied.

The statements used in the customer satisfaction portion of the survey were adopted from the customer satisfaction survey used by the Texas A&M AgriLife Extension Service. The customer satisfaction survey is widely used by Texas A&M AgriLife Extension Agents to measure clientele satisfaction with extension programs in Texas. Data from the instrument is used to report results to major stakeholders and partners.

Analysis

The data from the instrument was analyzed using SPSS version 22. The research objectives provided a base for analyzing the data. The research objectives are:

1. Identify knowledge gains of extension educators in regards to:
 - a. Program Planning
 - b. Needs Assessment
 - c. Teaching Methods
 - d. Evaluation
 - e. Youth Development
2. Identify knowledge gain of extension educators as a result of the five-day workshop.
3. Identify level of extension educator satisfaction with the five-day workshop.
4. Compare customer satisfaction and knowledge gain of participants by location of training course.

First, the study examined knowledge gains of extension educators in regards to program planning, needs assessment, teaching methods, evaluation, and youth development. Each of these five constructs represent core competencies of extension educators, and the course materials were centered on these competencies. The study described the average knowledge

gained by participants along each construct by comparing self-reported knowledge before and after the course.

Second, the study identified how much knowledge extension educators gained overall as a result of the course. The study described the average knowledge gained across all constructs for all participants by comparing self-reported knowledge before and after the course.

Third, the study described the level of extension educator satisfaction with the five-day workshop. The participants responded to 12 close-ended questions with a five-point ordinal scale. Participants were asked to rank their satisfaction on a scale of one to five with one being “not at all” satisfied and five being “completely” satisfied. The study examined the average satisfaction of participants, as well as described the number of participants at each level of satisfaction.

Fourth, the study compared customer satisfaction and knowledge gain of participants by location of the training course. Four courses were held in three separate locations. The study examined and compared scores at each location to understand possible differences.

Rigor

An Extension Specialist from Texas A&M AgriLife Extension and the IAER Project Director developed the instrument. The statements used in the instrument were based on program objectives for the course. The instrument was reviewed by experts in the field for content validity. The instrument was tested for reliability using Cronbach’s alpha. Cronbach’s alpha measures homogeneity on items with a scale of possible answers (Ary, Jacobs, & Sorensen, 2010). The instrument scored Cronbach alpha of .85.

CHAPTER IV

RESULTS

The data from the evaluation survey provides useful information for understanding what the participants learned and their satisfaction with the course. The findings were organized by the research objectives. The research objectives were:

1. Identify knowledge gains of extension educators in regards to:
 - a. Program Planning
 - b. Needs Assessment
 - c. Teaching Methods
 - d. Evaluation
 - e. Youth Development
2. Identify knowledge gain of extension educators as a result of the five-day workshop.
3. Identify level of extension educator satisfaction with the five-day workshop.
4. Compare customer satisfaction and knowledge gain of participants by location of training course.

The study examined knowledge gains of extension educators in regards to program planning, needs assessment, teaching methods, evaluation, and youth development. The study described the average knowledge gained by participants along each construct by comparing self-reported knowledge before and after the course. The first section of the instrument was a retrospective pre-post evaluation tool used to measure knowledge gains.

Thirteen statements were used in the instrument to measure knowledge gain in these constructs. Participants were asked to rate their level of knowledge on a four-point Likert-type scale where 1 = Poor; 2 = Fair; 3 = Good; and 4 = Excellent.

Three evaluation statements were used to measure knowledge gain related to program planning. One question addressed the program development model (N = 77); one question addressed understanding of adoption of new practices or technology (N = 56); and the final question focused on the use of stakeholder groups in program planning (N = 76).

Table 1 demonstrates the overall mean participant level of knowledge before the course was 2.29 (M = 2.29, SD = .797). The mean participant level of knowledge after the course was 3.18 (M = 3.18, SD = .727), with a mean difference of -.890 (M = -.890, SD = .762).

Table 1

Knowledge Gains Related to Program Planning for Responding Iraqi Extension Educators during Summer 2012 (Questions 14, 15, 17)

	N	Pre- Question Mean	Post- Question Mean	Mean Difference	SD	Corr.	Sig.
Program Development Model	77	2.18	3.18	-1.0	.843	.281	.013
Adoption of New Practice or Technology	56	2.38	3.05	-.679	.855	.456	.000
Stakeholder Planning Groups	76	2.32	3.31	-.895	.873	.343	.003
Totals		2.29	3.18	-.890	.762	.360	.005

Note: 1 = Poor; 2 = Fair; 3 = Good; 4 = Excellent
The mean difference is significant at the .05 level.

Three evaluation statements were used to measure knowledge gain related needs assessment. One question addressed identifying issues in the community (N = 76); one question focused on

understanding the target audience (N = 80); and the final question concentrated on identifying target audience characteristics (N = 77). Overall, the mean participant level of knowledge shown in Table 2 before the course was 2.39 (M = 2.39, SD = .798). The mean participant level of knowledge after the course was 3.29 (M = 3.29, SD = .730), with a mean difference of -.897 (M = -.897, SD = .843).

Table 2

Knowledge Gains Related to Needs Assessment for Responding Iraqi Extension Educators during Summer 2012 (Questions 16, 18, 19)

	N	Pre- Question Mean	Post- Question Mean	Mean Difference	SD	Corr.	Sig.
Identifying Issues	76	2.46	3.36	-.895	.873	.383	.001
Understanding Target Audience	80	2.34	3.24	-.900	.805	.460	.000
Identifying Target Audience Characteristics	77	2.36	3.26	-.896	.852	.333	.003
Totals		2.39	3.29	-.897	.843	.392	.002

Note: 1 = Poor; 2 = Fair; 3 = Good; 4 = Excellent
The mean difference is significant at the .05 level.

Two evaluation statements were used to measure knowledge gain related to teaching methods. One question addressed key characteristics that make adult learners different from children (N = 78); and the second question focused on using different teaching methods to reach different learners (N = 69). Table 3 demonstrates the overall mean participant level of knowledge before

the course was 2.49 (M = 2.49, SD = .812). The mean participant level of knowledge after the course was 3.36 (M = 3.36, SD = .681), with a mean difference of -.880 (M = -.880, SD = .879).

Table 3

Knowledge Gains Related to Teaching Methods for Responding Iraqi Extension Educators during Summer 2012 (Questions 21, 22)

	N	Pre- Question Mean	Post- Question M	Mean Difference	SD	Corr.	Sig.
Adult and Children Learners	78	2.33	3.29	-.962	.874	.298	.008
Different Teaching Methods	69	2.64	3.43	-.797	.884	.334	.005
Totals		2.49	3.36	-.880	.879	.316	.007

Note: 1 = Poor; 2 = Fair; 3 = Good; 4 = Excellent
The mean difference is significant at the .05 level.

Three evaluation statements were used to measure knowledge gain related to evaluation. One question addressed the different levels of client change to be evaluated (N = 61); one question focused on understanding designing an evaluation instrument (N = 60); and the final question concentrated on interpreting evaluation results (N = 54). Overall, the mean participant level of knowledge before the course was 2.28 (M = 2.28, SD = .827). Table 4 shows the mean participant level of knowledge after the course was 3.16 (M = 3.16, SD = .731), with a mean difference of -.877 (M = -.877, SD = .790).

Table 4

Knowledge Gains Related to Evaluation for Responding Iraqi Extension Educators during Summer 2012 (Questions 24, 25, 26)

	N	Pre- Question Mean	Post- Question Mean	Mean Difference	SD	Corr.	Sig.
Levels of Client Change	61	2.18	3.05	-.869	.785	.423	.001
Designing an Evaluation Instrument	60	2.32	3.12	-.800	.860	.504	.000
Interpreting Evaluation Results	54	2.35	3.31	-.963	.726	.540	.000
Totals		2.28	3.16	-.877	.790	.489	.000

Note: 1 = Poor; 2 = Fair; 3 = Good; 4 = Excellent
The mean difference is significant at the .05 level.

Two evaluation statements were used to measure knowledge gain related to youth development. One question addressed key characteristics that make adult learners different from children (N = 79); and the second question focused on using different teaching methods to reach different learners (N = 78).

Table 5 demonstrates that the overall mean participant level of knowledge before the course was 2.17 (M = 2.17, SD = .958). The mean participant level of knowledge after the course was 3.22 (M = 3.22, SD = .916), with a mean difference of -1.044 (M = -1.044, SD = 1.082).

Table 5

Knowledge Gains Related to Youth Development for Responding Iraqi Extension Educators during Summer 2012 (Questions 22, 23)

	N	Pre- Question Mean	Post- Question M	Mean Difference	SD	Corr.	Sig.
Adult and Children Learners	79	1.97	3.16	-1.190	1.051	.388	.000
Different Teaching Methods	78	2.37	3.27	-.897	1.112	.278	.014
Totals		2.17	3.22	-1.044	1.082	.333	.007

Note: 1 = Poor; 2 = Fair; 3 = Good; 4 = Excellent
The mean difference is significant at the .05 level.

Table 6 is a summary of how much knowledge extension educators gained overall as a result of the five-day workshop. The Extension educators indicated an average knowledge of 2.32 (M = 2.32) before participating in the workshop and an average knowledge of 3.24 (M = 3.24) after participating in the workshop. The average knowledge gain for all participants is .918 (M = .918), nearly whole point on the four-point scale.

Table 6

Overall Knowledge Gain for Responding Iraqi Extension Educators during Summer 2012

	Pre- Question Mean	Post- Question Mean	Mean Difference	SD	Correlation	Significance
Program Planning	2.29	3.18	-.890	.762	.360	.005
Needs Assessment	2.39	3.29	-.897	.843	.392	.002
Teaching Methods	2.49	3.36	-.880	.879	.316	.007
Evaluation	2.28	3.16	-.877	.790	.489	.000
Youth Development	2.17	3.22	-1.044	1.082	.333	.007
Totals	2.32	3.24	-.918	.871	.378	.004

Note: 1 = Poor; 2 = Fair; 3 = Good; 4 = Excellent
The mean difference is significant at the .05 level.

Customer satisfaction allows the instructor of a course to understand the learner's initial reaction to the class as a whole. Did the participants like the program? Were the instructors knowledgeable and clear? Was the information relevant? Customer satisfaction corresponds to the first level of Kirkpatrick's Levels of Evaluation, participant reaction (Caffarella, 2002).

Table 7 shows the level of extension educator satisfaction with the five-day workshop. The participants responded to 12 close-ended questions with a five-point ordinal scale. Participants were asked to rank their satisfaction on a scale of one to five with the following satisfaction levels, with 1 = not at all satisfied; 2 = slightly satisfied; 3 = somewhat satisfied; 4 = mostly satisfied; and 5 = completely satisfied.

Two workshops were held in Slemani to account for the greater number of extension staff in the directorates with 22 participants in each group. Eighty-three participants (N = 83) completed the customer satisfaction survey with a mean score of 3.855 (M = 3.855, SD = .832). Satisfaction among participants was highest in the second group trained in Slemani. Interestingly, the satisfaction was the lowest in the first group with the same location.

Table 7

Overall Levels of Iraqi Extension Educator Customer Satisfaction by Group Location during Summer 2012

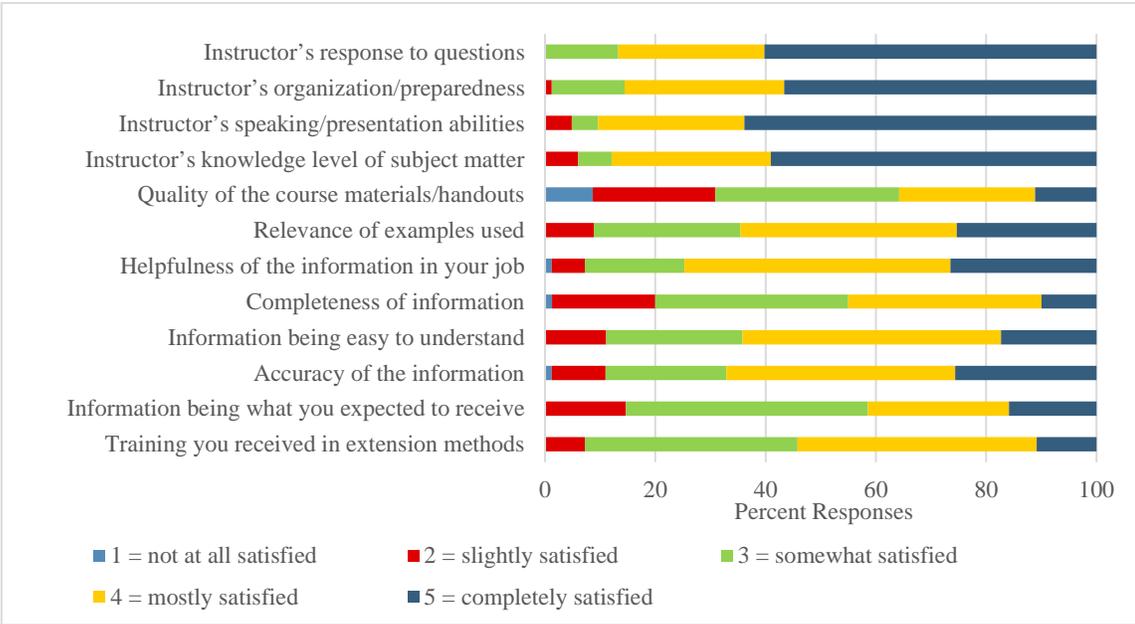
	N	Mean	SD
Slemani/Group 1	22	3.556	0.852
Slemani/Group 2	22	4.299	0.73
Dohuk	14	3.705	0.957
Erbil	25	3.861	0.788
Total	83	3.855	0.832

Note: 1 = not at all satisfied; 2 = slightly satisfied; 3 = somewhat satisfied; 4 = mostly satisfied; and 5 = completely satisfied

The mean difference is Significant at the .05 level.

Extension educators are interested in understanding participant reactions to educational programs to understand if the program met expectations and to improve future programs. Customer satisfaction surveys focus on the participant’s expectations and their experiences. This study used 12 statements to understand participant reactions to the extension workshops. Figure 1 demonstrates the level of participant satisfaction in 12 areas. The participants responded to 12 close-ended questions with a five-point ordinal scale. Participants were asked to rank their satisfaction on a scale of one to five with the following satisfaction levels, with 1 = not at all satisfied; 2 = slightly satisfied; 3 = somewhat satisfied; 4 = mostly satisfied; and 5 = completely satisfied. Each bar represents the percent of participants who responded in each satisfaction level. The participants responded very favorably to the instructors with nearly 60% of participants who were “completely satisfied” with the four statements about instructors.

Figure 1
12 Statements of Customer Satisfaction for Responding Iraqi Extension Educators during Summer 2012



The interaction between knowledge gain and customer satisfaction is useful for instructors to understand if programs are valuable and relevant for participants. In this study, the correlation between knowledge gain and customer satisfaction is clear. Figure 8 demonstrates the correlations between knowledge gain and customer satisfaction. The second group in Slemani demonstrated an average knowledge gain of 1.179 (M = 1.179) and a customer satisfaction score of 4.299 (M = 4.299). The Extension educators in Erbil had an average knowledge gain of 1.147 (M = 1.147) and a customer satisfaction score of 3.861 (M = 3.861). The group in Dohuk demonstrated less knowledge gain with an average of 0.573 (M = 0.573) and a customer satisfaction average of 3.705 (M = 3.705). The lowest knowledge gain score was the first group in Slemani with an average knowledge gain of 0.549 (M = 0.549) and the lowest customer satisfaction score of 3.556 (M = 3.556). All knowledge gain scores were measured on a four-point Likert-type scale, and customer satisfaction scores were measured on a five-point Likert-type scale.

Table 8

Comparison of Customer Satisfaction and Knowledge Gain by Group Location for Responding Iraqi Extension Educators during Summer 2012

		Mean	Knowledge Gain	Customer Satisfaction
Slemani/ Group 2	Before	2.401	1.179	4.299
	After	3.580		
Erbil	Before	2.098	1.147	3.861
	After	3.245		
Dohuk	Before	2.464	0.573	3.705
	After	3.037		
Slemani/Group 1	Before	2.387	0.549	3.556
	After	2.936		

CHAPTER V

CONCLUSIONS

Purpose

The purpose of the research was to measure knowledge gains and customer satisfaction of Iraqi extension educators who participated in a five-day workshop through the IAER Project.

Measuring knowledge gain and customer satisfaction has a twofold benefit of identifying areas of focus for future training based on knowledge of extension educators and evaluating teaching effectiveness of course instructors.

The study consisted of four specific objectives:

1. Identify knowledge gains of extension educators in regards to:
 - a. Program Planning
 - b. Needs Assessment
 - c. Teaching Methods
 - d. Evaluation
 - e. Youth Development
2. Identify how much knowledge extension educators gained overall as a result of the five-day workshop.
3. Identify the level of extension educator satisfaction with the five-day workshop.
4. Compare customer satisfaction and knowledge gain of participants by location of training course.

Method

The participants for the study included Iraqi extension educators who attended an IAER Extension Methods Course. Weeklong courses were held in the Kurdish Region of northern Iraq

at Extension Centers with one in Dohuk, one in Erbil, and two in Slemani. Two extension educators from each sub-department office to attended the IAER Extension Methods Courses in each province. Twenty-five extension educators attended the course at the Erbil Extension Center; 14 extension educators attended the course at the Dohuk Extension Center; and 22 extension educators attended each of the two sessions at the Slemani Extension Center. Two courses were offered in Slemani to reduce the number of participants per course. The sample for the study is a sample of convenience because only selected extension educators attended the course.

Visiting instructors from the United States created a predetermined outline and curriculum to teach the courses. All Iraqi participants worked as extension educators and had a technical or bachelor's degree in agricultural-related subject matter or extension education.

The instrument was composed of two sections. One section included a customer satisfaction survey made up of 12 close-ended questions with a five-point ordinal scale. Participants were asked to rank their satisfaction on a scale of one to five with one being "not at all" satisfied and five being "completely" satisfied. The second section of the instrument was a retrospective pre-post evaluation tool used to measure knowledge gains by asking participants to rate their knowledge before and after the course.

An Extension Specialist from Texas A&M AgriLife Extension and the IAER Project Director developed the instrument with statements from the course objectives. The instrument was reviewed by experts in the field for content validity. The instrument was tested for reliability using Cronbach's alpha. Cronbach's alpha measures homogeneity on items with a scale of possible answers (Ary, Jacobs, & Sorensen, 2010). The instrument has a Cronbach alpha score of .85. After the instrument was developed, a translator from northern Iraq translated it to

Arabic, and a native-Arabic speaker who is an expert in the subject matter checked the translation.

The instrument does not include any personal identifying information. Participants were asked to complete the survey after the course, but it was not mandatory. The researcher does not have a list of participants, so the data is completely anonymous.

Conclusion 1 Implications and Recommendations

Objective 1: Identify knowledge gains of extension educators in regards to program planning, needs assessment, teaching methods, evaluation, and youth development.

Swanson and Rajalathi (2010) and Cooper and Graham (2001) establish the need for extension professionals to develop a core set of competencies to be successful in their mission of disseminating information to the public. Stone and Bieber (1997) describe competencies as the application of knowledge, technical skills, and personal characteristics that lead to outstanding performance. The five-day workshop focused on increasing knowledge of extension educators in five competency areas for program planning, needs assessment, teaching methods, evaluation, and youth development. The findings in this study indicated that Iraqi extension educators did gain knowledge in all five competency areas.

In Bennett's (1975) hierarchy, a higher level of program evaluation is to measure behavior change and application. Iraqi extension educators who attended the five-day workshop should use knowledge and skills gained to improve program delivery. It is recommended that Iraqi extension administrators follow up with extension educators to plan programs, evaluate program delivery, and evaluate change among clientele.

Interestingly, participants indicated the lowest level of knowledge on the youth development construct before the workshop, but they reported the highest knowledge gains in this area. Youth development is a competency area in which Iraqi extension administrators were particularly interested. The knowledge gains found in youth development in this study imply that Iraqi extension educators are interested in youth development and need more training in this area. It is recommended that more resources be allocated for professional development in this area, as well as for programming efforts in youth development in the local communities.

Conclusion 2 Implications and Recommendations

Objective 2: Identify how much knowledge extension educators gained overall as a result of the five-day workshop.

This study found that Iraqi extension educators demonstrated knowledge gains because of the five-day workshop. Changes in participant knowledge are an important part of evaluating program impacts. Bennett (1975) indicates that changes in knowledge, attitudes, skills and aspirations is a stepping stone to behavior change or adoption of a practice. Jayaratne et al. (2009) and Hornik et al. (1995) found that increases in participant knowledge were linked to positive changes in their behavior. It is implied that Iraqi extension educators will make changes in their programs based on the knowledge they received at the training. Further, it is implied that they Iraqi extension educators may adopt new practices related to the training they received during the IAER training.

Radhakrishna (2001) found that many international agricultural and extension projects face many challenges in evaluating their programs. One particular challenge is that assessments focus on changes in participant KASA without going beyond to higher outcome levels. This might be because of lack of time, resources, or language barriers. With increasingly higher

levels of accountability demanded from stakeholders, Radhakrishna advocates for better evaluation models to help program implementers report higher levels of outcomes. It is recommended that a follow-up evaluation be completed with Iraqi extension educators to determine if new practices were adopted as a result of the IAER training.

Conclusion 3 Implications and Recommendations

Objective 3: Identify the level of extension educator satisfaction with the five-day workshop.

The study found the mean satisfaction among all four groups was 3.855 on a scale of one to five with the satisfaction levels as 1 = not at all satisfied; 2 = slightly satisfied; 3 = somewhat satisfied; 4 = mostly satisfied; and 5 = completely satisfied. This implies that Iraqi extension educators were somewhat to mostly satisfied with the five-day workshop.

High measures of customer satisfaction indicate that the client is pleased with the quality and relevance of extension programs. Agholor, Monde, Obi, and Sunday (2013) state that customer satisfaction feedback also helps to identify gaps in an educational program. The satisfaction levels reported by participants indicate that participants were not completely satisfied with the entirety of the five-day workshops. Participants indicated very high levels of satisfaction with the instructors' presentation skills, preparedness, knowledge, and response to questions; however, participants were less satisfied with the completeness of the information, quality of the handouts, ease of understanding the information, and the information meeting their expectations.

Potential explanations for some lack in satisfaction might be explained by demographic factors not captured by the instrument such as diverse learning styles; lack of interest since the participants were selected by an administrator; or cultural differences between instructors and participants. It is recommended for future training programs that instructors work closely with

administrators to identify topics of interest to participants. Further, instructors might partner with Iraqi extension educators to co-teach the courses to ensure that program materials are culturally relevant and meet the needs of the Iraqi extension program.

Conclusion 4 Implications and Recommendations

Objective 4: Compare customer satisfaction and knowledge gain of participants by location of training course.

Customer satisfaction and knowledge gain are two indicators on Bennett's hierarchy of evaluation. Positive participant reactions will lead to KASA change (Bennett, 1975). The study found that Slemani/Group 1 had the lowest customer satisfaction score and the least amount of knowledge gain. As the customer satisfaction scores increased by group, the knowledge gain scores in each group also increased. This implies that participant satisfaction with the workshop was related to their levels of knowledge gained during the workshop.

Potential explanation for the difference in scores between each group might be variations in the program delivery across the groups by different instructors, the quality of interpretation for each group, or the quality of classroom setup and tour locations for each group. Morera et al. (2014) found that the effectiveness of a training program was tied to program components such as content development and delivery, curricular quality, and practical logistical strategies. For future programs, it is recommended that content be standardized and program logistics arranged to meet the needs of the participants.

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APPENDIX A

DIVISION OF RESEARCH
Research Compliance and Biosafety



DATE: December 17, 2014

MEMORANDUM

TO: Kim E Dooley
ALRSRCH - Agrilife Research - Ag Leadership, Education & Communication

FROM: Dr. James Fluckey
Chair
Institutional Review Board

SUBJECT: Initial Review Submission - Approval

Study Number: IRB2014-0804

Title: Measuring Knowledge Gain and Customer Satisfaction of Iraqi Extension Agents

Review Type: Expedite

Approval Date: 12/17/2014

Continuing Review Due: 11/15/2015

Expiration Date: 12/15/2017

Documents Reviewed and Approved:

Title	Version Number
Whitney - Thesis Proposal	Version 1.0
IAER Evaluation - Arabic	Version 1.0
IAER Evaluation - English	Version 1.0

Waiver of Consent: Waiver/alteration approved 46.116(c) or (d)

- This research project has been approved. As principal investigator, you assume the following responsibilities:
1. **Continuing Review:** The protocol must be renewed by the expiration date in order to continue with the research project. A Continuing Review application along with required documents must be submitted by the continuing review deadline. Failure to do so may result in processing delays, study termination, and/or loss of funding.
 2. **Completion Report:** Upon completion of the research project (including data analysis and final written papers), a Completion Report must be submitted to the IRB.
 3. **Unanticipated Problems and Adverse Events:** Unanticipated problems and adverse events must be reported to the IRB immediately.
 4. **Reports of Potential Non-compliance:** Potential non-compliance, including deviations from protocol and violations, must be reported to the IRB office immediately.
 5. **Amendments:** Changes to the protocol must be requested by submitting an Amendment to the IRB for review. The Amendment must be approved by the IRB before being implemented.
 6. **Consent Forms:** When using a consent form or information sheet, you must use the IRB stamped

750 Agronomy Road, Suite 2701
1186 TAMU
College Station, TX 77843-1186
Tel. 979.458.1467 Fax. 979.862.3176
<http://rcb.tamu.edu>

APPENDIX B

IAER Participant Survey - English

This survey is simply designed so that we can determine how satisfied you are with the training you received and your level of understanding of the training subjects. Please **circle** your response.

1 2 3 4 5
 Not at all Slightly Somewhat Mostly Completely

Overall How Satisfied Are You?	Circle				
1. With the training you received in Extension Methods	1	2	3	4	5
2. With the information being what you expected to receive	1	2	3	4	5
3. Accuracy of the information	1	2	3	4	5
4. Information being easy to understand	1	2	3	4	5
5. Completeness of information given	1	2	3	4	5
6. Helpfulness of the information in your job	1	2	3	4	5
7. Relevance of the examples used	1	2	3	4	5
8. Quality of the course materials/handouts	1	2	3	4	5
9. Instructor's knowledge level of subject matter	1	2	3	4	5
10. Instructor's speaking/presentation abilities	1	2	3	4	5
11. Instructor's organization/preparedness	1	2	3	4	5
12. Instructor's response to questions	1	2	3	4	5

3. What did you like most about this activity?

4. What did you like least about this activity?

5. Would additional information in this subject area be useful to you?

_____ Yes, I would like more information on _____

_____ No, I have adequate information

6. Do you plan to take any actions or make any changes based on the information from this activity?

_____ YES _____ NO _____ NOT SURE

If “no” or “not sure,” which of the following best describes why? (Select one only)

- _____ Information was not applicable or relevant to my situation
- _____ Information was relevant to my situation but I am taking no action now
- _____ Need more information (or research further) before making a decision on action or changes
- _____ Something else

For each item listed below, mark the **ONE** number in the left column that best describes your level of understanding **BEFORE** the program; and then mark the **ONE** number in the right column that best describes your level of understanding **AFTER** the program.

Poor Fair Good Excellent
1 **2** **3** **4**

Statements	Before Training				After Training			
I understand how the Extension Program Development Model can help me develop better programs.	1	2	3	4	1	2	3	4
I understand how a new practice or technology is adopted by farmers.	1	2	3	4	1	2	3	4
I understand how to identify and prioritize important issues in my community	1	2	3	4	1	2	3	4
I understand how a committee works and can help me plan programs	1	2	3	4	1	2	3	4
I know why it is important to understand my target audience.	1	2	3	4	1	2	3	4
I can identify the important characteristics of a target audience that will affect their ability to learn	1	2	3	4	1	2	3	4
I understand the key characteristics that make adult learners different from children	1	2	3	4	1	2	3	4
I understand why it is important to utilize numerous teaching methods to reach different learners	1	2	3	4	1	2	3	4
I understand how a 4-H program could benefit youth in my community	1	2	3	4	1	2	3	4
I understand the importance of hands-on learning for youth participants	1	2	3	4	1	2	3	4
I understand the different levels of client change we can evaluate for	1	2	3	4	1	2	3	4
I understand how to design an evaluation instrument to measure the impact of my program	1	2	3	4	1	2	3	4
I understand how to interpret the results of an evaluation and tell the story of my program.	1	2	3	4	1	2	3	4

APPENDIX C

استطلاع رأي المتدرب المشارك لمشروع انعاش الإرشاد الزراعي في العراق

هذا الاستطلاع صمم ببساطه كي تتعرف على مدى رضاك عن التدريب الذي تلقينته ومستوى فهمك لموضوع التدريب الرجاء وضع دائره حول استجابتك.

1 لاشئ على الاطلاق 2 بعض الشئ 3 جزئياً 4 في الاغلب 5 تماماً

وضع الدائره	ما هو مدى رضاك عموماً؟
5 4 3 2 1	عن التدريب الذي تلقينته في التربة
5 4 3 2 1	عن المعلومات التي توقعت أن تتلقاها
5 4 3 2 1	دقة المعلومات
5 4 3 2 1	المعلومات التي كان من السهل فهمها
5 4 3 2 1	اكتمال المعلومات التي اعطيت
5 4 3 2 1	المساعدة التي تقدمها المعلومات لوظيفتك
5 4 3 2 1	وثاقه صلة الأمثله التي اعطيت بالموضوع
5 4 3 2 1	نوعية اللوازم/والمواد التي سلمت في الفصل
5 4 3 2 1	معرفة المدرس بمادة الموضوع
5 4 3 2 1	امكانيات المدرس في الكلام والتقديم
5 4 3 2 1	تنظيم واستعداد المدرس
5 4 3 2 1	استجابة المدرس للأسئله

3- مالذي احببته أكثر في هذا النشاط؟

4- مالذي احببته باقل صوره في هذا النشاط؟

5- هل هناك معلومات اضافيه في هذا الموضوع ممكن أن تكون مفيده لك؟

----- نعم، أرغب بمعلومات اضافيه عن:
----- لا، عندي معلومات وافيه

6- هل تخطط للقيام بعمل لاحداث اية تغييرات على أساس المعلومات من هذا النشاط؟
 نعم _____ لا _____ غير متأكد _____

ان كان الجواب "لا" أو "غير متأكد" أي من التالي يمثل السبب؟ (اختر واحده فقط)
 المعلومات كانت غير قابله للتطبيق أو ليست لها علاقة بوظيفتي.
 المعلومات كانت لها علاقة بوظيفتي ولكني لا أقوم بعمل الآن.
 أحتاج معلومات أكثر (أو البحث الى مدى أبعد) قبل اتخاذ قرار حول القيام بعمل أو تغيير.
 شيء آخر.

لكل فقرة ادرجت ادناه، اشر رقم واحد في العمود الايسر يوضح مستوى استيعابك قبل البرنامج؛ وبعد ذلك اشر رقم واحد العمود الأيمن يوضح بالصورة الأفضل مستوى استيعابك بعد البرنامج.

ضعيف 1 2 مناسب 3 4 ممتاز

البيانات	قبل التدريب				بعد التدريب			
أنا أفهم كيف يتمكن نموذج الموسع لبرنامج التنمية أن يساعدني على تطوير برنامج أفضل.	1	2	3	4	1	2	3	4
أنا أفهم كيف يتم تبني الممارسات الجديدة أو التكنولوجيا الحديثة من قبل المزارعين.	1	2	3	4	1	2	3	4
أنا أفهم كيف أشخص و أرتب الأوليات للمسائل المهمة في مجتمعي.	1	2	3	4	1	2	3	4
أنا أفهم كيف تعمل اللجنة و يتمكن على مساعدتي في خطة البرامج.	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4

لكل فقرة أدرجت أدناه، أشر رقم واحد في العمود الأيسر يوضح مستوى استيعابك قبل البرنامج؛ وبعد ذلك أشر رقم واحد العمود الأيمن يوضح بالصورة الأفضل مستوى استيعابك بعد البرنامج.

ضعيف 1 مناسب 2 جيد 3 ممتاز 4

البيانات	قبل التدريب				بعد التدريب			
أنا أفهم , لماذا فهم جمهوري المستهدف مهمة.	1	2	3	4	1	2	3	4
أستطيع تشخيص الخصائص المهمة للجمهور المستهدف, فيما يأتى على قدرتهم على التعلم .	1	2	3	4	1	2	3	4
أنا أفهم الخصائص الرئيسية الذي يجعل المتعلمين البالغين مختلفين من المتعلمين الأطفال.	1	2	3	4	1	2	3	4
أنا أفهم , لماذا الاستفادة من الطرق المتعددة في التدريس مهمة للوصول إلى المتعلمين المختلفين.	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4

لكل فترة أدرجت أدناه، أشر رقم واحد في العمود الأيسر يوضح مستوى استيعابك قبل البرنامج؛ وبعد ذلك أشر رقم واحد العمود الأيمن يوضح بالصورة الأفضل مستوى استيعابك بعد البرنامج.

ضعيف 1 مناسب 2 جيد 3 ممتاز 4

البيانات	قبل التدريب				بعد التدريب			
أنا أفهم كيف بإمكان برنامج 4-H أن يفيد الشباب / الشبابات في مجتمعي.	1	2	3	4	1	2	3	4
أنا أفهم أهمية التدريب العملي للمشاركين الشباب/الشابات.	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4

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العمود الأيمن يوضح بالصورة الأفضل مستوى استيعابك بعد البرنامج.

ممتاز 4 جيد 3 مناسب 2 ضعيف 1

البيانات	قبل التدريب				بعد التدريب			
أنا أفهم المستويات المختلفة لتغير العملاء (الزبائن) نستطيع التقييم.	1	2	3	4	1	2	3	4
أنا أفهم كيف أصمم أدوات التقييم , لقياس التأثير على برنامجي.	1	2	3	4	1	2	3	4
أنا أفهم كيف أفسر نتائج تقييم و أقص قصة برنامجي.	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4
	1	2	3	4	1	2	3	4