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Effectiveness of the Arkansas 4-H ATV Safety Training Course

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science in Agricultural and Extension Education

by

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Arkansas Tech University
Bachelor of Science in Agricultural Business, 2006

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This thesis is approved for recommendation to the Graduate Council.

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Abstract

In response to popularity of ATVs in Arkansas and youth ATV accident rates, the Arkansas 4-H program established an ATV safety training program in 2008. The program has educated 1,500 youth in Arkansas about basic concepts of safe ATV operation in response to youth accident rates. The course covered proper equipment, laws, proper riding, and handling techniques. The program has not been evaluated. The study was to evaluate participants' knowledge levels prior to participation in the program and after receiving instruction and hands-on ATV operation training, and to determine if Standard Course and S-Course participants' knowledge scores were different. The effectiveness of the program as a tool to teach participants basic concepts of safe ATV operation. The course covered proper equipment, laws, proper riding, and handling techniques. The study also compared the results of two different versions of the ATV Safety program, the Standard Course and the S-Course in order to determine which course was most effective at teaching the concepts previously listed. ATV Safety Course participants who completed the training between December 2015 and April 2016 participated in this study. A significant difference was seen in test scores for both the Standard Course and S-Course, while no significant difference was found when Standard Course and S-Course participant scores were compared. The study found that participant ATV knowledge increased regardless of which version of the course was completed.

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I. Introduction

Need for Study

Riding All-Terrain Vehicles (ATVs) is a popular pastime among youth and adults. ATVs are used in multiple applications, such as, in agricultural applications, recreation, competitions, and hunting. According to data collected by the United States Forest Service (USFS) between the years 1999 and 2007, 21.2% of Arkansas' population age 16 and older participated in off highway vehicle recreation (Cordell, Betz, Green, & Stephens, 2008). Many individuals ride ATVs improperly and unsafely. As a result of popularity and improper riding, a high rate of injury and death occurs. The Consumer Product Safety Commission (CPSC, 2015) reported ATV fatalities from across the country. Between 1982 and 2014 there were 13,617 reported fatalities. Furthermore 23% or 3,098 of the fatalities nationwide were youth under the age of 16 and 43% or 1,342 of the youth fatalities were youth under the age of 12. At the time of the CPSC report was released, Arkansas was ranked fourteenth nationwide in ATV fatalities (Topping & Garland, 2015). Arkansas laws (27-21-106) and (27-21-107) regulates where ATVs can be ridden and the age of the rider; however, Arkansas law does not require any training or testing prior to operation.

The University of Arkansas Division of Agriculture 4-H program offers an ATV Safety Training Course (AR STC) for youth and adults. It focuses primarily on individuals affiliated with the 4-H program but does not exclude individuals who are not part of 4-H. The 4-H program strives to educate its members and the general public on the importance of proper ATV handling.

The Arkansas 4-H ATV Safety program began in 2008, and instructors are certified through the ATV Safety Institute (ASI). The Arkansas 4-H ATV Safety program uses curriculum developed and provided by the ASI which covers pre-ride inspection, proper attire and proper riding techniques. Currently two course types, Standard and S-Course, are being used as part of the Arkansas 4-H ATV Safety Program.

Standard Course.

The half-day course takes approximately four to five hours. The course consists of lecture, demonstration, and practice. Participants are not required to review content or prepare before attending the course. All instruction occurs on-site during the course.

> "The ATV Rider Course provides a fast-paced, half-day, hands-on training session which includes pre-ride inspection, starting and stopping, quick turns, hill riding, emergency stopping and swerving and riding over obstacles. Participants also learn about protective gear, local regulations, places to ride and environmental concerns" (ATV RiderCourse[SM], n.d., ¶1).

S-Course.

The S-Course is a modified hands-on course that covers the same rider strategies as the Standard Course with a more focused or stream lined approach to time including combining similar lessons into one. The S-Course takes approximately two hours to complete, and consists of lecture, demonstration, and practice. S-Couse participants must complete an online course (E-Course) offered by the ATV Safety Institute (ASI). A certificate of E-Course completion is a pre-requisite to S-Course participation.

E-Course.

> "The ATV Safety Institute (ASI) offers three age specific e-learning courses online to address basic ATV safety principles. Adults, teens and children will learn how to apply the 'golden rules' of ATV riding in an interactive setting. The course includes videos, pictures, and interactive games to make it a fun and effective learning experience for all age groups. After taking the course, users can take an ATV safety exam and receive a certificate of completion. The entire E-course takes approximately 2 to 2.5 hours to complete. You can stop at any point and your progress will be saved so that you can return and pick up right where you left off" (First time visitor: Welcome, n.d., ¶1).

The 4-H ATV Safety Training Courses used four different teaching methods: lecture, online self-study, demonstration, and practice. The Standard Course used all but self-study whereas the S-Course used all four methods. During the Standard Course the three methods are used in a semi-rotational basis. Participants listen to instruction about what the course will consist of, learn about topics such as rules of thumb, things to watch out for, and laws relating to ATVs. Those topics are taught throughout the half-day course. Participants also received instruction and demonstration on all of the skills it takes to properly ride an ATV. Those skills include but are not limited to turns, sharp turns, obstacles, and traversing hills. Following the demonstration of each skill the participants were then able to practice each of those skills and receive immediate feedback regarding their abilities.

The major difference between the Standard Course and the S-Course is that many of the lecture topics were covered during an approximate two hour online self-study session for the S-Course. While S-Course participants still receive some instruction via lecture, their primary face-to-face instruction is

through demonstration and practice. The face-to-face time for the S-Course is about half of the time received in the Standard Course.

This study focused on the Standard Course and the S-Course. The E-Course was not evaluated separately, but rather as part of the S-Course. Training time varied slightly depending on the number of participants, volume of questions, and facility factors including space for the course, distance between course and restrooms, access to trails, etc.

Youth, ages six and up, or adults may participate in the training program. Participants were paired with a machine that was the appropriate size for their age and body size as indicated on the warning sticker on each ATV. The training courses were taught by certified ATV Safety Course instructors. Instructors go through a week long training course taught by an instructor from the ASI. Instructors may use the assistance of demonstration riders. Demonstration riders are used to demonstrate the skills while the instructor explains what the skill is and the proper execution. Demonstration riders completed the ATV Safety Training before being allowed to demonstrate skills during the sessions. Demonstration riders were selected by the instructor.

Participants did not need any prior ATV experience, did not have to own an ATV, or own any gear in order to participate in the training program. All needed safety materials and ATVs were provided at the training. Participants were required to wear long sleeved shirts, long pants, and closed toed shoes. Participants were provided with an ATV, gloves, helmet, and goggles to use during the training.

This program is used as a stand-alone program offered throughout Arkansas. Courses can be offered by or scheduled through the University of Arkansas Division of Agriculture Research and Extension, University of Arkansas System, Cooperative Extension Service. Over 1500 youth and adults have participated in this program since 2008. No evaluation methods have been used to determine effectiveness or measure knowledge acquisition by participants. By evaluating this program, instructors will be able to alter their teaching methods or increase practice or discussion of areas where students lacked knowledge based on the test scores.

Problem

Riding ATVs is a popular pastime among youth and adults. Arkansas laws regulate where ATVs can be ridden but, there are no regulations on who can ride an ATV and no training is required before operating an ATV. Many youth and adults have already participated in this program. There is a need for the program to be evaluated to measure participant knowledge prior to the training and then directly following the training so curriculum and delivery can be improved. Furthermore, it is important to make sure that both course formats are providing opportunities for participants to increase knowledge. In order to make this program as effective as possible, initial and continued evaluation is needed.

Purpose

The purpose of this study was to determine if ATV Safety knowledge increased for participants taking the Arkansas 4-H ATV Safety Training Standard and S-Courses. Additionally, this study determined if participant achievement differed between the two types of courses.

Research Questions

1. Does knowledge increase in competency areas associated with ATV Safety and Handling among Standard Course participants?
2. Does knowledge increase in competency areas associated with ATV Safety and Handling among S-Course participants?
3. Are participant knowledge scores different between the Standard Course and the S-Course?

Key Terms

4-H ATV Training Course (training course, training, course, program):– A program designed to teach youth and adults involved in 4-H who own, wish to own, or borrow ATVs to ride the proper procedures on how to handle them.

Adults: Participants over the age of 19 as of January 1 of the program year.

ATV: All-Terrain Vehicle

Demonstration Rider: Individual who demonstrates skills in order for the instructor to continue explaining the skill and how to execute it. This person is typically a past course participant.

E-Course: Online self-study course that participants go through to learn concepts not related to the actual handling of the ATV and is a pre-requisite to the S-Course.

Instructor: Individual certified to conduct the training course.

Knowledge in Competency Area: The number of correct answers given by participants on multiple choice questions related to correct and safe ATV handling indicates the participants' knowledge or lack thereof.

S-Course: The S-Course is a modified hands on course to reduce the required riding time with the E-Course certificate being a pre-requisite to participate. The S-Course covers the same rider strategies as the standard course with a more focused or stream lined approach to time including combining similar lessons into one.

Standard Course: The Standard Course is a half-day training that teaches participants about all aspects of ATV Safety including hands on practice of handling an ATV. The Standard Course covers everything that the combination of the E and S-Course does.

Youth: Participants between the ages of six and 19.

Assumptions

The following assumptions were made:

1. Each participant answered all questions to the best of his/her ability.
2. ATV Safety and Handling instructor(s) taught all content outlined by the training program.
3. E-Course participants actually completed online training either alone, as a group, or with help from a parent.

Limitations

The following limitations should be considered for this study:

1. Participant numbers are limited to a maximum of eight participants per class per instructor due to instructional class size limits and ATV availability.
2. Generalizations should not be made beyond the youth and adults assessed in this study.

II. Theoretical Framework

Introduction

The Arkansas 4-H ATV Safety Training Course is an educational program that trains youth and adults on the skills and knowledge needed to safely ride and operate ATVs. Currently this program has not been evaluated. There is also no known research done on any similar programs to evaluate participant knowledge. This study's literature review focuses on outdoor education, teaching and learning theories, hands-on and experiential learning.

Learning

Bernold (2005) argued that lecture and excessive homework in engineering programs limits creativity in an area where creativity is needed. "It is apparent that learning centered higher education will impact the role the faculty should play, away from the role as an 'instructor' to that of an expert, coach, learning mentor, role model, learning-environment designer, and holistic curriculum leader" (Bernold, 2005). Course content should focus on student needs rather than the instructor's wants and abilities. Bernold (2005) concludes that changes in instruction are needed to reduce the failure among students due to improper teaching methods.

Bloom's Taxonomy "refers to the retention of specific, discrete pieces of information like facts and definitions or methodology, such as the sequence of events in a step-by-step process" (Adams, 2015). Bloom's Taxonomy gives instructors different levels that participants learn at and a progression on how they learn. The levels of Bloom's Taxonomy include from basic to advanced, knowledge, understanding, application, analysis, synthesis, and evaluation. It also outlines ways to get participants to use higher order thinking skills to complete tasks. Facts, such as, where to ride and what safety equipment to wear are taught at the knowledge level which is the lowest level. "This allows learners to use knowledge, skills, or techniques in new situations through application" (Adams, 2015). Participants also have to evaluate the situations they are put in to determine the best course of action falling into the highest level of Bloom's Taxonomy.

Frear and Hirschbuhl (1999) conducted a study to determine if interactive multimedia promotes achievement. They used the Group Assessment of Logical Thinking (GALT) to evaluate the students both

before the treatment and after the treatment. The treatment group was required to use interactive multimedia for an instructional unit. The control group were not required to use the interactive multimedia, but could receive extra credit for doing so. “Seventy-four percent of the experimental group received a passing grade (B or better), while only 27% of the control group received a passing grade” (Frear & Hirschbuhl, 1999). Participants who interacted with what they were studying learned more based on a higher percentage of passing grades. The Arkansas 4-H ATV Safety program uses a variety of engagement to assist in student learning.

Hands-on and Experiential Education

“Learning is thus the process whereby development occurs” (Kolb, 1984). Experiential learning theory is not used as an alternative to behavioral and cognitive learning but rather a combination of experience, perception, cognitive, and behavioral learning (Kolb 1984). There are several models of Experiential Learning.

“Experiential Learning Theory (ELT) defines learning as the process whereby knowledge is created through the transformation of experience” (Yeganeh & Kolb, 2009). “The experiential learning theory learning model portrays two dialectically related modes of grasping experience – Concrete Experience (CE) and Abstract Conceptualization (AC) – and two dialectically related modes of transforming experience – Reflective Observation (RO) and Active Experimentation (AE)” (Kolb, 2015).

Burris, et al. (2008) presented a report on learners and learning styles and teaching considerations. “Learning style is the preferred or habitual patterns of mental functioning, information processing, and the formation of ideas and judgments” (Burris, et al, 2008). This group of researchers presented information on different aspects of an individual and how that affects their learning style and described them as being field dependent and field independent. Field dependent students tend to be outgoing and enjoy being around others. Field independent students generally seem harsh and antisocial. The authors also presented information on examples of activities for four learning modes. Those four modes are:

> “Concrete Experience – Small group discussion, specific examples, practical exercise, simulations, games, personal stories, role playing

Reflective Observation – Creative problem solving, personal journals, discussion groups, brainstorming, thought questions, reflective papers, observations
Abstract Conceptualization – Lectures, papers, analogies, model building, theory-building, questioning
Active Experimentation – Case studies, fieldwork, projects, homework, laboratories" (Burris, et al, 2008)

Participants were able to experience all aspects of the learning model in order to gain knowledge about ATV safety. They were able to grasp the experience by learning about ATV safety either through the online course or lecture and demonstration during the hands-on course, which aligns with AC, and then putting what they have learned into action which aligns with CE. They should then be able to transform their experience by processing and thinking about what they were being taught (RO) and then actually completing the skills during the course and at home (AE). Figure 2 illustrates the experiential learning theory learning model.

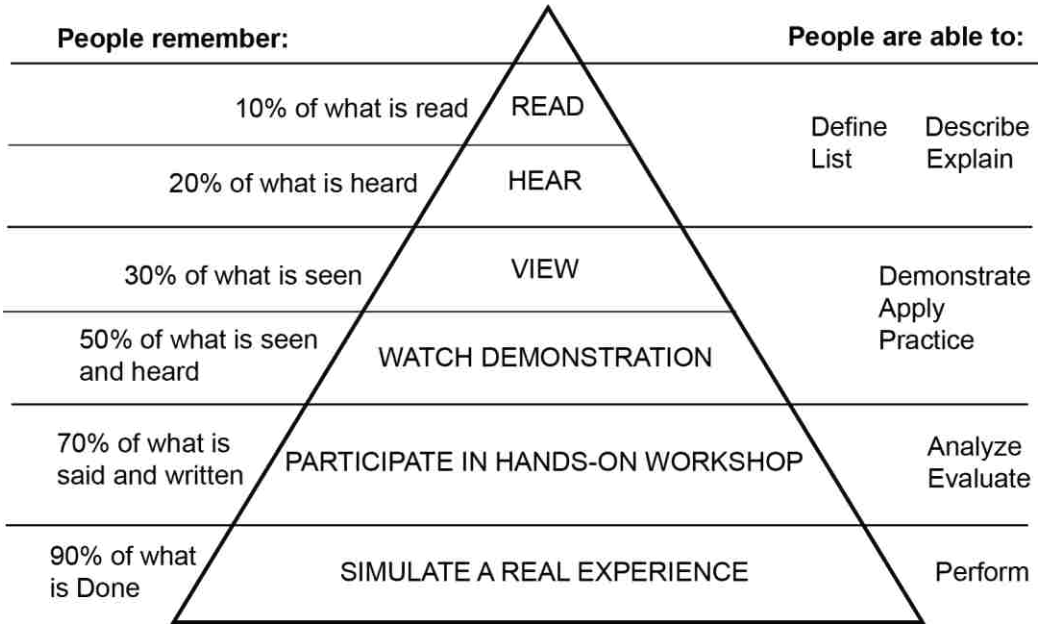
Figure 1 (Yeganeh and Kolb, 2009)

Dale's Cone of Experience is used to illustrate that different teaching methods provide a more memorable experience than others (Lalley & Miller, 2007). According to the adapted version of Dale's Cone of Experience (Figure 2), this program should have at least a 90% knowledge retention rate in its participants on concepts related to the actual handling of the ATV, because the participants are required

to practice the techniques that will be used while riding ATVs (Lalley & Miller, 2007). Participants in the S-Course will potentially only remember 10% of the topics covered in the online portion of the course. Participants have the opportunity to practice the riding concepts that were taught during both courses. Participants should have higher retention rates of the concepts because they were able to put the concepts into action. Retention percentage will vary on concepts not relating to the handling of the ATV itself due to difference in instruction method.

The Cone of Experience is a pictorial depiction of “direct and indirect experience, and of concrete and abstract experience” (Dale, 1946). What we learn does not have to travel from the base up. The components of the original cone were broken into three main parts: doing, observing, and symbolizing. “Experiences vary all the way from direct testing, handling, or seeing of concrete objects to the purely indirect manipulation through words and other symbols” (Dale, 1946). The Arkansas ATV Safety Training Course uses multiple levels of the Cone of Experience to enhance participant’s knowledge.

Figure 2. Adaptation of Dale’s Cone of Experience



Bialeschki (2007) concluded that research needs to be done in areas that are meaningful to the participants. Research should be participant driven not researcher driven. Participants in experiential

education need to be themselves. While practicing the concepts, the participants should get to practice at their own pace. There is no set speed skills must be performed. Participants should be able to apply what they learned at a speed that is comfortable to them.

Hairston (2004) evaluated what 4-H'ers learned from hands-on community service learning projects. "Community service learning is defined as a form of experiential learning in which youth apply the subject matter they are learning, along with critical thinking skills, to address genuine community needs" (Hairston, 2004, Introduction Section, p3). 4-H members selected a community service learning that tied directly into 4-H curriculum. Thirty-eight percent of participants indicated in written reflections that they learned new skills or information about topics that they had no prior experience in (Hairston, 2004).

Outdoor Education

Lakin (2006) reported on the theme of teaching science outside. The benefits of outside experiences were in the attitudes and feeling, knowledge and understanding, and personal and social development. Being outdoors "give scale and meaning to the virtual experiences of the classroom" (Lakin, 2006, p. 89) which can lead to positivity or improvement in these three areas. Using nature as a classroom allows for the reinforcement of knowledge and for hands-on learning which outweighs any risks posed by being outside (Lakin, 2006).

Learning Evaluation

Kirkpatrick's (1998) four level training evaluation has been widely used since its development because it uses basic ideas. Each of these levels should be considered when evaluating a program.

Kirkpatrick's model includes:

- Level 1 Evaluation—Reaction – participants reaction to the program
- Level 2 Evaluation—Learning – change in participant during the program
- Level 3 Evaluation—Behavior – extent of change because of participating in the program
- Level 4 Evaluation—Results – final results of the program (Kirkpatrick,1998)

Summary

Past research supports the use of multiple teaching methods, variety of experience levels, and hands-on education as a way to improve learning. The Arkansas 4-H ATV Safety program utilizes a variety of teaching methods, levels of learning, and hands-on experiences to train the participants in safe and proper handling of ATVs. Both courses utilized lecture, demonstration, and practice in order to meet participants learning needs. The S-Course also utilized an online self-study section. Throughout the program the researcher evaluated the participants based on their responses to questions, abilities to follow directions, and ability to perform the necessary skills to complete the given tasks. The researcher then evaluated the program using a pretest and posttest to evaluate the participants overall knowledge gain.

III. Methodology

Purpose

The purpose of this study was to determine if ATV safety knowledge increased for participants taking the Arkansas 4-H ATV Safety Training Standard and S-Courses. Additionally, this study determined if participant achievement differed between the two types of courses.

Research Questions

1. Does knowledge increase in competency areas associated with ATV Safety and Handling among Standard Course participants?
2. Does knowledge increase in competency areas associated with ATV Safety and Handling among S-Course participants?
3. Are participant knowledge scores different between the Standard Course and the S-Course?

Design of the Study

This research was conducted using a two-group pretest/ posttest design. This is a Quasi-Experimental non-equivalent pre-test post-test control group (Campbell & Stanley, 1963). The test and treatment were conducted seven times for the Standard Course and eight times for the S-Course between December 2015 and April 2016. A test over ATV safety and handling was developed by the research and administered to each participant twice. Standard course participants took a pre-test prior to the start of the face-to-face/ hands-on instruction and a post-test immediately following completion of the course. S-Course participants took a pre-test prior to beginning the online E-Course and a post-test immediately following the completion of the face-to-face/ hands-on instruction. Participants self-selected to take the course by signing up to participate. The Standard Course sessions were offered as half day programs open to the public. The S-Course sessions were offered through school programs and were open to students enrolled in those programs.

The Standard Courses consisted of three parts. Part one used lecture based instruction on general ATV safety and proper ATV use. Part two consisted of demonstration based instruction on proper ATV procedures and handling. Part three consisted of hands-on application of proper ATV procedures

and handling. The S-Course consisted of four parts. Part one consisted of the E-Course, online self-study, as a substitute for extensive face-to-face lecture. Part two consisted of some lecture and review of main concepts where instruction was provided in the E-Course. Part three consisted of demonstration based instruction on proper ATV procedures and handling. Part four consisted of hands-on application of proper ATV procedures and handling. Table 1 shows the research design used for this study.

Table 1. *Two group pretest/posttest design for the 4-H ATV Safety Training Course*

Standard Course	X_1	X	X_2
S-Course	X_1	X	X_2

X_1: Pretest before the training course
X: Treatment
X_2: Posttest immediately following the training course

The treatment was either the Standard Course or the S-Course. Multiple sessions of the training courses were required due to the limited number of ATVs and safety gear available as well as required instructor to participant ratio. Eight participants is the maximum number any one course can facilitate. Using multiple sessions in the research allowed for more subjects to be studied. The same pretest and posttest was given to participants in both the Standard Course and S-Course groups.

Subjects

The subjects of this research were the participants in the Arkansas 4-H ATV Safety Training Course between December 2015 and April 2016. All participants completed and signed a 4-H ATV training waiver. Thirteen courses were taught with seven of those being Standard Course trainings and eight being S-Course trainings. Data were collected during training sessions, and the researcher taught or co-taught each session to ensure consistency in curriculum delivery and data collection. The participants consisted of youth and adults. In addition to the training waiver, all participants signed a research study consent form agreeing to participate in the research study (Appendix B). Parents or guardians of minors were asked to sign the form also providing consent to participate in the study. If the participants or their parents or guardians refused to participate in the research they were still allowed to participate in the training course. The research was conducted as a census study of the participants who completed the

program and served as the population. The population was left intact because of the manageable number of participants. No randomization was used in selecting the participants because as a 4-H program the participants had to register on their own and could not be selected from a previously set up group of individuals. Participation in the Standard Course and S-Course was self-selected by participants as each participant signed up for the courses independently and the researcher did not have any input into which course format participants enrolled.

The total number of participants in the Standard Course was 34 and the total number of participants in the S-Course was 38. Table 2 indicates the demographic breakdown of the participants in each course.

Table 2. Demographics of ATV Safety Course Participants December 2015 to April 2016

	Standard Course	S-Course
Total Participants	34	38
Male	19	28
Female	15	10
Previous ATV Safety Training	2	3
4-H Training	1	0
Other Training	1	3

Instrument

The instrument consisted of a traditional multiple choice test. The test was written by the researcher, an ASI trained instructor with seven years of experience delivering the ATV Safety Training Course. It was created specifically for this program. The questions covered all of the topics and important information covered in the training course. The instrument was developed directly from the curriculum used to teach the class provided by the ATV Safety Institute. Test questions were based on key points the program was designed to target and the instructors were trained to teach and observe. The pre-test was given prior to beginning the program to determine the participants starting ATV safety knowledge and

what they knew before beginning the program. The post-test was given immediately following the program to measure change in ATV safety knowledge.

The pretest and the posttest consisted of the same 30 questions. Of the 30 questions there were five questions that were comfort level questions and were only used by the researcher to assist in determining the ability level of the class. The remaining 25 questions were multiple choice questions that had one correct answer and three incorrect answers. One of the 25 questions was not used in the study due to an error with the question. The study consisted of the remaining 24 multiple choice questions. The pretest had an additional 14 questions in order to gather the demographics and experience of the participants to aid the instructor with management decisions but was not used in a determining factor when analyzing results for the study.

Reliability and Validity

Reliability of the instrument was determined using Cronbach alpha coefficient for reliability estimates. Questions that asked about similar information were built into the test to determine if individuals answered the similar questions the same. Gliem and Gliem (2003) state “the closer Cronbach alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale.” The results of the reliability analysis concluded that the Cronbach alpha for the pretest was .73 and .84 for the posttest. George and Mallery (2003) provide a good scale or rule for acceptable coefficients while using Cronbach alpha. Greater than or equal to .9 is excellent, greater than or equal to .8 is good, and greater than or equal to .7 is acceptable. Thus, the instrument pretest reliability is acceptable and the posttest reliability is good.

Test questions were created by the researcher who has been an ATV Safety instructor since 2009 and has trained or assisted in training over 700 of the 1,500 participants in Arkansas. Test questions were made directly using the curriculum being taught provided by the ATV Safety Institute. Campbell and Stanley (1963) list several threats to validity of a study, including history – “the specific events occurring between the first and second measurement” (Campbell & Stanley, 1963), maturation – “the respondents operating as a function of the passage of time” (Campbell & Stanley, 1963), and instrumentation – changes in instrument calibration or observers. The participants of both the Standard

Course and the S-Course took the pretest prior to receiving any instruction or being granted access to the E-Course website. They were given the posttest immediately following the rider portion of the course therefore having no time to study or collaborate with other participants; therefore, minimal if any maturation or history occurred. For the Standard Course, the pretest and the posttest were given on the same day. Some participants of the S-Course had several weeks between the pre and posttests due to weather and scheduling conflicts but typically the pretest was given approximately a week before the posttest to allow for time to take the online portion of the class. The instrument remained the same throughout research process and did not change overtime eliminating any threats to validity due to instrumentation.

Data Collection Procedures

All of the Standard course participants underwent the same or similar conditions. Some of the settings of the program varied but the information given and the experiences were the same. The participants were assigned to an ATV that was appropriate to their size and age. Younger, smaller participants were given smaller ATVs that fit within the use guidelines. For example youth over the age of six are able to ride 50cc (cubic centimeter) ATVs. Age requirements vary depending on size and brand of ATV. But as a rule the larger the size of machine and the larger the motor, the older the driver. These specifications are established by ATV companies and printed on the safety stickers on the ATVs themselves. These requirements are followed when assigning youth to their training machines. The participants were required to wear appropriate clothing, such as long pants, long sleeved shirts, closed toe shoes, and gloves. They were also provided with helmets, gloves, and eye protection during the program. Each group of participants was only given one treatment which lasted four to five hours each. The Standard Course is delivered face-to-face. After the pretest was completed, instruction was provided by ASI certified instructor.

The S-Course time frame is broken into the self-study session which lasted approximately two hours. The self-study section was completed before the participant arrived for the rider course. The face-to-face session lasted approximately two to two and one-half hours.

All of the S-Course rider course participants underwent the same or similar conditions. Some of the settings of the program varied but the information given and the experiences were the same. The participants were assigned to an ATV that was appropriate to their size and age. Younger, smaller participants were given smaller ATVs that fit within the use guidelines. For example youth over the age of six are able to ride 50cc (cubic centimeter) ATVs. Age requirements vary depending on size and brand of ATV. But as a rule the larger the size of machine and the larger the motor, the older the driver. These specifications are established by ATV companies and printed on the safety stickers on the ATVs themselves. These requirements are followed when assigning youth to their training machines. The participants were required to wear appropriate clothing, such as long pants, long sleeved shirts, closed toe shoes, and gloves. They were also provided with helmets, gloves, and eye protection during the program. Each group of participants was only given one treatment which lasted approximately two and one half hours each. The S-Course rider course is delivered face-to-face.

Analysis

Data were analyzed using SPSS©. Descriptive and inferential analyses were used to analyze differences in pre and posttest scores. A t-test was utilized to compare the differences between the two groups. “The t-test is one of the most commonly used significance tests to assess whether the means of two groups are statistically significantly different from each other” (Zhang, 2009). T- tests are a common and simple method when conducting a quasi-experimental analysis comparing two groups and in this case a t-value of .05 or less was used to determine significance. Participants enrolled in one of two treatments or courses with one being the Standard Course and the other being the S-Course. Determining the change in knowledge of ATV safety was the basis for the analyses.

Standard Course - X_1 with X_2

S-Course - X_1 with X_2

Difference in the change in scores between Standard Course and S-Course

IV. Results/Findings

The following research questions guided this study:

1. Does knowledge increase in competency areas associated with ATV Safety and Handling among Standard Course participants?
2. Does knowledge increase in competency areas associated with ATV Safety and Handling among S-Course participants?
3. Are participant knowledge scores different between the Standard Course and the S-Course?

Findings for Question One

Test Question 12 was not analyzed due to an error. The question had no correct answer listed. This was missed during the editing process.

The findings for Research Question 1 – Does knowledge increase in competency areas associated with ATV Safety and Handling among Standard Course participants – were as follows: Thirty-four participants completed the test (X_1) prior to beginning the ATV Safety Course and then again at the conclusion training (X_2). The data from Standard Course are shown in Table 3. For Research Question 1, $t(33) = -14.61$ with a $p = .000$. Sixteen of the twenty-four questions that measured knowledge gained showed a significant difference.

The data indicated that there was a significant difference between the pretest and posttest for the Standard Course on the following questions: for question three that looked at the appropriate rated helmet analysis indicated a significant difference $t(33) = -5.48$ with a $p < .000$. For question 5 that asked about legal riding areas analysis indicated a significant difference $t(33) = -2.385$ with a $p < .023$. Question 6 asked how to properly mount the ATV indicating a significant difference $t(33) = -6.093$ with a $p < .000$. Question 8 asked about the pre-ride inspection with a significant difference $t(33) = -4.200$ with a $p < .000$. For question 9 asking about the pre-start routine $t(33) = -2.978$ with a $p < .005$. Question 13 asked about proper riding position traversing a hill with the uphill side on the left indicating a significant difference $t(33) = -6.465$ with a $p < .000$. Question 14 asked about proper riding position when descending a hill indicating a significant difference $t(33) = -3.943$ with a $p < .000$. Question 15 asks proper riding position

when ascending a hill indicating a significant difference t(33)= 4.871 with a p<.000. Question 21 asks proper riding posture when turning left indicating a significant difference t(33)= -7.586 with a p< .000. Question 22 asks proper riding posture turning right indicating a significant difference t(33)= -8.307 with a p< .000. Question 23 asks proper riding position when turning indicating a significant difference t(33)= -4.398 with p<.000. Question 25 asks what the proper riding posture is riding over an obstacle on the right hand side indicating a significant difference t(33)= -2.956 with a p< .006. Question 26 asks proper riding posture when riding over an obstacle with the left hand side of the ATV indicating a significant difference t(33)= -4.044 with a p< .000. Question 27 asks proper riding over an obstacle with both sides of the machine indicating a significant difference t(33)= -3.419 with a p<.002. Question 30 asks about the strategy used to reduce and manage risks indicating a significant difference t(33)= -4.871 with a p<.000.

A cumulative analysis of all questions on the pretest were compared to the analysis of all the questions form the posttest (Table 5) of the Standard Course indicated a significant difference t(33) = -14.609 with a p< .000. Results of the study indicate that there was a significant difference in scores among participants on 15 of the 24 questions, and nine questions showed no significant change between the pre and posttest. Differences between scores for each test question can be found in Table 3. Individual participant test results can be found in Appendix E.

Table 3. Results *from the Standard Course*

Question	M	SD	T	df	P
Pre1	0.94	0.239	1.000	33	0.325
Post1	0.88	0.327			
Pre2	0.97	0.171	-1.000	33	0.325
Post2	1.00	0.000			
Pre3	0.32	0.475	-5.480	33	0.000
Post3	0.85	0.359			
Pre5	0.50	0.508	-2.385	33	0.023
Post5	0.65	0.485			
Pre6	0.44	0.504	-6.093	33	0.000
Post6	0.97	0.171			
Pre7	0.62	0.493	-0.329	33	0.744
Post7	0.65	0.485			
Pre8	0.21	0.410	-4.200	33	0.000
Post8	0.65	0.485			
Pre9	0.38	0.493	-2.978	33	0.005
Post9	0.74	0.448			

Table 3. Standard Course Data continued

Question	M	SD	T	df	P
Pre10	0.56	0.504	-1.537	33	0.134
Post10	0.71	0.462			
Pre11	0.56	0.504	-1.977	33	0.056
Post11	0.74	0.448			
Pre13	0.41	0.500	-6.465	33	0.000
Post13	0.97	0.171			
Pre14	0.50	0.508	-3.943	33	0.000
Post14	0.91	0.288			
Pre15	0.47	0.507	-4.871	33	0.000
Post15	0.94	0.239			
Pre16	0.76	0.431	-1.436	33	0.160
Post16	0.88	0.327			
Pre18	0.82	0.387	-0.373	33	0.711
Post18	0.85	0.359			
Pre19	0.82	0.387	-1.139	33	0.263
Post19	0.91	0.288			
Pre21	0.24	0.431	-7.856	33	0.000
Post21	0.94	0.239			
Pre22	0.32	0.475	-8.307	33	0.000
Post22	1.00	0.000			
Pre23	0.26	0.448	-4.398	33	0.000
Post23	0.76	0.431			
Pre25	0.47	0.507	-2.956	33	0.006
Post25	0.79	0.410			
Pre26	0.47	0.507	-4.044	33	0.000
Post26	0.85	0.359			
Pre27	0.41	0.500	-3.419	33	0.002
Post27	0.79	0.410			
Pre28	0.59	0.500	-1.277	33	0.211
Post 28	0.71	0.462			
Pre30	0.26	0.448	-4.871	33	0.000
Post30	0.74	0.448			

Findings for Question Two

The findings for Research Question 2 – Does knowledge increase in competency areas associated with ATV Safety and Handling among S-Course participants – were as follows: The 38 participants completed a test (O_1) prior to beginning the ATV Safety Course and then again at the conclusion training (O_2). For question two $t(37) = -9.90$ with a $p = .000$. Twenty Four of the questions

measured knowledge gained with fifteen of them showing significant difference. The data from Standard Course are shown in Table 4. There was a significant difference between the pretest and posttest for the S-Course on the following questions: for question three that looked at the proper helmet analysis indicated a significant difference $t(37) = -6.412$ with a $p<.000$. Question 6 asked how to properly mount the ATV indicating a significant difference $t(37)= -2.364$ with a $p<.012$. Question 8 asked about the pre-ride inspection with a significant difference $t(37)= -3.464$ with a $p<.001$. For question 9 asking about the pre-start routine $t(37)= -4.515$ with a $p<.000$. Question 13 asked about proper riding position traversing a hill with the uphill side on the left indicating a significant difference $t(37)= -4.447$ with a $p<.000$. Question 14 asked about proper riding position when descending a hill indicating a significant difference $t(37)= -2.217$ with a $p< .033$. Question 15 asks proper riding position when ascending a hill indicating a significant difference $t(37)= -2.229$ with a $p< .032$. Question 21 asks proper riding posture when turning left indicating a significant difference $t(37)= -4.447$ with a $p< .000$. Question 22 asks proper riding posture turning right indicating a significant difference $t(37)= -4.195$ with a $p< .000$. Question 23 asks proper riding position when turning indicating a significant difference $t(37)= -3.026$ with $p< .004$. Question 25 asks what the proper riding posture is riding over an obstacle on the right hand side indicating a significant difference $t(37)= -2.729$ with a $p< .010$. Question 26 asks proper riding posture when riding over an obstacle with the left hand side of the ATV indicating a significant difference $t(37)= -4.646$ with a $p< .000$. Question 27 asks proper riding over an obstacle with both sides of the machine indicating a significant difference $t(37)= -3.855$ with a $p< .000$. Question 30 asks about the strategy used to reduce and manage risks indicating a significant difference $t(37)= -3.389$ with a $p< .002$.

A cumulative analysis of all questions on the pretest were compared to the analysis of all the questions form the posttest (Table 5) for the S-Course. Results indicated a significant difference $t(37) = -9.903$ with a $p< .000$. Results of the study indicate that there is a knowledge gain among participants and that the S-Course is effective. Individual participant test results can be found in Appendix F.

Table 4. S-Course Data

Question	M	SD	t	df	P
Pre1	0.84	0.370	-1.959	37	0.058
Post1	0.97	0.162			
Pre2	0.97	0.162	0.572	37	0.571
Post2	0.95	0.226			
Pre3	0.47	0.506	-6.412	37	0.000
Post3	1.00	0.000			
Pre5	0.63	0.489	-1.708	37	0.096
Post5	0.76	0.431			
Pre6	0.82	0.393	-2.634	37	0.012
Post6	0.97	0.162			
Pre7	0.53	0.506	-1.160	37	0.254
Post7	0.63	0.489			
Pre8	0.13	0.343	-3.464	37	0.001
Post8	0.42	0.500			
Pre9	0.32	0.471	-4.515	37	0.000
Post9	0.79	0.413			
Pre10	0.55	0.504	-1.160	37	0.254
Post10	0.66	0.481			
Pre11	0.47	0.506	-0.329	37	0.744
Post11	0.50	0.507			
Pre13	0.55	0.504	-4.447	37	0.000
Post13	0.95	0.226			
Pre14	0.68	0.471	-2.217	37	0.033
Post14	0.87	0.343			
Pre15	0.74	0.446	-2.229	37	0.032
Post15	0.89	0.311			
Pre16	0.87	0.343	-1.671	37	0.103
Post16	0.97	0.162			
Pre18	0.87	0.343	-1.356	37	0.183
Post18	0.95	0.226			
Pre19	0.71	0.460	-0.902	37	0.373
Post19	0.79	0.413			
Pre21	0.47	0.506	-4.447	37	0.000
Post21	0.87	0.343			
Pre22	0.53	0.506	-4.195	37	0.000
Post22	0.89	0.311			
Pre23	0.58	0.758	-3.026	37	0.004
Post23	0.95	0.226			
Pre25	0.55	0.504	-2.729	37	0.010
Post25	0.84	0.370			

Table 4. S-Course Data continued

Question	M	SD	t	df	P
Pre26	0.53	0.506	-4.646	37	0.000
Post26	0.89	0.311			
Pre27	0.42	0.500	-3.855	37	0.000
Post27	0.79	0.413			
Pre28	0.55	0.504	-0.442	37	0.661
Post 28	0.61	0.495			
Pre30	0.16	0.370	-3.389	37	0.002
Post30	0.47	0.506			

Findings for Question Three

The findings for Question 3 - Are participant knowledge scores different between the Standard Course and the S-Course were as follows. A cumulative analysis of all questions on the pretest were compared to the analysis of all the questions form the posttest (Table 5) for both the Standard Course and the S-Course. Results indicated significant change with a p<.000 for both Standard and S-Courses. This indicated no significant difference between the two courses. Based on the results of the study indicate that there is a knowledge gain among participants and that the Standard Course and S-Course is effective but that there is no difference in effectiveness between the two courses.

Table 5. Cumulative Data for both courses

Course	Test	M	SD	t	df	P
Standard Course	PreCumulative	12.32	4.013	-14.609	33	0.000
	PostCumulative	19.88	4.043			
S-Course	PreCumulative	13.95	3.639	-4.333	37	0.000
	PostCumulative	19.39	3.583			

Summary

Chapter IV illustrates the results of the pretest and posttest given to participants of the Standard Course and the S-Course. Results indicate a significant difference between the prestest and the posttest on many of the individual questions for both the Standard Course and the S-Course. No significant difference was shown between the results when compared together between the Standard Course and the S-Course.

V. Conclusions/Recommendations

Purpose Statement

The purpose of this study was to determine if ATV Safety knowledge increased for participants taking the Arkansas 4-H ATV Safety Training Standard and S-Courses. Additionally, this study determined if participant achievement differed between the two types of courses.

This study was guided by the following research questions

1. Does knowledge increase in competency areas associated with ATV Safety and Handling among Standard Course participants?
2. Does knowledge increase in competency areas associated with ATV Safety and Handling among S-Course participants?
3. Are participant knowledge scores different between the Standard Course and the S-Course?

Research Question One

Does knowledge increase in competency areas associated with ATV Safety and Handling among Standard Course participants?

The results of the cumulative test, illustrated in Table 5, and the results of individual questions illustrated in Table 3 indicate that the Standard Course was effective. Results indicated significant change with a p=<.000 for the Standard Course. Participants were able to utilize all four levels of Experiential Learning Theory throughout this program; thus, supporting curriculum should include Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation (Burris, et al, 2008). The ATV Safety Course allowed participants to have abstract conceptualization through the lecture portions of the course. The participants were then able have reflective observation during through group discussions and questioning. They were able to then participate in concrete experiences and active experimentation during the rider portion of the course.

Research Question Two

Does knowledge increase in competency areas associated with ATV Safety and Handling among S-Course participants?

Based on the results illustrated in Table 4 and 5 the conclusion to Question 2 is that the S-Course is effective. The results of the cumulative test, illustrated in Table 5, indicate that the program overall is effective with a p=<.000. Bloom's Taxonomy "allows learners to use knowledge, skills, or techniques in new situations through application" (Adams, 2015). Participants were able to gain knowledge and some understanding during the online portion of the course. They were then able to gain further understanding and apply what they had learned during the rider portion of the course. During sections of the rider course, riders had to analyze the obstacles, determine their options, and evaluate the best course of action in order to complete the obstacle efficiently and safely.

Research Question Three

Are participant knowledge scores different between the Standard Course and the S-Course?

Based on the results illustrated in Table 5 the conclusion to Question 3 is that there was no significant difference in knowledge gain between the Standard Course and the S-Course. While the courses utilized some different methods of delivery for portions of the course the portions most concerned with safe riding and handling of the machine consisted of a hands on approach and allowed the participants to practice what they were being told and shown. According to Kirkpatrick (1998) participants should be evaluated at different levels throughout the course of a program. Those levels include the participant's reaction to the program, the change in the participant throughout the course of the program, the extent of change in the participant as a result of participating in the program, as well as, the final results of the programs. Participants were given opportunities to ask questions and ask for clarification about information and skills being taught, the researcher was able to observe the participants throughout the course of the program and offer the participants feedback and praise on the progression of their abilities, the participants were able to build on each of the lessons being taught in the subsequent lessons, and the researcher was also able to see the final product in the riders abilities both through observation and through the testing method utilized in this research.

Recommendations for Practitioners

With 21.2% of Arkansas' population age 16 and older participating in off highway vehicle recreation between 1999 and 2007 (Cordell, Betz, Green, & Stephens, 2008) it is imperative to educate youth and adults about proper handling of ATVs utilizing effective curriculum. Though the results of this study cannot be generalized beyond the population studied, it does provide insight into the Arkansas 4-H ATV training program. The results of this study give credibility to the program. It is also an attempt to educate youth and adults about safe ATV handling to possibly keep the numbers of ATV related accidents from growing. Evaluation of the ATV training program should be ongoing in order to determine if the program remains effective or if individual instructors are being effective in their delivery methods. This study only applies the 4-wheelers. New curriculum should be created to incorporate side by side ATVs and more research is needed to determine if any new curriculum is effective.

Recommendations for Researchers

Evaluation has not been a part of the Arkansas 4-H ATV program since it started in 2008. Due to this evaluation being an initial step the scope was small. Thus, further research is needed among different age groups to determine if both courses are equally effective for all age ranges or if there is a difference between the course types among age ranges. Comparisons of learning outcomes should be evaluated based on other demographics including gender, how participant uses the ATV and prior experience with ATVs.

The researcher was the sole instructor or co-instructor for all courses in this study. All instructors should be teaching courses using the same instructional materials and covering the same topics within the course so it is recommended that the pretest and posttest be given in all courses offered by Arkansas 4-H to increase the number of results for evaluation and to evaluate program effectiveness across the program. Though the data indicates that the program was effective with the participants there were several questions within each session type that did not show significant change between the pretest and posttest. Expanding evaluation could help determine if programming and instructional changes are needed for the whole program or if changes are needed at the instructor level.

Evaluation of this program should be ongoing in order to ensure that it remains effective. Instruments and methodology should be adjusted as new session types, topics, or materials are added to the program over time. It is recommended that the E-Course be evaluated independent of the S-Course since it was not evaluated in this study. While Arkansas uses it as part of the S-Course, it could provide valuable insight for future programming and resource allocation.

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APPENDICES

APPENDIX A
IRB APPROVAL LETTER

UNIVERSITY OF ARKANSAS

Office of Research Compliance
Institutional Review Board

December 9, 2015

MEMORANDUM

TO:	Jesse Bocksnick Casandra Cox
FROM:	Ro Windwalker IRB Coordinator
RE:	New Protocol Approval
IRB Protocol #:	15-11-369
Protocol Title:	*Knowledge of Arkansas 4-H ATV Safety Training Course Participants*
Review Type:	☒ EXEMPT ☐ EXPEDITED ☐ FULL IRB
Approved Project Period:	Start Date: 12/08/2015 Expiration Date: 12/07/2016

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (https://vpred.uark.edu/units/rscp/index.php). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval. Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

This protocol has been approved for 75 participants. If you wish to make *any* modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 109 MLKG Building, 5-2208, or irb@uark.edu.

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APPENDIX B
INFORMED CONSENT FORM

Date:

Arkansas 4-H ATV Safety Participants:

I am conducting research on participant acquisition of knowledge through the ATV Safety Course you are taking. The goal of the research is to determine if ATV safety instruction increases participant knowledge.

You will be given a test prior to the training course and one following the training course. The test asks for some basic information concerning your ATV riding experience.

There is no risk connected with participating in the tests for this project. Participation in the research project is voluntary. If you choose not to participate in the study you will still be able to participate in the ATV Safety Course.

By signing below you authorize yourself (adult participants) or your youth (those 6-19) to participate in the research project and have data collected on their knowledge acquisition and perceptions. Your information will be kept confidential to the extent allowed by law and University policy. If you have any questions you can contact me. Thank you for your support and participation.

Sincerely,

Jesse Bocksnick, Graduate Student
Ag. Education, Communications & Technology

Casandra Cox, Instructor
Ag. Education, Communications & Technology

Adults:

_____

Signature Print name Date

Youth: I give my permission for _____ to participate in the research being conducted to evaluate the ATV Training Course.

_____

Parent/Guardian Signature Printed Name Date

_____

Youth Signature Printed Name Date

This research study has been reviewed by the Institutional Review Board at the University of Arkansas. For research-related problems or questions regarding subjects' rights, you can contact Ro Windwalker, the University's Compliance Coordinator, at 479-575-2208 or by email irb@uark.edu.

IRB #15-11-369
Approved: 12/08/2015
Expires: 12/07/2016

APPENDIX C
PRETEST

ATV Safety Rider Course
Pre-Test

Name:_____

Instructions:
Circle the letter for the response that best answers each question. Answer the questions to the best of your abilities. Do NOT use your neighbor's answers.

Section I ATV Basics: Before you ride

1. What should you wear when riding an ATV?
    a. Helmet, goggles, t-shirt, tennis shoes, shorts
    b. Helmet, goggles, long sleeved shirt, boots, long pants
    c. Helmet, goggles, t-shirt, boots, long pants
    d. Helmet, sun glasses, long sleeved shirt, sandals, long pants

2. When should you wear a helmet?
    a. When trail riding
    b. When riding competitively
    c. When riding in your yard
    d. When riding your ATV

3. What type of helmet should you wear when riding an ATV?
    a. DOT approved
    b. CPSC approved
    c. ASTM approved
    d. NOCSAE approved

4. How comfortable are you with knowing what to wear when riding your ATV? Circle the rank for your comfort level on a scale of 1-5 with 1 being very uncomfortable and 5 being very comfortable.
    1. Very Uncomfortable
    2. Slightly Uncomfortable
    3. Somewhat Uncomfortable
    4. Comfortable
    5. Very Comfortable

5. Where is it legal to ride?
    a. Roads, between trails/farms/hunting sites
    b. Private property with permission
    c. Marked trails, with registration
    d. All of the above
6. How should you get on your machine?
    a. From the left with both hands on the handles
    b. From the right with both hands on the handles
    c. From the left with both hands on the seat
    d. From the right with both hands on the seat

7. What is the largest ATV you should ride?
    a. 50-200 cc
    b. 200-500 cc
    c. Whichever one my parents give me.
    d. Use manufacturer's recommendations.

8. What is the Pre-Ride Inspection?
    a. BONE-C
    b. SIPDE
    c. TCLOC

9. What is the Pre-Start routine?
    a. BONE-C
    b. SIPDE
    c. TCLOC

10. What is the purpose of this training?
    a. Increase safety awareness and skills
    b. Identify your abilities and your ATVs capabilities
    c. Demonstrate the significance of ATV being rider active
    d. All the above

11. When can you carry passengers?
    a. Never
    b. When the machine is labeled for it.
    c. When you don't have enough ATVs
    d. When you need more weight

12. When is it ok to not wear a helmet?
    a. If it is over 100 degrees
    b. When your parents are watching
    c. When going under 10 mph
    d. When you give it to your passenger

Section II: Riding Your ATV

13. If you are riding across a hill and the uphill side is on your left, what should your position be?
    a. Stand and lean to the right
    b. Stand and lean to the left
    c. Stay seated in the center of the machine
    d. Stand and lean over the handle bars

14. If you are driving down a hill, what should your position be?
    a. Stay seated in the center of the machine
    b. Stand and lean over the handle bars
    c. Stay seated and shift your weight to the rear of the machine
    d. Stay seated and lean to the right

15. If you are driving uphill, what should your position be?
    a. Stand and lean over the handle bars
    b. Stay seated in the center of your machine
    c. Stay seated and shift your weight to the rear of the machine
    d. Stand and lean to the right

16. If you are riding on a hill, which way do you shift your weight?
    a. Downhill
    b. Uphill
    c. Right
    d. Left

17. How comfortable are you riding on a hill? Circle the rank for your comfort level on a scale of 1-5 with 1 being very uncomfortable and 5 being very comfortable.
    1. Very Uncomfortable
    2. Slightly Uncomfortable
    3. Somewhat Uncomfortable
    4. Comfortable
    5. Very Comfortable

18. What is your proper riding posture if you are riding in a straight line on a flat surface?
    a. Sitting on the seat near the rear of the machine
    b. Sitting on the seat near the front of the machine
    c. Sitting on the seat in the center of the machine
    d. Sitting on the seat and leaning over the handlebars

19. What is your proper riding position if you are stopping?
    a. Right hand on the brake, leaning over the handle bars
    b. Left hand on the brake, leaning over the handle bars
    c. Both hands on the brakes, sitting in the center of your machine
    d. Both hands on the brakes, sitting on the rear of the machine

20. How comfortable are you riding in a straight line or stopping? Circle the rank for your comfort level on a scale of 1-5 with 1 being very uncomfortable and 5 being very comfortable.
    1. Very Uncomfortable
    2. Slightly Uncomfortable
    3. Somewhat Uncomfortable
    4. Comfortable
    5. Very Comfortable

21. What is your proper riding posture if you are turning to the left?
    a. Seat off seat, with weight shifted to the left
    b. Seat off seat, with weight shifted to the right
    c. Standing slightly with weight over the handlebars
    d. Sitting on the seat in the center of the machine

22. What is your proper riding posture if you are turning to the right?
    a. Seat off seat, with weight shifted to the left
    b. Seat off seat, with weight shifted to the right
    c. Standing slightly with weight over the handlebars
    d. Sitting on the seat in the center of the machine

23. What is your proper riding position if you are turning?
    a. Seat off seat, with weight shifted to the outside of the turn
    b. Seat off seat, with weight shifted to the inside of the turn
    c. Standing slightly with weight over the handlebars
    d. Sitting on the seat in the center of the machine

24. How comfortable are you turning? Circle the rank for your comfort level on a scale of 1-5 with 1 being very uncomfortable and 5 being very comfortable.
    1. Very Uncomfortable
    2. Slightly Uncomfortable
    3. Somewhat Uncomfortable
    4. Comfortable
    5. Very Comfortable

25. What is your proper riding posture when riding over an obstacle and the obstacle is only on the right side of your machine?
    a. Standing slightly with weight shifted to the right
    b. Standing slightly with weight shifted to the left
    c. Standing slightly with weight shifted over the handlebars
    d. Sitting on the seat in the center of the machine

26. What is your proper riding posture when riding over an obstacle and the obstacle is only on the left side of your machine?
    a. Standing slightly with weight shifted to the right
    b. Standing slightly with weight shifted to the left
    c. Standing slightly with weight shifted over the handlebars
    d. Sitting on the seat in the center of the machine

27. What is your proper riding posture when riding over an obstacle that is on both sides of your machine?
    a. Standing slightly with weight shifted to the right
    b. Standing slightly with weight shifted to the left
    c. Standing slightly with weight shifted over the handlebars
    d. Sitting on the seat in the center of the machine

28. What is your proper riding posture if you are riding over an obstacle?
    a. Standing slightly with weight shifted to the right
    b. Standing slightly with weight shifted to the left
    c. Standing slightly with weight shifted over the handlebars
    d. Standing slightly with weight shifted over the obstacle

29. How comfortable are you riding across an obstacle? Circle the rank for your comfort level on a scale of 1-5 with 1 being very uncomfortable and 5 being very comfortable.
    1. Very Uncomfortable
    2. Slightly Uncomfortable
    3. Somewhat Uncomfortable
    4. Comfortable
    5. Very Comfortable
30. What is the strategy used to reduce and manage risk?
    a. BONE-C
    b. SIPDE
    c. TCLOC

Name:_____ Age: _____

Gender (Select one.)
❑ Female
❑ Male

Weight: _____lbs. Height: _____ feet. _____inches

How many years of experience do you have riding ATVs? (Select one.)_____
❑ None
❑ Less than one year
❑ 1-2 years
❑ 3-5 years
❑ 6-9 years
❑ 10 years or more

If you ride, what size machine do you currently ride? _____

Do you ride for the following reason(s)? Check all that apply.
❑ Hunting
❑ Trail Ride/Recreation
❑ Farming
❑ Competitive

Have you ever taken at ATV Safety Course before? ❑ Yes ❑ No

If yes, what course was it? _____

How many other people ride your machine at the same time with you? (Select one.)
❑ None. I ride alone.
❑ One other person
❑ Two other people
❑ Three other people
❑ Four other people
❑ More than four

What safety equipment do you use, if any?
_____

Have you ever had an ATV accident? ❑ Yes ❑ No

If so, were you injured? ❑ Yes ❑ No

If so, did you go to the hospital? ❑ Yes ❑ No

Do you know anyone that has been to the hospital due to an ATV accident? ❑ Yes ❑ No

APPENDIX D
POSTTEST

ATV Safety Rider Course
Post-Test

Name:_____

Instructions:
Circle the letter for the response that best answers each question. Answer the questions to the best of your abilities. Do NOT use your neighbor's answers.

Section I ATV Basics: Before you ride

1. What should you wear when riding an ATV?
    a. Helmet, goggles, t-shirt, tennis shoes, shorts
    b. Helmet, goggles, long sleeved shirt, boots, long pants
    c. Helmet, goggles, t-shirt, boots, long pants
    d. Helmet, sun glasses, long sleeved shirt, sandals, long pants

2. When should you wear a helmet?
    a. When trail riding
    b. When riding competitively
    c. When riding in your yard
    d. When riding your ATV

3. What type of helmet should you wear when riding an ATV?
    a. DOT approved
    b. CPSC approved
    c. ASTM approved
    d. NOCSAE approved

4. How comfortable are you with knowing what to wear when riding your ATV? Circle the rank for your comfort level on a scale of 1-5 with 1 being very uncomfortable and 5 being very comfortable.
    1. Very Uncomfortable
    2. Slightly Uncomfortable
    3. Somewhat Uncomfortable
    4. Comfortable
    5. Very Comfortable

5. Where is it legal to ride?
    a. Roads, between trails/farms/hunting sites
    b. Private property with permission
    c. Marked trails, with registration
    d. All of the above

6. How should you get on your machine?
    a. From the left with both hands on the handles
    b. From the right with both hands on the handles
    c. From the left with both hands on the seat
    d. From the right with both hands on the seat

7. What is the largest ATV you should ride?
    a. 50-200 cc
    b. 200-500 cc
    c. Whichever one my parents give me.
    d. Use manufacturer's recommendations.

8. What is the Pre-Ride Inspection
    a. BONE-C
    b. SIPDE
    c. TCLOC

9. What is the Pre-Start routine?
    a. BONE-C
    b. SIPDE
    c. TCLOC

10. What is the purpose of this training?
    a. Increase safety awareness and skills
    b. Identify your abilities and your ATVs capabilities
    c. Demonstrate the significance of ATV being rider active
    d. All the above

11. When can you carry passengers?
    a. Never
    b. When the machine is labeled for it.
    c. When you don't have enough ATVs
    d. When you need more weight

12. When is it ok to not wear a helmet?
    a. If it is over 100 degrees
    b. When your parents are watching
    c. When going under 10mph
    d. When you give it to your passenger

Section II: Riding Your ATV

13. If you are riding across a hill and the uphill side is on your left, what should your position be?
    a. Stand and lean to the right
    b. Stand and lean to the left
    c. Stay seated in the center of the machine
    d. Stand and lean over the handle bars

14. If you are driving down a hill, what should your position be?
    a. Stay seated in the center of the machine
    b. Stand and lean over the handle bars
    c. Stay seated and shift your weight to the rear of the machine
    d. Stay seated and lean to the right

15. If you are driving uphill, what should your position be?
    a. Stand and lean over the handle bars
    b. Stay seated in the center of your machine
    c. Stay seated and shift your weight to the rear of the machine
    d. Stand and lean to the right

16. If you are riding on a hill, which way do you shift your weight?
    a. Downhill
    b. Uphill
    c. Right
    d. Left

17. How comfortable are you riding on a hill? Circle the rank for your comfort level on a scale of 1-5 with 1 being very uncomfortable and 5 being very comfortable.
    1. Very Uncomfortable
    2. Slightly Uncomfortable
    3. Somewhat Uncomfortable
    4. Comfortable
    5. Very Comfortable

18. What is your proper riding posture if you are riding in a straight line on a flat surface?
    a. Sitting on the seat near the rear of the machine
    b. Sitting on the seat near the front of the machine
    c. Sitting on the seat in the center of the machine
    d. Sitting on the seat and leaning over the handlebars

19. What is your proper riding position if you are stopping?
    a. Right hand on the brake, leaning over the handle bars
    b. Left hand on the brake, leaning over the handle bars
    c. Both hands on the brakes, sitting in the center of your machine
    d. Both hands on the brakes, sitting on the rear of the machine

20. How comfortable are you riding in a straight line or stopping? Circle the rank for your comfort level on a scale of 1-5 with 1 being very uncomfortable and 5 being very comfortable.
    1. Very Uncomfortable
    2. Slightly Uncomfortable
    3. Somewhat Uncomfortable
    4. Comfortable
    5. Very Comfortable

21. What is your proper riding posture if you are turning to the left?
    a. Seat off seat, with weight shifted to the left
    b. Seat off seat, with weight shifted to the right
    c. Standing slightly with weight over the handlebars
    d. Sitting on the seat in the center of the machine

22. What is your proper riding posture if you are turning to the right?
    a. Seat off seat, with weight shifted to the left
    b. Seat off seat, with weight shifted to the right
    c. Standing slightly with weight over the handlebars
    d. Sitting on the seat in the center of the machine

23. What is your proper riding position if you are turning?
    a. Seat off seat, with weight shifted to the outside of the turn
    b. Seat off seat, with weight shifted to the inside of the turn
    c. Standing slightly with weight over the handlebars
    d. Sitting on the seat in the center of the machine

24. How comfortable are you turning? Circle the rank for your comfort level on a scale of 1-5 with 1 being very uncomfortable and 5 being very comfortable.
    1. Very Uncomfortable
    2. Slightly Uncomfortable
    3. Somewhat Uncomfortable
    4. Comfortable
    5. Very Comfortable

25. What is your proper riding posture when riding over an obstacle and the obstacle is only on the right side of your machine?
    a. Standing slightly with weight shifted to the right
    b. Standing slightly with weight shifted to the left
    c. Standing slightly with weight shifted over the handlebars
    d. Sitting on the seat in the center of the machine

26. What is your proper riding posture when riding over an obstacle and the obstacle is only on the left side of your machine?
    a. Standing slightly with weight shifted to the right
    b. Standing slightly with weight shifted to the left
    c. Standing slightly with weight shifted over the handlebars
    d. Sitting on the seat in the center of the machine

27. What is your proper riding posture when riding over an obstacle that is on both sides of your machine?
    a. Standing slightly with weight shifted to the right
    b. Standing slightly with weight shifted to the left
    c. Standing slightly with weight shifted over the handlebars
    d. Sitting on the seat in the center of the machine

28. What is your proper riding posture if you are riding over an obstacle?
    a. Standing slightly with weight shifted to the right
    b. Standing slightly with weight shifted to the left
    c. Standing slightly with weight shifted over the handlebars
    d. Standing slightly with weight shifted over the obstacle

29. How comfortable are you riding across an obstacle? Circle the rank for your comfort level on a scale of 1-5 with 1 being very uncomfortable and 5 being very comfortable.
    1. Very Uncomfortable
    2. Slightly Uncomfortable
    3. Somewhat Uncomfortable
    4. Comfortable
    5. Very Comfortable

30. What is the strategy used to reduce and manage risk?
    a. BONE-C
    b. SIPDE
    c. TCLOC

APPENDIX E
STANDARD COURSE INDIVIDUAL RESULTS

Standard Course Individual Results

Y = Correct Answer
N = Incorrect Answer

Participant #	1		2		3		4		5		6		7	
Questions	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3	N	Y	N	Y	N	Y	N	Y	N	Y	Y	Y	Y	Y
4	4	4	5	1	5	5	4	4	5	1	5	5	4	5
5	N	N	N	N	Y	Y	N	N	N	Y	Y	Y	Y	Y
6	N	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y
7	N	N	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	N
8	N	N	Y	N	C	Y	N	N	Y	Y	N	Y	N	Y
9	Y	N	N	N	N	Y	N	N	Y	N	N	Y	N	Y
10	N	N	N	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y
11	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
13	N	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
14	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y
15	N	N	N	Y	N	Y	N	Y	N	Y	Y	Y	N	Y
16	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
17	5	1	4	1	2	4	2	2	2	4	4	5	4	5
18	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
19	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
20	1	4	1	1	5	5	3	4	4	5	5	5	5	5
21	N	Y	N	N	N	Y	N	Y	N	Y	Y	Y	N	Y
22	N	Y	N	Y	N	Y	N	Y	N	Y	Y	Y	N	Y
23	N	N	N	N	N	Y	N	Y	Y	N	Y	Y	N	Y
24	1	5	1	2	5	5	2	4	2	5	3	4	4	5
25	Y	N	N	N	Y	Y	N	Y	Y	N	Y	Y	Y	Y
26	Y	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
27	Y	Y	N	Y	Y	Y	N	Y	N	Y	Y	Y	N	N
28	N	Y	N	N	Y	Y	Y	Y	N	N	Y	Y	Y	Y
29	5	5	4	1	2	4	5	2	2	5	4	5	3	5
30	N	Y	N	N	N	Y	N	Y	N	N	Y	Y	N	Y
# Correct	8	12	7	13	15	24	11	20	9	17	22	24	15	22
# Incorrect	16	12	17	11	8	0	13	4	15	7	2	0	9	2

Participant #	8		9		10		11		12		13		14	
Questions	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
3	N	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	N	Y
4	5	5	5	5	1	1	4	4	1	5	3	4	4	5
5	N	Y	Y	Y	N	Y	Y	Y	N	N	N	N	Y	Y
6	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
7	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y
8	N	Y	N	Y	N	Y	Y	Y	N	N	N	Y	Y	N
9	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y
10	N	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y
11	Y	Y	N	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y
13	N	Y	N	Y	N	Y	Y	Y	N	Y	N	Y	N	Y
14	N	Y	Y	Y	N	Y	Y	Y	N	Y	N	Y	N	Y
15	N	Y	Y	Y	N	Y	Y	Y	Y	N	N	Y	Y	Y
16	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y
17	2	5	3	4	2	1	2	2	1	2	1	3	2	5
18	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y
19	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
20	5	5	5	5	1	1	5	4	1	2	3	5	4	5
21	N	Y	N	Y	Y	Y	Y	Y	N	Y	N	Y	N	Y
22	N	Y	N	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y
23	N	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	N	Y
24	3	4	5	5	2	1	3	4	1	3	4	4	5	5
25	N	Y	Y	Y	Y	Y	N	Y	N	N	N	N	N	Y
26	N	Y	Y	Y	Y	Y	N	Y	N	Y	N	N	N	Y
27	N	Y	N	Y	Y	Y	Y	Y	N	N	N	N	Y	N
28	Y	Y	N	Y	Y	Y	N	Y	N	N	Y	Y	N	Y
29	2	4	4	5	3	1	2	4	1	1	1	4	3	5
30	N	Y	N	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y
# Correct	9	24	14	24	18	23	21	24	9	16	6	16	12	21
# Incorrect	15	0	10	0	6	1	3	0	15	8	18	8	12	3

Participant #	15		16		17		18		19		20		21	
Questions	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3	N	Y	N	Y	N	Y	Y	Y	N	Y	Y	Y	N	Y
4	4	4	4	4	5	5	4	4	4	4	2	1	2	4
5	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	N	N
6	N	Y	N	Y	Y	Y	N	Y	N	Y	N	Y	N	Y
7	N	Y	N	Y	N	N	Y	Y	Y	Y	N	N	N	N
8	N	N	N	Y	N	N	N	Y	N	Y	N	N	N	Y
9	N	Y	N	Y	Y	Y	N	Y	N	N	N	N	N	N
10	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	N	N	N
11	Y	Y	N	N	N	N	Y	Y	Y	Y	N	N	Y	Y
13	N	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y
14	N	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	N	N
15	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	N	Y
16	N	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N
17	2	5	3	3	1	1	3	4	1	3	2	2	3	3
18	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
19	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
20	4	5	5	5	4	5	4	4	1	5	1	1	2	2
21	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y
22	Y	Y	N	Y	N	Y	Y	Y	Y	Y	N	Y	N	Y
23	N	Y	N	Y	N	Y	Y	Y	Y	Y	N	Y	N	Y
24	5	5	3	2	4	5	3	4	1	5	1	2	4	3
25	N	Y	N	Y	Y	Y	Y	Y	N	Y	N	Y	N	Y
26	N	Y	N	Y	Y	Y	Y	Y	N	Y	N	N	N	Y
27	Y	N	Y	Y	N	Y	N	Y	Y	Y	N	Y	Y	Y
28	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N
29	3	5	2	4	4	5	3	4	1	4	1	1	2	4
30	Y	Y	N	N	N	N	N	Y	Y	N	N	N	N	N
# Correct	11	21	10	22	13	18	17	24	16	21	9	15	8	16
# Incorrect	13	3	14	2	11	6	7	0	8	3	15	9	16	8

Participant #	22		23		24		25		26		27		28	
Questions	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3	N	N	Y	N	N	Y	N	N	N	N	Y	Y	N	N
4	3	5	4	5	4	5	4	5	4	5	5	5	2	4
5	N	N	Y	Y	Y	Y	Y	Y	N	Y	N	N	N	N
6	N	Y	N	Y	N	Y	Y	Y	N	Y	N	Y	N	N
7	N	N	Y	Y	N	N	N	N	N	Y	Y	Y	Y	N
8	N	N	N	Y	N	Y	N	N	N	Y	N	Y	N	Y
9	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	Y	N	Y
10	N	N	Y	Y	Y	Y	N	N	N	Y	Y	Y	N	N
11	Y	Y	Y	Y	N	Y	N	N	Y	Y	N	Y	N	N
13	N	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	N	Y
14	Y	N	N	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y
15	N	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	N	Y
16	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N
17	1	3	3	4	3	4	4	3	3	4	4	5	3	2
18	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N
19	Y	N	N	Y	Y	Y	Y	Y	Y	Y	N	Y	N	N
20	5	1	3	5	4	5	2	4	4	5	5	5	5	3
21	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	Y	N
22	Y	Y	N	Y	N	Y	N	Y	N	Y	N	Y	Y	Y
23	Y	N	N	Y	N	Y	N	Y	N	Y	N	Y	N	N
24	3	5	3	5	3	5	5	5	4	5	5	4	5	2
25	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N	N
26	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N
27	N	Y	N	Y	N	Y	N	Y	Y	N	N	Y	N	N
28	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
29	1	1	2	3	3	4	4	4	4	5	4	3	3	3
30	N	Y	N	Y	N	Y	Y	Y	Y	Y	N	Y	N	Y
# Correct	11	15	13	22	13	23	9	18	12	22	12	22	7	9
# Incorrect	13	9	11	2	11	1	15	6	12	2	12	2	17	15

Participant #	29		30		31		32		33		34	
Questions	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3	N	Y	Y	Y	N	Y	Y	Y	N	Y	N	Y
4	4	5	4	2	1	1	3	5	4	4	1	4
5	Y	Y	N	N	Y	Y	Y	Y	N	N	N	Y
6	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
7	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
8	Y	Y	N	N	N	Y	N	N	Y	Y	N	Y
9	Y	Y	Y	N	N	Y	N	Y	N	Y	N	Y
10	Y	Y	N	N	Y	Y	Y	Y	N	Y	N	Y
11	Y	Y	N	N	Y	Y	N	Y	N	Y	N	Y
13	Y	Y	N	Y	N	Y	Y	Y	Y	Y	N	Y
14	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y
15	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y
16	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
17	2	4	4	1	2	1	4	5	3	3	2	1
18	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
19	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
20	4	5	4	5	4	5	4	5	4	4	1	5
21	N	Y	N	Y	N	Y	N	Y	Y	Y	N	Y
22	N	Y	N	Y	N	Y	N	Y	Y	Y	Y	Y
23	N	Y	N	N	N	Y	N	Y	N	N	Y	N
24	3	4	4	5	4	1	4	5	3	3	1	3
25	Y	Y	N	Y	N	Y	Y	Y	N	Y	Y	Y
26	Y	Y	N	Y	N	Y	Y	Y	N	Y	N	Y
27	Y	Y	N	Y	Y	Y	N	Y	N	Y	Y	Y
28	N	Y	Y	N	Y	Y	Y	Y	Y	N	N	N
29	3	4	3	1	2	5	4	5	2	3	2	4
30	Y	Y	N	Y	N	Y	N	N	N	Y	N	Y
# Correct	19	24	10	16	11	24	16	22	14	21	11	21
# Incorrect	5	0	14	8	13	0	8	2	10	3	13	3

APPENDIX F
S-COURSE INDIVIDUAL RESULTS

Standard Course Individual Results

Y = Correct Answer
N = Incorrect Answer

Participant #	1		2		3		4		5		6		7	
Questions	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
3	N	Y	Y	Y	N	Y	Y	Y	N	Y	N	Y	N	Y
4	3	3	5	5	3	5	5	5	5	5	5	1	3	5
5	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
6	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
7	N	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y
8	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N
9	Y	Y	N	Y	Y	Y	N	Y	N	Y	N	Y	N	N
10	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y
11	N	N	Y	Y	N	N	Y	Y	Y	Y	N	N	Y	Y
13	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y
14	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Y	Y
15	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N
16	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
17	2	4	5	5	3	5	4	5	5	5	5	1	3	5
18	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
19	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
20	5	1	5	5	5	5	5	5	5	5	5	1	4	5
21	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y	Y	N	N
22	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y	Y	N	N
23	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N
24	4	1	5	5	4	5	4	5	5	5	5	1	3	5
25	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
26	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y
27	N	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	N
28	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
29	4	1	5	5	3	5	4	5	5	5	5	1	3	5
30	N	Y	N	N	N	N	N	N	N	N	N	Y	N	N
# Correct	16	23	16	18	19	21	17	21	15	22	16	20	12	15
# Incorrect	8	1	8	6	5	3	7	3	9	2	7	4	12	9

Participant #	8		9		10		11		12		13		14	
Questions	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
2	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
3	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Y	Y
4	4	1	4	5	4	5	2	4	3	5	1	5	5	5
5	Y	N	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y
6	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
7	N	Y	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y
8	N	N	N	N	N	Y	Y	Y	Y	N	N	N	N	Y
9	N	Y	N	Y	Y	Y	Y	N	Y	Y	N	N	N	Y
10	Y	N	N	N	Y	Y	N	N	Y	Y	Y	Y	N	Y
11	Y	Y	N	Y	Y	N	N	N	Y	Y	N	N	N	Y
13	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y
14	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y
15	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
16	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
17	5	1	5	5	3	5	2	4	5	5	1	5	5	5
18	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
19	N	N	Y	Y	Y	Y	N	Y	N	N	Y	Y	Y	Y
20	5	1	5	5	5	5	2	4	5	5	1	5	5	5
21	Y	Y	N	Y	N	Y	N	Y	N	Y	N	Y	Y	Y
22	Y	Y	N	Y	N	Y	N	Y	N	Y	N	Y	Y	Y
23	Y	Y	N	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y
24	5	1	5	5	5	5	2	4	5	5	1	5	5	5
25	Y	Y	N	Y	Y	N	N	N	N	Y	N	Y	Y	Y
26	Y	Y	N	Y	Y	Y	N	N	Y	Y	N	Y	Y	Y
27	Y	Y	N	Y	N	Y	N	N	N	Y	N	Y	Y	Y
28	Y	Y	Y	N	Y	N	N	N	N	Y	N	Y	Y	N
29	5	1	5	5	5	5	2	4	5	5		5	5	5
30	N	Y	N	N	N	Y	N	N	N	N	N	N	N	N
# Correct	17	20	8	20	17	21	10	12	12	21	11	19	19	21
# Incorrect	7	4	16	4	7	3	14	12	12	3	13	5	5	3

Participant #	15		16		17		18		19		20		21	
Questions	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y
4	4	4	4	5	3	5	5	5	3	5	5	5	5	5
5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
6	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
7	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
8	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Y
9	Y	Y	N	N	N	Y	N	Y	Y	Y	N	Y	N	Y
10	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N	Y	N	N
11	N	N	Y	N	N	N	N	N	N	Y	N	N	N	Y
13	N	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
14	N	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	Y
15	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y
16	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
17	4	4	3	2	1	3	5	5	2	5	5	5	4	5
18	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y
19	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	N
20	4	4	4	5	5	3	5	5	4	5	5	5	4	5
21	N	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	Y
22	N	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	Y
23	N	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	Y
24	4	4	3	5	3	5	5	5	3	5	5	5	4	5
25	N	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	N
26	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	N
27	N	N	N	Y	Y	Y	Y	Y	N	Y	Y	N	N	Y
28	N	Y	Y	N	Y	N	Y	Y	N	Y	Y	Y	N	Y
29	4	4	3	4	2	5	5	5	1	5	5	5	4	5
30	N	Y	N	N	N	N	N	Y	Y	N	N	Y	N	N
# Correct	12	21	18	20	11	19	18	23	12	22	18	22	8	17
# Incorrect	12	3	6	4	13	5	6	1	12	2	6	2	16	7

Participant #	22		23		24		25		26		27		28	
Questions	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	Y	Y	N	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3	N	Y	N	Y	Y	Y	Y	Y	N	Y	N	Y	N	Y
4	5	5	2	3	1	5	5	5	4	4	3	5	4	5
5	Y	N	N	N	Y	Y	N	N	N	Y	Y	Y	Y	Y
6	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
7	N	N	N	Y	Y	Y	N	N	N	N	N	N	Y	N
8	N	N	N	N	Y	Y	N	N	N	N	N	Y	N	Y
9	Y	Y	Y	N	N	Y	N	Y	N	N	N	Y	N	Y
10	N	N	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y
11	Y	Y	N	N	Y	Y	Y	N	N	Y	N	N	Y	Y
13	Y	Y	Y	Y	N	Y	N	Y	N	Y	Y	Y	N	Y
14	Y	Y	N	N	N	Y	N	N	Y	Y	N	Y	Y	Y
15	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y
16	Y	Y	Y	Y	N	Y	N	Y	N	Y	Y	Y	Y	Y
17	5	5	2	2	1	5	1	3	3	5	4	5	4	4
18	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
19	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
20	5	5	4	2	1	5	1	5	5	4	5	5	4	5
21	Y	Y	N	Y	Y	Y	N	N	N	N	Y	Y	Y	Y
22	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
23	Y	Y	4	Y	N	Y	N	Y	N	Y	N	Y	N	Y
24	5	5	N	2	1	5	5	5	3	2	4	5	4	5
25	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y
26	Y	Y	N	Y	N	Y	Y	Y	N	N	N	Y	N	Y
27	Y	Y	N	Y	N	Y	Y	Y	N	N	Y	Y	Y	Y
28	N	Y	N	Y	Y	N	N	N	N	N	N	Y	Y	Y
29	5	5	3	4	1	5	4	3	2	3	4	5	4	4
30	N	N	N	Y	N	Y	N	N	N	N	N	Y	N	Y
# Correct	17	18	7	18	15	23	12	14	7	12	13	22	16	23
# Incorrect	7	6	17	6	9	1	12	10	17	12	11	2	8	1

Participant #	29		30		31		32		33		34		35	
Questions	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	N	Y
4	5	5	4	5	5	5	2	1	5	5	4	5	3	5
5	Y	Y	N	Y	N	Y	N	Y	Y	Y	N	N	N	Y
6	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N
7	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	Y	N
8	N	Y	N	Y	N	N	N	N	N	Y	N	N	N	N
9	N	Y	N	Y	Y	N	N	N	N	Y	Y	Y	N	Y
10	N	N	N	Y	Y	Y	Y	N	Y	Y	N	N	Y	Y
11	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N	N	N
13	Y	Y	Y	Y	N	Y	Y	N	N	N	Y	Y	N	Y
14	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
15	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y
16	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
17	5	5	5	5	5	5	1	1	4	1	5	5	2	5
18	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y
19	N	N	Y	Y	Y	N	N	N	Y	Y	Y	N	Y	Y
20	5	5	5	4	5	5	4	1	4	1	5	5	1	5
21	Y	Y	Y	Y	N	Y	Y	N	N	Y	Y	Y	N	Y
22	Y	Y	Y	Y	N	Y	N	N	N	Y	Y	Y	N	Y
23	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y
24	5	5	5	4		5	2	2	4	1	5	5	1	5
25	Y	Y	N	Y	N	Y	Y	N	N	Y	Y	Y	N	Y
26	Y	Y	Y	Y	N	Y	N	N	N	Y	Y	Y	N	Y
27	Y	Y	N	Y	Y	N	N	N	N	Y	Y	Y	N	Y
28	N	Y	Y	Y	N	N	N	N	Y	N	Y	N	N	Y
29	5	5	4	4	5	5	1	2	4	1	5	5	4	5
30	Y	Y	N	Y	N	Y	N	N	N	Y	N	N	Y	Y
# Correct	18	22	16	24	13	17	10	8	14	21	18	16	11	20
# Incorrect	6	2	8	0	11	7	14	16	10	3	6	8	13	4

Participant #	36		37		38	
Questions	Pre	Post	Pre	Post	Pre	Post
1	N	Y	Y	Y	Y	Y
2	N	Y	Y	Y	Y	Y
3	N	Y	Y	Y	N	Y
4	5	5	5	5	4	4
5	N	N	Y	Y	Y	Y
6	N	Y	Y	Y	N	Y
7	N	N	Y	Y	N	Y
8	N	N	N	Y	N	Y
9	N	Y	N	Y	Y	Y
10	N	Y	N	Y	N	Y
11	N	N	N	N	Y	Y
13	N	Y	Y	Y	N	Y
14	N	N	Y	Y	Y	Y
15	N	N	Y	Y	Y	Y
16	Y	Y	Y	Y	Y	Y
17	5	5	5	5	1	2
18	Y	Y	Y	Y	Y	Y
19	Y	Y	N	Y	Y	Y
20	5	5	5	5	4	5
21	N	Y	N	Y	Y	Y
22	N	Y	N	Y	Y	Y
23	N	Y	N	Y	Y	Y
24	5	5	5	5	3	4
25	N	Y	Y	Y	Y	Y
26	N	Y	Y	Y	Y	Y
27	N	Y	Y	Y	N	N
28	Y	N	N	N	Y	Y
29	5	5	5	5	3	4
30	Y	N	Y	Y	Y	Y
# Correct	5	16	15	22	17	23
# Incorrect	19	8	9	2	7	1