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Attitudinal Survey of Producers Involved in a Meat Goat Artificial Insemination Clinic

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Abstract: To quantify intrinsic learning processes, the Intrinsic Motivation Inventory (IMI) was established and incorporated into a questionnaire provided to participants in two meat goat artificial insemination clinics. Pre-test and post-test results on meat goat knowledge, motivation constraints, and confidence in livestock management skills were compared to assess the impact of the instructional clinics. In both months, participants increased their examination scores and improved confidence in their livestock management skills. Understanding of key aspects of the IMI may be of importance when planning educational programs for agricultural producers coming from a variety of different backgrounds and experiences.

Introduction

"Learn by doing" is the educational philosophy of the National 4-H program and has been adopted by agricultural educators as they attempt to teach the agricultural community through hands-on experiential learning (Torock, 2009). Learning occurs as a continuum of past experiences is blended into new

experiences, and some believe learning can only occur through reflection and application of the new experience (Dewey, 1938; Joplin, 1981).

Learning involves two important factors: (1) the stimulus for learning, which includes environmental and sociological stimuli as well as emotional and physical stimuli; and (2) the preference for learning and processing new information (Hoover & Marshall, 1998). Motivation is a major emotional stimulus influencing learning and understanding. Motivation can be divided into two categories: intrinsic and extrinsic (Levesque & Pelletier, 2003). Intrinsic motivation is motivation derived from within the individual by factors such as self-determination, curiosity, challenge, and effort. Extrinsic motivation involves outside forces such as rewards and punishments (Santrock, 2001).

Since the early 1990's, meat goat production has been an important source of income for livestock producers (Glimp, 1995). From 1987 to 2010, meat goats in the United States have increased in number from 415,000 to over 3 million head (USDA Sheep & Goats, 2010); at the same time, research related to the nutrition, health, parasite management, and reproduction in meat goats has subsequently increased (Sahlu, et al., 2009). Still, meat goat production does not have supporting infrastructure relative to other commodity-based enterprises, nor does it have the quantity of university/private sector-sponsored research or educational opportunities that other agricultural commodities enjoy (Fisher, Nye, & Mangione, 2004). Meat goat producers need to know the basics of production and management as well as how to select sound foundation stock and take advantage of artificial insemination in order to increase possible economic returns by using semen collected from genetically superior bucks that may not be available for live cover.

As research into methods to improve the productivity of meat goats (and/or other commodity-based agricultural products) is conducted, it will be important to successfully deliver this information to producers. Establishment of an enhanced experiential learning environment will help facilitate the transfer of information. To enhance learning, Extension educators must understand how their clientele learn and then design their instructional workshops to best foster learning among participants.

To facilitate understanding and to quantify intrinsic learning (an inherent motivation to learn), the Intrinsic Motivation Inventory (IMI) was established. This inventory (list of questions used to determine a person's desire to learn) was developed to ascertain information regarding the intrinsic motivation of learners and the underlying personal and emotional issues related to learning such as: perceived competence, interest-enjoyment, motivation, pressure-tension, and effort-importance (Markland & Hardy, 1997).

Extension educators are involved in the lifelong learning process and often come into contact with intrinsically motivated learners, so understanding impacts on learning motivation is important (Boggs, 1976). A meat goat production and artificial insemination (A.I.) clinic was planned that would involve experiential teaching/learning and would afford the instructors an opportunity to assess the IMI as it relates to agricultural/Extension education. Therefore, an IMI survey designed and used to assess participants' motivation for learning during the clinic and to determine if the teaching methods utilized influenced the intrinsic motivation of participants. The goals of the survey were: 1) to determine if the students learned the material and 2) assess the intrinsic motivation across the subscales of the IMI, which included interest and enjoyment, skill and competence, effort and importance, pressure and tension, and motivation. A pre-test/post-test examination was also used to determine if our participants retained information presented to them during the two-day clinic.

Methods

Population and Sample

A 2-day meat goat artificial insemination clinic was conducted at Redlands Community College in El Reno, Oklahoma at the Darlington Agricultural Research Center. This clinic was held twice in 2008, the first in June and the second in November, with 23 and 20 participants, respectively. The registration fee was \$200 unless participants were students of either Redlands Community College or Missouri State University. Congruency between the June and November sessions was maintained via use of the same curriculum, instructors, and hands-on activities.

The first day of the clinic consisted only of classroom instruction covering the topics of nutrition, health, animal stress, meat goat selection, and meat goat reproduction, including the major hormones involved in reproduction. Day two consisted of a review of day one with a question and answer session followed by a demonstration of ultrasonography on non-pregnant and pregnant does, hands-on participation of buck semen collection and handling, and demonstration and participant practice of A.I. techniques using live animals.

Instrument

The IMI instrument and practical meat goat production questions were employed to evaluate student motivation and learning. All research was approved and conducted in accordance to rules established by the Institutional Review Board at Missouri State University. This instrument, named the Midwest Meat Goat Questionnaire (MMGQ), is available upon request from the first author. After a brief introductory period, a pre-clinic survey was administered to volunteers. On day two, at the conclusion of the clinic, a post-clinic survey similar in format and content to the pre-clinic survey, was given to participants. Prior to conducting each pre- and post-survey, participants signed an agreement page indicating willingness to participate in the study. Pre-test and post-test questionnaire data were matched by signature and numbered in order to maintain confidentiality of the respondents. Participant numbers were the only identifier used in order to maintain impartial statistical analysis.

The pre/post-testing was composed of three sections. Section one, *exam*, consisted of 30 multiple choice exam questions and was developed to assess participants' basic meat goat knowledge. Multiple choice and matching questions were written related to the goat estrous cycle, body condition, gestation, nutrition, health, and A.I. procedures. Exams were graded and scores assigned to determine any differences between pre- and post-test scores.

The second section of the survey contained questions designed to evaluate the participants' *self-perceptions* that may influence the learning process as assessed by the IMI. Questions pertained to perceived interest and enjoyment, perceived competence, effort and importance, pressure and tension, and value and usefulness. This section was written using a Likert-type scale with 1 being "not true at all," 4 being "somewhat true," and 7 being "very true." Some questions in this section were reverse keyed to control for participant rater bias.

The third and final section, *management skills*, was designed to ascertain personal confidence in livestock management skills, including those related to body condition scoring in ruminants, A.I., health and management, and pasture management. This section was scale keyed as 1 being "highly skilled" and 5 indicating "not skilled."

In addition, demographic information was also collected and included age, gender, current ownership of goats, and breed and number of goats owned. This information was used to document the sample characteristics in order to gain background information related to the experiences of participants and, if sample size was appropriate, to determine if personal variables would influence results from the

questionnaire instrument.

Procedures of Data Analysis

Data was analyzed using SPSS 16.0 Statistical Software for the Social Sciences (SPSS, 2007). A series of paired-samples t-tests were conducted to assess differences between pre and post-test variables. Due to the number of paired-samples t-tests conducted, a Bonferroni alpha correction was applied to control for the probability of a Type I Error for each of the June and November clinics. The resulting alpha level employed was $P < 0.007$.

Results

Preliminary Statistical Analyses

A preliminary analysis was conducted for both months in which it was found that the sample size for gender, age, and education level were too small to include in our primary analyses. However, a series of analyses comparing gender on pre-test scores, age, and education revealed no significant differences ($P > 0.007$), and, therefore, all subsequent analyses were collapsed across gender, age, and education level. Overall, all participants did better on the post-clinic exam than on the pre-clinic exam. In the June and November clinics, females, on average, increased their exam scores approximately 9.25 points. Males in the June clinic also increased their average by about 9.46 points; however, males in November only increased their scores by 5.86 points.

Primary Statistical Analyses

Personal variables of the survey respondents are presented in Table 1.

Table 1.

Personal Variables of Survey Participants Who Attended Either a June or November 2008 (n = 22 and 19; respectively) Meat Goat Artificial Insemination Workshop

Personal Variable	June 2008	November 2008	Total
Gender			
Male	15	14	29
Female	7	4	11
Education			
High school diploma	5	1	6
Some college	6	8	14
Associates degree	5	4	9
Bachelors degree	2	4	6
Masters degree	3	0	3

Age			
19 â 30	1	6	7
31 â 40	5	2	7
41 â 50	10	4	14
51 â 60	3	5	8
61 â 70	1	0	1

The majority of participants owned goats, predominately Boer and Crossbred goats (Table 2). In total, the majority of the survey respondents, 61.3%, owned 50 goats or less, 10.75% owned between 51-75, 5.2% owned between 76-100, 9.95% owned 101-200, and 7.55% owned more than 201 goats (data not shown).

Table 2.

Meat Goat Ownership of Producer Survey Participants Who Attended Either a June or November 2008 (n = 22 and 19; respectively) Meat Goat Artificial Insemination Workshop

Personal Variable	June 2008	November 2008	Total
Goat Owner	21	18	39
Boer	21	15	36
Kiko	0	1	1
Savanna	0	1	1
Crossbred	11	7	18
Spanish	3	2	5
Tennessee meat	0	0	0
Dairy	4	0	4
Angora	1	0	1
Pygmy	0	0	0
Other	0	0	0

June 2008

The summary statistics from the June 2008 clinic are presented in Table 3. In order to determine the magnitude of change from pre- to post-test as a function of the clinic instruction an omega-squared (\bar{I}^2) effect size was calculated. Considering the average effect size was 0.32, it can be concluded that approximately 32% of the change (increase) from pre to post-test was a function of the clinic instruction (Table 3).

As a result of participating in the clinic, respondents improved their exam scores ($P = 0.001$), enjoyed the clinic more than they initially felt they would ($P = 0.004$), and felt more competent ($P = 0.002$) in meat goat A.I. than they did at the initiation of the clinic. There was a marginal positive change ($P = 0.07$) in the value and usefulness section of the survey from start to conclusion of the clinic. In addition, respondents felt more confident in livestock management skills ($P = 0.001$) at the conclusion of the clinic than they did at the start.

Table 3.

Participant Survey Responses from Pre- and Post-Test Results (\pm SEM) Obtained from June 2008 Meat Goat Artificial Insemination Producer (n = 22) Workshop

Variable	Mean	N ^a	Mean	N ^a	Maximal Score	t-value	η^2	P-value
	Pre		Post					
Section 1.								
Exam	12.25 \pm 0.91	20	21.70 \pm 1.05	20	30	-8.92	0.79	0.001
Section 2								
Participants Constraints								
Interest & Enjoyment ^b	44.53 \pm 1.27	19	48.63 \pm 0.37	19	49	-3.25	0.32	0.004
Competence ^b	45.47 \pm 1.68	19	50.42 \pm 0.98	19	56	-3.55	0.37	0.002
Effort and Importance ^b	52.05 \pm 1.26	19	53.58 \pm 0.93	19	56	-1.20	0.02	0.246
Pressure & Tension ^b	23.95 \pm 1.91	19	22.79 \pm 1.5	19	59	0.64	0.0	0.532
Value & Usefulness ^b	65.58 \pm 1.50	19	68.68 \pm 0.80	19	70	-1.93	0.12	0.071
Section 3								
Management Skills ^c	51.84 \pm 1.45	19	44.74 \pm 1.38	19	70	5.45	0.60	0.001
^a = Number of survey respondents who answered the question ^b = Based upon Likert type scale 1 = not true at all, 4 = somewhat true, 7 = very true ^c = Based upon Likert type scale 1=highly skilled, 3 = somewhat skilled, 5 = not skilled								

November 2008

In order to determine if results from the June 2008 workshop could be replicated, a second clinic questionnaire was conducted in November, 2008. As in June, η^2 effect sizes were calculated to assess the magnitude of change as a function of clinic instruction. Effect sizes ranged from 0 (pressure and tension) to 0.87 (exam), with an average effect size of 0.39, indicating that approximately 39% of the positive change in the pre versus post-test scores can be attributed to the clinic instruction.

Paired samples t-tests were used to determine if results differed between pre-clinic survey and post-clinic survey responses. The summary statistics from the November 2008 clinic are presented in Table 4. Participants did significantly better on the post-clinic exam than they did on the pre-clinic exam ($P = 0.001$). Respondents reported greater interest in the clinic on their post-clinic surveys than their pre-clinic surveys ($P = 0.004$), and there was a tendency for respondents to feel more competent at the end than the beginning of the meat goat A.I. clinic ($P = 0.02$) and experience less pressure ($P = 0.02$) than they originally felt they would at the beginning of the clinic. Additionally, respondents were inclined to feel they put more effort into the clinic than they thought they would ($P = 0.08$). No differences were found in the value of the clinic between initial and final surveys ($P = 0.336$). Regarding section 3, management skills, participants felt more skilled at the conclusion than the beginning of the clinic ($P = 0.004$).

Table 4.

Participant Survey Responses from Pre- and Post-Test Results (\pm SEM) Obtained From November 2008 Meat Goat Artificial Insemination Producer ($n = 17$) Workshop

Variable	Mean	N ^a	Mean	N ^a	Maximal Score	t-value	η^2	P-value
	Pre		Post					
Section 1								
Exam	13.72 \pm 0.90	18	20.67 \pm 0.84	17	30	-11.43	0.87	0.001
Section 2								
Participants Constraints								
Interest & Enjoyment ^b	42.64 \pm 1.29	14	47.00 \pm 0.93	14	49	-3.56	0.44	0.003
Competence ^b	38.14 \pm 1.62	14	32.79 \pm 1.52	14	42	2.56	0.27	0.024
Effort and Importance ^b	33.43 \pm 0.87	14	32.00 \pm 0.98	14	35	1.88	0.14	0.083
Pressure & Tension ^b	17.29 \pm 1.93	14	12.50 \pm 1.89	14	35	2.65	0.29	0.020
Value & Usefulness ^b	44.29 \pm 2.18	14	45.43 \pm 1.94	14	49	-1.00	0.0	0.336

Section 3								
Management skills ^c	47.71 ± 1.97	14	42.43 ± 1.84	14	70	3.48	0.43	0.004
^a = Number of survey respondents who answered the question ^b = Based upon Likert type scale 1 = not true at all, 4 = somewhat true, 7 = very true ^c = Based upon Likert type scale 1=highly skilled, 3 = somewhat skilled, 5 = not skilled								

Findings and Discussion

The format of the clinic was satisfactory as evidenced by the increase in exam scores from the pre-test to the post-test. Evaluations that indicate effective teaching can be interpreted as effective learning (Kauffman, Shrode, Sutherland, & Taylor, 1984). Participants increased their confidence related to meat goat production and A.I. in both workshops and felt more interested and enjoyed the workshop more than they initially felt they would. In areas with no obvious change in respondent scores, such as in the June 2008, effort and importance and pressure and tension, and in November 2008, value and usefulness, perhaps respondents felt the clinic to be important and of value so they knew they would be putting in maximal effort and responded as such during the pre-survey equating to no discernible change in the post-survey.

Perhaps regarding pressure and tension, there is some degree of pressure that increases students' willingness to try during a particular activity. This goes along with the "optimal learning theory," which states that experiences involving feelings of deep enjoyment and happiness—also known as "flow" occurs when people are concentrating during particular activities that they feel are neither too difficult nor too easy (Santrock, 2001). Flow is most often the result when students feel challenged, but not overwhelmed by the task at hand and perceive themselves to have skills adequate to master the activity.

In order to better address learner's needs, Extension educators should be aware of the skill level of their audience/participants. Matching skill level with material covered should increase the success of participants (Santrock, 2001). It might be that flow could be maximized in production-type workshops if Extension educators conducted pre-tests prior to their workshops perhaps during pre-registration (have a test included in the registration forms). A pre-test could also be conducted immediately prior to the workshop, but either way, the teaching format should be flexible enough to fit the educational needs of the participants. The post-test can then be conducted as a tool to evaluate teaching effectiveness and as a tool to determine if participant's knowledge was increased. Results of the pre and post testing could then be used to identify changes needed (if any).

In June, post-test analysis revealed that competence increased after the workshop concluded. Learner perception of success or failure (competence) is linked to both internal and external factors that can influence the learners' self-esteem, and those learners who link their success to internal factors (aptitude and ability) are more likely to have a higher self-esteem than those who link their success to outside factors (Santrock, 2001). Negative outcomes in the learning process can be seen by learners as either motivational or debilitating, depending upon the perspective of the learner.

Research indicates that for educational classrooms, the climate of learning needs to be such that students are intrinsically motivated to learn. Participants are more motivated to learn when they are given choices, i.e., they chose to come to the workshop, are met with challenges that match their skills, and are provided rewards which have an informational value but are not used for control (Santrock, 2001). Extension educators may be

able to use the IMI survey to determine the overall degree to which workshops affect the intrinsic motivation of participants to then more effectively support positive agricultural production outcomes.

Implications

Pre-tests can be used by Extension instructors to gain better insight as to the skill sets of their workshop participants. The pre-tests can be followed up with post-tests to determine retention of information by participants. The study reported here does show that "hands on" producer clinics are effective and should be offered to increase the knowledge, skills, and confidence of producers. As agricultural demographics shift via changes in age, gender, experience, and ethnicity as we have seen over the past 30 years, Extension educators must be aware that learning styles may also shift. Recognition of the learning styles of clientele may be important in formulating steps for success for agricultural producers. Many audiences that Extension educators are exposed to will be intrinsically motivated; therefore, workshops should be geared to enhance the success of intrinsically motivated learners.

Overall, in both June and November clinics, participants' level of knowledge regarding meat goat production and artificial insemination increased, as did confidence in their livestock management skills. However, it is not known what portions of the clinic were best at influencing these increases. More research should be conducted to determine what portion of production clinics should be lecture type vs. hands-on in regards to increasing knowledge and skills of workshop participants.

Based on the results of the study, the instructors of the clinic felt they presented appropriate material in a manner that produced a significant amount of learning and confidence. Possible effects of gender or other personal variables on overall intrinsic motivation could not be tested with the limited amount of data collected in the study. Similar surveys should be conducted to determine if people in agriculture with different demographic characteristics learn differently and have different personal constraints that affect their learning. Understanding the learning constraints of farmers may enable educators to better foster learning and potential success in production agriculture.

The study reported here provides insight into how Extension clientele learn and how production oriented workshops can be used to determine if sufficient teaching strategies are utilized to improve students' intrinsic motivation to learn the material presented.

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