

4-1-2012

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Recommended Citation

Strong, R. (2012). Reusable Learning Objects Enhanced Master Goat Producers' Learning. *The Journal of Extension*, 50(2), Article 73. <https://doi.org/10.34068/joe.50.02.73>

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April 2012
Volume 50 Number 2
Article Number 2RIB7

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Reusable Learning Objects Enhanced Master Goat Producers' Learning

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Abstract: Literature suggests Extension agents should be more proficient in delivering educational programs to enhance learning. This article reports on an innovative delivery method with a robust learning theory for constructing learning objectives. The reported here examined an approach used to improve learning in the Master Goat Producer program. The population (N = 96) was four Master Goat Producer classes from two states. Respondents demonstrated they learned and could practically apply the information. If agents attain different approaches to improve clientele learning, it may enhance Extension agents as educators and better assist Extension in accomplishing its organizational objectives.

Introduction

Extension educators should be more proficient in teaching methods and components of nonformal education programs (Downing & Finlay, 2005). Franz, Piercy, Donaldson, Westbrook, and Richard (2010) recommended agricultural Extension agents deliver educational programs with the intent of improving the knowledge of farmers. Agents should begin the program development process by describing what student achievement should be as a result of participating in the program (Diem, 2003).

An educational objective identifies what the learner will be able to do as a result of the learning experience. There are three parts associated with writing an educational objective: performance, conditions, and criterion. Performance signifies what the learner will be expected to do. Conditions outline the circumstances the performance will occur. Criterion indicates the level a learner must

perform at in order to be considered acceptable. Program outcomes must be evaluated by educational organizations to address program accountability (Conklin, Hook, Kelbaugh, & Nieto, 2002).

Master Goat Producer (MGP) is an Extension 12-week program designed to improve goat producer profitability. MGP is a joint program between 1862 and 1890 land-grant institutions in both Texas and Tennessee. The program teaches adults small ruminant production and management and marketing best practices in order for producers to attain maximum profits. Herd health, reproduction, nutrition, predator control, and marketing are some of the classes offered as a part of the 12-week program. MGP is designed for novice and advanced goat producers. Participants must attend each class to earn their certification as an MGP.

A Reusable Learning Object (RLO) is one low-cost, low-input method to teach Extension agents how to use the cognitive domain as a template to write educational objectives. RLO's are a stand-alone learning tool designed to focus on a singular learning objective (Koohang & Harman, 2007). RLO's are beneficial because they are accessible, reusable, and reliable (Koohang & Harman). For the MGP marketing session, the learning objective in the RLO was to write educational objectives based upon Bloom's (1956) cognitive domain. RLO's can be flash videos, PowerPoint slides, PDF's, etc.

The RLO's used to teach Extension agents how to write educational objectives for the marketing portion of MGP were PowerPoint slides and PDF's. The researcher worked with the coordinators to construct learning objectives for the marketing session stemming from Bloom's cognitive domain and designed the structure of each RLO. An RLO was developed for each phase of Bloom's cognitive domain for the MGP marketing session. Extension MGP coordinators and specialists from both states developed the content within the RLO's, and coordinators used each RLO in their respective county program.

Theoretical Framework

Bloom (1956) identified the three domains (cognitive, psychomotor, and affective) of educational objectives. The cognitive domain involves developing knowledge and intellectual skills (Bloom). Bloom defined six classifications within the cognitive domain educators can employ to improve student learning. When students gain knowledge they will be able to define, interpret, find, and remember the information. Comprehension signifies students are able to summarize, explain, and discuss what they have learned. The student's ability to use the information relates to the application classification. Analysis is the classification that enables students to examine and scrutinize information they have learned. In the synthesis classification, students have attained the capacity to predict and develop new ideas. Evaluate refers to the ability of students to judge and assess knowledge. Bloom said one classification in the cognitive domain has to be mastered by the student before an educator can move to the next.

Purpose and Objectives

The purpose of the research reported here was to examine an approach used to improve learning in the Master Goat Producer Program. Specifically, the objectives were to:

1. Assess learning in the marketing session of MGP after participating in the RLO's and;
2. Examine the effect of demographics on learning cognitive domain RLO's.

Methodology

Agricultural Extension educational objectives were developed into RLO's for the marketing class in the Master Goat Producer (MGP) program. The RLO's were employed in face-to-face teaching and learning environments during the fourth week of MGP in each of the four county programs. Participants (N = 118) from four MGP classes, two in Texas and two in Tennessee, were surveyed via email 1 week later through the use of Survey Monkey® to determine learning based on RLO's constructed using the cognitive domain. The response rate was 81.35 % (N = 96). According to Babbie (2007), a researcher should not examine nonresponse error when a response rate of at least 80% is achieved due to the lack of variance in the remaining percent of nonrespondents. Learning objectives for the marketing session were constructed using the cognitive domain in developing RLO's with the intent of improving participants' knowledge of recommended goat marketing practices (Table 1).

Table 1.
Cognitive Domain Learning Objectives in Reusable Learning Objects for the Marketing Session of Master Goat Producer Program

Cognitive Domain	Students will be able to:
Knowledge	Define fundamental terms in marketing and financial management
Comprehension	Generalize the information on marketing plans in small groups
Application	Demonstrate how to develop a marketing plan as a team
Analysis	Analyze the validity of the plan based upon content in the session
Synthesis	Create their own individual goat marketing plan from the information
Evaluate	Assess the goat marketing plan for their operation

The questionnaire included six questions about the cognitive domain and seven questions about participant demographics. Goat producers were asked their perceived learning in each level of the cognitive domain 1 week after their participation in the marketing class. Learning was measured on a five-point scale: 5 = strongly agree, 4 = agree, 3 = neither, 2 = disagree, 1 = strongly disagree.

Reliability of the scale was calculated ex post facto at .87. The majority of respondents were white ($n = 90, 93.75\%$), men ($n = 78, 82.29\%$), ages 46 and over ($n = 76, 81.25\%$), with high school degrees ($n = 62, 64.58\%$).

The first objective was to assess learning in the marketing session of MGP. Ary, Jacobs, Razavieh, and Sorenson (2006) identified descriptive statistics as the statistical method to condense the information in accumulation of data. Descriptive statistics are approaches and procedures applied in arranging, summarizing, calculating, and describing data (Agresti & Finlay, 2009). The variables indicate descriptive statistics were the most appropriate statistical method for measuring learning.

The second objective was to examine the effect of demographic characteristics on learning of the cognitive domain RLO's. The second objective was measured with an analysis of variance (ANOVA). The total variance of all subjects can be subdivided into variances between groups and variances within groups (Babbie, 2007). The resulting F ratio, in ANOVA, uses the variance of group means as a measure of observed difference among groups (Agresti & Finlay, 2009). The difference in two or more means can be examined by ANOVA. Agresti and Finlay said if the F is significant, then at a minimum one of all potential comparisons between comparisons of means will be significant.

Ary et al. (2006) said effect sizes evaluate the tendency and strength of a variance between two means. A large effect size is $d = .80$, a medium effect size is $d = .50$, and a small effect size is $d = .20$ (Cohen, 1988). Agresti and Finlay (2009) indicated Cohen's definitions of small, medium, and large effect sizes have been widely recognized and implemented into numerous social science studies. Cohen's d is computed with the standardized difference between two means divided by the data's standard deviation.

Findings

The first objective was to assess participants' learning in the marketing session of MGP. Respondents indicated their knowledge ($M = 4.71, SD = .45$), comprehension ($M = 4.53, SD = .46$), application ($M = 4.33, SD = .41$), analysis ($M = 3.90, SD = .78$), and synthesis ($M = 3.76, SD = .67$) increased in goat marketing from participating in the RLO's (Table 2). Participants disagreed that they were able to assess the goat marketing plan for their operation.

Table 2.
Master Goat Program Participants Learning from Cognitive Domain Reusable Learning Objects

	<i>N</i>	<i>M</i>	<i>SD</i>
Knowledge	96	4.71	.45
Comprehension	96	4.53	.46
Application	96	4.33	.41
Analysis	96	3.90	.78

Synthesis	96	3.76	.67
Evaluate	96	2.79	.58
<i>Note: Scale M = 4.01, SD = .59</i>			

Age was the lone demographic variable that had a significant effect on learning, $F(3, 93) = 6.95$, ($p < .01$). Tukey's post hoc analysis was conducted to determine if differences existed in respondent's age. The effect size was medium ($\eta^2 = .54$). Age accounted for 5.4% of the variance in learning of the cognitive domain RLO's for MGP.

Table 3.
ANOVA Results on Age and Learning of the Cognitive Domain RLO's for Master Goat Program

Age	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>
18 – 45 years old	30	4.81	.56	6.95*	.00
46 – 55 years old	31	4.48	.65		
56 years old or older	35	4.26	.61		
<i>Note: * p < .01.</i>					

Conclusions

Adults participating in the MGP programs were homogenous. Incorporating Bloom's (1956) cognitive domain in the marketing session of MGP revealed additional adult learning in certain classifications more than others. Adults believed they could define, discuss, utilize, analyze, and synthesize goat production marketing plans. Respondents may have disagreed on their ability to evaluate marketing plans because the plans were not put into practice at the time of this article submission. Younger adults indicated a higher degree of improved learning in the marketing session than older adults.

Implications

Bloom's (1956) research indicated the cognitive domain enhances participant knowledge and intellectual ability. In the research reported here, RLO's constructed from cognitive domain learning objectives served to improve participant learning in marketing content. The RLO's assisted participants in four separate county programs from two different states in mastering the information before undertaking new content (Bloom) and learning objectives within the marketing session of MGP. RLO's served as effective educational tools that could be shared by multiple educators and users across state lines and geographic regions. The implementation of RLO's served to focus on singular learning objectives in each phase of Bloom's cognitive domain for MGP and was

advantageous due to accessibility, reusability, and reliability (Koochang & Harman, 2007).

Recommendations

This innovative use of the cognitive domain is an approach Extension agents could employ when developing learning objectives in order to enhance learning in adult agricultural Extension programs. MGP and other practitioners of agricultural Extension "mastery" programs should construct targeted educational objectives based upon the cognitive domain for each educational session. Developing an understanding of the advantages of the employing the cognitive domain in constructing educational objectives may be a professional competency needed by agricultural Extension agents. More research is needed on the effect of cognitive domain RLO's on learning in Extension programs. The inclusion of cognitive domain underpinnings in current and future Extension professional development trainings may assist agricultural Extension agents in discovering different approaches to improve learning.

There is no cost associated with including cognitive domain RLO's in current practices of academic departments associated with preparing Extension agents and with agricultural education. This information could be incorporated into current professional development practices for current and future agricultural Extension agents. Using cognitive domain RLO's could be taught face-to-face or through online modules. Procedures to develop cognitive domain RLO's could be displayed on an academic department's website. Creating cognitive domain RLO's could be taught in current nonformal education and program development courses at institutions. Information on how to develop cognitive domain RLO's could be merged into Audacity® in order to create podcasts for multiple users to access at their convenience. Audacity® is an audio recorder and editor software program. Acquiring innovative methods to enhance learning would be a benefit to agricultural Extension agents and Extension as a nonformal educational organization.

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