

6-1-2004

Teaching Complex, In-Depth Programs

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Recommended Citation

Hall, J. B., McKinnon, B. R., Greiner, S. P., & Whittier, W. D. (2004). Teaching Complex, In-Depth Programs. *The Journal of Extension*, 42(3), Article 6. <https://tigerprints.clemson.edu/joe/vol42/iss3/6>

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Teaching Complex, In-Depth Programs

Abstract

Changing demographics of rural Extension audiences create challenges to program delivery, and multiple delivery methods may be needed to effectively improve skills and knowledge of clients. We examined the effectiveness of different delivery methods and changes in client skills, knowledge and abilities as a result of a complex, in-depth program, the Virginia Cow/Calf Management Course. Almost 500 producers took the 5-month course. Changes were measured from pre- and post-course surveys. Skills easily employed by the producers were readily adopted. Experiential learning opportunities and written materials had the greatest impact on producers, while Web-based information and discussion groups were marginally effective.

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Introduction

Changes in U.S. demographics are creating challenges for Extension program delivery. In rural areas, the shift towards dual income households with off-farm employment results in clientele being less available for daytime producer meetings or field days. Although face-to-face programming continues to shift towards more evening and weekend meetings, these meetings increasingly conflict with limited family time.

In addition, more clientele seek information in areas where they may have little background or limited experience. In Iowa, education of beginning farmers is an important programmatic thrust (Trede & Whitaker, 1998). In the eastern U.S., many new part-time beef producers are people "returning to the land" or producers desiring to add an alternative enterprise to row crops or tobacco. As a whole, these clients lack basic livestock production skills and may have limited exposure to Extension.

Although most Extension clientele prefer experiential learning (Richardson, 1994), audiences still want concise printed material (Rodewald, 2001) for reference and review. Both of these methods are preferred over seminars. Exposing clients to problem solving and critical thinking is essential to developing skills to handle a variety of situations and decisions (Meir, 1989; Jones, 1992).

Self-directed learning or at-home short courses provide considerable information, but may not establish or evaluate needed skills. In rural areas, access to the Internet may be limited by

computer literacy (Taylor, Hoag, & Owen, 1991), bandwidth, modem speed or cost. Therefore, program delivery may need to use multiple methods simultaneously, especially for rural audiences that are geographically dispersed. This multi-method delivery system may be particularly important for highly technical information. The Virginia Cow/Calf Management Course was designed to use diverse teaching methods and media to deliver complex information.

Purpose

The purpose of this article is: 1) to describe the development and conduct of a complex, in-depth educational program for beef producers; 2) to evaluate the program impact on producers' adoption of the practices; and 3) to evaluate different delivery methods for educating beef producers.

Program Development

Several surveys indicate that Virginia beef producers may be technologically "above average" compared to other beef producers in the Southeastern and Mid-Atlantic states, but Virginia beef producers are limited users of technology in cow/calf operations (Stanley, Eller, McKinnon, Wahlberg, & Gerken, 1993; Eller & McKinnon, 1994). Similarly, a USDA survey (NAMS, 1997; 1998) indicated that U.S. beef producers are not using basic technologies (Table 1). This lack of use of these basic procedures results in lower productivity and profitability compared to producers adopting these technologies.

Interviews with Extension agents, beef producers, and Extension specialists indicated a need for educational programs for beginning and part-time beef producers. The planning group of specialists, agents, and producers indicated the course should:

1. Build beef production skills and knowledge through experiential learning and problem solving,
2. Initiate life-long learning through exposure to Extension and educational resources,
3. Provide a cow/calf management manual,
4. Regionalize materials based on geographic and production differences,
5. Establish the county agent as the local beef production expert, but expose producers to Extension specialists,
6. Use local producers and veterinarians as guest instructors,
7. Provide opportunities for producer-to-producer learning and information exchange,
8. Employ a mechanism for course evaluation and modification, and
9. Evaluate delivery methods used and their future value in program delivery.

Table 1.
Percent of U.S. Beef Cow/Calf Operations Using Various Technologies

Technology	Percent of Operations
Tagging calves	53.2
Tagging cows	48.1
Body condition score	23.3
Pregnancy check	34.3
Cull on pregnancy check	16.0
Controlled calving season	46.4
Use artificial insemination	13.3

Breeding soundness exam (bulls)	39.9
Forage availability dictates calving season	< 10.0
Vaccinated calves against clostridial diseases	61.9
Vaccinated calves against respiratory diseases	25.4
Sold cattle on carcass basis	< 1.0
Adapted from USDA-APHIS 1997, 1998	

Program Delivery

The goal of the Virginia Cow-Calf Management Course is to teach proper management techniques and instill usable skills to beginning and part-time beef producers. The program is designed as a 5-month series that combines at-home learning, lectures, Web-based materials and discussion groups, and hands-on workshops. The course is taught at four different locations around Virginia each year.

About 1 month before each workshop, participants receive reading material and study questions that relate to the upcoming workshop. By the end of the course, the reading material forms the Virginia Cow/Calf Management Handbook. Handbook materials and other pertinent information are posted on the Virginia Cow/Calf Management Course Web site. Web-based materials are password protected. A bulletin-board discussion page is also accessed through the Web site, which allows producers to ask questions when not in class.

The workshops meet on one Saturday in the months of October, November, January, February, and March. Workshops stress skill building by allowing and encouraging participants to engage in actual management practices. Cattle are used in every workshop. Skills taught at the workshops include body condition scoring, castration, implanting, freeze branding, ear tagging, tattooing, forage sampling, and vaccination. Producers learn to select bulls and heifers, read Expected Progeny Difference data, balance feed rations, evaluate feeder cattle, and cull cows. Demonstrations are given on delivering calves, performing breeding soundness exams, examining rumen microflora, erecting high tensile electric fence, facility design, and proper animal handling. The importance of various marketing options is also discussed.

Extension Beef Cattle Specialists, Extension Veterinarians, and local Animal Science Extension Agents teach the course. One specialist is teamed with two or three agents. Agents stay constant within each location, but specialists rotate among locations. Rotation of specialists allows participants to access each specialist while maintaining the agent as the local expert in beef cattle production. University veterinarians, local veterinarians, and Farm Management Extension agents serve as guest instructors. Workshops are held on a different farm in the community each month. The farms are chosen to demonstrate proper cow/calf management, and their owners become instructors for the workshop, as well.

An Extension Program Support Technician assembles instructor packets for workshops with all materials, equipment, and supplies. This technician is also responsible for communication among location instructors as well as participants. All handbook materials, registrations, and data input are handled by the technician.

Program Evaluation

A survey is given at the beginning and end of the course to all participants. These surveys are designed to assess: 1) changes in adoption of technology, 2) effectiveness of various course components and instructors, and 3) impact of the course on the beef operation. The beginning course survey consisted of 35 questions on producer and operation demographics as well as current management practices. All participants were given this survey on the first workshop they attended.

The end of course survey was administered at the conclusion of the last workshop. The 50-question survey was to be completed by a representative from each farm. If a person was absent on the last workshop, then a survey was mailed to them. Final survey questions addressed course content and quality as well as changes in management as a result of the course. Over forty-six percent of the participants (228) representing approximately 65% of the operations returned the full end-of-course survey.

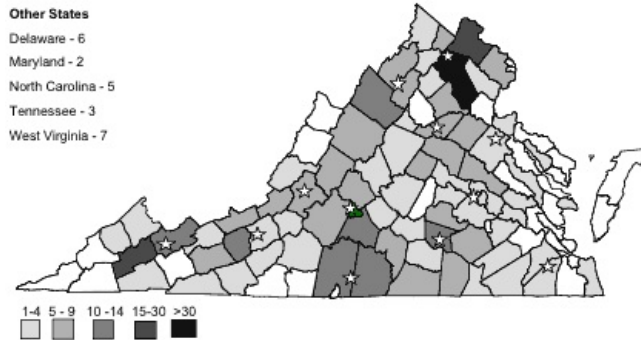
Changes in pre- and post-course adoption rate of management techniques were analyzed by Chi Square (SAS, 1999). A long-term follow-up is planned to assess behavioral change and ranch-level

impacts 3 to 5 years after the course.

Results

From 1998-2001, 490 producers participated in the Virginia Cow-Calf Management Course. These producers came from almost every county in Virginia and the five surrounding states (Figure 1). Courses were held in 12 different locations identified by stars on the map in Figure 1.

Figure 1.
1998-2001 VA Cow/Calf Management School Participants (by county)



Pre-Course Survey Results

Producers taking the course were generally representative of beginning to part-time beef producers in Virginia. The average age of participants was 48 years old with 10.5 years experience in the beef industry. A majority of the participants (>60%) had off-farm jobs, which is typical for this region. Farm size was moderate for the area, ranging from 200 to 500 acres (Figure 2) and supporting about 100 cows (Figure 3). Average herd size in Virginia is 30 cows. Even though the relative herd size was moderate, larger cowherds were well represented, with herds exceeding 250 cows accounting for 10% of the operations participating in the course (Figure 3).

Figure 2.
Distribution of Farm Size of Participants in 1998-2001 Cow-Calf Management Course

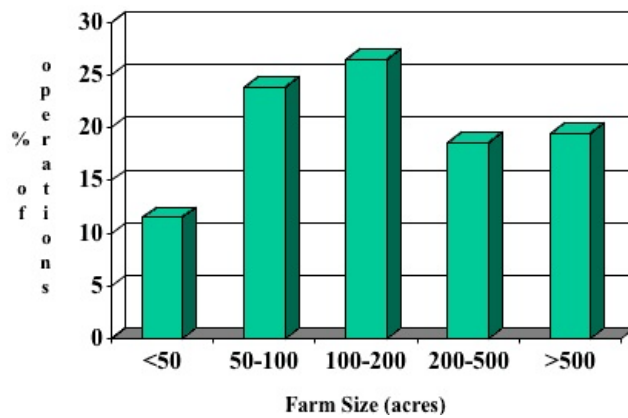
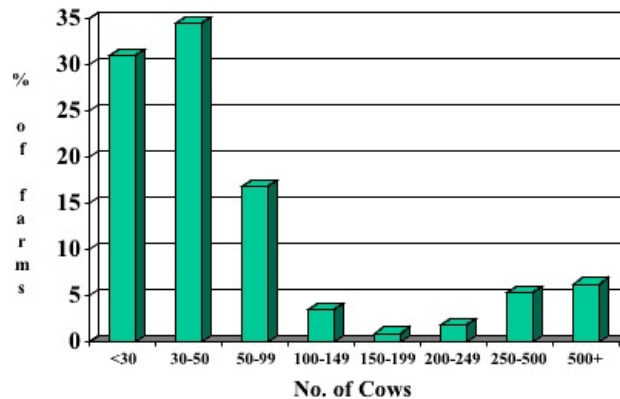


Figure 3.
Distribution of Herd Size of Participants in 1998-2001 Cow-Calf Management Course

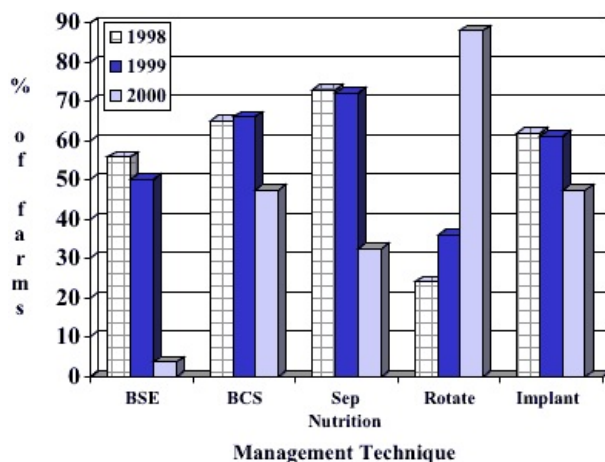


At the start of the course, a majority of the farms did not employ basic management practices such as body condition scoring or implanting calves (Figure 4). While producers claimed pregnancy rates for their herds of 85% to 90%, only 50% of the operations pregnancy checked cows. Body condition scoring and feeding cattle by age and production stage groups were used as indicators of nutritional management. Limited use of these strategies indicated marginal nutritional management. Non-adoption of breeding soundness exams for bulls and pregnancy diagnosis in

cows demonstrated a need for basic reproductive management. Producers tended to be more likely to use some type of pasture rotation during the year, indicating at least a basic knowledge of pasture management. Producers were limited in employing additional growth promotants such as implants and ionophores.

Figure 4.

Percent of Farms at the Beginning of the Course That Did Not Perform Selected Management Practices.*



* BSE = performed breeding soundness exams on bulls; BCS = Body condition score cows; Sep Nutrition = divide cows by ages for feeding; Rotate = rotate pasture at least once; Implant = implant suckling calves

In general, most producers were not using some of the most basic management strategies available to beef producers. Many of these strategies are low cost practices. Informally, producers indicated that the prevailing reasons for not using these technologies were not being familiar with the practice or not feeling skilled in conducting the practice.

End-of-Course Survey Results

Compared to other Extension programs they had taken, producers rated the Cow/Calf Management Course highly, averaging 9.1 (1 = worst program; 10 = best program). They also felt the course was very useful (4.6; 1 = not useful; 5 = extremely useful) to their operation. In addition, 86.7% of the participants wanted a follow-up program or an in-depth course on a single topic.

Components of the course were also rated. The handbook was rated very good (8.8; 1 = poor to 10 = excellent) and was considered a valuable resource for the future. Participants particularly enjoyed the hands-on workshops, and they indicated the workshops were an important part of the course. Workshops were also listed as a primary reason that producers took the course. The Web site portion of the course was considered less valuable. Only 35.9% of the participants accessed the Web site. Those using the Web site rated it as fairly useful (3.9; 1 = not useful, 5 = extremely useful). Only 13.8% of all participants used the Web-based discussion.

The Cow/Calf Management Course resulted in increased adoption of most management procedures or technologies (Tables 2 & 3). Simple procedures that could be easily performed by the producer on the ranch, such as body condition scoring cows, showed the greatest increase in adoption by producers. Procedures that required more expense or the hiring of a professional showed greatest resistance to adoption. For example, use of proper injection sites or timely and proper castration of calves were readily adopted, with adoption rates of 90 to 100%. On the other hand, getting breeding soundness exams for bulls or using artificial insemination only had total adoption rates of 46% and 48%, respectively.

Table 2.

Percentage of Producers Using Nutrition and Growth Technologies by the End of the Cow/Calf Management Course and Percent Increase in Producers Using Those Technologies

1998-1999 (n=80)				
	Pre-Course Adoption Rate	Post-Course Adoption Rate	Changes	Significance
Body condition score cows	35%	93.0%	58.0%	P<0.0001

Improved nutrition	15%	44.3%	29.3%	
Use of proper injection site	--	96.8%	--	NA
Proper age and method of castration	88%	100.0%	12.0%	P<0.06
Implanted suckling calves	38%	52.6%	14.6%	P<0.22
1999-2000 (n=76)				
Body condition score cows	34%	88.1%	54.1%	P<0.001
Use of proper injection site	--	95.4%	--	NA
Proper age and method of castration	76%	86.0%	10.0%	P<0.14
Implanted suckling calves	39%	70.6%	31.6%	P<0.001
2000-2001 (n=72)				
Body condition score cows	47.3%	88.9%	41.6%	P<0.001
Use of proper injection site	--	98.1%	--	NA
Proper age and method of castration	90.9%	94.4%	3.5%	P<0.47
Implanted suckling calves	47.3%	84.9%	37.6%	P<0.001

Table 3.

Percentage of Producers Using Reproduction and Breeding Technologies by the End of the Cow/Calf Management Course and Percent Increase in Producers Using Those Technologies

1998-1999 (n=80)				
	Pre-Course Adoption Rate	Post-Course Adoption Rate	Changes	Significance
Breeding soundness tested bulls	15%	44.3%	29.3%	P<0.09

Used artificial insemination	34.7%	49.2%	14.5%	P<0.07
Used or adopted crossbreeding	60.0%	65.0%	5.0%	P<0.52
1999-2000 (n=76)				
Breeding soundness tested bulls	48.0%	48.0%	0.0%	P<0.95
Used artificial insemination	17.4%	47.5%	30.1%	P<0.01
Used or adopted crossbreeding	21.1%	87.7%	66.6%	P<0.21
2000-2001 (n=72)				
Breeding soundness tested bulls	31.6%	45.8%	42.2%	P<0.001
Used artificial insemination	25.5%	48.1%	22.6%	P<0.04
Used or adopted crossbreeding	64.5%	84.9%	20.4%	P<0.04

Conclusions

The Virginia Cow/Calf Management course has been effective in assisting participating producers in improving the efficiency of their operations. In addition, it serves as a model for the type of program that results in positive changes in producers' skills, knowledge, and abilities. Important points for successful programming for agricultural producers were as follows.

1. Targeted, intensive hands-on workshops and demonstrations appear to be effective methods for technology transfer.
2. Providing written materials at-home accompanied by study questions helped clients assimilate core information while avoiding the lecture format. Supplying clients with a comprehensive reference was important to them.
3. Developing a statewide program that featured county agents as co-instructors created a stronger linkage between clientele and Extension as well as demonstrating the agents' subject matter expertise.
4. Providing instructor packets and teaching materials allowed agents to focus on program delivery and customization of materials for their area.
5. Support of local beef producers to provide cattle and meeting locations for hands-on workshop enhanced the value of the program to clients. Interactions among technically adept beef producers and clients are an important learning tool.
6. Client use of Web-based material and Web-board discussion group was limited. Delivery of materials by these methods exclusively would not be effective.

Results from this course demonstrate that program delivery should focus on experiential learning opportunities backed by written reference materials. Providing face-to-face contact among Extension professionals and clients is essential. The technical skills of clients can be improved through these methods. In addition, a team approach among Extension professionals results in positive perception of the organization. At this time, physical and social barriers to Web-based instruction do not support extensive investment in this delivery system for Virginia beef producers;

however, this method should not be ignored.

Acknowledgment

This program was supported by a grant from the USDA-EPA Ruminant Livestock Efficiency Program.

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