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ABSTRACT

The comparative effectiveness of tele-lecture and traditional lecturer methods for a series of dairy meetings was assessed, and the value of a pre-test and post-test in identifying important concepts and measuring learning was studied. A three-month experiment was conducted with 99 dairy herd improvement association members throughout Minnesota. A lecture was prepared by an Extension specialist and visuals were provided so that the lecture was adaptable to both regular lecture and telelecture. Pre- and post-tests contained 10 single-answer multiple-choice questions, which covered knowledge such as recall, comprehension, application, analysis, and synthesis. Of the participants, 98 completed both tests in three telelectures, and 99 completed both in the seven regular lectures. The tests scores were analyzed to compare the two methods, using a one-way analysis of variance, and an F test at the .01 probability level was used to test for significance. The experiment results showed that there was no significant difference in knowledge gained between the two educational methods. The use of pre- and post-tests was shown to be of value in identifying important concepts and measuring learning; the educator can provide a significant increase in learning by adult students by basing the educational method on the concepts identified in the tests, and it provides a structure by which the learners can identify concepts to be discussed. Appendixes provide the pre- and post-test as well as answers to the test questions. (DB)

THE COMPARISON OF TELELECTURE AND REGULAR LECTURE IN THE TRANSFER OF KNOWLEDGE TO ADULTS

By

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Introduction

The time and expense required to conduct an ever-increasing number of educational meetings at distant locations have caused state extension administrators and specialists to explore new instructional methods and devices. One such alternate method to in-person appearances is telelecture, sometimes referred to as remote teaching. Through two-way audio hook-ups, an instructor is able to conduct an educational session simultaneously at multiple locations.

The economy of tele-lecture over traditional lecturer for out-state sessions is obvious. The question of effectiveness, though, is of concern. Several studies have been reported which tend to show that there is no difference in amount of knowledge gained between tele-lecture and traditional lecture (Blackwood and Trent; Eubank and Baker; Edelman; Mocker and Hamlin).

In the study reported here, main concern was with assessing the comparative effectiveness of the two methods for a series of dairy meetings in Minnesota. A second concern was to consider pre-testing as an educational technique. In other words, the question was whether having participants answer a series of knowledge items before the course began would improve their learning by giving them some kind of outline, structure or orientation to the content to be presented.

Methods

The first step in comparing the teaching effectiveness of telelecture to regular lectures was to identify a particular educational program and clientele. A program on the use of dairy herd improvement records for dairy cow evaluation was selected for two reasons. First, the course content lended itself to identifying specific concepts intended to be taught. Second, the material was such that the possibility was slight that respondents could learn the content from any source outside the educational meeting planned. Participants were limited to dairy herd improvement association members throughout Minnesota. While the participants represented a relatively small percentage of the total farm population, they were quite uniform in terms of interest and experience.

Modern computerized production record evaluation methods were introduced to DHIA (Dairy Herd Improvement Association) dairymen in January 1968. These new annual summaries contained a comprehensive genetic analysis of their breeding program using modern evaluation methods such as Estimated Producing Ability, and Estimated Average Transmitting Ability.

Cow Evaluation Workshops instructed dairymen on the effective use of this information in planning and executing breeding programs that will enhance the rate of genetic improvement.

A lecture was prepared by an Extension specialist, and visuals were produced to make the lecture adaptable both to regular lecture and telelecture. Major concepts to be taught were identified by dairy specialists in consultation with other animal science faculty. These concepts were used to prepare a pre- and post-test.

Pre- and post-lecture tests contained ten single answer multiple choice questions. The tests were designed to measure the client's knowledge of dairy breeding principles and the application of this knowledge using modern methods of record evaluation. (See Appendix A) Test questions covered a broad spectrum of knowledge levels as defined by Bloom's Taxonomy of knowledge such as recall, comprehension, application, analysis, and synthesis.

The two tests were designed to be of equal difficulty. The two tests were randomly assigned, and administered simultaneously to determine if differences existed in a preliminary trial. The resulting mean pre-lecture and post-lecture test scores were 61.25 and 60.00 respectively.

Three separate telelectures on the same subject were given in 11 Minnesota counties. The same lecture was given in person by an area specialist in 7 other counties. The following procedure was used to collect data from both types of lectures.

Dairymen were asked to participate in a study aimed at improving Extension's ability to meet their particular needs. They were asked to take a short quiz before and after the educational program. Questionnaire A, the pre-test, was read to respondents in both lecture groups since the test was of knowledge rather than reading ability. The same procedure was repeated with quiz B, the post-test. Questionnaires completed by respondents who came after quiz A had been given or who left before taking quiz B were discarded. Both questionnaires were sent to the State Extension Office without grading.

The experiment was conducted over a 3-month period during which time 98 respondents completed both questionnaires in three telelectures. Ninety-nine dairy farmers completed both questionnaires in the seven regular lectures.

Analysis of variance was used to determine significant differences: 1) between knowledge acquired by the two methods, 2) between specific telelectures or regular lectures, and 3) by location. Similar analysis were run eliminating respondents who scored above 50 percent on the pre-test. This was done to determine the effect on dairymen presumably less informed about the subject at the beginning of the educational activity.

Results

Table I contains the means and standard errors for pre-lecture and post-lecture test scores and the post minus pre-lecture test score differences for the two instructional methods. A one way analysis of variance was used to make the comparisons and an F test at the .01 probability level was used to test for significance.

The standard errors represent variability between observations and lecture sessions within each instructional method.

Table I Comparison of Instructional Methods

	Instructional Method	
	Regular Lecture	TeleLecture
Number of Observations	85	112
Number of Lectures	5	4
Mean Pre-test Score	61.3	61.8 N.S.
Mean Post-test Score	86.8	86.2
Mean Difference	25.5	24.4 N.S.

N.S. - Non-Significant differences at $P < .01$

Telelecture and regular lecture participants started with an equal subject matter knowledge base as indicated by the comparison of pre-test scores for the two instructional methods.

The comparison of post-lecture and pre-lecture test score differences between the two instructional methods provide an unbiased evaluation of knowledge gained. These differences were not significant indicating no difference in the learning response between the two instructional methods.

The frequency distribution in Table II relative to magnitude of pre-lecture and post-lecture test score differences show similar responses in amount of knowledge gained between the two educational methods.

Table II Frequency Distribution Comparison of Pre to Post Test Difference for Telelecture and Regular Lecture

Change from Pre to Post Test	Telelecture		Regular Lecture	
	Number	%	Number	%
+ < 41	20	18	13	15
+ 31 - 40	12	11	13	15
+ 21 - 30	16	14	19	22.5
+ 11 - 20	30	27	10	12
+ 1 - 10	16	14	19	22.5
Same	8	7	6	7
Lower	10	9	5	6
	112	100	85	100

Discussion

While the primary purpose of the study was to compare learning in a single subject matter area via two lecture methods, a number of facts bear discussion.

First, the results coincide with previous research, which indicates no significant difference in knowledge gained between the educational methods used. In this study dairy farmers who received the knowledge first-hand from the specialist did not score any higher in the post-test than did those dairy farmers who received the information via telelecture. It is important to note, however, that this research points out only that learning can take place by both methods. Obviously, the advantages of direct interaction between learner and teacher are lost with methods like telelecture.

Another conclusion is that rather complex topics can be handled by the telelecture method. This study shows that careful planning, material preparation, and concern for the learner can make telelecture as effective as traditional methods.

The relatively little difference in learning that occurred from one telelecture to another and from one regular lecture to another raises a third point. This lack of variation suggests that a well planned educational activity can consistently cause knowledge transfer and does not rely excessively on such things as location, time of day, mental or physical attitude of the teacher, etc. The replications point out that the dairymen who attended the first lecture gained as much knowledge as did those attending the last dairy cow evaluation seminar.

The value of a pre-test and post-test in identifying important concepts and measuring learning were demonstrated in this study. The educator, by taking time to identify educational concepts to be taught, preparing a measurement device, and then basing the educational method on the concepts identified, can provide a significant increase in learning by adult students. Another result of using a prepared pre-test and post-test was that it gave the learners a structure for identifying concepts that were to be discussed, as well as giving them a chance to review these concepts at the conclusion of the activity.

Summary

This study provides the adult educator with a basis for the use of telelecture in lieu of regular lecture. The results do not say that a carelessly planned presentation is equally productive by either method, rather a well-planned lecture by both telephone or in person will result in a similar amount of learner knowledge transfer. The findngs presented seem to accentuate the need for educational skills in planning and implementation by the adult educator as an important determinant of learning regardless of the method used or the physical presence of the lecturer.

APPENDIX A

Pretest A

DAIRY SERIES EVALUATION

Instructions:

The following questions have been prepared in an attempt to measure the effectiveness of our Extension methods. Would you please give one answer for each of the following questions. (Guess if you are not certain of the answer).

Because we will need your help at both the beginning and the end of today's class, would you identify this sheet by placing the last five numbers of your driver's license here _____. (If you would rather put your name do so because the answers will be kept confidential).

Check one answer for each question.

1. The best producing cows always have the best udders.

   _____ True

   _____ False

2. Which herd turnover rate (% left herd) will be the best for making genetic improvement?

( ) a. 10% left herd

( ) b. 25% left herd

( ) c. 40% left herd

3. Genetic improvement will be fastest if:

( ) a. All heifer calves born are raised and freshen in the herd

( ) b. If only heifers from the best cows are raised for replacements

( ) c. If only heifers from the best sires are raised for replacements

( ) d. If only the best looking heifer calves are raised for replacements

4. Which of the following has the greatest influence on genetic improvement?

( ) a. Quality of sires of herd replacements

( ) b. Culling cows

5. What portion of differences between cows milk records are due to the genetics of the cows?

( ) a. 10%

( ) b. 25%

( ) c. 75%

6. Which young unproven bull will have the highest odds of siring the highest producing daughters?

	Young Bull's Sire	Young Bull's Dam
( ) a.	Excellent Not proven	Excellent 4-00 yrs. 365 days 2X 16,000 lbs. milk
( ) b.	Predicted Difference (P.D.) + 100 lbs. milk Repeatability = 98%	6-00 yrs. 305 days 2X 20,000 lbs. milk
( ) c.	P.D. = + 1000 lbs. milk Repeatability = 98%	Estimated Avg. Transmitting ability = + 1000 lbs. milk Repeatability = 42%
( ) d.	P.D. = + 1300 lbs. milk Repeatability = 22%	Estimated Producing Ability = + 2000 lbs. milk 1 record

7. Which cow would be the highest producer in a herd averaging 17,000 lbs. milk?

( ) a. 2-00 yrs. 305 days 2X 16,000 lbs. milk

( ) b. Estimated Producing Ability 1 record = + 3400 lbs. milk + 60 lbs. fat

( ) c. 2-00 yrs. 390 days 2X 18,000 lbs. milk

( ) d. EATA = + 400 lbs. milk + 20 lbs. fat

8. Which is the best milk transmitting sire?

( ) a. Repeatability = 90%

( ) b. Predicted Difference = + 1120

( ) c. Predicted Difference = + 100

( ) d. Repeatability = 26%

9. The cows with the highest EPA (Estimated Producing Abilities) are also always the best transmitters of production.

_____ True

_____ False

10. High calf mortality losses:

( ) a. Slows genetic improvement

( ) b. Does not affect genetic improvement

( ) c. Speeds up genetic improvement

Thank you

B.

Post test B DAIRY SERIES EVALUATION

Instructions:

The following questions are a second set that have been prepared in an attempt to measure the effectiveness of our Extension methods. Would you please give one answer for each of the following questions. (Guess if you are not certain of the answer).

Because we would like to compare these answers with those you filled out earlier, would you identify this sheet by placing the last five numbers of your driver's license here _____. (If you would rather put your name do so because the answers will be kept confidential). Please identify yourself the same as you did on the earlier form.

Check one answer for each question.

1. Which is the best calving interval?

( ) a. 12½ months

( ) b. 8 months

( ) c. 15 months

2. Breeding at 15 months rather than 20 months of age in a herd will:

( ) a. Slow genetic improvement for production

( ) b. Not affect genetic improvement for production

( ) c. Speed up genetic improvement for production

3. Genetic Improvement in a herd results from

( ) a. Improved feeding

( ) b. Replacing poor cows with better ones

( ) c. Milking at regular intervals

4. Production differences between cows calving in Winter and Summer are usually due to

( ) a. The best cows calve in the Winter

( ) b. Feeding and management (environmental opportunities) for higher production is provided in the Winter

( ) c. Cows calving in the Summer produce more than Winter calves

5. Which is the most important information to use in evaluating a cow's own producing ability?

( ) a. Cow's own records

( ) b. Dam's records

6. Breeding first calf heifers to beef bulls:

( ) a. Slows genetic improvement for milk production

( ) b. Does not affect genetic improvement for milk production

( ) c. Speeds up genetic improvement for milk production

7. Which is the best milk transmitting sire?

( ) a. 20 Daus. Avg. 20,000 lbs. milk (2X-305-M.E.)

( ) b. P.D. = + 400 lbs. milk, 62% repeatability

( ) c. 10 daughters in one herd avg. + 800 lbs. above herdmates

( ) d. P.D. = + 800 lbs. milk, 90% repeatability

8. Which information tells us the most about a young sire's ability to transmit production?

( ) a. Dam's records

( ) b. Sire's proving

( ) c. Grandparents' records

9. Which young unproven bull would have the greatest odds of sireing the highest producing daughters?

	Young Bull's Sire	Young Bull's Dam
( ) a.	Young unproven	2-00 yrs. 305 days 2X 14,500 lbs. milk
( ) b.	P.D. = + 150 lbs. milk	6-00 yrs. 365 days 2X 21,000 lbs. milk
( ) c.	P.D. = - 600 lbs. milk Repeatability = 98%	3-00 yrs. 305 days 2X 32,500 lbs. milk
( ) d.	P.D. = + 1320 lbs. milk Repeatability = 94%	Estimated Average Transmitting Ability = + 750 lbs. milk Repeatability = 38%

10. What portion of the average differences between herd averages (2X-305-M.E.) is due to genetics and what portion due to environment (feeding and management)?

	Genetic	Environment
( ) a.	25%	75%
( ) b.	75%	25%
( ) c.	0	100%
( ) d.	100%	0

Thank you. If you have any comments on either the questions or the meeting please write them on the back of this form.

DAIRY SERIES EVALUATION

ANSWERS TO QUESTIONNAIRES

A

1. False
2. c
3. a
4. a
5. b
6. c
7. b
8. b
9. False
10. a

B

1. a
2. c
3. b
4. b
5. a
6. a
7. d
8. b
9. d
10. a