High Mastery Levels Achieved On Verbatim-Type Responses By Use of Lecture Objectives

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Abstract

In two of five semesters students from a junior-senior level crop production course were provided written lecture objectives at the beginning of each new major subject category. Students were informed that the majority of test questions from lectures would be based on data and concepts specified in the lecture objectives. Throughout the study period approximately 20 percent of the questions were identical or nearly identical. The remaining questions were changed because of updated course material and/or because an item analysis indicated something was wrong with the question. This study examined whether scores achieved on (i) identical or nearly identical questions, and (ii) all questions, differed when students were/were not provided lecture objectives.

The mean of each question was calculated and statistically compared by a standard t test. The means and standard deviations for similar or identical questions based on lecture objectives were 81.4 and 11.9 as compared to 68.8 and 18.0, respectively, when students did not have lecture objectives. The difference was significant at the 1 percent level. Students provided with lecture objectives also received higher mean scores on all multiple choice questions. These differences indicated that students provided with lecture objectives achieved higher scores on verbatim-type responses than students who did not have access to lecture objectives.

Introduction and Literature Review

Conscientious instructors constantly strive to improve the effectiveness of their lectures. Several learning aids have been integrated with the presentation of material to help students increase their comprehension of lectures. Techniques used include slides, lecture outlines, overhead projectors (Himes 1976), videotape clips (Burger and Aleamoni 1972), crop simulation models (Holt et al. 1976), and classroom demonstrations (Wolf and Carson 1975). In addition to these physical aids Baker (1969) and Shrode (1976) suggested methods to improve classroom student rapport.

Another technique is the use of lecture objectives. They are given to students prior to the lecture and specify data or concepts the lecturer has determined are the most important to aid students master the subject matter. Therefore, they are the source of many test questions. Generally Mager (1962) is credited with the increased use of objectives in classrooms. Elson (1972) and Gronlund (1970) suggested alterations and/or modifications to Mager-type objectives. Ching (1976) outlined a partial list of specific objectives used in a beginning agriculture economics course and Anderson (1974) listed objectives for an Agronomy course. Both examples were based on Mager type objectives. Lewis (1973) listed objectives for a soil morphology course based on Gronlund-type objectives. These authors and O'Conner (1973) summarized positive attributes of objectives as follows: (i) some concepts or data are more important than others, (ii) since students rarely retain all material presented in a course, use of lecture objectives insures that the information with which they become most familiar includes the most important data and concepts, (iii) they furnish the student with justification for critical reading, and (iv) they stimulate class discussion. Evidence to substantiate these attributes is limited. Anderson (1975), Royer (1977), and Staley (1978) reported improved performance with lecture objectives. Staley stated that improvement was greater with verbatim items than with paraphrase items. Vebatim-type responses are answers which are provided with the examination question and students designate the correct response, i.e., true/false or multiple choice. Paraphase type responses require students to write the answer as on an essay examination. Jacobson (1972) reported equivalent results on tests and that most students felt it was easier and more efficient to learn using objectives.

The purpose of this study was to determine whether students provided with lecture objectives, vs students not provided with objectives, received higher scores on tests.

Methods

In two of five semesters (1973-1977) in a junior-senior level crop production course students (40-60/semester) were provided with lecture objectives at the beginning of each new major subject category. Approximately ten categories were covered during a semester. The amount of material varied between categories and the number of lecture objectives ranged between 10 and 20/unit. Students were informed that the majority of test questions from lectures would be based on data and concepts specified in the lecture objectives. A similar aid was not provided for readings from the course textbook.

Three examinations were given each semester. During the first three semesters students did not receive lecture objectives, and both multiple choice and true/false questions were given. Scores were calculated by the computer from mark-sense sheets and questions were evaluated by an item analysis system similar to that described by Sorensen and Hart, 1975. The anaylsis indicated that most true/false questions did not discriminate between high-achieving and low-achieving students. Therefore, true/false questions were not given during the two semesters that students received lecture objectives. After each examination students were required to turn in the answer sheet inside the test instrument. After scanning, the optical sensory unit placed the student's score on the answer sheet. This score was placed by the instruc-

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tor on the test instrument and both the answer sheet and the test instrument were returned to students for class discussion of questions. After discussion the test instrment was returned to the instructor and then grades were recorded. Recording of the grades from the test instrument insured the security of questions during this study.

Results

Through the five year period of this study about 150 questions were given each semester and 24 multiple choice questions were either identical or nearly identical. A question was considered "nearly identical" if the wording was changed, but the degree of difficulty and knowledge required to answer the question was the same. Because of new information and/or poor questions (determined by the item analysis), the remaining questions were not the same throughout the study period. The means of each of the 24 questions for the semesters the lecture objectives were/were not available were calculated and statistically compared by a standard t test. The means and standard deviations for questions based on lecture objectives were 81.4 and 11.9 as compared to 68.8 and 18.0, respectively, when students did not have lecture objectives. The difference was statistically significant at the 1 percent level. Thus, a higher degree of learning with less deviation was achieved when questions were based on material emphasized via lecture objectives.

Data for each test during the study period for all multiple choice questions are presented in Table 1. Differences in test means of scores achieved between the two groups ranged from 1.2 to 9.1 points. Initially the author was surprised that there was not a greater difference in means between the two groups. An analysis of test questions indicated that during semesters that lecture objectives were available to students 79 percent of the multiple choice questions contained four or five choices as compared to 58 percent of the multiple choice questions given during semesters that students did not receive lecture objectives. Also by providing lecture objectives test questions could be designed to probe specific data in more detail.

Table 1. Scores achieved on all multiple choice questions by students who were/were not provided with the lecture objectives during a five semester study period.

Semester	Test mean scores: With lecture objectives			Without lecture objectives			
	Semester						
	1	2	$\bar{x}$1 & 2	3	4	5	x 3-5
	% correct						
1	77.9	79.5	78.7	62.5	72.4	73.8	69.6
2	73.5	67.7	70.6	57.5	70.3	70.7	66.2
3	72.5	68.8	70.6	64.0	74.4	69.8	69.4

Discussion and Summary

It seems logical that if students were told what topics would be emphasized on examinations, their scores should be higher than if they were not informed. However, in one of the four studies where measurements were made, Jacobson (1972) reported equivalent scores, and in another study Staley (1978) stated that providing objectives facilitated learning on verbatim but not on paraphase items. Since performance in Anderson's (1975) study and this one was measured with multiple choice questions, both studies would be classified as measurements of verbatim responses. Thus, providing students with lecture objectives improved student performance on verbatim-type questions. However, the usefulness in improving students' ability to apply or extrapolate has been measured in only one study and additional research is needed.

It also seems logical and inevitable that many students who were provided with lecture objectives would reduce the amount of time they would devote to organizing and reviewing notes, and evaluating which factors were most important. Some proponents of instructional objectives promote their use, in part, by reasoning that students should not be required to play guessing games with the instructor. I am uncomfortable with that rationale because a good examination should reflect the tenor of lectures; therefore, students aren't required to guess but rather to evaluate and consolidate relevant material presented in lectures. It is important that students have opportunities to develop these skills in our classrooms, and we need to determine if by providing lecture objectives such opportunities are significantly reduced.

The advantages listed earlier for objectives are valid and important; however, the major advantage of objectives is that students receive better lectures: to prepare lecture objectives the instructor must first determine what is important and why it is important to the student.

The challenge to instructors is to devise a system which incorporates the advantages of lecture objectives and neutralizes the risk that many students may utilize lecture objectives as a crutch rather than a positive aid.

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Providing Practical Training For Non-Farm Agriculture Students

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Abstract

The most efficient, most highly productive agriculture in the world has been fueled by a highly sophisticated agricultural technology which has been developed and applied to real agriculture problems on farms and in agricultural business and industry. Historically, most professional agriculturists have had a background in practical agriculture, but an alarming majority of college agriculture students today come from non-farm or urban backgrounds. Although agricultural graduates are still getting jobs, colleges and universities are genuinely concerned about the implications of graduating students who may not be able to relate and apply agricultural technology to practical situations. Some institutions are developing a capability to provide practical training for agriculture students. The successful experience of these institutions suggest some guidelines for providing practical training.

The New Breed of Students

Enrollments in colleges of agriculture have been steadily increasing. Young people are becoming keenly aware of career opportunities in agriculture. Placement possibilities have been good for college agricultural graduates. Included in this increased enrollment are substantial numbers of women and urban students, many of whom are motivated by a strong interest in the environment and a desire to return to the soil. In some colleges of agriculture, women make up as much as one-third of the total enrollment in agriculture. If enrollments in home economics are included, women make up as much as 50 percent of total enrollments in some colleges of agriculture. Approximately two-thirds of total enrollment in agriculture now comes from non-farm or urban backgrounds.

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Employer Preferences

A practical farm background may not be a requirement for employment, or for success on the job, for some agricultural occupations, especially those occupations based upon the application of highly specialized agricultural science and technology; however, a substantial portion of employers of college graduates from production agriculture-oriented programs still prefer applicants with a practical farm background.

In most colleges, there aren't enough graduates with a practical agriculture background to satisfy fully this employer preference. Colleges and schools of agriculture are keenly aware of these deficiencies in the practical aspects of agriculture among their students from urban areas and those from highly specialized farming backgrounds. There is genuine concern among many of these institutions for developing means for coping with this deficiency.

Why do employers want their professional workers to have a practical farm background? Reasons may vary according to the nature of the establishment, the products manufactured, the services provided, and the clientele served. A universal need of many agricultural establishments is to bring agricultural technology to bear upon the solution of practical agricultural problems. Capability to solve problems is contingent not only upon technical expertise, but also upon the ability of the professional agriculturalists to understand practical problems and to conceptualize possible solutions to these problems. Persons with a practical background in agriculture are usually preferred for agricultural teaching and extension work.

Providing Practical Training

Several alternative approaches could be considered as a means for providing practical training for agriculture students with an urban background:

1. Maximize use of existing university or college research farms, greenhouses, and orchards for field trips and other observational experiences, and utilize these farms to the extent possible for skill training without interfering with research activities.