

Evaluation of Student Response To Printed Instructional Material

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Abstract

Methods of presenting basic information and instructions were evaluated using student responses from 3 plant propagation classes. Learning, as measured by grades and observed student laboratory performance, was as high or higher when instruction was given orally as when printed handouts were used with or without discussion.

Introduction

The unprecedented growth in enrollment in all phases of agricultural education, and specifically in horticulture, has prompted universities to examine carefully the efficiency of their instructional programs. It was brought out at a recent symposium (1) that the curricula and methods then being used in many of the agricultural colleges and universities were not adequate to meet the needs of this large influx of students in a rapidly changing agricultural environment. Published texts were limited in many of the newly expanding areas of horticulture, and instructors had to begin developing their own printed materials. Teacher accountability for effective classroom presentations has received increased emphasis during this same time period. Instructors have attempted to use innovative techniques, but unfortunately, they have not always been successful (5).

Technology and knowledge have changed and expanded rapidly making it difficult to keep instructional materials current in all areas of learning. Instructors have been using increasing amounts of personally prepared handouts in an effort to keep instructional material current, improve its quality, and be innovative.

Although there are definite advantages to the instructor-prepared handout approach, it also has drawbacks. First, it is time consuming. If the major advantage of currency is to be maintained, the material must be continually updated. Journals received during even one term contain new items that can advantageously be incorporated into the class presentation. Secretarial and graphic arts assistance are also needed and expensive. Preparation time — both instructors' and secretaries' time — plus reproduction costs are serious drawbacks of the handout approach. Few departments can afford to provide free textbooks to students yet large quantities of handouts can have final total cost per student equal to that of a standard textbook.

Literature Review

The primary concern however, should be student learning. J. P. Mahlstedt (1971) said, "We must never

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lose sight of the reason why we are in higher education — to serve society through developing in youth, in particular, and people, in general, the ability to think and be creative" (4).

It is probably true that good students will learn regardless of the teaching techniques used. Burger and Seif (2) found no correlation between grades and time spent by students using study carrels. Wessel et al. (7) found no significant difference in grades between students using an audio-video, self-learning program and those given conventional classroom instruction. Although there is no one best way that students learn, research indicates that active participation does facilitate the process (3).

We need, therefore, to consider whether or not handouts are desirable from the student standpoint. We may be failing to help students develop the ability to listen, pick out important points, and take meaningful notes on those points. There is considerable indication that today's college students are woefully inadequate in the arts of listening and note taking. These skills are important for achievement not only academically but also professionally.

Purpose and Objectives

Most instructional budgets are severely strained because increased student enrollment has not brought compensating increases in revenue. Therefore, it is important to determine whether or not the use of extensive handouts is justified in terms of student learning. The objective of this study was to determine the effectiveness of written handouts in providing laboratory instructions and related in-depth background information. The experiment was designed to compare student response to instructions and information presented orally with response to instructions and information given on written handouts.

Figure 1. Form used by students for evaluation of method of lab presentation.

Name of lab:
Group number:
Individual number:
Type of handout:
Rate 1 (low) to 5 (high):
Background detail:
 Amount:
 Quality:
Instructional detail:
 Amount:
 Quality:
Predictive detail:
 Amount: (If rating is less than 5, explain whether too much or too little)
 Quality:
Record keeping instruction:
 Amount:
 Quality:
Could a short handout entirely replace discussion? (Yes or no):
Could a long handout entirely replace discussion? (Yes or no):
Could discussion and your notes entirely replace a handout? (Yes or no):

Table 1. Student evaluation of laboratory instructional method - means of ratings on scale of 1 (low) to 5 (high). Study 1, 33 students.

Information evaluated	Rating			
	L-D*	L*	S-D*	S*
Background				
1. Amount	4.4	3.5	4.1	3.6
2. Quality	4.2	3.1	4.5	3.8
Instruction				
3. Amount	4.3	3.7	4.1	3.7
4. Quality	4.2	3.5	4.4	2.9
Predictive detail				
5. Amount	4.0	4.4	4.2	4.0
6. Quality	3.0	2.6	2.6	2.9
Record keeping instruction				
7. Amount	4.0	3.9	3.8	2.7
8. Quality	4.4	4.5	4.5	5.0
Discussion and notes could replace S = yes	5.0	5.0	5.0	4.7
Overall rating	4.2	3.7	4.1	3.7

*L - long handout
S - short handout
D - discussion

Method

The complete study involved three separate plant propagation laboratory sections of approximately 30 students each.

Four styles of instructional handouts and an oral presentation without handout were used with a class in the first study. Presentation methods used included the following: (1) a complete handout giving objectives, detailed background information, step by step procedure, and references supplemented with a detailed oral class discussion; (2) the same handout without an oral presentation; (3) a handout giving only the laboratory procedures plus an oral discussion; (4) the short handout without discussion; (5) oral presentation and demonstration without a handout. Students in the last case were expected to take notes that they could follow in the laboratory to complete the assignment. The study was continued through six laboratory assignments. The lab instructional methods were randomly assigned to groups of students and were rotated so that each person received each type of instruction at least once. All the handouts and discussion were presented in class the day preceding the laboratory session.

Student performance in the lab was observed and note was made of those requiring the most assistance. An evaluation form rating the presentation was completed by the students (fig. 1). In addition, students were asked to relate the effectiveness of the handouts and oral presentation. All of the collected data was statistically analyzed by analysis of variance.

The second test was designed so that the students' laboratory grades could be recorded by type of instructional presentation. A similar plant propagation class was divided into three groups of ten students each. One

group received a short handout, the second group received a long handout, while the third group received no prepared material. All groups participated in classroom discussion of the laboratory activity for the following day. Again, those students given no handout material were expected to take notes during the discussion and to work from their notes in the laboratory. Students evaluated the instructional presentations in the same manner as before. Four separate assignments were included in the study, and the groups were rotated so that each individual received each type of instruction at least once.

The final part of the study was done to compare in another manner grades of students who received or did not receive handouts. The third class received no handouts for any of the laboratory work, and grades for each session were compared with those of the previous class for the assignment. This third class was comparable to the previous one (second) in academic background and level of achievement. The same criteria were used for grading students' work, and all written reports were graded by the same individual throughout the study.

Results

Students in the first test rated the handouts with discussion higher than the handouts without discussion in all but 3 of the 18 choices (Table 1). The overall difference between discussion and no discussion was highly significant at the .05 confidence level (Table 2). However, there was no difference in overall ratings between the long and short handouts; that is, if the student response means of the two short handouts are compared with the

Table 2. Means of student evaluations of laboratory handouts (HO) on scale of 1 (low) to 5 (high). Study 1, 33 students.

Question	Discussion vs. no discussion		Long vs. short form	
	HO-disc	HO only	Long	Short
Background				
1. Amount	4.25	3.6*	4.0	3.9
2. Quality	4.34	3.5*	3.7	4.1**
Instruction				
3. Amount	4.2	3.7*	4.0	3.9
4. Quality	4.3	3.2*	3.8	3.6
Predictive detail				
5. Amount	4.1	4.2	4.2	4.1
Quality	2.8	2.5	2.5	2.8
Record-keeping instruction				
7. Amount	3.9	3.3*	3.9	3.3**
8. Quality	4.5	4.7	4.4	4.8
Discussion and notes could replace S = yes	5.0	4.9	5.0	4.9
Overall rating	4.2	3.7*	3.9	3.9

* Indicates this pair of row means, discussion vs. no discussion, is significantly different at 5% level.

** Indicates this pair of row means, short vs. long form, is significantly different at the 5% level.

Table 3. Student evaluation of laboratory instructional techniques. Means of ratings on scale of 1 (low) to 5 (high). Study 2, 30 students.

Question	Rating		
	Short - Discussion	Long - Discussion	Discussion only
Background			
1. Amount	3.5	3.9	3.6
2. Quality	4.3	4.0	4.0
Instruction			
1. Amount	3.8	4.0	4.1
Quality	3.9	4.0	4.3
Predictive detail			
1. Amount	3.2	3.7	4.1*
2. Quality	3.7	3.8	4.2*
Record-keeping instruction			
1. Amount	2.8	3.5*	3.5*
2. Quality	3.0	3.3	3.5*
Overall rating	3.5	3.8	3.9
Mean lab grades based on scale of 10	8.2	8.1	8.3

* Indicates value is significantly different from lowest value in the row at 5% level.

student response means of the two long handouts, the difference is not statistically significant.

In the second test student grades were compared by the type of instruction received and also by the specific laboratory assignment. There was no interaction between laboratory activity and the style of instruction given.

The overall mean grades of students in Class 2 who used their own notes were slightly higher than grades of students receiving either style handout (Table 3). There was no indication of instructional style on assignments submitted or on test papers so that the instructor's grading was unaffected by this factor.

Student ratings for each type of presentation are also given in Table 3. Student ratings in Test 2 showed no statistically significant difference in response between the long and short form handouts for any item. There was slight preference for discussion and notes for those items where predictive detail and record keeping was required. Students rated long handouts higher than the short ones on these same items. Students who received only an oral presentation required less assistance during the laboratory sessions. Students who received only the handouts without discussion often failed to read the handouts prior to coming to the laboratory. Students participating in Test 1 indicated a preference for handouts; however, written comments on the evaluation sheets favored oral presentation. A majority of students in Test 2 also felt discussion and notes would be adequate for effective instruction.

Mean grades for Class 3, receiving no handouts, are given in Table 4. They tended to be higher in each case for the class receiving no handouts.

Discussion and Conclusions

This study suggests that learning and comprehension are as good or better when students actively participate in discussion and/or note taking during oral presentation rather than self study of prepared printed instructions. The results of this test seemed to indicate that handouts were less effective without discussion. However, handouts may be an effective way to vary teaching technique, and instructor-prepared material may be valuable for presenting detailed information that is not readily available from another source. It would seem that in view of costs and time of preparation, the procedure should be used only for data and material that will be retained for future reference.

Literature Cited

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Table 4. Comparative grades of class 2, 30 students, receiving handouts and/or discussion, with class 3, 32 students, receiving only discussion.

Lab	Means	
	Class 2	Class 3
Woody cuttings	8.1	8.6
Herbaceous cuttings	8.4	9.1
Seed propagation	7.8	8.9
Transplanting	8.5	9.0
Overall mean	8.2	8.9*

* Overall means significantly different at 5% level.



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