Conclusions

A weighting of grading components is generally achieved by assessing the validity, reliability, and uniqueness of each variable. The variability of the scores (standard deviation) must be examined before several weighted variables are combined. The mere adding of scores will not always yield the desired weights.

The five methods of grading described differed in their philosophical bases and in ther appropriateness from both educational and technical standpoints. There is no "right" method of assigning grades as long as educators differ philosophically about what a grade should mean. The relative grading method described is sound and attractive for those who use a norm-referenced approach. Those who prefer absolute standards should find merit in the absolute grading method described. Some variation in methods of grading can be tolerated as long as those methods are logically and educationally defensible.

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The Relationship of Carrel Use With Subject Matter Taught, Student Background, and Grades in an Autotutorial Crops Lab.

A.W. Burger and R.D. Seif

Abstract

No significant correlation between carrel times and/or total time spent in the laboratory with final course grades was found during four years (1972-1975) of autotutorial crop science laboratory teaching. Urban students spent either more carrel time or total laboratory time than did farm students in completing studies on the identification of common legumes and grasses as well as insects. No significant differences in either carrel or total laboratory times were observed between urban and farm students on studies of: (a) crop or weed seed identification, (b) corn and soybean seedling emergence, (c) basic genetics, (d) classification of flowering plant families, and (e) common crop diseases. Females spent more total laboratory time than males, but less carrel time in completing some objectives in crop science. Freshmen, students with no part-time employment, and students enrolled in non-engineering-mechanization curricula spent either more carrel or total laboratory time in completing some objectives than did sophomores and upper classmen, students with part-time employment, and engineering mechanization students, respectively. In 8 of 10 study units, student carrel times exceeded unit tape times.

Introduction

Autotutorial study by college students is not new (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14). An examination and/or evaluation of this system of teaching is important in order that such a program is conducted as efficiently as possible to promote learning.

The makeup of our University of Illinois college crop science classes is not stable from one year to the next. Five years ago, most of the students in our crop science course came from the farm or they had a farm background. In the spring semester of 1976, 40 percent of our crop science enrollees were from urban areas. Many more female students are majoring in Agronomy. Because of this ever changing makeup of our classes, it becomes necessary to adapt autotutorial materials so that urban as well as rural, female as well as male students can achieve equally well the learning objectives programmed for credit in crop science courses.

The total amount of student time spent in independent study carrels is important in the planning of future learning units. The alert instructor must be concerned constantly with whether there is enough time for all students with varied backgrounds to complete the lesson in a given subject matter within the laboratory period allotted for a given laboratory experience. Units may be too long, too challenging, or too tiring.

This paper examines the possible relationship of carrel use times with: (a) the many subject matter disciplines quite typically taught in a beginning crop science laboratory course at many institutions, (b) student backgrounds, and (c) final grades achieved in the course. It is hoped that the method used in measuring this possible relationship of carrel use times with the many factors of the student's background and environment will be useful to others in future planning and programming of autotutorial instruction.

Methods and Materials

A simple correlation analysis was made to test the possible relationship of carrel times and/or total laboratory times with final course grades of enrollees in the introductory crop science course during seven semesters, spring 1972 - spring 1975, at the University of Illinois. In this study, carrel times are defined as the actual amount of time in minutes consumed by a student in the study

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carrels at the beginning of a two hour laboratory period scheduled each week. Total laboratory times refer to carrel times at the beginning of the laboratory period plus additional time spent in the regular crop science laboratory in fulfilling the week's objective. The carrel study orients the student concerning the week's laboratory objective. The laboratory allows the student to work with live specimens and prepare seed, seedling, and other vegetative herbaria. In addition, the laboratory allows for study of specimens and solving problems related to the carrel orientation at the beginning of the two hour laboratory period. In this study, carrel times were monitored during three semesters, namely, spring and fall of 1974 and spring of 1975. Total laboratory times (carrel time plus regular laboratory time) were monitored during five semesters namely, spring and fall of 1972, spring and fall of 1973, and spring of 1975. Note that both carrel and total times were recorded for the spring of 1975 while either carrel or total laboratory times were recorded for other semesters. Students in the beginning crop science course regularly sign into and out of the carrels and/or the regular laboratory under instructor supervision after completing their study units. A standard test was used to test for differences between actual tape times (amount of time to play a given tape without interruption) and average student carrel times (amount of time the student has to listen to the tapes plus pause time needed to record notes or to study diagrams, etc.). Both total laboratory and carrel times were analyzed using standard analysis of variance. Differences noted are significant at the 5 percent level.

Results and Discussion

No significant correlation between student carrel times ($r = -.054$, spring 1974; .157, fall 1974; .088, spring 1975) and/or total student times spent in the laboratory ($r = -.030$, spring 1972; .234, fall 1972; .089, spring 1973; .195, fall 1973; -.014, spring 1975) with final course grades was found during four years (1972-1975) of autotutorial crop science laboratory teaching. Thus, the often assumed idea that the more time one spends in the learning center (carrels and laboratory) the higher will be the grades, is rejected. Since the students in this introductory course represent all four academic classes in college, it follows, perhaps, that some students require more study time than others for a certain level of achievement depending on previous learning.

Subject matter taught in various introductory crop science laboratories would be expected to be similar at most four year colleges in the United States. The amount of student time spent in mastering various learning objectives must be of primary concern to all crop science teachers if they are to use valuable laboratory time efficiently. Varying backgrounds of enrollees in a crop science course may result in a difference in the speed of mastering the different objectives. Thus, the measurement of time needed by students of varied backgrounds to complete different crop science laboratory study units becomes an essential part in the future programming of laboratory objectives. It is one of the purposes of this study to examine the amounts of time used by students with varied backgrounds in completing ten different subject unit often programmed in introductory crop science courses using autotutorial teaching across the nation. Only significant differences will be stressed in order that voluminous nonsignificant data in lengthy tables can be avoided.

Student carrel times on either crop or weed seed identification did not differ with sex, class, major, course load, amount of part-time employment or farm experience; however, the total amount of laboratory time spent by male students, 111", was less than that by female students, 131", on crop seed identification. Students with no part-time employment spent 117" on weed seed identification, compared to 107" for those with part-time employment. Further, mastering weed seed identification took less time, 100", for students with a 14 credit hour course load than those enrolled with course loads of: (a) less than 14, (b) 15, (c) 16, (d) 17, (e) 18, and (f) more than 18 taking respectively, 127", 122", 113", 113", 116," and 107." The normal course load range for students at the University of Illinois is 14 to 18 credit hours. Since the number of students taking less than 14 hours was very small, they may not represent the range in academic performance found for students taking a normal course load.

In studies on corn and soybean seedling emergence, which involves the learning of the two basic types of seedling growth, differences in total laboratory time use were observed for students with different academic class standings, part-time employment, and credit hour load categories. Freshmen took more time, 95", than either juniors or seniors who spent 83" and 87", respectively. Sophomores spent 93" on this unit; however, they did not differ significantly from freshmen on time use. Students with a 14 credit hour course load took less time, 82", than did students with credit hour loads of less than 14 - 94", 15 - 98", and 16 - 95." Students with credit hour loads greater than 16 did not differ in total laboratory time use from those with a 14 credit hour load. Similar to the result for weed seed identification studies, students with no part-time employment took more total laboratory time, 92", whereas those with part-time employment took only 85" to complete this unit on the hypogeal and epigeal emergence of corn and soybeans.

Farm background, major, sex, and part-time employment caused differences in carrel time spent in mastering the unit on the identification of ten common legume seedlings. Students with more than five years of farm experience took less time, 34", than urban students, who took 39" in completing this unit. Perhaps this result reflects the greater first hand familiarity with common farm legume plants by farm students than by urban students. Agronomy majors used more total laboratory time, 81", to master legume seedling studies than did students majoring in agricultural engineering-mechanization, who took only 66." Majors other than agricultural engineering-mechanization did not differ significantly from agronomy majors in total laboratory time

consumption on identifying common legume seedlings. These majors along with a listing of total laboratory times are: (a) animal science including dairy science, 85", (b) agricultural economics, 76", (c) agricultural science, 80", (d) core program (undeclared majors, usually freshmen and sophomores), 79." In mastering this same unit, male students took significantly more carrel time, 37", than female students, 31"; however, female students used more total laboratory time, 88", than did male students, who took 77." Similar to time use for both weed seed identification and corn and soybean seedling emergence studies noted above, students with part-time employment used less time, 72", than those not working part-time, who used 81" to complete this unit.

In studies involving the identification of fourteen common grasses by vegetative characters, students with differing farm experience and from different classes used different times in completing the unit. Freshmen used more time, 108" than did sophomores, 100", juniors, 95", and seniors, 97", in learning the identification of grasses via vegetative characters. Farm students used less carrel and total times, 51" and 98", respectively, than did urban students with 59" of carrel and 110" of total laboratory time in completing this unit.

The differing times consumed by students in different classes and from differing farm experience categories in the identification of grasses by means of floral characters parallels those registered for studies on the identification of grasses by means of vegetative characters noted above. Freshmen needed more time to complete floral identification of grasses, 43", than did seniors, who needed 37." Students with farm experience used less carrel and total time, 40" and 83", respectively, than did urban students who took 48" of carrel and 90" of total laboratory time in completing grass identification via floral characters. Thus, studies on grass identification by means of either vegetative or floral characters appear to be less time consuming for farm than urban students probably as a result of the former's previous knowledge of grass species through actual farm experience.

Males required 45" of carrel time compared to 40" for females in completing the unit on the characterization of various flowering plant families with emphasis on families incorporating weed species.

Personal farm experience again appears to be involved in allowing farm students to complete carrel times in 36" compared to 42" for urban students on studies of common crop insects and their control.

Perhaps similar training of students in basic genetics in high school or college plant science courses was responsible for no significant differences in either carrel or total laboratory times required to complete this genetics unit. College genetics is not a prerequisite course for the beginning crop science course.

Table 1 shows the actual tape times for the ten different subject matter units and respective average student carrel times during the fall semester, 1974 and the spring semesters of 1974 and 1975. In eight of the ten study units, student carrel times exceeded tape times.

Table 1. The Actual Tape Times for Ten Different Subject Matter Units and Respective Average Student Carrel Times During the Fall Semester, 1974, and the Spring Semesters of 1974 and 1975.

Subject Matter Unit	Actual Tape Time		Avg. Student Carrel Time	No. of students
Crop Seed Identification	49"	*	59"	215
Weed Seed Identification	40"	**	63"	214
Corn and Soybean Seedling Emergence	22"	**	41"	218
Legume Seedling Identification	22"	**	36"	216
Grass Identification - Vegetative Characters	36"	**	53"	223
Grass Identification - Floral Characters	38"	*	42"	212
Basic Genetics	27"	**	45"	217
Flowering Plant Families	48"	**	45"	210
Crop Insects: their identification and control	30"	**	38"	212
Crop Diseases: their identification and control	74"	**	71"	200

Standard t test used to test differences between actual tape times and average student carrel times. *Significant 5 percent level; **Significant at 1 percent level.

This finding suggests that students took sufficient time to take a good set of notes while listening to the tapes in their entirety. On the other hand, for studies on flowering plant families and crop diseases, the actual tape times exceeded the student carrel times. Obviously, some students could not have finished these lessons completely. Some taped lessons may be too long, too tiring, too challenging. Thus, the instructor would expect to analyze carefully the length and structure of such units as either plant family or crop insect studies cited above in order that the entire taped lessons are on target and related to the backgrounds of the students and the time allotted for completing the units.

Conclusion

A study of both carrel and total laboratory times of students enrolled in the beginning crop science course during seven semesters, 1972-1975, at the University of Illinois indicates that:

1. Final course grades of enrollees are not significantly correlated with either the amounts of time spent in the study carrels or the total amount of time spent in the laboratory.

2. Urban students spent more carrel time and/or total laboratory time than farm students in completing studies on several subject matter units commonly taught in introductory crop science laboratory courses, namely: (a) the identification of common legume seedlings, (b) the identification of grasses by means of either vegetation or floral characters, and (c) the identification and control of common crop insects.

3. Freshmen students spent more carrel and/or total laboratory time than upperclassmen in completing certain crop science laboratory objectives; namely, (a) corn

and soybean seedling emergence studies and (b) grass identification by means of both vegetative and floral characters.

4. Female students spent more total laboratory time than males in (a) crop seed identification studies, and (b) legume seedling identification. However, while males spent more carrel time on legume seedling identification, females spent more total time on this unit.

5. Students spent significantly more time in the study carrels than actual tape times in 80 percent of the study units, indicating adequate time for completing these units. Where tape times exceeded carrel times, tapes may be too long and thus may need modification. Such changes can be made accurately only by careful measurement of carrel and total times consumed in mastering various subject matter units by students of varying backgrounds and training.

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Resources for Teaching and Learning

Wesley J. F. Grabow

The Positive Approach

Dr. H. E. Gruber, an Austrian psychologist, states "child prodigies are developed and not genetic freaks. The average person is a potential genius." This indeed is a positive approach to teaching/learning. We also recognize that leaders are made not born. The simple psychological fact that you can provide experiences that will promote behavioral change is the basis of a positive approach that should guide our teaching/learning activities. Even the realm of intuition has been shattered. There is really no evidence that supports intuitive behavior. My brief thesis is that use of a positive approach can provide experiences that effect behavioral changes in the learner.

Because all behavior is related to some past experience we must constantly be aware of negatives, for they are learned too! Negative energy is stimulated by fear, guilt, threats, and intimidation. It doesn't last. It leaves utter fatigue in its wake. Little is retained, for a mechanism exists that encourages one to forget negative thoughts and ideas. Positive energy fed with enthusiasm lifts the learner higher, and success becomes self perpetuating and leaves the learner exhilarated to do more and better. Each new achievement intensifies and reinforces the attitude and enthusiasm. As they say, "it is a good tired!" Failure to reach an objective is not negative as long as you continue towards its accomplishment. As someone once said, "The only time you must not fail is the last time you try."

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THE POSITIVE APPROACH— when treed by a bear enjoy the view.