USING STUDENT RESEARCH GROUPS AS A SUPPLEMENT TO LECTURE

Daniel C. Voltz[1]

The Ohio State University,1328 Dover Road

Wooster, OH 44691

Abstract

Student research groups were included on a trial basis as a supplement to the traditional lecture format in an introductory plant pathology course. The first half of the course included traditional lecture, discussion, and laboratory settings. However, during the second half of the course, the student research groups worked on formal written reports and gave in-class presentations. The group assignment included a class presentation with the instructor's assistance and a formal written report.

Overall, student interest and performance in the course were improved. Several other positive benefits were observed. However, the instructor's out-of-class workload was considerably increased. In addition, a number of students indicated a strong preference for using the lecture-orientated format for the entire course.

Introduction

College introductory plant pathology courses typically include such topics as a brief historical background of phytopathology, plant disease concepts, nomenclature, disease symptoms and signs, causal agents, epidemiology, and disease management strategies. Traditional lecture and laboratory settings are employed as the major method of instruction. Assessment consists of quizzes, midterms, a comprehensive final, and laboratory reports.

Formal lectures have been the traditional method of teaching in higher education, particularly in introductory courses. It has long been recognized that the lecture format places students in a passive learning role (Bligh, 1972, McKeachie; 1980). This passive approach to education can hinder learning (Chism et al, 1997). Information will be processed more effectively if the student is actively engaged in processing the material rather than passively soaking it up (McKeachie, 1980). Retention of information presented in lectures is inferior in delayed tests of recall than the same information taught by more active methods such as discussion (Bane, 1931). Lectures fail to sustain student attention and the material presented tends to be forgotten quickly (Chism et al., 1997). A basic assumption inherent in the lecture method is that all students learn at the same rate and at the same level of understanding (Chism et al. , 1997).

Bligh (1972) encouraged instructors to use a variety of teaching methods to cater to the differences among students. Newcomb and Trefz (1987) suggested that university agriculture programs need to help students develop skills in communication, higher level thinking, and creativity that are required for success in professional careers in agriculture. Bruening's (1990) research indicated that instructors commonly find that students enjoy working in cooperative groups. A number of instructors in colleges of agriculture have reported in recent years on their efforts to incorporate cooperative learning projects into their courses in order to promote positive group interdependence, improve

[1] Assistant Professor

critical thinking, and increase active learning (Murano and Knight, 1999; Retmeier, 1995). However, comparative studies have shown that lecture was better for low-ability students, and discussion was better for high-ability students (McKeachie et al., 1964; Ward, 1956).

I have taught an introductory plant pathology course to horticulture students at The Ohio State University, Agricultural Technical Institute for two years. I employed the traditional lecture and lab teaching format and assessment methods. The overall course grade was assigned based on the following criteria: quizzes = 25%, midterm = 30%, lab = 20%, and a comprehensive final exam = 25%. Based on information in the literature, student performance and feedback, and my evaluation of the course, I decided to incorporate an interactive group learning activity into the course format and assessment procedure to encourage oral student participation and interest in the science of plant pathology.

Methods

Disease of Ornamentals and Turf is a three-credit (quarter basis) course required for all horticulture students. Students attend three, one-hour classroom sessions and one, a two-hour lab per week. Typically, about 50-60 students are enrolled in each classroom section and 20 students are enrolled in each lab section. For the Winter Quarter, 1999 offering, I developed, an interactive learning activity which I named Plant Disease Research Groups (PDRG's). My objectives for using the PDRG's as a learning activity were: 1) to stimulate student interest in the subject matter; 2) to encourage teamwork; 3) to enhance public speaking skills; 4) to provide practice writing reports; 5) to analyze and synthesize complex data; and 6) to refine decision making skills.

During the first half (five weeks) of the course, students were introduced to the basic principles and practices of plant diseases and control using the traditional lecture and discussion format. For the second half of the course, the classroom sections were divided into ten PDRG's, each with five to six students. Groups were organized alphabetically by last names.

Each PDRG was assigned a plant disease commonly encountered in the industry. I selected the topics for the groups so that there would be a balanced selection of diseases caused by fungi, bacteria, virus, nematode, and abiotic factors. Three weeks of classroom time were allotted to the PDRG's for research and information organization. The instructor provided a selected list of reference materials and the PDRG's were also encouraged to use library and other information sources.

Each member of a PDRG was required to take lead responsibility for a particular facet of the assigned disease, such as its history, causal agent, symptoms, epidemiology, or management, and provide at least one reference for group use. A minimum of five references was required for each PDRG, four of which had to be print sources. Use of additional references was strongly encouraged, including some from the Internet.

Each PDRG was required to prepare a 15 minute oral classroom presentation and a written report. Class times during the ninth and tenth week were used for PDRG oral reports. The written reports were assembled in book form and placed on closed reserve in the library for student use.

The oral and written assignments were graded on a group basis. The PDRG grade counted 20% of the course grade. This was accomplished by reducing the laboratory and final exam from 20% to 10% and 25% to 15%, respectively. In addition, the standard in-class final exam was replaced by a take-home final based on the oral and written information presented by the PDRG's. The overall course grade was assigned based on the following criteria: PDRG written & oral report= 20%, quizzes = 25%, midterm = 30%, lab = 10%, and a take home final exam = 15%.

Results and Discussion

I observed a number of benefits with the use of the PDRG's as a supplement to the traditional course format. Students exhibited an improvement in attitude, motivation, and interest in the subject matter. The students were successful in working together as a team and enjoyed the camaraderie of classmates. Student attention was focused on the group assignment and other groups members instead of on the instructor. My role changed from lecturer to facilitator. Informal discussion sessions among students and between students and me became commonplace during the group activities. The increased use of higher order thinking skills was apparent.

I obtained additional feedback concerning the PDRG's by conducting an informal student survey. Students responded by e-mail, written and verbal comments in class, and by visiting my office. Most of the students stated a preference for the PDRG's, citing many of the positive benefits that I discussed above.

I did observe some negative aspects of using PDRG's. A major problem was the increased amount of time the instructor devoted to the course. This additional time was required due to the need to meet more often with students outside of class, assist students in finding references, helping students interpret the research articles that they collected, and grading the additional oral and

written reports. I also noticed problems of absenteeism within some of the groups which lead to disruptions in harmony.

Students also noted some criticisms of the PDGR's in their survey comments. One of the most frequent criticisms was the amount of time and work involved in this project. Much of the assignment could be completed during regular class sessions, there still was additional work required outside of class. Some students objected to the way groups were assembled, to the assigned plant disease, and to certain individuals in their group. Some concern was also expressed about group members who didn't do their fair share of the assignment.

Conclusion

I believe the PDRG activity was successful overall. The change from passive to active learning was accomplished with improved attitudes and an increased interest in the science of plant pathology. Many of the students' grade performances in the course improved during the last five weeks. The PDRG's definitely increased the students' responsibility for, and controls of, class time, course content, and grade earned.

I plan to continue the use of PDGR's in future offerings of the course and encourage others to try this approach. However, based on this trial effort, I have developed several recommendations for changes which I plan to implement. These suggestions follow: 1). Students organize themselves into groups with instructors' assistance; 2). Students choose their own diseases based on PDRG's interests; 3). Students grade their classmate's oral presentations, but not their own.

Literature Cited

Bane, C.L. 1931. The lecture in college teaching. Boston, MA: Badger.

Bligh, D. 1972. What's the use of lectures? Harmondsworth, England: Penguin.

Bruening, T. 1990. Cooperative learning as a teaching strategy. Agric. Educ. Magazine 64(2): 12-14.

Chism, N., J. Christopher, R. Mountford, B. Macce, C. Stanley, N. Single, and J. Bonilla. 1997. Lecturing and us ing instructional technology. In: Teaching at the Ohio State University: A Handbook. Faculty and TA Development, The Ohio State University, 4th Revised Edition.

McKeachie, W.J., R.L. Isaacson, and J.E. Milholland. 1964. Research on characteristics of effective teaching. University of Michigan, 1964. (ERIC Document No. ED 002 948).

McKeachie, W.J 1980. Improving lectures by understandi ng students' information processing. In: W. McKeachie, Learning, cognition, and college teaching. New Directions for Teaching and Learning, No. 2 (pp 25-35). San Francisco: Jossey-Bass.

Murano, P.S. and T.D. Knight. 1999. Introducing a cooperative learning term project into an introductory food science course. NACTAJour. 43(4): 21-25.

Newcomb, L.H. and M.K. Trefz. 1987. Toward teaching at higher levels of cognition. NACTAJour. 31(2): 26-30.

Retmeier, C.A. 1995. Cooperative learning increases student interaction in food science courses. 1995 IFT Annual Meeting: Book of Abstracts. Institute of Food Technologists, Chicago, IL, USA. (Abstr. 12A-4).

Ward, J.N. 1956. Group Study Versus Lecture-Demonstra tion Method in Physical science instruction for General Education College Students. Jour. Exp. Educ. 24: (197-210).

Editor:

Bob Gough, Ph.D.

Montana State University

Dept. of Plant Science

PO Box 173120

Bozeman, MT 59717-3120

Ph: 406-994-6523

rgough@montana.edu