

10. Worked with consultants to develop matching curriculum materials.

As the North Carolina course was being developed, the pilot teachers and the curriculum committee realized the need for a comprehensive and up to date agricultural biotechnology curriculum. The National Agricultural Council was interested in supporting the development of such a curriculum. Smith and Strozier consulting firm was identified as having developed biotechnology curriculum and having assisted with various high school agricultural projects in North Carolina. Current agricultural applications of biotechnology were integrated with employee skills identified in the "National Voluntary Occupational Skill Standards for Agricultural Biotechnology Technicians" and the course competencies of the North Carolina Biotechnology and Agriscience Research course to create the framework for the "Biotechnology for Plants, Animals, and the Environment" curriculum.

The "Biotechnology for Plants, Animals, and the Environment" curriculum was piloted in North Carolina and nation wide by the National Agricultural Education Council during the spring of 1999. This curriculum is complete and will be available for purchase by the National Agricultural Education Council in the spring of 2000

Results To Date

The goal of this project was to expand biotechnology education among Agricultural Education students in North Carolina. During the 1998-1999 school year, 98 students were enrolled in the Biotechnology and Agriscience Research course at pilot schools. An additional 295 students took part in one or more of the biotechnology labs integrated into an existing agriculture education course. In the summer of 1999, pilot teachers conducted a teacher workshop at the annual N.C. Agricultural Education Summer Conference to introduce over 50 teachers to the course and new curriculum. In the fall of 1999, the pilot teachers presented an introductory NATA workshop to showcase the curriculum to over 100 teachers nationwide.

Implications

In this project, many partners of education have come together to deliver biotechnology education to agriculture education students. The purpose of agriculture education is to educate and train future leaders and employees of the agriculture industry. The success of these students will depend on their knowledge of current technology including biotechnology. In turn, the biotechnology industry will depend on the agriculture industry to understand and utilize biotechnology products and processes. Biotechnology education should and is an integral part of agriculture education.

Future Plans

In the spring of 2000, national train the trainer workshops will be conducted by the National Agricultural Education Council to distribute the curriculum nationwide. The North Carolina pilots will continue to serve as model/pilot programs. The projector director will research the barriers of adoption of the course and curriculum in North Carolina. North Carolina State University will create an item bank of multiple choice objectives for post assessment/accountability requirements.

TEAM WORK

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Introduction

In any career, you will spend an enormous amount of time working with people. This involves experience in organizing, managing and coordinating groups, projects, and events. Teamwork, leadership and problem solving skills have been identified as important interpersonal skills being sought in potential employees. In research by Bruening, Cordero, and Scanlon, (1996), one employer stated "...the one consistent thing I am looking for...is team work...the ability to work well with others and the ability to feel part of the team....". Jill Stephens, Director of Corporate Outreach with America Online stated "you absolutely have to be able to work in teams, rather than being purely self-oriented." (Techniques, 1997)

People can play various roles within group situations. These roles are team-centered and self-centered. Team-centered roles are concerned with helping the group work toward cooperation and accomplishment and are used to make the team more effective. These roles help build a harmonious group, and are involved in coordinating task accomplishment. Self-centered roles are concerned with personal goals and are often destructive in group situations. (Clifford & Robinson, 1974). Learning to be a team player takes practice.

How It Works

Teamwork is used as a group learning strategy in the Issues in Agriculture course. A main goal of the course is to help students gain the ability to use team approaches to problem solving and decision making in the context of agricultural issues. This goal is accomplished through small group activities such as simulation activities,

presentations and papers, and organized discussion meets. Each student is challenged to address selected issues, to identify problems and causes, to analyze and synthesize all available data, and to bring multiple sources of knowledge and skill to the group in order to make logical recommendations toward resolving the problem. Each group consists of 3-5 students. Students are assigned to a group based on the results of the Myers-Briggs Type Inventory or chosen by classmates. The various methods are used to foster an understanding of the group process and problems associated with working in a group. The following steps are used for group projects:

1. Groups are assigned an issue for resolution.
2. The group decides how to approach the gathering of background information
3. The group develops an organizational structure and outlines the issue.
4. The group writes a paper concerning the issue.
5. The group chooses a method of presentation and presents the issue to the class.
6. Each student writes a group process essay to explain what he or she learned from the group experience.

An example of the group working together is the final project. This project consists of a paper and discussion meet. Groups are assigned based upon a common interest and divided into opponents and proponents of the issue. The discussion meet is designed to teach the value of compromise, to effectively solve problems through discussion, stimulate logical thinking, develop the ability to listen, and assist the individual in learning to give and receive criticism in a meaningful manner.

Results

The group process essay is used to evaluate the effectiveness of using teamwork in the classroom. The essay provides an analysis of the group experience and is written after each group paper and presentation. The following comments are responses from student process essays:

Worked well in the group because personalities complemented each other.

We had a common interest/goal and divided the tasks equally.

Worked well around everyone's needs and the group's needs.

Communication was verbal and nonverbal.

We listened, supported each other, and compromised.

Time was the biggest problem.

We didn't have consistent involvement.

The group accomplished its' goal.

Group members were prepared for discussion.

Future Plans/Advice

When planning to use group activities to teach teamwork skills, it is important to set specific guidelines for group interaction. The use of group activities involves each student in the learning process and fosters an environment of cooperation and learning. It is important to allow class time for the initial group meeting.

References

Bruening, Thomas H., Cordero, Ana, and Scalon, Dennis C. (1996). An industry perspective on changes needed in agricultural education curricula. *Journal of Agricultural Education*, 37(2).

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