Academic Controversy: Fostering Constructive Conflict in Natural Resources Education

Steven E. Jungst,* Janette R. Thompson, and Gary J. Atchison

ABSTRACT

Students who graduate from natural resource management curricula are virtually assured of having to deal with controversial public issues throughout their professional careers. Regardless of whether or not students will face such issues after they graduate, they can benefit from learning strategies that foster productive conflict in the classroom. Such strategies can lead to deeper understanding of issues than would be the case with lecture formats or outside readings. This paper discusses the use of a strategy called an academic controversy to facilitate critical thinking about, and deeper understanding of, natural resource issues. A format is given for conducting an academic controversy in the classroom along with suggestions for timing of the strategy. Students who have been involved in such controversies in forestry at Iowa State University rate themselves highly on team skills used during the controversy. Their overall impressions of the exercise are quite positive. Instructors have observed that students stay more focused on the problem being discussed than when the material is presented in a lecture format. The authors have not conducted controlled experiments to compare students' level of understanding between those who have participated in an academic controversy and those who have not. However, discussions and exam scores following the use of this strategy indicate that students do, in fact, develop a better understanding of central issues as a result of having experienced this strategy. Suggestions are also provided for other techniques to assess the effectiveness of the strategy.

A considerable body of research suggests that, where there is little conflict over issues, there is also likely to be poor decision making…. Constructive conflict is a vital resource for social and organizational learning. Orchestrating conflicting perspectives ensures that key information that might otherwise be lost to view is brought to the fore, so that factions might learn from one another.

Bowman (2001)

WITHIN the broad arena of natural resource management, conflict abounds. The editorial pages of newspapers, public hearings dealing with resource management plans, and discussions over coffee at local cafés often illustrate that there are numerous differing opinions about the best course of management for natural resources. Opinions are numerous, divergent, and strongly held. Unfortunately, strongly held, divergent opinions often lead to conflict, but not necessarily constructive conflict.

Department of Natural Resource Ecology and Management, 253 Bessey Hall, Iowa State Univ., Ames, IA 50011-1021. Received 9 Aug. 2002. *Corresponding author (sejungst@iastate.edu).

Unproductive conflict exists when individuals or groups cannot, or will not, look beyond their own concerns. Constructive conflict, on the other hand, is an approach to problem solving that leads to deeper understanding of issues of and more enduring solutions to problems. It is characterized by groups who are willing to (i) listen openly and carefully to the arguments of others, (ii) build on the ideas of others, (iii) seek common ground, and (iv) find a solution that is better than that of any single interested party. Such an approach is inherent in the U.S. judicial process. Herreid (1996), writing about the use of academic controversy centered on legal issues, says, "Whatever else it does, the adversarial system hones the wits of participants and brings the issues of any problem into sharp focus."

Students in natural resource management disciplines can benefit tremendously by participating in classroom strategies that involve constructive conflict that leads to a negotiated solution. Cognitive research has demonstrated that learning is social and situational (D'Arcangelo, 1992), that it is enhanced through active participation of the learner (Nastasi and Clements, 1991; Cavalier et al., 1995; Springer et al., 1997), and that generating emotional involvement on the part of students is an important part of the learning process (Leamnson, 2000). Constructive conflict that includes effective negotiation encompasses all of these aspects of learning.

CONSTRUCTIVE CONFLICT IN THE CLASSROOM

Herreid (1996) discusses the use of structured controversy in biology classrooms to hone students' debating skills and to involve them more actively in their own education. He describes two approaches for conducting a structured controversy. The first is a structured controversy as described in Johnson et al. (1992). This approach makes more extensive use of classroom time. The second approach described by Herreid (1996) utilizes more out of class time for students to research their position and write position papers (one supporting and one opposing the issue). Class time is then used for students to role-play the two sides of the issue, discuss both sides of the issue, and ultimately, to try to reach consensus about the issue. However, student team consensus may not always be possible. Campa (1995) discusses the use of constructive controversies in his classroom in both informal and formal settings. He used informal controversies in his class initially to help students gain necessary background information. Toward the end of the course, he used more formal controversies to help students integrate a number of concepts and issues that had been discussed throughout the semester.

In this paper, we discuss the use of a classroom strategy referred to as an academic controversy to foster constructive conflict in the natural resource management classroom. The approach used is flexible enough that it can occupy as little as a single class period if necessary. The basis for the strategy is suggested by Johnson and Johnson (1992). We also identify

specific steps necessary to effectively conduct an academic controversy as well as caveats to instructors planning to employ the technique in their own classrooms.

An academic controversy is a highly structured, learning-centered strategy that helps student groups systematically work through constructive conflict (Johnson et al., 1991b, p. 7:01–7:26). The purpose of using the strategy may be to have students try to reach consensus on an issue, or it may simply be to have them thoroughly explore the facets of an issue. Because of its structure, and because of the learning-centered approach, the strategy helps students practice critical thinking skills and can help them reach a deeper understanding of issues than is possible through lecture presentations or assigned readings. Huba and Freed (2000) discuss the use of assessment to develop critical thinking and problem solving abilities in students. One of the characteristics they discuss is the use of authentic tasks that "address important recurring issues or enduring problems…and replicate challenges adults face in their daily lives or representative challenges within disciplines." Academic controversies are one example of such an authentic task.

Before discussing the logistics of an academic controversy, it is appropriate to identify two key elements that make this strategy more successful. First, the instructor is responsible for (i) creating a *safe* atmosphere in the classroom, and (ii) if necessary, teaching students certain team skills so that their controversy teams will function effectively.

The importance of a safe atmosphere cannot be overstated. If students are expected to actively enter into discussions where differing opinions are expressed, they must feel comfortable expressing these opinions. According to Sousa (1995), learning occurs most easily in "environments free from threat or intimidation." Depending on the instructor and the students, a safe atmosphere may develop rather quickly, or it may take much longer. Activities in the classroom that demonstrate to students that their thoughtful input is valued, that there is room for disagreement on issues without fear of embarrassment, and that everyone's input is encouraged help create such an atmosphere.

To function effectively in teams, the students also must exercise a number of interactive skills. Johnson et al. (1991a) outline a number of important team skills and discuss techniques for teaching those skills. Among the most important for conducting successful academic controversies are: active listening, encouraging participation by all, seeking clarification and elaboration, asking for justification, and challenging ideas not people. Often, instructors assume students already possess these skills, but instructors and students alike can gain a great deal from a few brief sessions focusing on their importance. Using strategies to teach these skills and giving students opportunities to practice them and reflect on their use are an important prelude to the use of academic controversy. Typically, student use of these skills should be monitored and evaluated by instructors during the early stages of development of the skills. Monitoring those skills that relate to effective (and civilized) argument during an academic controversy is also helpful. Such monitoring can be done by the instructor or may be assigned as a student role within each of the controversy teams.

Table 1. Examples of statements or issues for use in academic controversies.

Scientific evidence
- Is wildfire beneficial to wildlife?
- Is clear-cutting a good management tool for red oak?
- Does hunting provide effective management for deer herd size?

Ethical issues
- Should private forestland owners be required to modify management activities to favor endangered species?
- To what extent should clear cutting be allowed on national forests?
- To what extent should oil and gas exploration take place on Alaskan wildlife refuges?

Fundamental issues
- Should Iowa have a hunting season on mourning doves?
- Should a particular road be built through a particular wetland?
- Should red cockaded woodpeckers be added to the endangered species list?

ORCHESTRATING THE CONFLICT

At the heart of academic controversy lies a statement or an issue that can be supported (defended) or opposed. Because the statement or issue sets the stage for the remainder of the academic controversy, it is important for the instructor to think carefully about the intended purpose(s) of the activity. In some situations, the most important purpose for the controversy is to give students a chance to experience and practice the technique itself for possible use in conflict resolution later in their careers. In other cases, the main purpose is to have students think more carefully about a particular issue than they might otherwise.

Careful thought about how the statement or issue is presented to the students is important. Statements and issues can be divided into three categories (Table 1). Some hinge on the strength of scientific arguments that can be made in support of or opposed to the issue. The question of whether wildfire is beneficial to wildlife is largely such an issue. Science-based information about the impact of fire on wildlife habitat, on water quality, and on individual animals is available. Once that evidence is carefully reviewed, it is relatively easy for students to reach consensus on the issue. A second group of issues or statements have strong ethical implications. Certainly, scientific evidence can be brought to bear on the issue of whether private forestland owners should be required to modify management activities to favor endangered species. However, there are a number of ethical considerations that students must work through as well. Such issues often involve compromise to reach consensus. Clabaugh and Rozycki (1997) refer to the third category as fundamental issues. If an issue involves choosing one option or the other and either choice precludes the other, the issue is fundamental. Issues that involve doing or not doing something often (though not always) fall into this category. For example, *Should Iowa have a hunting season for mourning doves?* is such a fundamental issue. Often, these issues also have substantial ethical implications as well. In the case of whether oil and gas exploration should take place on Alaskan wildlife refuges, varying degrees of exploration are possible. If the issue is stated so it either allows exploration or prohibits it, the issue becomes fundamental. If, however, the possibility of differing amounts of exploration are allowed where banning exploration on some refuges would not preclude exploration on other refuges, then the issue more appropriately falls in the category of an ethical issue.

Table 2. Introduction used to set the stage for an academic controversy involving red-cockaded woodpeckers.

Should the red-cockaded woodpecker be added to the endangered species list?

The U.S. Congress passed the Endangered Species Act in 1973 to provide for the conservation and preservation of the diversity of wildlife that resides in the USA. Under the Act, the Secretary of the Interior oversees the protection of fish, wildlife, and plants found to be in serious danger of extinction throughout all or a significant portion of their range. The U.S. Fish and Wildlife Service follows a formal rulemaking procedure to determine which species should be placed on the list, reclassified, or delisted. This process involves the participation of all interested parties, including the general public, the scientific community, other U.S. government agencies, and occasionally foreign governments. If a species is listed, it is given full legal protection under the Act, which forbids importing, exporting, killing, harming, harassing, or possessing protected organisms. The penalties can be heavy, up to $100 000 or 1 yr in jail.

The red-cockaded woodpecker was once a common bird throughout the southeastern USA, ranging from Texas to Florida, and north to Missouri, Kentucky, and Maryland. Now, its range and population have been all but eliminated. The species requires old-growth long leaf pine (or over mature loblolly, shortleaf, or slash pine) to excavate cavities for roosting and breeding, and to provide suitable areas for foraging. Very few suitable timber stands remain.

For today's exercise, you are a member of a coalition required to present a recommendation to the Secretary of the Interior on the addition of the red-cockaded woodpecker to the endangered species list, to be managed in accordance with the Endangered Species Act. *The decision you are about to make is very serious.* There are many pragmatic and economic consequences of an endangered species listing. Sometimes, listing a species can do more harm than good, even to the listed species itself. However, the demise of the woodpecker is nearly certain if it is not listed.

To help you make your decision, you will engage in a structured activity called an *academic controversy*. You will be assigned a partner and a position to support. For the time being, it is your job to support your assigned position as fully as possible, whether you personally agree with the position or not.

To set the stage for the controversy, it is useful for the instructor to provide a setting for the issue. An example of how students were introduced to an academic controversy involving red-cockaded woodpeckers is shown in Table 2. Emphasizing the importance of the decision to be made helps put students in the proper frame of mind for developing their positions and for the discussions that will ensue among team members.

The steps necessary to conduct an academic controversy are shown schematically in Fig. 1. Each of the elements of the flow chart is presented in more detail in the following paragraphs.

Forming Teams and Subgroups and Assigning Positions

As Brickell et al. (1994) suggest, purposive assignment of students to teams by the instructor will result in better group performance and functioning and more positive student attitudes about the learning experience than student-selected teams. The instructor should think carefully about team and subgroup makeup to take full advantage of student backgrounds and abilities. As an example, a course on fire control and management taught by one of the authors contained 32 students—16 animal ecology majors, 8 forestry majors, and 8 from numerous other disciplines. Ensuring that there were two animal ecology majors and one forestry major on each of the four-person teams with one animal ecology major on each of the subgroups within teams proved to be very effective for dealing with the issue of the impact of wildfire on wildlife.

Likewise, subgroups should not be left to decide for themselves whether their initial position will be to support or oppose the issue. Depending on the instructor's purpose, the decision might be made to form subgroups based on students'

predisposed position, or students with similar predispositions could be placed in different subgroups.

Individual Student Preparation

Once teams and subgroups have been formed and initial positions assigned, it is important to require students to begin the development of reasons supporting their assigned position individually. The amount of time allowed for this step may vary significantly, but this step should not be omitted. There are three compelling reasons for doing this. First, requiring individual, independent work of students helps hold them accountable for input for developing an argument. Second, this step ensures that students have something to bring to the discussion that will take place later in the academic controversy. Third, this step gives students time to start formulating their own thoughts before having to present and defend them to others.

Subgroup Sharing of Reasons

When sufficient time has been allowed for individual development of position, students are asked to work in their two-person subgroup. The purpose of this interaction is to share with their partner the list of supporting reasons for the position that they have developed individually. Beyond that sharing, however, should be the clear expectation that the subgroups are going to use this time to further develop the list, search for fallacies in reasoning, and strengthen their arguments. Frequently, as a result of this discussion, the two-person subgroups will make significant additions to their position, and they may agree to reject some of the reasons developed individually for lack of supporting evidence. This typically is a time when students begin to take ownership of the position they have been assigned.

Interaction among Subgroups of Like Position

At some point, it will become evident to the instructor that subgroups working independently have exhausted productive discussion. To reinvigorate the discussions, and to shed additional light on the positions, students are asked to interact with subgroup members from other teams who have been assigned the same position on the issue. This is facilitated by cues that help students quickly and completely identify all of the class members who are developing the same position on the issue (e.g., nametags with position indicators, color-coded briefing sheets for different positions, or designated locations in the room where proponents of a particular stance on the issue may gather). The assignment during this part of the academic controversy is for students to seek input from as many others developing the same position as possible.

The process that ensues can be left purposely unstructured. Sometimes the two members of a subgroup will decide to work independently in an effort to canvas as many other students as possible. Other subgroups may elect to stay together so that both members have the benefit of first-hand discussion with others developing the same position. In an academic controversy centered on the public taking of lands to protect special natural resources, student subgroups assigned to the position against the taking met as one large group to discuss their position, while at the same time students assigned the supporting position were engaged in one-on-one interactions
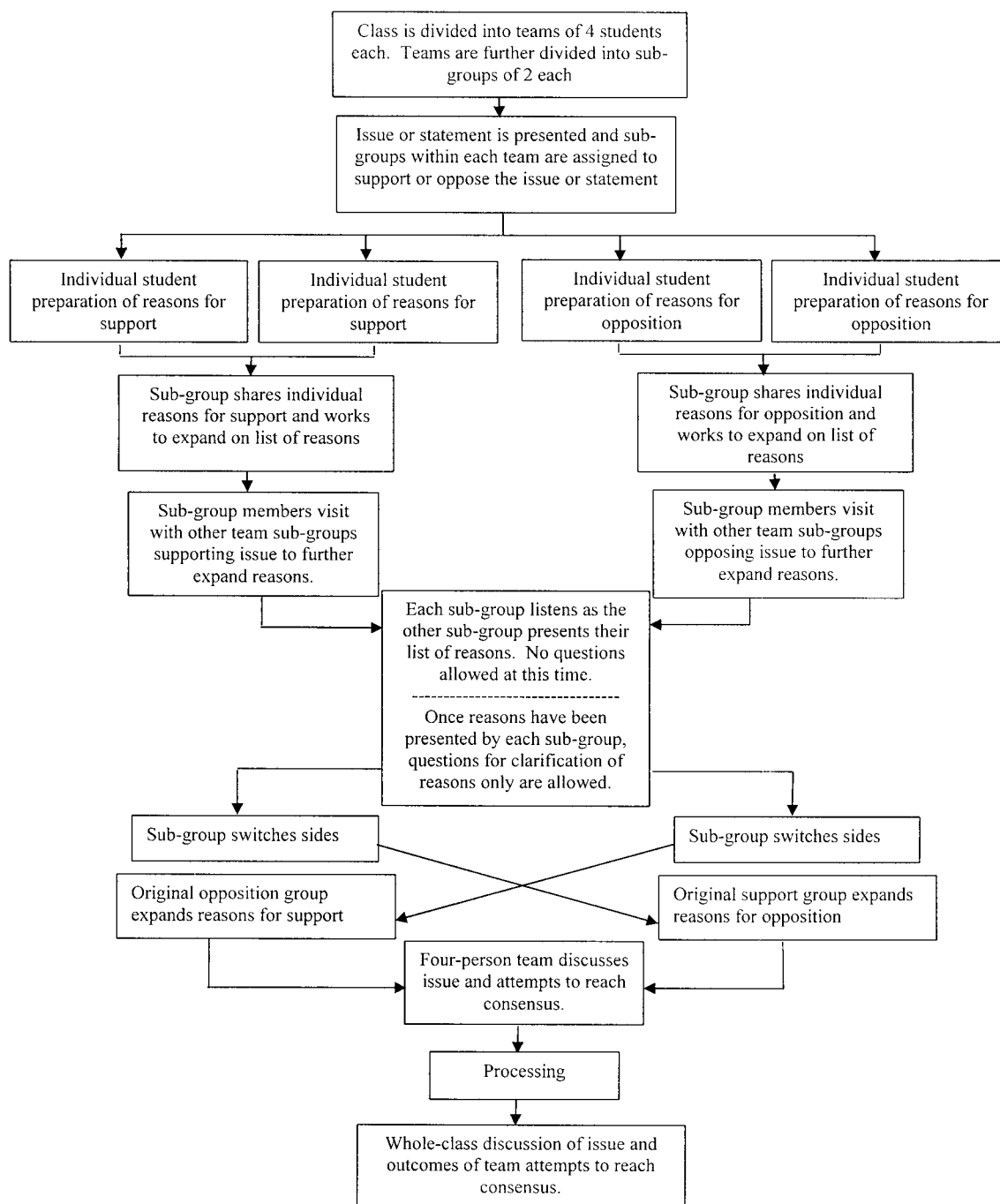
Fig. 1. Flow of important steps used in conducting an academic controversy in the classroom.

with members of different subgroups. Regardless of how students elect to accomplish the task, the interaction almost always generates new insights.

Team Sharing and Questioning

Once students have had an opportunity to talk with other subgroup members developing the same position, it is time to bring the teams back together again. The goal of this part of the exercise is to ensure that each subgroup develops a clear and complete understanding of the other subgroup's position and supporting reasoning. At this time, one of the subgroups

shares the reasons they have developed for their position. The other subgroup should be actively listening to the arguments, and taking whatever notes they wish, but they are asked not to challenge or ask questions about any statements made. When the first subgroup has given the reasons supporting their position, the other subgroup presents their support for the opposing position.

When both subgroups have presented their arguments, each subgroup is given a brief period during which they may ask questions for clarification or elaboration about anything the other subgroup has presented. In a classroom situation, 2 to 3 min for each subgroup is usually sufficient. The purpose

Table 3. Example processing sheet for an academic controversy.

Should the red-cockaded woodpecker be added to the endangered species list?

Processing Sheet

Please rate your efforts in this activity for each of the following items on a scale from 1 to 5 (1 being poor and 5 being excellent):

	Poor				Excellent
1. I actively sought out the opinions of all other group members.	1	2	3	4	5
2. I made a distinct effort to listen to others.	1	2	3	4	5
3. My contributions were actively sought by others.	1	2	3	4	5
4. I made effective use of the skill *challenging ideas, not people*.	1	2	3	4	5
5. I felt comfortable doing this exercise with my group.	1	2	3	4	5

Please indicate your response to the following:

6. Our group might have been more effective if _____
7. Did your group reach consensus?
   If yes, what was your decision?
   If not, what was an important barrier to reaching consensus?

of the questioning is not to try to refute arguments, but rather to ensure that each subgroup understands the other's reasoning as clearly and completely as possible. Upon completion of this part of the process, it is important for each subgroup to be able to state the other subgroup's position and supporting reasoning clearly and accurately.

Changing Sides of the Issue

The next step in the process requires each subgroup to take the position of the opposing subgroup in their team. That is, they must now view the issue from the opposite position. Using the reasoning developed by the original subgroup, they are asked to do their best to provide additional supporting reasoning for their opponents' point of view. Although much of the supporting reasoning for each position is usually on the table by this time, it is fairly common for the opposing subgroup to be able to add significantly to their opponents' position. The subgroup that was originally supporting the issue must now begin to gain some empathy for the opposing side of the argument and vice versa.

Initially, students may take this part of the exercise lightly, or merely add trivial support to their opponents' arguments. The instructor must closely monitor the groups and continually provide encouragement as needed to help students examine the issue as deeply as they can. Although the amount of time dedicated to this part of the exercise is usually less than that allotted for initial development of arguments, the time should be sufficient to allow students to seriously ponder their changed position.

Coming to Consensus

Before an attempt is made by the teams to reach consensus on the issue, some discussion about what is meant by reaching consensus is beneficial. In some cases, consensus might mean that everyone in the team must agree with the final team position. In other cases, consensus may be sufficient for one of the team members to be willing to accept the position of the other three, even though he or she may not favor that position personally.

Teams then are asked to discuss the issue openly and completely in light of the two positions the subgroups have de-

veloped. They are asked to try to reach consensus on a team position for the issue. Allowance of sufficient time for teams to work through their various arguments and the justifications for those arguments is important.

During this part of the discussions, constructive and creative solutions to the problem or issue usually begin to emerge. In some instances, those solutions clearly will be based on the original supporting or opposing arguments. In other cases, a reasonable team position may be some middle ground, unlike either of the original arguments. Individual groups may come to a consensus, but not all groups necessarily come to the same conclusions. In an academic controversy that focused on the question of whether sabotage can be justified in support of certain natural resource issues, a case is presented to students detailing the sabotage of a whale processing facility and the sinking of two whaling vessels in Reykjavik, Iceland in 1986. Some student groups have reached consensus that this was justified and other groups that it was not. The underlying justifications for these conclusions are quite diverse, but often center on the degree to which individuals believe that killing whales is unethical.

Occasionally, a team simply will not be able to reach consensus. In a classroom setting, that, too, is acceptable provided the team has worked diligently in the attempt to reach consensus.

Whole-Class Discussion

Some form of whole-class discussion following the exercise is usually very beneficial. To begin the discussion, the instructor can poll the teams to determine which position each decided to support and why. In instances where a team failed to reach consensus, discussion of why that happened can be very informative as well.

In some cases, the instructor may have asked each individual, at the beginning of the academic controversy, to write down their initial position on the issue before any discussions with others. If that was done, it is interesting to find out at the end of the exercise whether any of the students changed their personal position on the issue. In the academic controversies that the authors have conducted, there has always been at least one student whose stance on the issue changed from the beginning to the end of the exercise. Having those individuals share the reasons for their change of position is also enlightening for the whole class.

Processing

To help students reflect on the academic controversy experience, a processing sheet (Table 3) may be used. Each student is invited to rate their own performance of interactive skills and identify things that would have increased group productivity. Again, depending on the instructor's purpose, the processing sheet can be slanted toward evaluation of interactive skills, or evaluation of the academic controversy process in general, or toward specific information contained in the controversy. All too often, this step is omitted, either due to lack of time, or because it does not seem important. However, as quoted in Leamnson (2000), David Perkins points out, "learning is a consequence of thinking—it's less the doing than the thinking, the reflecting on the doing that counts." If students are going to improve their skills, they need to have time to re-

flect on how well they are doing, and on what they might do to improve their performance.

Closure

If the issue is one that has already been decided professionally, or one where a significant portion of the professional population shares a common position, it can help bring closure by telling the class what that position is. As an example, the question of whether fire was beneficial to wildlife was conducted as part of a fire management class during the fall of 2000. The 2000 fire season in the western states had been particularly severe with a number of serious fires occurring in Montana. The Missoulian newspaper ran an interview with a wildlife specialist about the effect of fire on wildlife. His conclusions were that while there were some detrimental effects to individual animals, the net effect was probably going to be positive. That was the consensus reached by the class in fire management. Having their reasoning confirmed in an actual fire situation by a professional added very effective closure to the discussions.

Finally, the need to *defuse* the atmosphere at the end of an academic controversy may be required. Students often become engrossed in the process, and they may have developed much stronger feelings about an issue than is typical in a lecture format classroom. If the instructor senses that this may be the case, simply reminding students that they have been involved in an academic exercise can be helpful. By calling attention to the heightened level of tension that may have developed, the instructor can both reduce the tension, and make the point that controversies such as these are often highly charged. By taking this final step, the instructor helps to maintain the *safe* atmosphere in the classroom that was mentioned earlier.

Timing

The question of timing of an academic controversy is twofold. First, when during a class or curriculum should an academic controversy be conducted, and second, how much class time does an academic controversy take? Academic controversies can be used effectively to introduce students to the study of a new topic, particularly in upper-level courses, or as a way of summarizing and amplifying information at the end of a unit. Some students have enough previous knowledge about natural resource management to do a plausible job of developing arguments either for or against an issue, even if they have not been formally introduced to the subject. Even first-semester freshmen can benefit from academic controversies as a means of introducing issues that are important in the natural resource management arena.

The second timing question relates to the amount of time necessary to conduct an academic controversy in the classroom. An instructor can conduct an academic controversy using the steps described in one 50-min period if instructions are very well presented, structure is adhered to fairly rigorously, and students work quickly. However, reality suggests allowing more time, especially the first time the instructor introduces the technique. That additional time can either be the result of conducting the exercise during a longer period such as a lab session, or the process can be spread over two 50-min periods. When the purpose of using the controversy is to introduce students to a topic, spreading the exercise over two pe-riods can be very beneficial. In such a case, the exercise proceeds through development of the initial subgroup position during the first class period. In addition to developing their initial position, students are asked to make a list of additional information they need to further develop their argument. Between the first and second periods, students are asked to find as much of the additional information as they can as a homework assignment. At the beginning of the second period, the subgroups are given additional time to develop their position before they begin talking with other subgroups developing the same position. By conducting the academic controversy in this way, students take more responsibility for their own learning.

CONCLUSIONS

An academic controversy is both a strategy to help students learn to think critically and to assess their critical thinking skills. We have not used the strategy in a controlled study, which would allow us to do statistical analysis of the students' improved critical thinking skills. However, we have used the strategy repeatedly and in different situations while observing student interactions and discussions, and we are convinced that it is an effective teaching strategy.

Students have consistently given their own efforts high ratings when reflecting on this exercise. For example, 29 forestry students participated in the academic controversy focused on endangered species listing for the red-cockaded woodpecker. The averages of their responses to the first five items on the processing sheet (shown in Table 3) were 4.3, 4.7, 4.3, 4.4, and 4.6, respectively, on a rising 5-point scale. This reflects both assessment of their individual performance in different aspects of the exercise, as well as a generally positive attitude about the experience as a whole. Open-ended student responses to Item 6 (How might your group have been more effective during the controversy?) were similar for the red-cockaded woodpecker case and the controversy dealing with public taking of lands. In both exercises, approximately 20% of students indicated that they would have been more effective if they had more complete information before the controversy, and about 15% indicated that they would have benefited from spending more time engaged in the activity.

Students seem to enjoy the academic controversy process, an indication that they remain focused on the process. The following comments come from processing sheets administered at the end of the red-cockaded woodpecker academic controversy.

> …Through participating in the academic controversy, we saw that decisions need to be made, but that they need to be made working with others, like community leaders and other public figures.

> It was actually kind of fun to have permission, even encouragement, to argue a position on a case…

In some situations we know what the students' previous knowledge of and exposure to an issue has been. Full class discussions at the end of the controversy have shown us that students have constructed effective arguments for positions they had not been exposed to previously. This is another indication that they are not only thinking critically about the issue, but synthesizing information as well.

For those interested in conducting a more controlled approach to evaluating the strategy, several possibilities exist. First, the processing sheet presented in Table 3 currently addresses only issues related to how students assess their level of functioning during the controversy. That processing sheet could be expanded to include questions designed to assess their level of critical thinking. Second, classes that have multiple sections present the possibility of a more controlled experiment. If some sections receive the material through the standard lecture format, and others are involved in an academic controversy approach, the instructor could then compare student responses to follow-up exam questions designed to evaluate the level of critical thinking. Third, where classes do not have multiple sections, the instructor could use a lecture format during one semester, and an academic controversy format during the next semester the course is taught. This also would provide an opportunity for comparison. Finally, instructors who use the strategy should not overlook the fact that an academic controversy is both a teaching and an assessment tool. Where material is presented in lecture format, instructors might use an academic controversy to assess whether students have developed the desired level of critical thinking using the more traditional approach to classroom teaching.

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