
Students Thinking Critically about Agricultural Issues

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Abstract

The agricultural sector of the United States provides an enormous number of issues that require critical thought and evaluation, such as low farm prices, soil depletion, free trade agreements, food safety, rural depopulation, water quality, and farm subsidies. Individuals addressing these issues bring with them different backgrounds, experiences, and perspectives. Often, these differences result in divergent and conflicting opinions on agricultural issues. The objective of this paper is to describe how critical evaluation of agricultural issues in the classroom can lead to greater comprehension, refinement of opinions and ideas, and a passion for lifelong learning.

Introduction

The agricultural sector of the United States provides abundant food and fiber to consumers throughout the globe. As with any successful endeavor, the agricultural economy is surrounded by an enormous number of issues that require critical thought and evaluation. A short list of important and interesting issues includes: persistently low farm incomes, soil depletion, free trade agreements, food safety, rural depopulation, water quality, and the subsidization of farm family incomes. Individuals addressing these issues bring with them different backgrounds, experiences, and perspectives. Often, these differences result in divergent and conflicting opinions on agricultural issues. Bringing together persons with different perspectives to discuss timely agricultural issues often results in an exhilarating learning experience.

Interest in critical thinking in the classroom was originally sparked for the author by attending a teaching symposium entitled, "Strategies for Teaching and Learning" (Buelow). As a result, a senior-level discussion class in agricultural and natural-resource policy issues became a new teaching-learning effort at Kansas State University.

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Thinking Critically about Agriculture

ag • ri • cul • tur • al (ag.ri-kul'cher.el) *adjective*. *Pertaining to the science, art, and business of cultivating the soil, producing crops, and raising livestock useful to man: farming.*

is • sue (ish'oo) *noun*. *1.a. A point of discussion, debate, or dispute. b. A matter of wide public concern. c. The essential point; crux. d. A culminating point leading to a decision.*

—*The American Heritage Dictionary*

The dictionary definitions above provided the necessary focus for the development of course concept and strategies. The definition of the word "agricultural" emphasizes that food and fiber production is a combination of science, art, and business. Integration of these apparently disparate aspects of agriculture provides a foundation upon which carefully reasoned and articulated opinions and conclusions can be formulated. Anecdotes follow about classroom techniques and experiences that characterize attempts to provide an integrated approach to learning more about agricultural and rural matters.

Critical Thinking and the Science of Agriculture

The usefulness of science is the application of scientific methodology to real-world issues. Course work and examinations often require the acquisition of facts or scientific skills. After graduation, students will find the need to apply techniques and tools to complex and challenging situations. Homework assignments that reflect the uncertain nature of agricultural production and agribusiness can better prepare students for career and life experiences that do not have clear-cut solutions.

Weekly homework assignments that require critical thinking form a solid underpinning for problem-solving skills. One method of integrating problem solving into course work is to assign short statements that require an answer of true, false, or uncertain, with a brief explanation (Appendix A). Statements about real-world events, such as the impact of the dissolution of the Soviet Union on American wheat producers, the effectiveness of food aid to Somalia, or the economic consequences of the BTU tax proposal (rejected in 1993), require students to evaluate both benefits and costs, rather than memorize textbook answers to hypothetical problems.

The key to this type of learning is the introduction of uncertainty into the classroom. Restated, there is an optimal level of confusion in the learning process. Many scientific, economic, and social issues do not have definitive solutions. When asked to compose clear answers to uncertain situations, students (and instructors) are forced to clarify their views and approach problems using an organized, consistent methodology. Essay questions that have no single "correct" answer can be intimidating and sometimes frustrating to students, particularly at the beginning of a course. This is the point of the exercise. Students will "rise to the occasion" when encouraged in an enthusiastic fashion. There is no higher satisfaction than that which comes from resolving a difficult problem. Encouragement can be given in the form of instructor comments on each short essay, providing feedback to students as they struggle with the challenge of "higher-order" learning.

Students gain an enormous amount by working through ideas and possible solutions to weekly homework assignments as a group. Students often are excited when two very different solutions (true, false, or uncertain) to a question both receive full credit. As long as careful thought and scientific principles are applied in a coherent fashion, multiple solutions to real-world problems can be "correct." After two or three assignments, enthusiasm for problem solving and learning overtakes any initial frustration associated with the challenging homework format.

Graduating seniors are particularly inquisitive about learning the limitations of science. Scientific reductionism often can overshadow the usefulness and applicability of science to societal problems. Instructors can provide a classroom environment that is conducive to critical thinking by asking difficult questions and remaining flexible enough to interpret and assign grades to a diversity of responses. Higher-order learning is difficult and challenging for both students and instructors, but the benefits of addressing what (Herrett) identified as the "big picture" can be very rewarding.

Critical Thinking and the Art of Agriculture

One aspect of learning and personal growth that is often lacking in formal education is the creative component, or "art" of living and working with a myriad of ideas and opinions. Critical thinking is not an activity that can be practiced in isolation. Incorporating diverse viewpoints requires exposure to other views. During a class discussion on government spending, a show of hands of individuals who favored the continuation of government subsidies to family farmers was requested. This question is particularly contentious in Kansas, where agriculture is divided in roughly equal proportions between livestock and crop production. Cattle producers are typically against government regulation of any sort, whereas many crop producers have come to rely on government subsidies to maintain their way of life. The class was divided: with one-third against subsidy, one-third for continuation of farm subsidies, and one-third neutral. A formal debate between the two sides was suggested by the teacher. The class "bought into" this experiment resulting in a planned debate

during the next class period, after each side had studied the arguments for and against farm subsidies.

The next class period was devoted to the presentation of opening arguments, questions to both sides, and closing arguments (Appendix B). One student's response to the debate was, "I did not realize that many of the arguments on both sides were based on emotion rather than facts." Sorting out both sides to a delicate issue causes participants to reflect upon and reevaluate their own opinions and know the arguments from both sides of the issue. Higher-order thinking requires the development of the "art" of sifting out good arguments from rhetoric. Formal debate is an excellent and exciting format for practicing the art and skill of working with persons who have divergent persuasions and perspectives.

Critical Thinking and the Business of Agriculture

All careers dictate at least a degree of entrepreneurship. The ability to interpret market signals and opportunities is an important aspect of success in today's evolving economic environment. A recent survey of graduates of the College of Agriculture at Kansas State University revealed that over 95 percent of the respondents agreed or strongly agreed that communication, people skills, and problem solving were "important to me in my current position" (Barkley).

Communication and problem-solving skills demand hard work and practice. Weekly essays can provide the opportunity for students to hone communication skills. Requiring students to critically evaluate important issues in short essays can build the confidence that is a prerequisite for successful career performance. Some essay topics are presented in Appendix C. Weekly writing assignments allow for a flow of communication between students and the instructor. This feedback results in weekly improvement that is obvious to students.

Thinking Critically about Issues

An issue is, by definition, a source of disagreement and conflict. An issue that everyone agreed upon would immediately lose status as an issue. Thus, critical thinking and the evaluation of agricultural issues must be antagonistic. Thomas Stout reports that "I jar students with the cost of their own convictions." Perplexing and emotional issues can be discussed in a productive and mature manner, particularly when class members know each other after spending time in discussions.

A Point of Discussion, Debate, or Dispute

In the senior-level discussion class, time is spent on racism, affirmative action, sexism, the decline of family farms, homosexuality in the military, and abortion. Each time an emotion-laden issue surfaces, a teacher may worry that some students may become offended at views expressed in the classroom. Assessment, the teacher is usually overly sensitive to this possibility. Conclusion, never fear the capacity of students to deal with subjects dear to their hearts. The benefits

of including ethical issues in the classroom are enormous. Tolerance and listening skills are among the major advantages of providing an atmosphere capable of handling issues considered to be "too personal" for inclusion in formal courses.

A Matter of Wide Public Concern

Essay topics that seem vague or difficult often result in excellent essays and deep thought (Appendix C). An example of such an assignment: "Is there a relationship between religion and agriculture?" After reading this assignment, Mark, a junior in agribusiness, became perplexed and confused. He had been taught in his agribusiness courses that "agriculture is a business" with no room for religion in this economic view of food and fiber production. He was advised that he could write an essay that clearly articulated this opinion and provide convincing evidence of the separation of church and farm.

No further discussion with Mark occurred until the day the essays were due. Mark's essay was a very carefully organized composition explaining why production agriculture was inseparable from religion. It was indeed Mark's paper. The paper's clear, forceful style; organization; and content were all excellent, and Mark received a high grade. But why did Mark make a complete turnaround in his agriculture and religion views?

Mark had spoken to his parents, his friends, and his high school agricultural teacher. After receiving input from these important sources, Mark came to the conclusion that he disagreed with the "agriculture is a business" point of view. Mark provides an example of critical thinking where the student took his assignment seriously, challenged his own beliefs, and presented his ideas in a well-crafted essay. Mark's inner struggle and growth is an example of the great rewards of teaching critical thinking.

The Essential Point; Crux

Graduating seniors are in a period of their lives characterized by major change. Many students look forward to commencement with excitement conditioned by a degree of fear and trepidation. This apprehension results in classroom discussions that deal with the attempt to put past college experiences and future career events into perspective, by getting to the essential points of students' values, expectations, and ambitions.

Anticipation of working for a living, whether it be on a wheat farm or in a corporate office, results in self-examination and introspection. This line of thought can be encouraged through the requirement of a term paper and class presentation on a topic that is the most important issue, or the crux, of each student's career or life (Appendix D). One student, grappling with a job offer from a large multinational agribusiness firm, wrote on the tradeoff between high salaries and perceived quality of life. A recent student body president discussed how personality traits affect career paths. A religious student who was interested in secondary education

wrote an excellent paper on religion in the classroom. More conventional topics have included NAFTA, GATT, agricultural trade with Japan, crop insurance, the federal budget deficit, world hunger, and nutritional issues.

An additional requirement is that each student present his/her term paper to the class in a 50-minute exposition. Creativity is encouraged. Discussions, debates, and quizzes have exhibited student competence at leading the class in highly consequential matters. The requirement of importance to the students' lives results in the devotion of much time and energy to the pursuit of excellence in the papers and presentations.

Cathy, a shy farm wife and mother of two teenagers, did not know what topic to choose for her term paper. She was scared of public speaking. She had told the class about a recent farm accident that resulted in a broken back for her 17-year-old son. Her concern about farm safety and the possibility of another accident that could occur on her husband's wheat farm stimulated her to write a term paper on farm safety.

The paper that Cathy produced was both informative and personal. In spite of the success of a well-written paper, Cathy needed encouragement to speak in front of the class for one hour. After much preparation, encouragement, and lack of sleep, Cathy presented a very good talk on farm safety, followed by a meaningful discussion of how farm accidents can be prevented. What a great achievement! Cathy will be able to speak publicly with the confidence that comes from knowing that she held the attention of her peers for an entire hour on the essential points of a subject that is important to her.

A Culminating Point Leading to a Decision

After four years of college, students have mastered the art of learning course material for quizzes and examinations. Many, if not most, seniors have developed the skill of achieving good grades by reporting lecture material and textbook information back to professors. Challenging students to push themselves to higher levels of critical analysis and decision making can result in an excellent conclusion to a college education. Encouraging the investigation of alternative viewpoints allows students to make informed decisions.

Recently, the livestock industry has come under fire from Jeremy Rifkin, the author of *Beyond Beef*. Beef is big business in Kansas; more steers are slaughtered in Kansas than in any other state. Rifkin's book is not on the best-seller list in western Kansas. It has the potential to affect agriculture in Kansas through his call for a national boycott of beef.

Many students were shocked to find that *Beyond Beef* was on the reading list for AGEC 610, Agricultural and Natural Resource Issues. One student informed me that she would enroll in the class only if she were not required to read *Beyond Beef*. She was encouraged to enroll but did not want to read the book. She indicated that Rifkin was "crazy" and that "everyone knows that the book is full of lies and misinformation." Asked what was in the book that was incorrect, she did not know. After asking many of her friends about the book,

she returned to my office a few days later and concluded that no one who she had asked knew what the book contained and that no one had read the book to find out.

Rifkin does use statistics and previous research to misrepresent the cattle industry. This is not revealed to students at the beginning of the course, but they are challenge them to determine what is incorrect about the book. When no answer is forthcoming, students realize that they need to read the book before they can disagree with it.

The student who refused to read *Beyond Beef* ended up writing her term paper on the subject. She interviewed vegetarians and spoke with experts on food safety. She read Rifkin and received information from the National Cattlemen's Association concerning the animal rights movement. She became an expert on what was correct and what was incorrect about the book and what the consequences might be for her future husband's cow-calf operation. In her oral presentation, the student concluded that it is best to "know thy enemy" rather than make a misinformed judgment. Many students reported that they were glad to have the opportunity to learn how to identify illogical conclusions and bad statistics in a purportedly "scientific" study of great importance to the Kansas beef industry. Critical evaluation of this agricultural issue resulted in superior decision making.

Conclusion

Challenging students to critically examine the science, art, and business of agriculture results in an intellectual climate that is at times enjoyable and at other times demanding. Critical thinking is hard work for both students and instructors. Listening, interpreting, and evaluating other's opinions becomes instinctual for students who have discussed true, false, or uncertain statements about real-world issues: worked together in groups to solve problems; participated in classroom debates; written weekly essays on complex issues; participated in classroom discussions; and devoted much effort to identification of a subject and development of a meaningful term paper and oral presentation. Perhaps the most rewarding experience for a teacher is meeting with former students who can't wait to tell you about an issue that was discussed in a college course and has become important in their life or career. This is evidence of a true love of lifelong learning, the ultimate goal of critical thinking.

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Appendix A

True, False, or Uncertain. [10 points; 1 point each]. Indicate whether each of the following is TRUE (T), FALSE (F), or UNCERTAIN (U). Explain your answer *briefly*. No credit is given without explanation. Late problem sets are marked 50% off.

1. Economic theory predicts that, as the 1996 presidential election approaches, President Clinton will move toward the center of the ideological spectrum.
2. In recent years, many universities have developed videotaped college courses that are transmitted via satellite to students who live and work away from the campuses. Economic theory indicates that this technology will result in fewer students attending classes at the university campuses and a decrease in the demand for professors at these campuses.
3. The development and adoption of high-yielding varieties of wheat result in higher prices received by wheat producers.
4. The agricultural sector of the United States produces a greater supply of food than can be sold at prevailing market prices. The U.S. government donates much of the surplus to low-income nations. The impact of this foreign aid is always beneficial to recipient nations.
5. In the past 20 years, the per capita demand for beef has declined relative to the per capita demand for poultry products because of health concerns about red meat.
6. Subsidizing agricultural incomes through price supports and deficiency payments is beneficial to our society as a whole.
7. The use of ethanol as an alternative fuel source should be legislated by congress.
8. During congressional debate over the 1990 Farm Bill, the current sugar subsidy of 18 cents per pound was contested. Corn producer groups in Iowa and Illinois were