

Case Studies: A Teaching Strategy for Promoting Critical Thinking in the 21st Century Agriculture Student

Introduction

Recent discussions in the agricultural sciences are focusing on how to best prepare students to become critical thinkers. According to Ricketts, Lewis and Faulkner (2018), gaining an understanding of critical thinking skills, and developing those skills themselves, is essential for educators if they are to better prepare their students to think critically.

Critical thinking is purposeful thinking in which individuals systematically impose criteria and intellectual standards upon their own thoughts (Paul, 1995). Critical thinkers are “outcome driven,” open to new ideas, flexible, willing to change, innovative, creative, assertive, persistent, energetic, risk taking, intuitive thinkers who can analyze a situation and get things done (Popil, 2013).

Teachers of agriculture are in a perfect position to increase students’ critical thinking skills through the use of relevant, integrative lessons. But, while there are numerous opportunities in agriculture to teach critical thinking, teachers are not necessarily developing students who are critical thinkers (Pithers, 2000). One reason may be the lack of knowledge of best practices in developing lessons and activities for students. Curricula promoting higher-order thinking must employ appropriate teaching strategies to develop critical thinking and measure its effectiveness (Chikthimmah et al., 2009).

Settle and Shaw (2018) suggested that agriculture teachers may find including critical thinking activities within their classroom challenging or time-consuming. There are several teaching strategies that are best practices for engaging students but few they are best for both formal and non-formal settings. One of these teaching strategies is Case Study. Incorporating case studies into one’s class discussions provides active and engaged learning while promoting higher-order thinking among students.

How to Use the Case Study to Improve Critical Thinking

Case studies can be applied to a wide range of disciplines and topics. Teachers should begin by first introducing the topic and then the problem or issue to solve to the students and then have students:

1. Provide what they know about the problem or issue being introduced;
2. Describe in detail discuss the problem or issue;
3. Outline the steps to solve the problem or issue;
4. Assess the steps to solve the problem or issue;
5. Discuss the possible pros and cons to solving the problem or issue; and
6. Make concluding remarks on what was found when solving the problem or issue.

For *agricultural education*, there are cases in need of investigation in every context. It’s as simple as finding an authentic problem and describing that problem in as much detail as possible, usually in a written format (but a video explanation could work, too.) Students simply take all the information given to them and work through the above steps.

Specific cases related to *agricultural and environmental problems* can help students investigate the context of the course of materials (Handayana, 2011). Examples of case study topics include agroforestry, biodiversity, cover crops, genetically modified organisms (GMOs), deforestation, organic farming, soil quality and urban farming.

For *food and nutrition*, it’s also quite simple. Just think about how doctors are trained in med school. Students are usually presented with someone who is sick, and their job is to determine what is wrong with the case study in question by working through the previous steps.

In *agricultural mechanics*, safety is of great concern in the laboratory. A case study lesson could focus on how to address a potential safety violation. A picture could be taken of those violations and shared with class members, who could then rectify the safety issues. If the hazardous situation has the potential to be an immediate danger to the operator or others, then the picture will be skipped, and proper safety procedures will be followed.

Table 1. Strategies for Using Case Studies in Various Agricultural Disciplines

Discipline	Case Study Problem or Issue
Agricultural Education	Should lesson plans be developed differently for students with special needs?
Food Safety and Nutrition	Why it is important to track contaminants before they enter the food chain?
Agricultural Engineering	GMOs healthy or not?
Agribusiness/Agricultural Economics	Are Marketing Plans really useful?
Animal Sciences	Is there a such thing as Ethical euthanasia? How best to practice Animal Handling/Safety
Landscape and Horticulture	Are Rain Gardens cost effective?

Conclusion

Critical thinking is a rich concept that has been developing for many years (Parker, 2010). As educators develop lessons, it is important to remember: 1-Critical thinking is never universal in any individual (Parker), or discipline; and 2-Employers of college graduates in agriculture, natural resources, and related careers increasingly search for, and vet, applicants who are critical thinkers and problem solvers (i.e. Crawford et al., 2011). Case-based learning provides opportunities for students to more actively engage in the subject matter, especially in agricultural sciences (Simmons et al., 2005).

Continued evaluation of case studies should be conducted due to students' diverse learning styles (Handayani, 2011). The disadvantages of case studies include: embedded author biases, narrow focus on a dilemma facing a single person or group, and limitations in scope (Grupe and Jay, 2000). Nevertheless, using case studies is purposeful, as it allows students to address real- life situations that may not be presented by other teaching strategies.

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