Influence of Case Studies when Teaching Agricultural and Natural Resource Issues

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Introduction

According to research priority 7 in the American Association for Agricultural Education National Research Agenda, the agricultural and natural resource (ANR) industry faces many complex, often controversial, issues such as agricultural production, natural resource management, energy consumption, climate change and public perception (Andenoro, Baker, Stedman, & Pennington Weeks, 2016). It is important for ANR college graduates to be aware and knowledgeable about these issues to become leaders in the ANR industry upon graduation. One way to engage students in complex topics is through case study teaching method. Case studies allow students to "learn how to evaluate a situation or identify problems in a variety of settings" (Naumes & Naumes, 2006, ch.1, para. 3). Cases are complex educational instruction in the form of written narratives based on facts and data from a past event or experience (Naumes & Naumes, 2006) using videos, audio clips, web resources and animations to recreate real world scenarios (Chattaraman, Sankar, & Vallone, 2010). The purpose of this study was to assess if case studies increased undergraduate students' self-perceived knowledge of ANR issues when taking an ANR issues course. The research objectives were to a) describe undergraduate self-perceived knowledge before and after taking an ANR issues course with integrated case studies, and b) determine if there was a significant difference in perceived knowledge gain as a result.

Theoretical Framework

Experiential learning theory served as the framework for this research. Experiential learning is learning through personal experiences to make sense of the world (Dewey, 1938). According to Dewey (1938), experiential learning occurs when one observes surrounding conditions, has a working knowledge of similar situations and makes a connection between what is being observed, and what happened in the past to make sense of the situation. Kolb (1984) defined learning as a cyclical process of creating knowledge that is ongoing based on experiences. Students typically retain more information when they learn by doing rather than sitting in lecture (Naumes & Naumes, 2006) and case studies can bring personal relevance into the classroom through multimedia experiences (Chattaraman et al., 2010).

Methods

The population of interest were students enrolled in ANR issue courses. The sample for this study were 26 students enrolled in the ACOM 3300: Communicating Agriculture to the Public class at Texas Tech University. The class was taught for eight years using a variety of teaching techniques other than case studies, which made the class a candidate sample for the population. Three case studies were presented during the course that addressed 1) antibiotics in animal agriculture, 2) water conservation in agriculture, and 3) crisis communication after a food recall. The researchers developed a pre and post-test survey that was reviewed by a panel of experts and pilot tested to ensure face and content validity. Students' perceived level of knowledge of nine different ANR issues were measured using a Likert-type scale (1 = *Not at all Knowledgeable*, 5 = *Extremely Knowledgeable*). An online survey was used to collect data. Students completed the pre-test within the first week of class and took the post-test within the last week of class for the fall 2016 semester. Descriptive statistics and Chi square tests were used with a significance level of < 0.05 established *a priori*.

Results

There was an increase in students in the *somewhat knowledgeable* category for the post-test with both case studies, food safety and water, but a decrease of students in the lower and upper levels

of self-perceived knowledge. There was also a statistically significant change in self-perceived knowledge within five issues, two of which were those covered by the case studies (Table 1).

Table 1
*Perceived Self-Knowledge Change through Case Study Teaching (*N = *26)*

	NK/SK %		SWK %		MK/EK %		
Issue	Pre	Post	Pre	Post	Pre	Post	X^2
Biotechnology (GMOs)	46.16	46.15	26.92	26.92	26.92	26.92	42.90**
Food Security (food availability, access, and use)	42.31	34.61	26.92	34.62	30.77	30.77	40.76**
Food Safety (foodborne illnesses)	34.62	26.93	26.92	42.31	38.46	30.77	40.65**
Water (water quality, water quantity, agricultural water use)	34.61	30.77	30.77	38.46	34.61	30.76	28.65*
Climate Variability & Change (carbon sequestration, greenhouse gas emissions, sea level rise)	69.24	61.54	19.23	23.08	11.54	15.38	22.31**
Animal Health (animal welfare, animal disease)	23.08	23.08	23.08	26.92	53.84	50.00	21.56
Marketing and Trade (imports/exports)	50.00	38.46	26.92	38.46	23.08	23.08	17.41
Conservation (endangered species, land use)	50.00	34.61	15.38	38.46	34.61	26.92	16.78
Invasive Species (not native to specific location)	50.00	50.00	23.08	38.46	26.93	11.54	11.00

*Note: *p* < 0.05*; **p* < 0.01*;* NK/SK = *Not at all Knowledgeable/Slightly Knowledgeable*, SWK = *Somewhat Knowledgeable*, MK/EK = *Moderately Knowledgeable/Extremely Knowledgeable*.

Conclusions, Discussion, & Recommendations

The results show the case studies had an impact on self-perceived knowledge of issues related to some topics discussed indicating students increased their knowledge by experiencing the issue (Dewey, 1938) and agricultural educators should consider using the case study teaching method more extensively. It is important to note pre-test effect may have impacted the students self-perceived knowledge with nearly all of the issues decreasing in the moderately knowledgeable and extremely knowledgeable categories from pre-test to post-test. Perhaps students overestimated their knowledge prior to taking the course. Future research should examine actual knowledge through a content test of each issue before and after the experience of a case study to determine effect. In addition, students' ability to communicate about issues should be examined as they become future agricultural leaders and communicators. A final recommendation for future research is to conduct an experimental design to investigate the differences between case study and traditional methods of teaching with the focus of ANR issues.

References

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