Case Study Integration in the Undergraduate Classroom: Can We Enhance Willingness to Communicate?

The agricultural and natural resources (ANR) industry wrestles with many contentious issues (Andenoro, Baker, Stedman, & Pennington Weeks, 2016) as it struggles to feed 9.8 billion people by 2050 (United Nations, 2017) while ensuring sustainability of the world's natural resources. These issues include – but are not limited to – climate change, food security, water, bioenergy, and food safety (United States Department of Agriculture – National Institute of Food and Agriculture [USDA – NIFA], n.d.a). Education about food, agriculture, natural resources, and human sciences issues is needed at all levels. More specifically, how to engage in conversations about ANR issues has been identified as an educational need (USDA – NIFA, n.d.b), and strong communication skills are imperative (Hackman & Johnson, 2000) to be a leader who addresses complex and controversial ANR issues.

To begin to address complex issues through effective leadership, leaders are required to possess exceptional communication skills, specifically two-way communication skills (Heath & Palenchar, 2009). Two-way communication emphasizes listening to the public and engaging in dialogue to reach audience members to be aware of their concerns (Heath & Palenchar, 2009).

Mutual knowledge and understanding are key components two-way communication promotes between parties. Despite recognizing dialogue is necessary to work toward understanding issues (Heath & Palenchar, 2009) and beginning to solve the problem, parties with opposing views on a particular issue tend to avoid communication.

A lack of knowledge about ANR topics (Kubitz, Telg, Irani, & Roberts, 2013) has made these issues even more controversial and complex (Andenoro et al., 2016). The complexity of ANR issues may not be compatible with social norms, which has resulted in the need to have more educational opportunities for undergraduate students to discuss these topics to minimize the effects of a polarized environment (Rumble et al., 2016). To counteract skepticism toward agriculture (Goodwin, 2012) and misinformation that have occurred from lack of communication and understanding (Rumble & Buck, 2013), students need to be equipped with superior communication skills to enter the workforce successfully after college. In this study, willingness to communicate was a communication skill tested by integrating case studies about nine ANR issues into a communication course and the purpose of the study was to determine the change in self-perceived willingness to communicate after the course.

Developing Effective Communicators

Employers place a heavy emphasis on new undergraduates possessing communication skills (Crawford, Lang, Fink, Dalton, & Fielitz, 2011). In a study of more than 200 employers, communication skills ranked highest among the skills new college graduates must possess to be successful (Crawford et al., 2011). The most important communication skills in the workforce were listening effectively, communicating accurately, effective oral communication, communicating pleasantly and professionally, effective written communication, asking good questions, and communicating appropriately and professionally using social media (Crawford et al., 2011). Moreover, employers value excellent communication skills so much, they are willing to pay employees more in salary for those superior skills (Norwood & Henneberry, 2006).

Morgan and Rucker (2013) investigated the competencies agricultural communication undergraduates need to enter the workforce successfully. "Ability to communicate, both orally and

in writing, ability to understand conceptual thinking and how it related to communication" were top competencies undergraduates should possess upon graduation (Morgan & Rucker, 2013, p. 57). Oral communication, overall, was an important skill to have when undergraduates enter the workforce (Morgan & Rucker, 2013). Faculty interviewed for this study saw a need to "integrate curriculum which would encourage students to assimilate and apply the technical skills learned in the classroom" (Morgan & Rucker, 2013, p. 60).

In a more recent study, professionals involved in agricultural advocacy emphasized the importance of key skills undergraduates must possess to have the ability to advocate for the ANR industry (Steede, Gorham, & Irlbeck, 2016). One skill revealed as important was the ability to have genuine conversations and listen. One participant said the value of students' willingness to communicate was "when the rest of the audience can see that you are able to have those conversations with people of different views" (Steede et al., 2016, p. 60). The ability to communicate with those outside the industry arose as a key skill for undergraduate students to have post-graduation (Steede et al., 2016).

Willingness to communicate is a key aspect of interpersonal communication (MacIntyre, 1994) and has been identified as a key leadership characteristic (Hackman & Johnson, 2000). MacIntyre (1994) suggested a willingness to communicate "functions as a personality trait" (p. 135). When an individual is given the opportunity to communicate, willingness to communicate is an individual's intention to communicate with others (MacIntyre, 1994) and the actual amount people do communicate with one another (McCroskey & Baer, 1985). The situation a person encounters (McCroskey & Baer, 1985) and an individual's fear to communicate (Roach & Olaniran, 2001) can affect his or her willingness to communicate.

Using Case Studies to Improve Communication Skills

Due to the controversial and complex nature of ANR issues, people may avoid or fear conflict with others due to their differences in knowledge and opinions. By discussing and evaluating the issues via case studies in a classroom setting, fear of communicating about the issues could be lessened. The case study method of teaching may be a way to assist students in developing and honing their communication skills, specifically their willingness to communicate. Case studies are pedagogical tools built on facts and data from past events or experiences in a written narrative (Naumes & Naumes, 2012). In addition to addressing and teaching about real-life problems, case studies can meet many educational goals due to their flexible nature (Zimmerman, 2002). Case studies help students make connections between theory and practical application in the classroom because case studies are designed to address big-picture problems around significant issues that require thorough discussions (Wassermann, 1994) and evaluation of the issue presented in the case (Naumes & Naumes, 2012). Also, using a case study in a classroom setting provides students with the opportunity to discuss and analyze the issues in a supportive and comfortable environment with their peers (Cassimjee, 2007). Case studies have been widely used in business and medicine, and recently, this style of teaching method has gained popularity with complex science topics (Bonney, 2015).

Multimedia elements, such as videos, audio clips, web resources, visuals, and animations can be incorporated in case studies to enhance the case (Chattaraman, Sankar, & Vallone, 2010). Integrating multimedia, particularly videos, can help bring students into the time, place, and people involved in these issues. Cai and Abbott (2013) investigated whether the use of video in a traditional demonstration training could be effective when training rural Uganda farmers on farming practices. Videos were used in the training to demonstrate real-life techniques and

practices of farming in Uganda for participants to watch (Cai & Abbott, 2013). Overall, the researchers found videos were just as useful and effective in the training to increase learning. Likewise, when a video demonstrated a farming technique or practice to a group, discussion was enhanced among the farmers. Farmers were more willing to communicate by integrating a real-life scenario presented in the videos (Cai & Abbott, 2013) like what a case study would provide in a classroom setting.

Case studies were used as an instructional tool in a graduate-level course focusing on risk and crisis communication in the ANR industry (Witt, Doerfert, Rutherford, Murphery, & Edgar, 2011). The results indicated students preferred the case study instructional method to develop their self-confidence when completing risk and crisis communication tasks. Nearly half (47.1%) of the class reported team-developed case studies had the greatest influence on their self-perceived confidence to complete a risk and crisis communication task (Witt et al., 2011). Not only did case studies have the greatest influence among other instructional methods, but case studies were considered the most beneficial instructional method when teaching about risk and crisis communication (Witt et al., 2011).

Case studies have also been shown to improve undergraduate students' oral communication about biological topics (Bonney, 2015). Eighty-one percent of students indicated case studies helped "a 'good' or 'great' amount" in oral communication skills compared to class discussions and textbook readings (Bonney, 2015, p. 24). The effectiveness of the case study produced an increase in oral communication, which was statistically different among other methods of teaching, at the completion of the case studies (Bonney, 2015). To enhance students' oral communication skills, the researcher recommended incorporating case studies into classes, especially in biology classes so that students can experience real-world issues (Bonney, 2015).

Furthermore, case studies have been shown to increase discussion among students in a class setting effectively. In one study, students felt their communication skills improved because of the experience a case study provided in a nursing program (Cassimjee, 2007). The results indicated case studies aided in interaction and information-sharing with other students in the class. Students felt more comfortable in group discussions and debates because of the integration of case studies. Students were more engaged in the topic, resulting in the promotion of more discussion in the classroom (Cassimjee, 2007).

Previous researchers in agricultural communications have recommended the use of case studies to develop interpersonal skills such as willingness to communicate (Morgan & Rucker, 2013) and to expose students to real-world contexts so they might be more willing to communicate about ANR issues (Steede et al., 2016). The case studies in the context of the current study presented students with real-world situations related to invasive species, antibiotic use in animal agriculture, community resilience, crisis communication, and water conservation.

Purpose, Objectives, and Hypotheses

The current body of knowledge highlights the critical need to improve communication around contentious and complex ANR issues and the importance of future professionals' willingness to engage in communication about these topics. In addition, previous research has shown the benefits of case study integration in a classroom setting to promote students' willingness to communicate and oral communication skills. There is limited research, though, investigating how case study integration into curriculum impacts undergraduate students' willingness to communicate about ANR issues. Therefore, the purpose of this study was to determine if the integration of case studies

influenced students' self-perceived willingness to communicate about nine ANR issues after taking a communication course that teaches about ANR issues. The following objectives guided the study:

1. Determine if there were changes in self-perceived willingness to communicate resulting from enrollment within communication courses taught without case studies.
2. Determine if there were changes in self-perceived willingness to communicate resulting from enrollment within communication courses taught with case studies.
3. Determine if there were differences in self-perceived willingness to communicate between courses taught without case studies and courses taught with case studies.

The following hypotheses guided analyses for each objective in this study:

- Objective 1: H_0: There was no significant change in students' self-perceived willingness to communicate after completing communication courses without case studies.
- Objective 2: H_0: There was no significant change in students' self-perceived willingness to communicate occurred after completing communication courses with case studies.
- Objective 3: H_0: There was no significant difference in students' self-perceived willingness to communicate after completing communication courses between the courses taught without case studies and courses taught with case studies.

Methods

To test the hypotheses, a pre-/post-test, quasi-experimental research design was used to examine the effects of the case study-based curriculum (Ary, Jacobs, Sorensen & Razavieh, 2010). The curriculum was implemented in three universities' undergraduate courses that specifically address FNR issues communication, and each course was led by a different instructor. The convenience sample of undergraduate students in these courses included students primarily from the universities' college of agriculture but also some from other colleges. The case study-based curriculum used was the same across all three, which addressed the following topics: a foodborne illness crisis, water conservation issues pertaining to the Ogallala aquifer, resource-dependent rural community resiliency in the face of climate change and natural disasters, the use of antibiotics in animal agriculture and its connection to antimicrobial resistance, and managing a complex and critical threat to an agricultural crop. Although objectives varied somewhat across the case studies, all were designed to have students analyze who the stakeholders are, consider multiple perspectives, analyze the social and communication aspects of the issues, practice evidence-based reasoning, and apply effective communication tactics.

The curriculum included PowerPoints providing background on the issue covered in that case as well as ways to communicate about that issue. Each case study had videos with experts and those affected by or involved with the issue at hand, instructional activities to allow students to think about the issues critically and practice communication skills, and discussion questions to encourage communication amongst students in the class. Students could experience the case by watching the video footage provided in the case study. They could gain a sense of the context and stakeholders involved in the issues and reflect on the experience the case study provided them through activities with their peers.

Measures

Childers' (1986) opinion leadership scale was used to determine students' self-perceived willingness to communicate. Childers' scale has been well recognized by scholars over the years as a valid and predictive measure of opinion leadership, but primarily as a measure of an individual's tendency to engage in social communication (Flynn, Goldsmith, & Eastman, 1994; Goldsmith & De Witt, 2003). Therefore, it was ideally suited for measuring willingness to communicate. The index had six five-point scales ranging from zero to four. The following statements were adapted: (a) during the past six months, how many people have you told about each of the following agriculture and natural resource issues (0 = *told no one*, 4 = *told a lot of people*, (b) in general, how often do you talk to your friends and colleagues about the following agriculture and natural resource issues (0 = *never*, 4 = *very often*), (c) in a discussion about the following agriculture and natural resources issues, which of the following happens most (0 = *your friends tell you about the issue including new developments*, 4 = *you tell your friends about the issue including new developments*), (d) when you talk to your friends and colleagues about agriculture and natural resource issues do you (0 = *give very little information*, 4 = *give a great deal of information*), (e) compared with your circle of friends, how likely are you to be asked about new information regarding each of the following agriculture or natural resources issues (0 = *not at all likely to be asked*, 4 = *very likely to be asked*), and (f) overall, in your discussions with friends and colleagues, regarding each of the following agriculture or natural resources issues are you (0 = *not used as a source of advice*, 4 = *often used as a source of advice*).

A total of 55 statements were used to assess perceived willingness to communicate about nine agricultural issues areas identified by USDA as "challenge areas" (USDA, n.d.a). These were animal health, biotechnology, climate variability and change, conservation, food safety, food security, invasive species, marketing and trade, and water. The six-item scale was repeated nine times, once for each issue. To measure willingness to communicate about each issue, the stem of the statement was altered to match the willingness to communicate about that issue being analyzed. Internal reliabilities of the each of the nine willingness to communicate indices for the control and treatment group were measured *post hoc*. All of the indices for the control and treatment groups in the pre- and post-tests were internally reliable as determined by Cronbach's alpha calculations all being greater than .87. The overall willingness to communicate index with all nine agricultural issues integrated together was also reliable ($\alpha = .97$).

The instrument included demographic questions to provide the samples' data on race, ethnicity, gender, college rank (e.g., freshman, sophomore, etc.), college major, and age. The same measures were used for the pre- and post-test as well as control and treatment groups.

Procedure and Data Analysis

During the spring 2016 semester, baseline data were collected in the three courses. The case studies were not integrated into the courses in spring 2016, so those students in those courses served as the control group. In the spring 2017 semester, all three universities offered the courses again but with the integration of five case studies. The spring 2017 semester served as the treatment group.

The measures were designed within an online survey tool, Qualtrics. The questionnaire was sent to all students twice (pre- and post-test periods), which included 59 in the control group and 63 in the treatment group. The same procedure was followed for both groups. Students were sent a link to the questionnaire on the first day of class and were given the opportunity to complete it for up to a week. The questionnaire was administered again on the last day of class with a week

allowed for completion. Students were incentivized to complete the two questionnaires differently: those in the control group were offered extra credit, whereas those in the treatment group were offered it as an assignment for regular course credit. Students in both groups could complete alternative assignments in place of the extra or course credit if they elected to opt out of the questionnaire component of the study. The questionnaires were an assignment for the treatment group students because it was directly relatable to the instructional content in the treatment period.

The response rate for the control group was 44% and 87% for the treatment group. For the control group, there were 26 matched complete pre- and post-tests and 55 matched complete pre- and posttests for the treatment group. Both the relevance and the framing of the survey as an assignment option (rather than solely extra credit) is primarily attributable to the response rate difference between the control and treatment groups. This is a limitation of the study that primarily suggests caution in interpreting differences examined *within* the control group (pre-test vs post-test scores); however, it does not affect the interpretation of differences *between* the treatment and control group. Multivariate tests like ANOVA tests are generally robust to differences in sample sizes between comparison groups so long as there are at least 25 in each group as is the case with our data (Schmider, Ziegler, Danay, Beyer, & Bühner, 2010). Data were analyzed in SPSS 24 using descriptive statistics, dependent *t*-tests, and ANOVA.

Description of Respondents

For the control group, the 26 students at the University of Florida, Texas Tech University, and Colorado State University were 20 to 24 years old, white, and non-Hispanic. Freshmen (7.7%), sophomores (15.4%), juniors (38.5%), and seniors (38.5%) were all represented in the study with an equal number of juniors and seniors. Most students were female (80.8%), with an agricultural education, leadership, and/or communication major (65.4%). Other majors represented were journalism and media communication (18.5%), agricultural literacy (7.7%), environmental communications (3.8%), and natural resource recreation and tourism (3.8%).

Fifty-five students at the University of Florida, Texas Tech University, and Colorado State University represented the treatment group and were 19 to 27 years old, with one student older than 27. Hispanic students made up 8.9% of the sample, and multiple races were represented. Most of the students were juniors (41.1%). Students also were mostly female (75%) in the spring 2017 semester, and had an agricultural education, leadership, and/or communication major (64.3%). Other majors included journalism (8.9%), business (5.4%), communications (3.6%), and environmental sociology (3.6%). Other majors represented were natural resource tourism, cultural anthropology, ecosystem science, agricultural literacy, animal science, natural resource conservation, advertising, agricultural business, and a double major (agricultural education and agricultural business).

Results

Self-Perceived Willingness to Communicate – Control Group

Prior to taking the course, the respondents had a low level of willingness to communicate about all nine issues (Table 1). They were most willing to communicate about biotechnology (M = 2.00, SD = 1.18) prior to the class, followed closely by water (M = 1.99, SD = 0.88), and food safety (M = 1.99, SD = 1.12). They were least willing to communicate about invasive species (M = 1.15, SD = 0.84).

After taking the course, the respondents were more willing to communicate about the nine issues, but this was not considered a high level of willingness to communicate (Table 2). They felt the most comfortable communicating about animal health (M = 2.47, SD = 0.83) and water (M = 2.47, SD = 0.89), in addition to food safety (M = 2.46, SD = 1.00). While the respondents were still least willing to discuss invasive species (M = 1.72, SD = 0.94), that issue had the largest positive change in willingness to communicate. Respondents only expressed a statistically significant higher level of willingness to communicate in six of the nine issue areas after taking the course (Table 1). The null hypothesis was rejected for objective two.

Table1

Willingness to Communicate – Control Group

Issue	*N*	Pre M*(SD)*	Post M*(SD)*	Δ	*t*	*p*
Overall Willingness to Communicate	**26**	**1.81(0.63)**	**2.17(0.70)**	**0.36**	**-2.54**	**.02***
Invasive species	26	1.15(0.84)	1.72(0.94)	0.57	-2.89	.01**
Animal Health	26	1.91(0.88)	2.47(0.83)	0.56	-4.60	.00**
Water	26	1.99(0.88)	2.47(0.89)	0.48	-2.33	.03*
Food safety	26	1.99(1.12)	2.46(1.00)	0.47	-2.80	.01**
Food security	26	1.87(1.12)	2.31(1.01)	0.44	-2.62	.02*
Conservation	26	1.79(0.92)	2.19(1.05)	0.40	-2.34	.03*
Climate Variability and Change	26	1.72(0.88)	2.05(1.09)	0.33	-1.49	.15
Biotechnology	26	2.00(1.18)	2.15(1.08)	0.15	-.66	.51
Marketing and trade	26	1.73(1.02)	1.84(1.18)	0.11	-.51	.62

Note. 0 = *Low level of willingness to communicate*, 4 = *High level of willingness to communicate; **p* < .01; *p < .05; *Animal Health (animal welfare, animal disease); Food Safety (foodborne illnesses); Marketing & Trade (imports/exports); Conservation (endangered species, land use); Biotechnology (GMOs); Invasive Species (not native to specific location); Food security (food availability, access and use); Water (water quality, water quantity, agricultural water use); Climate Change (carbon sequestration, greenhouse gas emissions, sea level rise)*

Self-Perceived Willingness to Communicate – Treatment Group

In the treatment group, the respondents also exhibited a low level of willingness to communicate prior to taking the courses (Table 2). However, they were more willing to communicate about animal health (M = 1.94, SD = 0.90) and conservation (M = 1.87, SD = 1.09). Invasive species was the issue the respondents indicated they were least willing to discuss (M = 1.25, SD = 1.01).

After taking the course with the integration of case studies, willingness to discuss issues was still low, but the overall average of willingness to communicate was higher than the control group (+0.58). The respondents were still more willing to communicate about conservation (M = 2.38, SD = 0.85) and animal health (M = 2.38, SD = 0.82) than prior to the course. They were most willing to discuss water issues (M = 2.47, SD = 0.86) after the completion of the class. In addition, invasive species had the largest positive change (+ 0.76) in willingness to communicate. In the

treatment group, where the case studies were integrated, there were statistically significant changes in willingness to communicate in all nine issue areas (Table 2). The null hypothesis was rejected.

Table 2

Willingness to Communicate – Treatment Group

Issue	*N*	Pre M*(SD)*	Post M*(SD)*	Δ	*t*	*p*
Overall Willingness to Communicate	**52**	**1.68(0.78)**	**2.26(0.54)**	**0.58**	**-5.20**	**.00****
Invasive Species	55	1.25(1.01)	2.01(0.95)	0.76	-5.64	.00**
Food Safety	55	1.58(1.11)	2.24(0.85)	0.66	-5.14	.00**
Water	55	1.81(1.05)	2.47(0.86)	0.66	-4.28	.00**
Food Security	54	1.70(1.08)	2.35(0.91)	0.65	-4.59	.00**
Biotechnology	53	1.81(1.17)	2.37(0.84)	0.56	-4.15	.00**
Conservation	55	1.87(1.09)	2.38(0.85)	0.51	-3.86	.00**
Climate Change	54	1.63(1.12)	2.12(0.94)	0.49	-4.02	.00**
Animal Health	55	1.94(0.90)	2.38(0.82)	0.44	-3.54	.00**
Marketing and Trade	55	1.47(1.14)	1.81(0.95)	0.34	-2.07	.04*

Note. 0 = *low level of willingness to communicate,* 4 = *high level of willingness to communicate; **p < 0.01; *p < 0.05; Animal Health (animal welfare, animal disease); Food Safety (foodborne illnesses); Marketing & Trade (imports/exports); Conservation (endangered species, land use); Biotechnology (GMOs); Invasive Species (not native to specific location); Food security (food availability, access and use); Water (water quality, water quantity, agricultural water use); Climate Change (carbon sequestration, greenhouse gas emissions, sea level rise)*

Self-Perceived Willingness to Communicate – Comparing the Control and Treatment

When compared, respondents' willingness to communicate was significantly different, based on being in the control and treatment group in all nine issue areas (Table 3). While the effect size for all issues was medium to low, food safety had the highest power, followed by marketing and trade, biotechnology and food security. Based on the univariate analysis of variance, respondents were more willing to communicate about all the issues after completing the communication course with the case studies integrated compared to the courses taught without case studies. The null hypothesis was rejected for the third objective.

Table 3

Willingness to Communicate Comparison between Control and Treatment Groups

Issue	*df*	*F*	*p*	*R*
Food Safety	2	18.76	0.00**	0.33
Marketing and Trade	2	16.88	0.00**	0.31
Biotechnology	2	16.82	0.00**	0.31
Food Security	2	16.69	0.00**	0.31
Conservation	2	16.24	0.00**	0.30
Animal Health	2	15.43	0.00**	0.29
Climate Change	2	14.92	0.00**	0.28
Invasive Species	2	6.24	0.00**	0.14
Water	2	5.89	0.00**	0.13

Note. 0 = *low level of willingness to communicate,* 4 = *high level of willingness to communicate; **p < 0.01; Animal Health (animal welfare, animal disease); Food Safety (foodborne illnesses); Marketing & Trade (imports/exports); Conservation (endangered species, land use); Biotechnology (GMOs); Invasive Species (not native to specific location); Food security (food availability, access and use); Water (water quality, water quantity, agricultural water use); Climate Change (carbon sequestration, greenhouse gas emissions, sea level rise)*

Discussion, Conclusions, and Recommendations

Students' ability to discuss critical and challenging ANR issues is imperative as they start their careers in the agricultural industry (Morgan & Rucker, 2013; Steede et al., 2016). Employers have expressed the need for students to be able to communicate about ANR issues to be successful in the workforce (Crawford et al., 2011; Norwood & Henneberry, 2006). Willingness to communicate has also been identified as a key leadership trait (Hackman & Johnson, 2009). This study examined the impact of case study integration in communication courses discussing ANR issues. The sample of students was mainly upperclassmen (juniors and seniors), female, and had a major in agricultural education, leadership, and/or communication areas.

It is important to recognize there were limitations to this research. First, the results should not be generalized to a larger student population due to the small sample size in the control and treatment groups. Although this study explored the effectiveness of integrating case studies into the classroom and demonstrated the benefits of integrating case studies, the case studies should be replicated to ensure effect. Another limitation is only the treatment group had incentive to complete the pre-/post-test. Limitations being recognized, educators should consider integrating case studies into their curriculum based on the results.

Respondents indicated a low level of self-perceived willingness to communicate before taking the courses with and without case study integration. Between the two groups, respondents were more willing to communicate about biotechnology, food safety, water, animal health, and conservation before the courses. After taking the communication courses, respondents were more willing to communicate about animal health, water, food safety, and conservation. Previous literature does support the findings of this study that case studies do increase willingness to

communicate (Bonney, 2015; Cassimjee, 2007). While respondents in both the control and treatment groups were not considered to have a high level of willingness to communicate, there were positive changes. When compared, the case study integration was found to have a positive impact on students' willingness to communicate.

The results revealed communication courses focused on discussing ANR issues prepare students to be more willing to communicate about issues, and the integration of case studies into these courses amplified the effect. According to Steede et al. (2016) listening, having a genuine dialogue with others, and a willingness to have those conversations those who have different views were aspects of a willingness to communicate. Therefore, as the willingness to communicate increases, two-way communication may also increase, which emphasizes listening to the public and engaging in dialogue to address the complex ANR issues (Heath & Palenchar, 2009). Moreover, as students' willingness to communicate increases, they enhance a leadership trait (Hackman & Johnson, 2000) that may allow them to serve as better leaders of the ANR industry through communication.

The integration of these case studies provides students with real-world experience because of the nature of case studies (Naumes & Naumes, 2012), and the cases will help educators teach students about ANR issues and how to communicate about these issues. It is recommended educators use case study methods of teaching when teaching about complex issues to make the connection between theory and practice (Naumes & Naumes, 2012). Furthermore, educators should consider using the multimedia components in the case study to immerse the students in the case to address the big-picture problem at hand (Chattaraman et al., 2010; Naumes & Naumes, 2012).

Students will be challenged with these issues in the future, and willingness to communicate is the critical first step to bringing stakeholders together to collaboratively solve problems. This research provides the beginning stages of empirical support for the link between the use of case studies in the classroom and improving students' willingness to communicate about ANR issues. We theorize this effect may stem from the more experiential nature of the case studies as demonstrated by the differences seen between the students who did not receive the case study-based curriculum and those who did.

Future research should include using the case studies outside of a communication course to see if the same effect is found. Integrating case studies into science courses could help students better understand the real-life implications of their subject matter areas of interest. Those future professionals' willingness to communicate seems equally important to that of communication professionals. Studies should also examine whether these case studies improve students' competencies in other aspects of the communication process, particularly for future communication professionals, such as their understanding of the issues, steps in the communication process, audience analysis, and crafting strategies and messages. Finally, additional research could examine willingness to communicate outside of these nine issue areas because the ANR industry faces even more issues.

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