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An Examination of Postsecondary Agricultural Education Instructors' Perspectives of the Case Study Instructional Technique and the Development of a Model to Encourage Use

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Abstract

In an effort to evaluate the current use of case studies as a teaching technique in postsecondary agricultural education and to develop a model for integrating technologies into the case study technique (CST), a qualitative study was conducted that explored the current use of case studies, examined the effectiveness of the technique, and explored the technology skills held by instructors. Study findings revealed benefits and limitations to the use of CST within postsecondary agricultural education as well as methods for integrating technology into the process. Benefits of CST to students included (a) preparation for real-world application of knowledge, (b) development of higher-order thinking skills, and (c) communication skills improvement. Limitations of CST included (a) students' lack of prior experience, (b) difficulty for instructors to find quality cases, and (c) the need for skilled facilitators. Ways to address these limitations were identified through the research and involved the integration of technology. Research findings provided a foundation for the development of a model to integrate technology with CST. While further research is needed to confirm the effectiveness of the model, the research implies that the use of the resulting model could increase the use of CST and improve teaching effectiveness.

***Keywords*:** case study technique; instructional technology; technology-integrated case study technique

Introduction

During the 20th century, philosophers and educators developed various teaching methods as a response to studies on the condition of human learning. Teaching methods primarily fell into two approaches: *teacher-centered* and *student-centered* (Committee on Academic Programs and Teaching Learner-Centered Task Force, 2005). However, the education reform movement in the United States

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emphasized, "the effort to develop student-centered approaches to teaching and learning" (Deboer, 2002, p. 405). In addition, several educational philosophers, such as Piaget, believed the student-centered approach was more effective than the teacher-centered approach, as students would be able to develop personal meaning through relating the knowledge to real-world situations and discussion with others to make evidence-based decisions (Deboer, 2002).

One student-centered approach used across academic disciplines such as business, law, and health is the case study technique (CST) (Kimball, 2006; Peuse, 1989). CST originated at Harvard Law School in 1870 (Kimball, 2006) and utilized reported or recorded instances, situations, problems, or events as a teaching tool. The technique was often used to develop critical thinking skills, as learners would be able to apply the learning concept in real situations as they analyzed the issue, developed an evidence-based solution, and made reasonably, informed decisions (Smith, n.d., para. 2). Therefore, the use of case studies helped students make connections between knowledge gained in class and real-world practices based on evidence from cases (Davis & Wilcock, 2003). Commonly, instructors used CST in conjunction with the traditional lecture as CST could assist in the development of procedural knowledge (Kindle & Schmidt, 2011). CST also allowed learners to build their knowledge through assessing a situation (Kindle & Schmidt, 2011), identifying issues, and solving problems simulating real-life situations (Baeten, Dochy, & Struyven, 2013).

Not only did CST enable theory-practice connections among students, but also encouraged active learning that provided students with a variety of vital skills that encourage critical thinking (Popil, 2011). In academia, communication and collaboration are essential learning tools for active learning. Case studies are powerful teaching and learning tools that encourage collaboration between the instructor and learners. Compared to using traditional paper assignments to assess students' knowledge, the use of CST greatly improves students' communication skills (Noblitt, Vance, & DePoy Smith, 2010).

While the literature reported positive outcomes associated with using case studies as a teaching technique, research also showed that instructors in the field of agricultural education still perceived their skills in using CST to be low compared to other teaching activities such as lectures (Rocca, 2010). Just as CST has been studied, the use of technology for teaching has also been examined. One study found technology improves access, enhances communication and feedback, restructures teacher time, extends purpose and audience for student work, and shifts teacher and student roles (McKnight et al., 2016). However, examination of the integration of technology with teaching among agricultural education instructors at the postsecondary level revealed that instructors perceived their technology skills to be insufficient (Wingenbach & Ladner, 2002). According to AAAE's 2016-2020 National Research Agenda, the fourth research priority emphasizes creating an engaging learning environment that allows the learner(s) to "reconcile new knowledge with existing knowledge, apply it to gain resolution of the educational objective(s), and transfer what is learned to future experiences" (Roberts, Harder, & Brashears, 2016, p. 39). CST allows students to apply learning to practice and build new knowledge upon existing knowledge through application. In addition, priority number two of the National Research Agenda calls for additional research "on new technologies, practices, and products [to] help agricultural educators develop and implement agricultural teaching and learning processes contributing to the development of sustainable agricultural systems needed in the future" (Roberts et al., 2016, p. 20). Therefore, agricultural educators need to recognize new approaches in teaching as well as ways to improve current teaching techniques. Given that faculty have shown an interest in using technology for teaching (Rocca, 2010) and technology has proven to be impactful when integrated into teaching and learning processes (Kirkwood & Price, 2014), would the integration of technology benefit CST? Further examination of CST use across postsecondary agricultural education was needed to gain a better understanding of the current use of CST, the use of technology with CST, and the impact of CST based upon instructors' perspectives.

Purpose and Objectives

The purpose of this phenomenological study was to investigate the phenomenon of the CST by examining the experiences of instructors in postsecondary agricultural education who utilize CST for instruction in both traditional and technology-integrated classes. Phenomenological research focuses on "interpretive analyses of lived experiences" (Yin, 2016, p. 20). The goal of this research was to document the lived experiences of instructors in order to later develop a model for using CST across postsecondary agricultural education, broadly speaking. The purpose was supported by three objectives: (a) document instructors' experiences with the current method of using the case study as a teaching technique, (b) document instructors' perspectives on limitations of CST, and (c) determine instructors' attitudes toward technology.

Conceptual Framework

The conceptual framework of this study was based on constructivism, a learning theory that explains how people construct knowledge. There are various positions on constructivism, including Piaget's (1967) personal constructivism and Von Glasersfeld's (1987) radical constructivism. However, Vygotsky's social constructivism was determined to be the most fitting theoretical framework for this study due to its significant impact on instructional design and current educational approaches (Jones & Brader-Araje, 2002).

Vygotsky and Kozulin (1986) explained that people form knowledge by experiencing events in a social context, reflecting on those experiences, and discussing such experiences with others. Such social interaction allows people to interpret the world and form their own understanding. CST is one instructional approach that follows constructivist learning, as it requires learners to immerse themselves in real-life experiences (Davis & Wilcock, 2003). These experiences allow learners to think critically, analyze the situation, discuss the experiences with others, and form an understanding that empowers them to make informed decisions (Kindle & Schmidt, 2011).

This study ultimately sought to develop a model for use across postsecondary agricultural education to enhance CST through the integration of technology. While the conceptual framework of the study was based on the concept of constructivism, the literature provided an additional framework to guide interpretation of participants' lived experiences. The literature reviewed included teaching methods (Committee on Academic Programs and Teaching Learner-Centered Task Force, 2005; Deboer, 2002; Popil, 2011; Rocca, 2010) and, more specifically, the case study method (Kimball, 2006; Noblitt et al., 2010; Peuse, 1989), along with characteristics of the case study method (Baeten et al., 2013). The teaching methods literature was complimented with literature related to the role of technology (Kirkwood & Price, 2014; McKnight et al., 2016; Rocca, 2010) and technology skills (Wingenbach & Ladner, 2002) to provide a context from which to view individual responses. As the research moved from phenomenological and the documentation of the lived experiences to the interpretation and application of these experiences, we integrated the application of technology to enhance the utilization of CST based upon findings.

Methods

A deep understanding of the perspectives and lived experiences of instructors as they attempt to utilize technology to enhance teaching while ensuring students receive the full benefits of CST was needed. As the phenomenological approach is concerned with the paradigm of personal knowledge and subjectivity (Lester, 1999), this phenomenological study employed individual in-depth interviews with instructors who regularly used the case study as an instructional method. The goal was to describe "the

common meaning for several individuals of their lived experience of [this] concept," (Creswell & Poth, 2018, p. 75) the case study. This type of research aims to reveal different interpretations of reality to understand how individuals within the context of a social system construct their own reality (Merriam & Tisdell, 2015). This approach was especially appropriate given that the study describes instructors' individual experiences with CST in both traditional and technology-integrated classes and allowed us to examine human experiences through the descriptions provided by the participants. The human instrument was used to interview, observe, and analyze reality that is essential for this research (Merriam & Tisdell, 2015). Interviews were conducted in a semi-structured manner where participants were allowed to elaborate on and explain their perspectives beyond the guided questions. To understand how technology could be integrated into the CST of instruction, it was first necessary to understand how case studies were currently being implemented and utilized within the classroom. It was also important to be aware of the technical skills possessed by instructors.

Regarding the subjectivity of the study, the main researcher is an instructional designer. She is passionate about improving instructional methods. After a first-hand experience with the use of case studies as a teaching technique at Harvard University, which is well known for being the pioneer in the use of case studies as a teaching technique (Kimball, 2006), she became interested in the technique and determined to develop a model in which the technique can be applied to agricultural education.

Sampling

A purposive sampling technique, expert sampling, was used for this study (Merriam & Tisdell, 2015). Participants were selected based on their identification as an instructor of courses in which case studies were utilized. We reviewed syllabi that were available on publicly accessible agricultural education departments' websites to identify potential participants. Ten of the most distinguished programs in agricultural education were selected, including "University of Florida, Texas A&M University, The Ohio State University, University of Missouri, Iowa State University, Oklahoma State University, North Carolina State University, Pennsylvania State University, Texas Tech University, and University of Arizona" (Birkenholz & Simonsen, 2011, p. 16). Individuals who were identified were contacted individually via email, and a recruitment email was also sent via the listserv of the Association for Agricultural Education to solicit volunteers.

From the review of syllabi, 16 individuals from seven universities throughout the United States were selected from various disciplines of agriculture such as agricultural education, agricultural leadership, and agricultural communications. From the recruitment email sent to the Association for Agricultural Education listserv, an additional five individuals were identified. A total of 14 individuals responded with a confirmation that they were willing to participate in the study. All participation was voluntary, and all participants provided informed consent in line with confidentiality. The combining of these approaches allowed the maximum number of instructors to contribute to the study. Individuals were recruited for participation until data saturation was reached.

Data Collection Strategy/Procedures

After receiving confirmation from individuals indicating willingness to participate, date and time were set for an interview with each. An email reminder was sent to each participant one day before the scheduled date. The interviewer began each session with a brief description of the research and explained the research purpose and objectives. The interviewer then asked the participants to describe their use of case studies to ensure the definition of case studies was consistent with the study. A total of 14 interviews were conducted. Nine were by phone, and five were in person.

Data Analysis

The constant comparative method (Lincoln & Guba, 2013) was used for data analysis, in which we compared interview responses and reflection notes throughout the study. The overall steps in the analysis process were (a) transcribing the interview, (b) member checking, (c) unitizing the data, (d) labeling each idea/comment, (e) coding and documenting phrases for emerging themes, (f) regrouping/reorganizing, (g) defining keywords, and (h) peer debriefings. For this study, each participant was coded using a unique identifier with three parts. The first part of the code consisted of the letter P and a number assigned to the participant. The second part consisted of the letter E (agricultural education), C (agricultural communication), or L (agricultural leadership), identifying each participant's discipline. The third part consisted of the letter T (tenured) or N (non-tenured), identifying the tenure status of participants.

After receiving a confirmation from each participant that the transcripts accurately represented their views (member checking), the transcripts were broken down for the data to be unitized (Merriam & Tisdell, 2015). We disaggregated transcripts into unitized pieces consisting of independent ideas or thoughts. These standalone thoughts were considered units, and each unit was labeled for easy identification. For example, a comment on line 12 of participant P01ET was coded "P01ET.L12." The next step of the data analysis was to employ the constant comparative method, which used the emergent category designation approach (Merriam & Tisdell, 2015). This approach included open coding and the axial coding technique. The first unit was set aside as the first entry and first category. Other units were added to the first category or set aside as new categories. This step continued until all units were assigned a category. Coding revealed themes that resulted in the following: Use of Case Studies for Teaching, Intended Learning Outcomes and Skills, Student Issues, Instructor Issues, Technology for Instruction, Future for Technology-Integrated Case Study Technique, Technology Skills/Efficacy, and Issues/Concerns with Technology Integration. Each theme was defined based upon the units. Results from this step were documented in a peer-debriefing document, which we created to ensure the keywords represented the data units appropriately. Following a research team review of the peer-debriefing document, feedback was taken into consideration as key phrases were finalized for the themes. Emerging themes were compiled into three areas corresponding to the three objectives of the study. This compilation of the resulting themes is shown in Figure 1. Each box represents an objective of the study, and the corresponding boxes reveal emerging themes that address the objectives.

In addition to each objective corresponding to specified themes, each theme then resulted in subthemes to further specify the theme. To reveal connections and themes associated with technology integration, a combination of themes and subthemes were used to respond to the objective. Evidence from the resulting themes was used to develop a model of technology integrated CST.

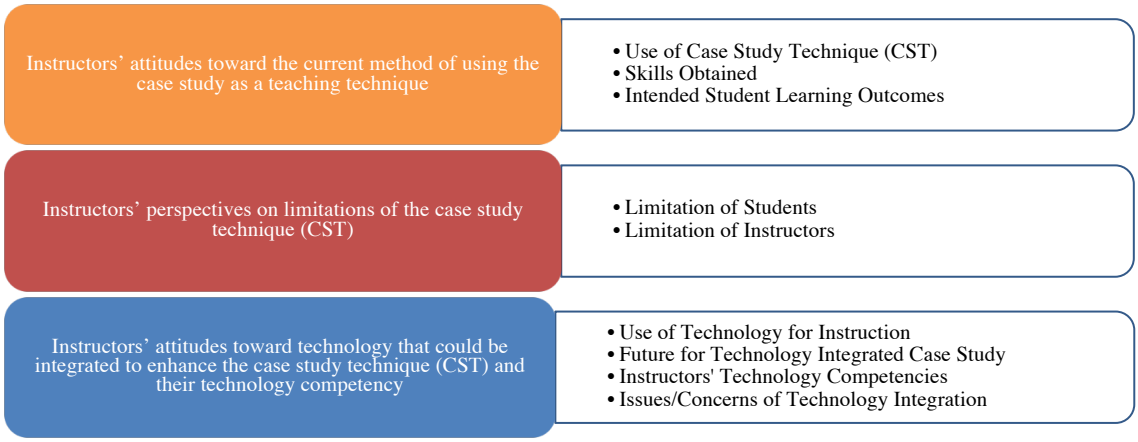

Figure 1. Compilation of emerging themes for instructors' attitudes and perspectives related to the case study technique.

Findings

The 14 participants were instructors at six of the 10 most distinguished programs in agricultural education (Birkenholz & Simonsen, 2011). These instructors taught both undergraduate- and graduate-level courses with six in agricultural education, six in agricultural leadership, and two in agricultural communications. The genders were eight male and six female; ages ranged from 30 to 60 years of age. Instructor ranks included two lecturers, four assistant professors, six associate professors, and two full professors. Findings follow by objective.

Objective I: Instructors' Experiences with the Current Method of Using the Case Study as a Teaching Technique

The first research objective focused on documenting instructors' experiences with CST. An analysis of the interview data revealed four major findings characterizing how and why participants utilized CST. In addition, findings suggested skills students obtained from the use of CST.

Designing teaching to utilize the CST. Two different approaches existed in the ways participants designed the integration of CST in teaching. The first related to implementing CST after content creation due to concerns that the case study would not match learning outcomes (P03LT; P05ET; P09LN). The second approach related to designing the content around CST (P06LN.L21-22). The participants who supported this second approach believed that designing the use of CST this way would help them prepare students for the workforce (P06LN; P12ET).

Regarding the approach of integrating CST into the design of the course content, the findings indicated that the instructional method, such as CST, should be integrated based on the content (P05ET.L27-29), meaning the cases should be selected to fit the content. To support the importance of course content, one participant stated that he used case studies because they were relevant to the topics he was covering (P09LN.L2-3). The second idea of implementing CST was to be "organized around case studies" (P06LN.L21-22), meaning cases were selected prior to designing the content.

Development of case studies to be used in CST. There were four approaches to case study development in the participant group. The first approach was expressed by participants as a reaction to not being able to find suitable cases for their content as one participant indicated, "sometimes, I have something in mind; if I cannot find a case, I would write my own" (P12ET.L19). This participant elected

to write his/her cases. Another participant concurred, stating, "most of the time, I prepare the cases myself" (P09LN.L36). These participants found themselves preparing or writing case studies. One reason behind developing the cases themselves was to ensure relevant learning outcomes were met, as one participant stated, "…the ones I developed focus on the outcomes of the class" (P06LN.L28-29). The second approach to development was through the utilization of textbooks. Several participants indicated that they intentionally chose or searched for textbooks that included case studies. One participant mentioned, "in a Technology Change class, I am using Roger's book, and the content is based on case studies and real-life situations" (P12ET.L6-7). Another participant shared that the textbooks used included guided questions that were used "for the case study assignments" (P01ET.L30). The reason many instructors used cases from textbooks was because "it was really easy for the instructor" (P12ET.L23). The third approach participants mentioned was to develop cases from news items and current events. Instructors believed that developing case studies through this approach would guarantee case studies "that are very real and very current" (P05ET.L43). The final approach was to have students write their own cases based on their field experiences, interviews, and research. One participant explained their process for this approach:

> Each student writes the case, brings [it] to class, and presents. The class would discuss what they would do with it, without revealing what the case is about. [The] instructor would facilitate the discussion. Then, the writer reveals the outcomes. (P08LT.L37-39)

Utilizing CST within instruction. There were four unique ways that participants delivered case studies. The first method was delivery through lectures as CST assisted in delivering the content. The second method that participants expressed was using case studies to lead discussions. The third method involved participants utilizing case studies for assignments. The fourth method related to using case studies to teach high impact experiences such as fieldwork.

According to the findings, the first approach to utilizing CST was to "deliver the content" (P04LN.L21) and "validate the lecture using real-world examples" (P11ET.L4). Participants agreed that CST has the potential to deliver concepts and theories in the courses. CST is useful because it combines traditional lectures with real-life scenarios, allowing students to experience "real-world context that they can work through" (P06LN.L14-15). Participants indicated that students tend to be "more engaged" [P01ET.L20] and "more interested" [P11ET.L5-6] in their learning when using CST.

The second approach to CST delivery from the findings was the utilization of CST to lead group discussion (P01ET.L4-5; P05ET.L58; P07CT.L15). CST allows students to see actual situations and theories utilized, fostering excellent discussion among student groups (P01ET). Through constructive and informed arguments, instructors and students can come together to identify problems and bring their own experiences to case study discussion (Fawcett, 2017). However, to ensure meaningful discussions, instructors need to facilitate the discussion (P08LT.L37-39).

The third method of utilizing CST was through class assignments, as some participants assigned writing assignments that connected to the case studies (P06LN). Instructors also observed that students handled case study assignments differently than other assignments (P10CN). These assignments were beneficial for students as they were able to apply what they learned in a real-world situation (P08LT).

The fourth method of utilizing CST was to deliver high impact experiences by incorporating case studies into activities such as fieldwork, research, and professional development. Participants believed that with CST, "students would learn and highlight experiences that were impactful" (P08LT.L11) as they were able to "make decisions and experience consequences" (P05ET.L64-65).

Especially in the field of agricultural development, it is "important to understand first- hand experiences of what is going on out there" (P08LT.L5-6).

Intended outcomes. In addition to how often participants used CST, they were also asked to articulate their thoughts about student learning. Participants indicated they design, develop, and deliver CST based on the intended learning outcomes, including classroom interaction and ability to rationalize theories to students.

Regarding classroom interaction, participants indicated CST forced students to interact with instructors and among themselves. One participant indicated, "I have to be much more engaged in the conversation in helping shape students' understanding of each case" (P07CT.L22-23), which allowed "students to get involved and participate in the lesson more completely" (P02EN.L6-7). CST also builds trust between instructors and students, empowering students to express their opinions openly. One participant stated, "Students establish a relationship with me when they begin to trust" (P04LN.L36). Another participant shared, "It's important for the instructor to give control to students" (P07CT.L16) to create a safe space by giving up control of the classroom and urging students to participate.

In addition to classroom interaction, participants indicated CST helped students rationalize theories by connecting to practice. One participant stated, "Case study gives me opportunities to provide real-world context that students can work through" (P06LN.L14-15), "which is valuable for understanding the outputs" (P06LN.L17-18). Students were also able to rationalize how the same theory applied to different situations. "As much as you can in the classroom, give students the feel of what to do when things happen and allow them to apply concepts" (P10CN.L19-20). By relating concepts to real-world application, students would be able to put content to context, which increases their interest in the subjects.

Skills. As participants identified intended learning outcomes, they also identified skills that they believed students obtained from CST, including higher-order thinking, real world application, and communication. According to participants, "higher-order thinking skills are employed when using case studies" (P04LN.L17). These skills included "critical thinking, being able to evaluate, synthesize information, dissect info[rmation] and being able to see what happened in an individual context" (P01ET.L12-13). Participants indicated students gained an ability to "think of different vantage points" (P09LN.L26) by analyzing and solving problems through case studies. In addition to higher-order thinking skills, experience with real-world application through case studies allowed students to think deeply about their decision. One participant explained, "For me the opportunity to think about something that might have been abstract to them and think how it would play out in the real-world allowed them to demonstrate critical thinking" (P09LN.L19). Students were able to "respond and react in different situations" (P02EN.L19) appropriately and apply what they learned when facing real-world situations. As the theme of classroom interaction emerged in the intended learning outcomes, this study also learned that CST helped students with "communication and collaboration" (P03LT.L46). They developed the ability to listen to different perspectives and respond appropriately. One participant shared that, "students needed to talk to each other. They have to think, write well, and speak well" (P08LT.L59-61). In summary, participants believed students developed their communication skills over time with CST.

Objective II: Instructors' Perspectives on the Limitations of the CST

The second objective examined the limitations of CST. Data revealed obstacles that prevented or obstructed participants from using CST efficiently and effectively. Two categories emerged indicating limitations on both the instructors' side and the students' side.

Limitations of CST for students. Regarding limitations of CST for students, several themes emerged. First, participants from all three agricultural disciplines (i.e., leadership, education, and communication) agreed that students' prior experience with CST was a limiter of CST's effectiveness. One participant stated, "students react to cases differently based on their background" (P08LT.L49). Another participant stated that for some students, "it's really difficult because they expected to come to the class being told what to do and what the answer was" (P05ET.L18-19) because they were "not used to being taught this way with case study" (P08LT.L45). Students who did not engage would not receive the full benefit of CST. The second theme emerged primarily from participants within agricultural education. Participants indicated that excessive use of CST could be another limitation. One instructor indicated, "students can get tired of case study if it becomes a routine" (P12ET.L24-25). Indeed, case studies should not be used alone, but they should be used in conjunction with another method of teaching as one participant noted: "we have to use multiple tools" (P04LN.L22).

The last theme identified within limitations of CST for students related to the formats and structures of the case studies used. First, the case studies needed to be current. A participant indicated, "I think CS can get old quickly. The content can become dated. It has to be revised and adapted" (P05ET.L52). This factor was very important to ensure the effectiveness of CST, as one participant mentioned, "If students don't see why they need to know something or if they don't have an interest in it, they won't remember [content]" (P03LT.L10-11). In addition, one participant indicated that the length of the case studies also greatly affected the class participation as "some students…may not get to participate in the discussion" due to time constraints or large class sizes (P02EN.L21-23). Lastly, another limitation of CST for students was expressed as the relevancy to their discipline(s). Participants suggested that if case studies were not related to students' discipline, "it made connecting the theory-concept difficult for them. Having a case study that is appropriate to the audience is very important" (P12ET.L45-47).

Limitations of CST for instructors. The majority of participants agreed that the biggest obstacle in using CST was finding high-quality cases. Some existing cases were too old or no longer relevant. One participant stated, "I think case studies can get old quickly. The content can become outdated. [Cases] have to be revised and adapted" (P05ET.L33-34). Specifically, case studies that are tied to current events, "like political ones or agricultural technology ones, these might be outdated" (P05ET.L49-50). If instructors were unable to find cases that work with their content, instructors resorted to crafting their own case studies. This method, however, required a significant amount of "time and skills to develop good case studies" (P01ET.L18). Participants indicated that there were additional development struggles because "[instructors] have to put enough detail [in case studies they developed] for it to be believable" (P12ET.L37-38). Not only did case studies take time to develop, but participants also indicated, "It takes time writing guided questions" (P03LT.L32).

The second limitation of CST was the need for skilled facilitators. Participants mentioned that CST intimidated many new instructors because this technique of instruction "encouraged deep thought" (P07CT.L20-21) and intense discussion; therefore, instructors needed to be well prepared to facilitate classroom discussion. A participant explained, "As an instructor, I need to be able to take the inputs and opinion[s] from students and make sure students stay on topics" (P07CT.L18). However, some participants expressed that they struggle to keep up with the pace of change. They had to study to "keep up with students" (P07CT.L80-81).

Lastly, participants indicated issues stem from letting go of control of the classroom. To deliver CST effectively, instructors needed to let students take charge of the classroom, especially for discussion. As one participant explained, "I have to force myself not to tell students what I think. In the case study method, I have to hold back and wait for students to ask me what I think" (P05ET.L14-15).

"Using the case study method, I need to know a whole lot more than I need to share. I may not always know the answer" (P07CT.L24-25).

Objective III: Instructors' Attitudes toward Technology

The last objective was to understand instructors' attitudes toward technologies that could be integrated into teaching plans to enhance CST and instructors' competency in using those technologies. Findings resulting from this line of questioning during the interviews resulted in four themes: (a) use of instructional technology (IST), (b) future of technology-integrated CST, (c) technology concerns and skills needed for CST, and (d) concerns regarding technology integration.

Use of instructional technology. Technologies were described by participants as serving three purposes: delivering learning materials, communicating beyond the classroom, and assessing learning. The first instructional objective of IST mentioned by participants was to deliver learning materials. Electronic presentation software such as PowerPoint seemed to be the most frequently mentioned software (P01ET.L27; P08LT.L65-66; P11ET.L16-17). However, other web-based presentation programs such as Prezi and GoogleSlides were also mentioned, as these offered more interactive features that would increase student engagement (P11ET.L16-17; P12ET.L54). Among the mentioned technologies for delivering content, learning management systems (LMS) and the use of video were mentioned by the participants. LMSs that participants reported currently using included Blackboard, Moodle, and Canvas. The LMS was described as housing learning materials such as syllabi, presentations, articles, and additional web resources (P03LT.L55; P10CN.L56).

The second purpose of IST was for communication beyond the classroom. To connect with students outside of the classroom, participants used social media and blogs. These technologies allowed students to share content online with each other, establishing a learning community outside of the classroom. One participant explained, "I use Facebook (closed group); I tried to get students to see…content. Students share interesting content to the group" (P12ET.L63). Another participant concurred that a social media site like Facebook allowed students to "post video presentations on the Facebook group and have others comment on their posts as well" (P12ET.L58-59). Additionally, using social media sites such as discussion boards allowed students to use the online space to "get feedback from each other" (P08LT.L67-68). A third participant mentioned LinkedIn as a social media website, believing that incorporating the professional social media site could help students connect on a professional level (P09LN.L63-64). Blogs were also mentioned as a technology they used for instructional purposes. Blog sites, such as Wordpress, were shared as an alternative to a LMS (P04LN.L30) as it allowed instructors to post learning materials while giving students a space to share their thoughts online. In addition to social media and blogs, other communication technologies such as videoconferencing and online messaging were mentioned as a way to bring students together regardless of geographical locations. Among the specific programs participants mentioned were: Adobe, Collaborate, Skype, and Yahoo Messenger (P01ET; P02EN; P11ET). These technologies allow participants to bring in experts and guest speakers to the class with ease (P01ET.L28).

The third purpose of IST was for assessing student learning. First, participants mentioned electronic voting systems that allowed participants to collect immediate feedback and assess students' formative learning during class (P07CT.L70). Systems such as iClickers and web-based software such as Socrative and Kahoot were mentioned as applications that created an interactive learning experience allowing instructors to "ask a series of questions on prior class readings" (P02EN.L30) and students to provide feedback that instructors could grade (P12ET.L70-71).

Future of technology-integrated CST. Regarding the future of the technology-integrated CST, participants were asked what technologies they were interested in using and which technologies

they believed would support the implementation of case studies. Examination of participant responses revealed technologies that could be categorized into three major themes based on the intention to integrate with CST. These themes included improving content accessibility, enhancing an existing practice, and increasing interaction.

Improving content accessibility. Participants seeking to use technologies to improve case study content accessibility indicated that they would like to share case studies among themselves because high-quality case studies were difficult to identify (P01ET; P05ET; P06LN). The participants believed using Cloud or online data storage to share case studies with other instructors was a viable option. If someone had developed a high-quality case and was willing to share, the case could be beneficial to other instructors who are looking for cases (P01ET; P05ET; P06LN). In addition to creating a Cloud space for sharing cases with other instructors, creating additional access through online channels such as YouTube for video cases was an interest of participants. One participant mentioned, "I would like to provide links through a YouTube channel" (P06LN.L41).

Enhancing existing practice. The second type of technology described as having the potential to enhance existing CST practices included video and virtual reality experiences. Traditionally, CST was accomplished through readings, as students would read case studies then discuss findings. However, when participants were asked if there were technologies they would like to integrate with CST, they emphasized a need for alternative ways to present case studies. The majority of participants suggested video cases as an alternative or enhancement to CST. One participant explained, "I started out with not using videos, but just links to content but students would have a lot of questions. Now I develop video solutions, which help students better" (P06LN.L43). Another participant used video cases for "discussion after we talk about theories or concepts" (P09LN.L9) to enhance the use of the CST. A third participant explained, "Videos are used to show how things work. [For] example, showing clips of people negotiating to teach how to negotiate" (P03LT.L50-51). These responses reveal a strong interest in the development of video-supported case studies. In addition to videos, participants who already implemented video cases expressed that they would like to try creating a virtual reality to bring experiences to life within a case study. Virtual reality has become a technology that affords educators and students the "opportunity for us to go to places we could not [go before]" (P04LN.L59). At the time of this study, one participant had already "developed online simulations that are like case studies" (P05ET.L63) to be used for CST. For study abroad purposes, virtual reality would also be useful and allow instructors to "bring back the experience to students and what it would be like interacting with people from another country" (P04LN.L45-48). These technologies would bring case studies to life and allow students to gain knowledge through more than moving images or text.

Increasing interaction. The last theme category, which emerged from participants, related to increasing interaction in both the classroom and the online environment when using CST. These technologies included software and hardware that aided in classroom management, connected students outside of the classroom and in an online environment, and assessed students' learning and understanding of case studies. Electronic classroom management tools such as TopHat can turn students' electronic devices into learning tools. In larger classrooms, participants mentioned that TopHat allowed them to "keep up with what's happening" (P07CT.L84). In addition to a classroom management software, participants also indicated they would like to "find an innovative way to incorporate social media" (P09LN.L63-64). Lastly, participants indicated they were interested in using an electronic voting system to facilitate discussion about cases. For a larger classroom, "incorporat[ing] technology like an electronic voting system" (P09LN.L57) such as iClicker, Polleverywhere, Plicker (P07CT.L66), etc., allowed instructors to "assess concepts relating to the case studies – getting the class consensus" (P02EN.L39-40).

Technology concerns and skills needed for CST. To gauge the technology competencies of the responding instructors, participants were asked to describe their technology skills. Analysis of responses indicated differences in self-identified technology skills among participants. Participants who described themselves as being early adopters (P05ET; P02EN; P12ET) indicated that they would attend technology training and had experimented with different technologies because "it is easier now to be an early adopter compared to the past when technology was more expensive" (P02EN.L34-36). Participants who considered themselves to be late adopters and had a low use of technology indicated that they would consider themselves "somewhere in the middle" (P09LN.L59-61) and that "it helps me to see what technology they use and in what way" (P09LN.L59-61). Another reported they would like to "see how people use it first" (P03LT.L58-59). One indicated that he would "hop on board if something is interesting" (P07CT.L78-79) and "usually would try it out" (P10CN.L62).

Concerns regarding technology integration. In addition to technology competency, participants were also asked to identify concerns or issues they may have experienced when implementing instructional technologies. According to the analysis of responses, three major themes emerged including (a) technology could be a distraction, (b) technology could be time-consuming, and (c) the availability of technology support.

Technology could be a distraction. Three participants indicated, "technology could be a distraction" (P07CT; P09LN; P10CN). Students do not always use their devices for learning purposes, which can detract from classroom engagement. Another shared that devices such as "laptop[s] can hinder learning" (P07CT.L90). One participant indicated that he tried using online resources such as YouTube videos, but non-relevant content could appear unexpectedly and distract students (P07CT.L91).

Technology could be time-consuming. In addition to the distraction technology might create, participants also mentioned that there were other issues that obstructed them from using technology efficiently such as time. One of the reasons expressed related to technology being appropriate for particular learning objectives. Sometimes instructors found difficulties in implementing technologies that "do not satisfy the [discipline] objectives" (P04LN.L24). Participants agreed that they did not want to "use technology for technology sake" (P08LT.L76-78) but desired to "have a reason for using technology" (P08LT.L76-78). Others were worried about "the time to do personal development in technology" (P03LT.L62). Another participant concurred with the heavy time demand that training in new technologies requires: "the more we use technology, the more adaptive we are. We never finish with improving our ability to use technology" (P04LN.L50-51).

Availability of technology support. The most emphasized concern mentioned by participants was technology support. When technical issues used valuable time, it created obstacles in implementing classroom technology. One participant stated, "I don't want to waste class time. The classroom hardware needs to also support the technology" (P04LN.L62). Another participant who used videos intensively was concerned that students would not "have access to the videos" (P09LN.L32-33). She also believed that "it's always important to have a backup plan, as technology might not always come through" (P09LN.L65). Another participant expressed similar experiences and stated, "If I can't install software on computers, that could be a problem" (P02EN.L44); for many universities, installing software requires administrator-level access.

Development of Model

Findings from the study aided in the development of a model, as shown in Figure 2, in which technology can be integrated to enhance CST. This model was created based on the understanding of instructors' experiences with CST, technology to enhance CST, and technology skills needed by

instructors and is intended to guide instructors. Starting with implementing CST in instruction, the model addresses the need for establishing goals, objectives, and instructional methods. In addition, the model also explains how ideas that are essential to the development of case studies fit into CST. Furthermore, to ensure active learning experiences, the model includes four approaches in which CST can be delivered. Additionally, the intended outcomes should inform the design phase of CST. Each learning outcome leads to skills which students would obtain from the use of CST. Findings revealed several limitations of CST but also implied attributes to improve CST. These attributes allowed us to build a model for CST regarding the development of cases and instruction. Regarding technology integration, the model displays the utilization of technologies for each of the instructional areas according to the analysis of participants' responses. The model, based upon participant input, also includes the application of technologies to enhance content delivery, discussion, and assessment. As our findings and literature review concurred, technologies mentioned in the model have the potential to enable CST to prepare students for real-world application, higher-order thinking, and improved communication skills. Lastly, the support/services from the administration of a department, college, or university for technology use were included in the model as a reflection of an important need expressed by participants.

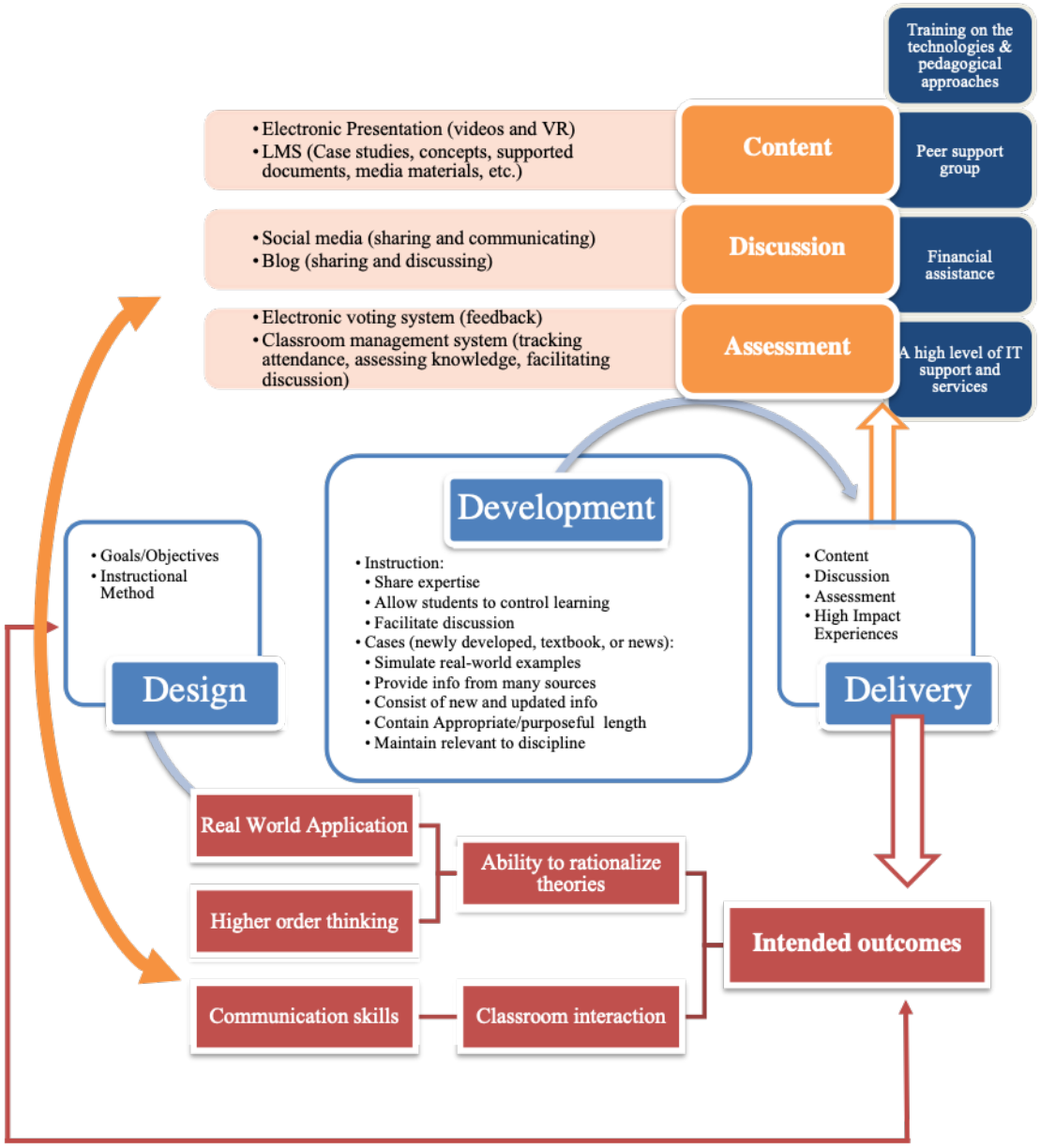

Figure 2. Technology-Integrated Case Study Technique Model based upon participant input.

Conclusions, Implications, and Recommendations

We studied the current use of case studies as a teaching technique (CST) across the broad discipline of agricultural education, including leadership, education, and communications. Through this phenomenological study, we explored the current use of case studies, technology use with CST, and skills instructors needed to effectively enhance CST through the use of technology. The goal was to investigate the phenomenon of CST and develop a model for integrating technologies into CST. This study provides a clear description of the use of CST from the perspective of those within the field who identify as using it as a teaching tool.

Findings allowed us to conclude that instructors integrate CST into teaching with two different approaches. The first approach was implementing CST after content creation. The findings implied that relevancy to course content should be a criterion for choosing CST as an instructional method. Some scholars suggested that focusing mainly on content coverage explained students' ability to recall and identify content material during assessments (Burris & Garton, 2007). Problem-based learning required students to adjust their learning approach. Some students struggled to process the learning content due to lack of experience with problem-based instruction (Burris & Garton, 2007) such as CST. Therefore, case studies should target the appropriate level of learners, match the content, and reflect instructional goals and objectives (Kim et al., 2006). The second approach was designing the content around CST. The findings implied the conceptual content could be built around case studies, which is different from the prior approach. Both ideas have merit, as they focused on creating an active learning experience through relevancy and realism. Therefore, to choose one method over the other, one must consider which method would be best to accomplish the goal of instruction. The development of case-based courses must begin with a careful consideration of learning outcomes (Giancalone, 2016). This implied that how CST will be used should be determined early when goals and objectives of the course are being developed.

Regarding utilizing CST within instruction, findings revealed that instructors used CST to deliver the content. The findings implied that CST works best when used to support and validate concepts. As students may have experience in processing problems raised in case studies, traditional techniques of instruction such as lecture may be used to cover the content knowledge (Burris & Garton, 2007). An additional approach to CST delivery, based upon findings, was the utilization of CST to lead a group discussion. This implied that to utilize CST for discussion effectively, instructors need high-quality reasoning and questioning skills, as the lack of real connection could lead to students' inability to grasp the learning concepts and result in an ineffective class discussion (Herreid & Schiller, 2013). The third method of utilizing CST was through class assignments. The findings implied CST could be used for writing assignments that offer an enhanced way to improve the ability of students to learn. Instructors could check knowledge and understanding of concepts while promoting creativity in problem- solving and preparing learners for the workplace. For example, Agricultural and Natural Resources industry leaders desire employees with basic communication skills such as basic communication, writing, and public speaking (Easterly III, Warner, Myers, Lamm, & Telg, 2017). Therefore, CST also allows assignments to be relevant to today's needed skills in the field of agriculture. A fourth method of utilizing CST was to deliver high impact experiences (HIE). The findings implied that CST, which provides a simulated delivery method for HIE, fosters learning through actively solving problems, working collaboratively with peers, immersing students in meaningful discussion, and applying knowledge to solve real-world issues. A student-centered teaching technique, such as HIE, can create an engaging learning environment that allows students to direct their own learning through collaboration to solve real-world problems (McCubbins, Paulsen, & Anderson, 2018). Therefore, CST can be used as a tool to achieve HIE.

This research resulted in a model (see Figure 2) to serve as a guide for designing, developing, and effectively delivering CST within the broad context of agricultural education. For those interested in using case studies for teaching or those who are already using CST, this research confirmed the benefits of using CST and added factors to be considered to increase the likelihood of using the technique effectively. Furthermore, this research provided a guide to improve CST by addressing its limitations with effective technology integration, while pointing out limitations that exist. The analysis of findings has identified ways to improve CST as an instructional method to prepare students for real-world situations, higher-order thinking, and communication skills. The model provides a graphic depiction of the current use of CST, the use of technology with CST, and the potential for impact of CST based upon participant perspectives. Overall, instructors require training in technical and pedagogical aspects to utilize CST effectively.

This research explored instructors' experiences with CST and integrating technology; it did not examine the impact of the Technology-Integrated CST model on students' learning. Research is recommended to assess the use of CST and Technology-Integrated CST on student learning. In the evaluation phase (Dooley, 2005), the research should focus on examining the effectiveness of the Technology-Integrated CST model in preparing students for real world application, higher-order thinking, and communication skills. To determine effectiveness, future research should utilize students' self-evaluation, students' achievement of learning outcomes, and employers' satisfaction/evaluation as measures of students' success. This data could provide an understanding of the impact of CST use and the role of technology in enhancing CST.

For practitioners (i.e., instructors, instructional designers), the use of CST and Technology-Integrated CST should be considered when designing a course that focuses on real-world application, higher-order thinking, and communication. As the use of technology impacts student learning (Altun, 2015), practitioners may find increased student engagement as a result. However, the importance of technology support cannot be overstated. Administrators must recognize that effective use of technology requires sufficient and reliable support, as expressed by participants. Therefore, an underpinning of technology support is critical to the implementation of the model. In addition, CST itself requires well-designed and well-managed instructional activities as well as skilled facilitators. With the integration of technologies, instructors will need training related to the technical and pedagogical approaches of the model. Participants often relied on case studies for teaching as it was easy to connect content with real-world examples. Thus, another recommendation for practitioners is to consider using CST in conjunction with other instructional methods or switching among instructional methods to encourage engagement. AAAE's 2016-2020 National Research Agenda (Roberts, et al., 2016) calls for improvement to teaching and learning methods. This study contributes to a model that agricultural education instructors can use to meet this challenge.

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