

What are the teachers' experiences when implementing the Curriculum for Agricultural Science Education?

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This multiple case study was designed to understand the experience of implementing the Curriculum for Agricultural Science Education (CASE) for five teachers at four high schools. All teachers were in their first year of implementing CASE. Through the use of weekly journals, semi-structured interviews and a focus group, researchers attempted to gain insight into how the teachers were implementing CASE as well as their perceptions of the curriculum's impact on their program and students. Five themes emerged from the study: a) some teachers adapted more easily to the student-centeredness of the curriculum; b) teachers enjoyed having content available, but none of them made it all the way through the material; c) the materials and equipment were essential to the successful implementation of CASE; d) teachers saw attending the CASE training institute as vital to their implementation of the curriculum; and, e) implementing CASE allowed the teachers to refocus. Additionally, researchers used the Concerns Based Adoption Model as a framework for this study and determined each teacher's level of use, stage of concern and innovation configuration. Recommendations are included for classroom teachers, teacher educators, as well as the CASE developers.

Keywords: CASE; Curriculum for Agricultural Science Education; institute; teacher experience; barriers; agricultural education; Concerns Based Adoption Model; CBAM

In 1983, the National Commission on Excellence in Education issued a report known as *A Nation at Risk*, which argued the American education system was in trouble. The response to this report from many states was to increase science and math requirements for high school students (Camp & Heath-Camp, 2007). This focus on core subjects and increasing test scores in areas like math and science has led to decreased Career and Technical Education (CTE) enrollments at the secondary level as students have less time to fit CTE courses into their schedules (Camp & Heath-Camp, 2007; Martin, Fritzsche, & Ball, 2006).

Actively involved in CTE reform efforts, the National Council for Agricultural Education established eight initiatives to facilitate the development of quality CTE programs. The third initiative, which called for a sequence of courses to enhance the delivery model of Agricultural Education, led to the development of the Curriculum for Agricultural Science Education, also known as CASE (CASE, 2011). The first teachers used CASE in 2009 for pilot testing the curriculum. CASE purports to be the complete package of resources and to remove a lot of teacher stress by shifting the focus from preparation to instruction (CASE, 2011).

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CASE was developed following the Project Lead the Way (PLTW) model. PLTW has approached reform through the integration of Science, Technology, Engineering and Math (STEM), project based learning, and rigorous academic content. PLTW currently impacts over 400,000 high school and middle school students in all 50 states. While the curriculum is free, teachers are required to attend professional development activities and purchase equipment and technology to implement the program (PLTW, 2011) which tends to be the biggest barrier to implementation (Shields, 2007).

Like PLTW, CASE also requires up to 80 hours of professional development for each CASE course a teacher wants to offer in his or her program. CASE provides rigor in the agriculture curriculum through the alignment of national agriculture, science, math, and English language arts standards, while delivering curriculum using the same activity-, project-, and problem-based instructional framework which is the foundation of PLTW (CASE, 2011c). Research supports the claim that integration of science into the agriculture curricula is a more effective way to teach science. Students taught by integrating agriculture and scientific principles together demonstrated higher achievement than did students taught by traditional science-only approaches (Chiasson & Burnett, 2001; Enderlin & Osborne, 1992; Roegge & Russell, 1990; Whent & Leising, 1988). While some research has been conducted on the integration of science into Agricultural Education (Connors & Elliot, 1993, 1994; Miller, 2000; Myers & Thompson, 2009; Thompson & Balschweid, 1999), there is little scholarly research specific to CASE.

This study attempts to address the National Research Agenda's *Priority Area 5: Efficient and effective agricultural education programs* (Doerfert, 2011). The National Research Agenda states "Agricultural education has the obligation to show that its curriculum can be used to meet the academic challenges of today's school system while preparing students for a career in the agricultural industry" (Doerfert, 2011, p. 26).

Conceptual Framework

The Concerns-Based Adoption Model (CBAM) (Hall & Hord, 2001) is a conceptual framework which describes, explains, and predicts probable teacher concerns and behaviors throughout a **change process**. Here, the CBAM is being applied to the change process of implementing the CASE curriculum within a high school agriculture program. Of particular interest in this study are the stages of concern, the levels of use, and the innovation configuration components of the model.

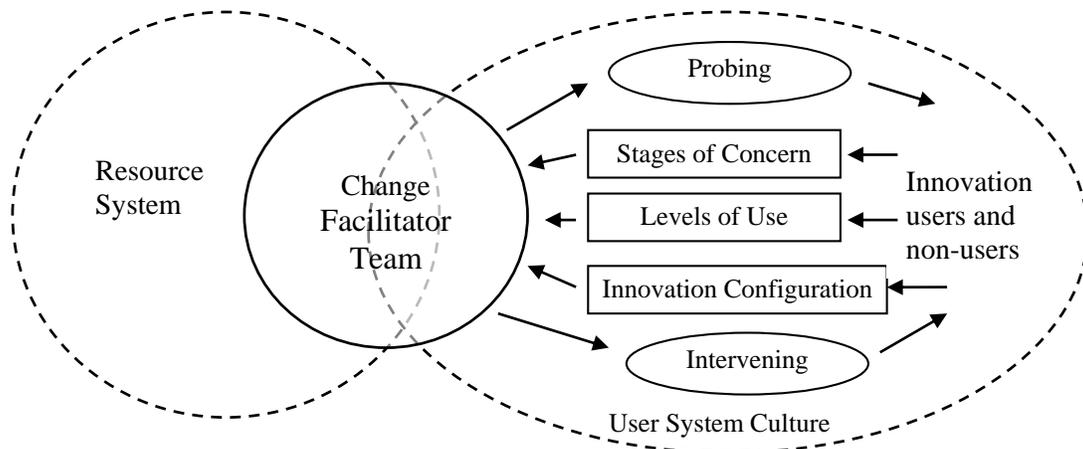


Figure 1. Hall & Hord (2001)

Hall and Hord (2001) defined seven *Stages of Concern* a person may experience when implementing change. Stage 0 is 'Awareness' which can be defined as concern or involvement with the innovation. Stage 1 is 'Informational' and concerns the participant gaining more information about the innovation. Stage 2 is 'Personal' and involves concerns about how the innovation relates to the individual. Stage 3 is 'Management' and involves concerns about the mechanics of using or integrating the innovation. Stage 4 is 'Consequence' and looks at concerns about the effect of an educational innovation on students. Stage 5 is 'Collaboration' and concerns coordinating efforts in using the innovation with others. Finally, stage 6 is 'Refocusing' and involves the exploration of other ways to utilize the innovation or improve upon the innovation.

Hall and Hord (2001) also defined eight *Levels of Use*. These levels focus on the behaviors in teachers that are or are not taking place in relation to implementation of a new curriculum (Willis, 1992). Applying Newhouse's (2001) explanation, these levels are the phases through which a teacher would pass as they implement a curriculum and gain confidence in its use. These begin with Level 0 or *Nonuse* when the teacher has little or no knowledge of the curriculum. Level I *Orientation* is the point at which the implementer begins acquiring information about the curriculum. Level II is *Preparation* and involves preparing to use the curriculum. Level III is *Mechanical* and reflects a user focused on the mechanical day-to-day aspects of using the curriculum. Level IVA is *Routine* and has been reached when the implementer is comfortable with the curriculum with little preparation and they are not planning to change how the innovation is used. Level IVB *Refinement* is reached when the implementer is working to improve their personal use of the innovation. Level V *Integration* and has the teacher working with colleagues in a collaborative effort to use the curriculum. Lastly, level VI is *Renewal* and has the teacher re-evaluating the innovation and seeking to make major modifications.

Lastly, attempts are made to understand how the innovation is being implemented, what Hall and Hord (2001) called *innovation configuration*. As stated by Hall and Loucks, "it can no longer be assumed that an innovation is in use in an unaltered form just because it is supposed to be" (p.7). Hall and Hord (2001) indicated "in nearly all cases the innovation as operationalized by different users will vary along a continuum from being very close to what the developer had in mind to a distant zone where what is being done is nearly unrecognizable" (p. 39). At the conclusion of the study, we attempt to summarize how each teacher is implementing CASE using these three components of the Concerns Based Adoption Model.

Purpose of the Study

CASE was first fully implemented in during the 2010-2011 school year, the year data was collected for this study. During that school year, there were 87 teachers in 17 states implementing the initial foundational courses in plant and /or animal science (N. Trivette Personal E-mail communication, January 21, 2011). As of 2014, there are now 550 schools with 655 teachers in 38 states utilizing the CASE curriculum as more teachers have been trained and additional course materials have been made available (CASE, 2014). As this curriculum spreads, understanding the implementation experience and impacts are critical.

The purpose of this multiple case study was to explore CASE implementation by five different teachers and understand their experience. The researchers hoped to gain an understanding of the barriers to adoption of CASE as perceived by the teachers. Additionally, the researchers hope to understand these levels of use, stages of concern and innovation configurations through the Concerns Based Adoption Model (Hall & Hord, 2001).

Methods and Procedures

Qualitative methods were chosen to investigate this problem because these methods allow the researcher to understand how people make sense of their world (Merriam, 2009). This type of research is more concerned with meaning than frequency (Van Maanen, 1979). Feagin, Orum, and Sjoberg (1991) argue case study is an essential investigation tool to allow for better understanding than is possible with quantitative measures. The current study used a multiple case study lens. Stake (2006) explained in "multicase study research, the single case is of interest because it belongs to a particular collection of cases" (pp. 5-6).

The size of qualitative studies is usually quite small, averaging between one and twenty participants (Creswell, 1998). Using criterion sampling, five teachers were selected as the focus of this study. Criterion-based selection techniques involve determining participants based upon the goals of the study (Creswell, 1998). The participants were selected because they each met the selection criteria as teachers implementing CASE for the first year. Additionally, they were located within the Educational Consortium funding the research. For reporting purposes, pseudonyms were used. Qualitative researchers make use of non-probabilistic sampling procedures to focus the study from its inception, identifying cases demonstrating the specific characteristics of interest (Patton, 2002). Permission was granted through the individual and the Institutional Review Board. It is important to note Oregon was connected to CASE in a number of ways other states may not have been. Because of the tight knit Oregon Agricultural Education community, there were teachers in this study who have done early field experiences with CASE authors or had them as professors while attending classes at Oregon State University. One of the teachers in this study was the former teaching partner of a current CASE curriculum developer.

Data were collected through two semi-structured interviews, a focus group and a full school year of weekly journal email submissions. Questions were planned ahead based upon the central questions being investigated and aimed to capture participant experiences with the CASE curriculum as well as how it was impacting their students and their program. Both semi-structured interviews lasted approximately 30 minutes per teacher while the focus group lasted just over an hour. Weekly journal prompts were sent every Thursday morning, for the duration of the school year, with teachers responding by email.

Bracketing the experiences and biases of the researchers which could have potentially influenced the interpretation of the results helped ensure the objectivity and confirmability. The researchers in this study are former high school teachers and are all presently involved in teacher education. One researcher taught in North Carolina and one in California, while a third taught in Oregon. These experiences influenced how the researchers interacted with and received responses from the agriculture teachers, but every attempt was made to minimize this influence by triangulating data and being aware of these possible influences. All of the researchers left the high school classroom without having taught using CASE curriculum.

The data was compiled into a single file for each teacher containing all of their journal entries, both interviews, and the focus group. The coding process began with a review and re-read of the data for an individual teacher. An attempt was made at open-coding looking for significant comments and reflections which helped a reader understand the individual as clearly as possible while remembering the goal of the study. The data for each teacher was compiled and analyzed for overlapping information. Each researcher wrote two to three of the case summaries and the other researchers read behind them to examine the report for comprehensiveness. After the cases were triangulated among the researchers' observations, the researchers determined stages of concern, levels of use and innovation configurations for all five teachers with 100% agreement.

Qualitative researchers use measures of validation formed from the credibility, transferability, dependability, and confirmability achieved through the methods (Lincoln & Guba, 1985). Credibility relates to the level of confidence in the researcher, design, and findings, to accurately represent and interpret the data (Ary, Jacobs, & Sorensen, 2010). Credibility of the data was established through the use of reference materials, peer debriefing, and member checks. First, interviews and the focus group were audio recorded, and transcribed word for word. According to Kvale (1996), transcripts are translations of the lived interview experience into the text format and are interpreted differently as a result. Therefore, transcripts were submitted to participants to allow them to check for the accuracy of statements. Additionally, after cases were assembled, each participant had the chance to read their case summary in its entirety to ensure they felt represented. Throughout the data collection, individual coding, and group coding process, the lead researcher consulted an outside peer in order to debrief the process as well, and further ensure through an outside perspective the results could hold true (or be considered credible). Finally, to ensure the dependability and confirmability of the results, the raw interview protocol, records of the audio transcripts, raw individual and group codes, and researcher reflections have been maintained, so future researchers could feasibly conduct the study with other participants.

Qualitative research, by purpose and design, focuses on a smaller number of participants in greater depth. While potentially transferable to other settings, the findings from this study are limited to the context of the five teachers in Oregon who participated. In addition, this is one component of a larger study. Within qualitative research, the concept of quantitative generalizability is discussed in terms of transferability. Lincoln and Guba (1985) argue the decisions regarding transferability lie with those seeking to make application, not the original researcher. Thick descriptions are utilized to further support the transferability of the results.

Case Summaries

Doug teaches in a suburban school in a multi-teacher agriculture department and has taught for 12 years. He attended the CASE institutes for both Principles of Agricultural Science - Plant and Animal, during the same summer, and holds a Bachelor's degree in Agricultural Sciences. Doug has interacted extensively with CASE personnel and is active in utilizing available resources, including contacting the CASE developers directly, with questions and recommendations.

Doug is an overall positive supporter of CASE and knows several of the curriculum writers and stated "I am a supporter. I am always going to be. I believe in the people that are running it." At the beginning of the research year, Doug indicated his perspective on CASE and stated "I like it. I appreciate it a lot. And my students are appreciating it too and that's the important thing for me." He describes CASE as "what ag teachers would teach if they had the time to teach just one class."

Doug indicated the institute was "outstanding for the most part." He encouraged participation in the institute and stated "without hesitation go. Be prepared to be challenged about your teaching and go with an open mind to get better at your craft... embrace it as a tool to make you and your program better." He believed the biggest challenge upon completion of the institute was "buying \$30,000 worth of stuff." However, the cost was also reflective of the materials needed to teach all three courses his program was implementing for the first time in 2011 – Principles of Plant, Animal, and Introduction to AFNR. Doug indicated the initial cost was one of his biggest areas of concern.

At the beginning of the year, Doug indicated one of his concerns with the curriculum was that he was “not going to get through the whole course.” However, once he began teaching and modified the pacing, he indicated he was okay with the pacing and just would not try to get to everything. He explained “next year I know it will be much faster and I have already found places where we can pick up the pace.” At the conclusion of the year, Doug indicated he made it sixty percent of the way through the curriculum.

Specifically, Doug appreciated the heavy science components of CASE and the method of delivery. He stated “it is more inquiry based, problem based.” He went on to indicate “it is not anything different than what I have ever taught before. But it is put together into a logical sequence and a packet that makes sense, not only to me, but to our kids.” He also felt the CASE curriculum could work in any program, with any type of student “if the ag teacher is willing to make it work.” He believed “CASE is a powerful tool for anybody, but I don’t think it is the savior for ag programs.”

Doug felt the CASE curriculum had encouraged positive changes in both the students and his teaching. He felt he had already seen changes in how the students processed information and stated “they are really going to start looking for the concepts.” He saw CASE as effective with students who do not typically excel in regular academic courses and he highlighted some of the positive benefits to IEP students. Doug felt, overall, students were finding the CASE material “more accessible, interesting, and fun.”

Regarding his teaching, Doug stated “I believe it has made me better. I see it starting to spill over into my other courses as well.” One consistent theme with Doug was how the CASE curriculum caused him to reevaluate his teaching. He stated CASE has “really forced me to step back and look at ‘what is teaching’ and ‘what is learning’ and ‘what is that process’ and redefine my definition of teaching, to an extent.” He went on to say “I think it’s made me a more effective teacher, a more efficient teacher.” Doug is in the refocusing stage of concern and the refinement level of use.

Annie teaches with Doug and has taught for three years. She attended the CASE Institute to certify in the Introduction to Agriculture, Food and Natural Resources and holds a masters degree. She taught one class period of Introduction to AFNR to mostly freshmen and a few upperclassmen, but all were first time agriculture students. Annie was piloting the AFNR course for CASE. As such, she was asked by the CASE staff to “follow it by the book” and admits the first week of school she “freaked out” and “got really nervous about it.” Annie added “I think if I was a little bit more loosey-goosey about it, it probably would have gone a little bit better. It would have been a little bit more me and less the curriculum.” She did indicate she thought her CASE class was “more work...in prepping and grading,” but added all of her struggles lie in “personally not having enough prep time to go through each lesson and prepare all of the lab equipment for each lesson...two days in advance.”

At the beginning of the year, she was not enjoying the process of teaching with CASE and was somewhat disillusioned with the day-to-day management. She stated “it runs me out.” She felt that working with CASE had not been a positive experience “but I don’t think it is necessarily CASE, I think it is the situation.” She indicated by ‘situation’ she meant the piloting of the course. During a mid-year interview, her feelings had improved, but not gone away. Annie stated “I am little bit more comfortable with it than the last time we spoke but...everyday is a challenge for me.” She also stated “I don’t feel like it is mine so I don’t feel like...I don’t feel comfortable.”

Annie was frustrated with the consistent grading components of the CASE curriculum and stated “by the end of the week, I have 90 freaking packets sitting on my desk.” Her frustration was also apparent in other ways. For example, when asked if she was cutting units or doing them exactly as written, she said “I have only cut one lesson that they said we should do and it just required so much material and so much crap and it was another kind of soft skill communication, and I was just like we are done with that crap.” While Annie was frustrated with elements of the CASE curriculum, she did indicate there were elements she enjoyed. Specifically, she liked the organized nature of CASE and appreciated she “didn’t have to think of the activities.” She valued the structure and thought the students “basically know the format, which is so helpful.”

Annie was thankful for the institute and felt it was the key to her familiarity with the CASE curriculum. She said “I learned so much...I thought that there was no better way to prepare me to teach it than by going to that.” She did mention several times she struggled with the curriculum organization and having to look in several places to find the objectives, activity, materials, and other requirements. She stated “I would say between five to seven places that you need to actually look to make sure that you are getting it all.” To get all the items she needed for the activities, Annie indicated she was “constantly, at least once a week, tapping my personal bank account as well as our FFA chapter account.” She recognized she was purchasing consumable materials and, in all likelihood, would not get reimbursed. She was challenged by the amount of printing and materials necessary to implement CASE. Referring to the paperwork, she stated “I mean, it’s insane. The amount of stuff you need to print is crazy because there’s a worksheet, literally, a little packet...there is something that they get every single class period.” Annie stated “the other reason that CASE isn’t going to work in every program is that not everybody has a science classroom... you will be able to teach CASE in a regular classroom, but it would be so much harder.”

At the end of the year, Annie, reflective and looking back, recognized there were opportunities to adjust the curriculum. For her first year, she “followed the CASE curriculum by the book” and indicated the next year she would “restructure my units and switch them all around.” She felt her lack of flexibility, mainly due to the pressure of piloting the course is “why she struggled.” Annie acknowledged “I wasn’t moving and playing with it. I was trying to teach the curriculum exactly how it was presented straight through.” Annie, therefore, is at the management stage of concern and the mechanical level of use.

Jane teaches at a large, urban school. She is in a single teacher department and has taught for 8 years. She is certified in Principles of Agricultural Science – Plant. She was traditionally certified with a bachelor’s degree. She has experience working in several different sized high schools and has a background in horticulture. The large, urban school in which Jane teaches, is comprised of around 17% English Language Learners, 13% of students receiving special education and 52% of students are on free and reduced lunches. Jane taught three horticulture classes and utilized the CASE Plant Science curriculum. Her average class size was around 32 students and classes were 90 minutes in length. In addition, it is important to recognize Jane’s experience with CASE was underfunded. She was funded to attend the institute, however, she taught through year one (the research year) without the materials CASE recommends for implementing the curriculum. Especially early in the study, Jane made statements like “my biggest concerns are not getting the materials I need to teach the class the way it is supposed to be taught” or “my frustration with not having the equipment is that we can’t do things the right way, that you have to constantly modify.” Jane added “I changed ... some of the activities. We don’t have computers in here. Computer access is an issue sometimes and so we had to scrap some of those [activities] and change the way we had it done.”

On her first reflections and during her first interview, Jane mentioned the high numbers of ELL students presented a problem with the reading-heavy CASE curriculum. She developed strategies to meet the needs of students and as the year progressed, she expressed gratefulness for the reading load and recognized an improvement in reading fluency. Jane's strategies included decreasing the lesson pacing and spending time reading and re-reading the important lesson content. Jane continued to struggle with the heavy reading components in CASE. In some of her later reflections, Jane stated "my students are really struggling... they don't have the reading levels and basic skills and we are having to go back and re-teach things."

Jane recognized the CASE curriculum forced the students to actively participate. Regarding the ELL students, Jane felt in the past those students would do what their friends were doing and sit and wait. She stated "well, they can't do that now." Overall, she indicated it took a while for the students to make the shift in thinking. Jane recognized CASE works differently for different students. She stated CASE "definitely works for the upper level kids that are kind of the general good kids and good students that do as they are told and follow directions." She went on to say "it doesn't work very well for kids that have attention issues. It doesn't work with kids with low IEP and reading issues, writing issues." Jane referenced the pacing of the curriculum and indicated that she picked from each CASE unit and didn't necessarily cover all the material. Jane stated "we're going to shorten up and focus on maybe six weeks at a time and then one unit and maybe the next unit, and then the next."

When asked about her overall reflections on the CASE curriculum, Jane stated "I really still like it. I think it is a really good program. It just doesn't address everybody, obviously, but not all of them are going to." On a personal note, Jane said she still felt "a lot more prepared academically. I can just read over the lesson and I am ready to go." She attributed her success to attending the CASE Institute. In describing the institute to a new teacher, she stated "It is the best teacher training I have ever been to. You will come away with something you will use every day and not one of those binders that sit on the shelf... I wish I would have had this in college."

Jane shared some similar comments to other participants regarding the impact of the CASE curriculum on her personal teaching habits. She stated "I feel like I don't have to scramble at midnight to try and figure out how I am going to teach this." She said "I can look it up and go through... some great activity for them to do because it is already there." Jane also offered some advice for other teachers as they prepare to implement CASE. She encouraged other teachers to "look through a calendar...map out what you really want to do... because you can't go from start to finish. You're going to have to modify things." Jane is at the consequences stage of concern and the mechanical level of use.

Heather teaches in a small, rural school in a single teacher agriculture department and has taught for 4 years. She is certified to teach Principles of Agricultural Science – Plant, and holds a master's degree in Agricultural Education. Heather is active in her school and teaches agriculture courses which offer students science credit. She is currently the only CTE program offered in the school. Heather teaches in a four day school week, with seven period days, and her class sizes are between 12-26 students. Her students typically share some demographic similarities. The school population contains 16% special education and only 3% English language learner students.

She started out the first six weeks of the school year with the CASE curriculum, but no CASE lab materials. At the beginning of the year, she "honestly thought that I wasn't going to be able to implement it because of resources . . . my school never had that kind of budget." Heather was able to find some "outside funding" and she went "from not being able to teach it to, all of a

sudden before two days of school starting, to being able to start teaching it.” Even after she secured funding, the materials took a long time to arrive. Heather stated “without the available equipment, implementation of the curriculum is severely limited.” Consequently she suggested “purchases be made more than a month in advance of school starting.” Heather declared “from what I see, to get the best out of CASE you would need a school with a lot of financial resources or a teacher that is proactive enough to go outside to find resources.”

Heather liked the CASE institute, but felt like it was a “whirlwind.” In hindsight, she wished that she could have taken better notes and perhaps videoed several short clips to help her better remember. She described CASE as “rigorous and relevant classes. They are hands-on student driven and they are tied to academic core standards.” Heather really felt the addition of the CASE curriculum was improving the academics of her students. Heather liked the hands-on aspects of CASE and appreciated the fact the students were forced to take an active role in their learning. She did have some logistical challenges with getting supplies for the CASE lessons, due to the lack of stores in her rural area. She said “I don’t live near any stores, so it’s not easy to just run down and go get some things.” Similar to Annie, Heather stressed she had to “take a lot out of my own personal finances, and then wait to get reimbursed for it.” Heather wanted to caution new teachers about prep time and stated “I feel that my CASE course has the greatest amount of prep time than any other class of mine.”

Heather felt comfortable changing the pacing and some of the CASE content. Specifically, she did not teach the material in the pacing suggested by CASE. Rather, she stepped away from CASE and inserted the lessons she needed to maintain the school greenhouse and other program activities. She stated “I’m definitely way behind where I should be” on the CASE schedule. Heather indicated her biggest adjustment was in the time allotted for lessons and activities. While she had a “great group of students”, Heather noticed they “seem to require a lot of extra direction no matter how thoroughly I review the lab at the beginning of class.” She also noted differences across groups of students indicating “the upperclassmen do well with the self-directed learning, but my class is predominantly sophomores who are in the process of learning personal management and self-guided direction.” Overall, Heather struggled with some of the aspects of CASE, but at the end she stated “I don’t like the program. I love it.” She stated “CASE provides teachers with a convenient resource of rigorous, science-based curriculum, so as a teacher I feel that the quality of my course curriculum has multiplied tenfold.” Heather is at the consequences stage of concern and the routine level of use.

Claire is in a multi-teacher department in a suburban area of Oregon. She has taught for 5 years. She is certified in three areas of CASE (Plant, Animal and AFNR). At the completion of the study, she was selected to serve as a lead teacher for CASE trainings. She holds a master’s degree and a traditional teaching license. She was teaching 2 periods of AFNR, one period of animal science and one period of plant science. Overall, she teaches in a school with a seven period day on traditional 45-50 minute periods and her class sizes range from 25-38 students. She has only one repeating class and, thus, has 5 different class preps per day.

Claire’s perspective on CASE was “that it is nothing revolutionary,” but she appreciated CASE “brought in the science skills that I certainly was lacking.” She noted her program before CASE was “pretty traditional in what we taught” and “production-oriented which isn’t what we need to be teaching kids” and CASE “provided that opportunity for me to take it to a different level.” She also lauded CASE for being “a model where all the stuff is pretty hands on which is what we preach about in ag education all the time.” She appreciated the organized structure and the fact she knows what she is “going to do the next day because all that busy work is gone.” Claire mentioned several drawbacks of the CASE curriculum including the initial startup costs,

the prep time for both materials and labs, and the grading load which she called “a really unfair amount of grading.” Regarding the applicability of the CASE curriculum, Claire stated “CASE is designed for everyone... as long as you are willing to admit you don’t have it all figured out.”

She appreciated the applicability of the CASE Institutes. She felt the institutes allowed her to “collaborate with teachers from all over the country in different types of programs and with different types of agriculture and to see what they did in their program and that in itself was a really tremendous learning experience.” She also believed “we would see a decrease in teacher burn-out if we provided new teachers with the experience and guidance to more effectively deliver classroom material.” Claire’s personal reasons for attending three CASE institutes in one summer was to “provide myself with resources to allow me to spend more time on teaching, FFA and my family, rather than always trying to prepare or just to stay afloat.” She believed the structure of the curriculum was beneficial for her and her students and it would draw a different type of student to the program. In relation to the draw her program would have for students, Claire said “I think it is going to change the type of kids that we get out there in some of those areas as it becomes more science-based and inquiry-based. We are going to draw on a different kind of kid.”

Similar to Heather, Jane, and Doug, Claire didn’t have any issues modifying CASE. She noted “how you run your classroom is ultimately your decision. There is no CASE police out there.” She felt the CASE curriculum had actually given her some additional freedom in her classes by providing her “more time to make it fun instead of trying to just get the bare minimum.” While Claire believed CASE had the ability to work in any program, she did recognize she had to adjust some of the lessons, both content and pacing. She felt “there is no way I can get through it, so I just have to pick and choose what is important in terms of science and articulation, and community college articulation.” Claire felt the CASE curriculum overall was not completely changing her curriculum “it’s just enhancing it.” As a result of the implementation of CASE, Claire stated “instead of being a production agriculture class, I’m teaching an agricultural science class, which is what industry says we need.” Claire talked about how the CASE curriculum provided her some balance between “core” content and FFA content.

Going through the training and implementing CASE caused Claire to rethink her philosophy. Evidence of reflection was apparent in statements like “I think that I spent a lot of time this summer thinking about what is important. Is it important to win a banner? Is it important that you are getting experience or learning those things?” She was also reflective about times she gave a month of class time to prepare speeches or learn for other FFA events stating “I’m not proud, but for certain things, I spent too much time.” For her, the most important thing was that her students were “well-rounded and exposed to a variety of different things.”

Claire felt as far as rigor, CASE hit about in the middle and “unfortunately, for some it is over their heads and for some it is too low.” She stated using CASE has “kept my lessons more meaningful.” Instead of spending two weeks making wreaths and centerpieces, she said she “spent two days.” When describing the curriculum, Claire used words and phrases like routine, reliable, consistency, “know what to expect”, “clear path to follow.” She appreciated the structure of the curriculum yet also emphasized the importance of materials. Claire, who has a classroom with “lab stations with sinks, gas/air and a hood,” indicated not having that would be a challenge saying “I can’t imagine trying to teach some of the labs and activities in my old room! It would take a lot more prep if you didn’t have the space or materials that are recommended.” If she could change one aspect of the curriculum, she “would make funding available to purchase ALL of the recommended supplies for teachers interested in adopting the curriculum.” She stated she was able to purchase “most of the equipment and supplies through Perkins and other grants.” Claire

did struggle with implementing the curriculum within larger class sizes. She had purchased materials for twenty students and very quickly realized students would need to share and work in groups to accommodate her larger class sizes. She also referenced the sizable amount of copies required. Claire said "I feel like I have made more copies in the first week than I did all last year." At the end of this study, Claire is at the refocusing stage of concern and is moving back and forth between the refinement and integration levels of use.

Conclusions, Implications and Recommendations

This study lends itself to the exploration of CASE implementation by five different teachers. Each teacher, context, and materials vary from program to program. While each teacher, situation, and case is different, there were several overlapping themes identified in the results. The five strongest themes to emerge were:

- Some teachers adapted more easily to the student-centeredness of the curriculum.
- Teachers enjoyed having content available, but none of them made it all the way through the material.
- The materials and equipment were essential to the successful implementation of CASE.
- Teachers saw attending the institute as vital to their implementation of CASE.
- Implementing CASE allowed the teachers to refocus.

The use of the Concerns Based Adoption Model (Hall & Hord, 2001) encourages the analysis of findings for clues to the stages of concern, levels of use, and implementation configurations. Placement of individuals into stages, levels, and configurations can be done through the analysis of interviews, reflections, and focus groups. Within the stages of concern, Annie was in a management stage and was highly focused on the mechanics of the implementation. Heather and Jane were both in the consequences stage of concern. They were confident in implementation and reflected on how the curriculum was influencing their students. Doug and Claire were not only comfortable with the curriculum, they had both developed active strategies for improving CASE; therefore, they were in the refocusing stage of concern.

When applying the CBAM framework (Hall & Hord, 2001) to the participants, they varied as to the level of use. This could be expected with the implementation of a new curriculum and the vastly different school contexts, locations, and support structures (both administrative and fiscal). Jane and Annie were both in the mechanical level of use and primarily occupied with day-to-day aspects of the curriculum. However, they appeared to be at this level for different reasons. Annie was in the mechanical level because she was struggling to take ownership of this curriculum while piloting the course. Jane was at the mechanical level because she was lacking the money to fully implement the curriculum and was perhaps struggling to modify the curriculum. Heather was able to implement the curriculum yet didn't significantly alter the curriculum, thus placing her in the routine category. Doug and Claire were both in the refinement category as they more fully engaged with the curriculum and were able to make changes in both their grading and pacing. However, the researchers also felt Claire exhibited signs of also being at the integration level. She articulated her ability to work within the curriculum while consulting with colleagues and addressing the needs of community members. Additionally, Claire was active in the National Association for Agricultural Education's Communities of Practice group for her CASE Institute and mentioned it several times as a source she used for collaboration and problem solving.

When looking at the participant data, it was apparent each adopted a different implementation configuration. Annie implemented the material in a straightforward manner with

little variation as a result of being a pilot school for new curriculum not yet widely released. Heather and Jane used the CASE curriculum in a supplemental manner. Doug and Claire both fully implemented the curriculum and evidenced a configuration closest to the full adoption intend by CASE (CASE, 2011).

As a result of the emergent themes, and the data collection as a whole, the authors recommend teachers interested in participating in CASE consider their own personality in the classroom and whether they are willing to make the shift from a teacher to student-centered environment. It appeared the teachers who struggled with allowing students to work on their own, or who had students who could not yet work independently, or who preferred the structure of specific answers, found the CASE curriculum difficult to implement. This is consistent with other students which have found teachers struggles with implanting student-centered activities (Brush & Saye, 2000; Felder & Brent, 1996).

Based upon the participants' experiences with CASE, the researchers recommend teachers try to line up the funding to purchase the CASE-related scientific equipment prior to the summer institute. The participants in this study had varying levels of equipment support, yet all indicated without some equipment, the institute and training are not nearly as effective. This finding is consistent with previous research showing resources and funding were barriers to implementation within Project Lead the Way schools (Shields, 2007). Many saw the cost of these materials and equipment along with the space needed to use them as a barrier preventing programs from using CASE.

Implementation of the CASE curriculum allowed the participants a chance to refocus and reflect on their development as teachers. Several of the teachers referenced the fact CASE would have been extremely beneficial during their first few years of teaching and recommended other teachers consider how the implementation of CASE can create the additional time necessary to focus on several different classes (preps). As a group, participants recommended the CASE curriculum and voiced appreciation for the fact it allowed them to refocus some of their creative and curriculum development energies in a different direction. Two of the participants referenced the high burnout rate in agricultural education and felt having access to a curriculum such as CASE may lessen teacher attrition. This supports recent research findings which indicated creating new curriculum was highly stressful, second only to paperwork on the list of classroom instruction responsibilities (King, Rucker, & Duncan, 2013).

Based on the voice of the participants, the authors recommend practicing agricultural education teachers consider attending the CASE institute and engaging with the CASE curriculum. The fact that teachers saw the CASE institute training as vital to their implementation is supported by a recent study from Ulmer, Velez, Lambert, Thompson, Burris, and Witt (2013) which found the CASE institutes were effectively impacting teacher's science efficacy. While the researchers are aware of non-CASE trained teachers using CASE curriculum "borrowed" from a colleague, the Ulmer et al. (2013) study as well as the teachers in the present study seem to indicate the summer institutes are worthwhile. Further research is recommended to distinguish both the cognitive and affective impacts of the CASE institute.

The participants indicated teacher educators should encourage participation in CASE as a means to promote professional development and allow teachers the opportunity to refocus. CASE (2011) indicates in their promotional materials that implementation of this curriculum package allows teachers to focus on how they teach, not what they teach. This experience held true for the teachers in this study. Most indicated a reevaluation of their teaching and their classroom focus as a result of interacting with the CASE curriculum. In this study, CASE was a tool which promoted

self-reflection and program evaluation among the practicing teachers, of which teacher educators have long lauded the importance (Baird, Fensham, Gunstone, & White, 1991; Calderhead & Gates, 1993; Patterson, 1993). Teacher educators should consider the refocusing benefits of the CASE curriculum when discussing curriculum merits with both their current teacher education students as well as with current practicing teachers.

The authors recommend teacher educators consider exposing students to components of the CASE curriculum during their undergraduate or graduate experience. However, the participants of this study also questioned the readiness of pre-service teachers to understand and implement the curriculum as first year teachers. Further research should examine the readiness of pre-service teachers to actively engage with the CASE curriculum and implement it in the classroom during their first year.

The participants also indicated the need to be flexible with the implementation of the curriculum and willingness to insert your own voice, make modifications, change PowerPoints, supplement materials, and adjust the curriculum to meet the needs of your program and local community. None of the participants made it all the way through the yearlong curriculum and each one recognized the importance of modification and tailoring the curriculum to meet their local needs. Furthermore, the authors recommend CASE investigate ways to help teachers customize the curriculum to fit the needs of their program, either through the training they provide during their summer institutes or in the materials they provide with the curriculum.

It may be beneficial for CASE to address some of the challenges a teacher may face with fully implementing the program and continue to look for ways teachers can share some of their best practices with their peers. As CASE continues to grow, further research is recommended which examines teachers by similar schools and contexts. This will allow for greater applicability and aid Agricultural Education as we seek to address industry and employability needs in the 21st century.

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