Journal of Agricultural Education, 60(4), 199-211
https://doi.org/10.5032/jae.2019.04199

Continuing Professional Education and Collaborations Between University Faculty and Agricultural Education Teachers

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Abstract

The call for agricultural education programs to integrate more rigorous scientific and technology-driven content has left many secondary agricultural education teachers unprepared (Baker, 2015). New content that addresses the changes in the agricultural industry has required secondary agricultural teachers to seek continuing professional education. This case study examined one secondary agricultural education program and how the teachers in that program have taken advantage of continuing professional education opportunities to change local program content. The study shows that through collaborations with the faculty at the university and the secondary agricultural education teachers, continuing professional education can drive the changes needed to design and develop a relevant agricultural education program. It is through collaborations that the participants in this study connected continuing professional education with curriculum development, to focused on student needs and the expectations for their success after leaving the secondary program. Finally, the rigorous local program's content has emerged from the small group discussions and one on one experiences of the teachers in this program collaborating with faculty at the university. It is through these unique continuing professional education experiences that teachers built a network that keeps them abreast of changes in the industry and provides an avenue for their lifelong learning experiences.

***Keywords*:** agricultural education; collaboration; continuing professional development; and innovative programs

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Introduction

The world in which we live is changing and has changed since secondary agricultural education was introduced in public school programs (Dimitri, Effland, & Conklin, 2005). During the past 100 years, agricultural education has struggled to remain a relevant secondary education program because it is not perceived by school administrators as a rigorous academic curriculum (Stewart, 2003). However, "agricultural education has consistently changed its instructional programs to meet the needs of a more dynamic and rapidly changing industry" (Gordon, 2003, p. 152). Today, the call for secondary agricultural education programs to integrate content that is more scientific continues to progress slowly (Baker, 2015). In 2001, "The No Child Left Behind Act", directed that K-12 curriculums focus on improving students' knowledge and performance in Science, Technology, Engineering, and Mathematics (STEM). In response to the 2001 Act, the American Association for Agricultural

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Education established research priorities to integrate STEM (Science, Technology, Engineering, and Mathematics) content into secondary agricultural education (Baker, 2015). However, studies have shown that agricultural education teachers are willing to integrate more scientific content, but Baker (2015) reported that in a case study by Scales, Terry, and Torres conducted in Missouri, less than 10% of the teachers were considered proficient in scientific knowledge (Scales, 2009). This finding would suggest that agricultural education teachers need continuing professional development to expand their scientific content knowledge.

Virginia State Department of Education in October of 2013 published "Preparing Students for Successful Transition to College and Careers," which was a review of agricultural education secondary courses in the context of current and future workforce needs and to make strategic decisions regarding the states course offerings (SDOE, 2013). This report outlined the many aspects of Agricultural Education that required immediate attention to ensure consistent high-quality programs. Continual teacher retraining and professional development, infusion of critical technology requirements for the industry, and flexible, innovative delivery systems for agricultural education courses that reflect coordination between secondary and postsecondary education were key factors found in the review. Therefore, continuing professional education could be used to encourage teachers to begin developing new aspects of their programs to meet priority items of the Strategic Review (SDOE, 2013). This study examined how one secondary agricultural education program used collaborations between university faculty and the secondary agricultural education teachers to enhance the teacher's scientific knowledge and curriculum content The study used Rogers' "Diffusion of Innovations Theory" (Rogers, 2003) for the theoretical framework. This theoretical framework was used to support the findings, which showed how the collaborations and the time committed by teachers and university faculty increased agricultural education teachers' scientific content knowledge and provided the content resources needed to make secondary programmatic changes.

Conceptual Framework

Collaborations between secondary agricultural education teachers and university faculty can provide secondary teachers with continuing professional education (CPE) needed to be proficient in the content area (Calico, 2015). As the Calico study focused on agricultural communications curriculum, the conceptual framework of the study could be applied to content and curriculum across pathways throughout agricultural education. Proficiency in new and emerging agricultural content is an area where collaborations can be designed and facilitated to achieve a change in today's agricultural education programs (Baker, 2015). "Continuing professional education programs are considered the most effective means of changing teacher practices" (Shoulders & Myers, 2014). Therefore, CPE used to achieve changes in agricultural education will need to be designed to represent the rapid changes in the agriculture industry (Rhoton & Shane, 2001). Traditional CPE programs are generally conducted at seminars, conventions, and other workshops. These programs are usually facilitated in a face to face format, limited in content because of time, limited in hands-on activities, and often lacking in direct communication with the program leaders (Birman, 2000). In conceptualizing this study, the focus was placed on the collaborations between university faculty and secondary agricultural education teachers and the impact on a local agricultural education program. Secondary agricultural teachers have been encouraged to engage in continuing professional education, delivered by university faculty and the state association of agricultural educators (VDOE, 2013).

Continuing professional education is designed to deliver more hands-on and problem-based learning instruction to prepare students with the skills needed to contribute to a changing industry and to inspire them to face challenges themselves. Agricultural educators must be prepared to continuously expand their content knowledge to capture the rapidly changing field of agriculture and communicate those changes in the classroom. This constant need for new content information and strategies used to communicate it and engage students will require a change in the way CPE is delivered. These changes

must be presented in a way that welcomes agricultural educators to explore new and relevant content (Boone, 2006). Agricultural teachers are the first to acknowledge they have little understanding of how to integrate all the changes which are taking place and express reservations in teaching new material (Wilson, 2002). Other agricultural teachers have expressed concerns about having resources available to integrate new and emerging agricultural content and having the facilities available for such changes (Mowen, 2007). In this study, gaining different perspectives should challenge the assumptions, and by obtaining the lived details about the phenomena, such as the stakeholder's feelings, thought processes, and emotions (Strauss & Corbin, 1998), useful insight could be gained to develop a model for CPE.

Theoretical Framework

This study examines how collaborations between university faculty and secondary agricultural education teachers have led to the design and development of a relevant educational program. The researcher focused on Rogers' "Diffusion of Innovations Theory" (Rogers, 2003) for the theoretical framework of the research. The diffusion of innovations theory has been deliberated and found useful in an enormous collection of theoretical research and is used to support the program planner's framework in which innovations become applicable to the stakeholders (Murray, 2009). Rogers defines diffusion as "the process in which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2003). Innovations are the first element in Rogers' theory and advocates for the following explanation: "An innovation is an idea, practice, or project that is perceived as new by an individual or another unit of adoption" (Rogers, 2003). In this study, the one on one collaboration between agricultural education teachers and university faculty is the idea, practice, or project that is perceived as new (Rogers, 2003). This method of CPE differs from programs that are generally conducted at seminars, conventions, and other workshops. "For CPE to be engaging and effective, the event needs to appeal to the audience, the duration time is adequate to allow for engagement, and there is room for participation (Birman, 2000). Teachers are given more time to master new content, experience the content in a safe environment, and have access to university faculty members when questions arise. The second element of the diffusion is the communication channels used to introduce innovation. Communication is "a process in which participants create and share information with one another in order to reach a mutual understanding (Rogers, 2003). The open dialog of the collaborations presented a change in the content being taught in this agricultural education program allowing the teachers to reach out to university faculty and seek new content helped guide faculty at the university to develop CPE and implement research projects with other agricultural education teachers and university faculty. This study will focus on these two elements of the theory, and how the collaboration of teachers and faculty is supported by the theory.

Purpose and Research Question

The purpose of this case study was to determine the importance of continuing professional education and collaborations between university faculty and secondary agricultural education teachers. The following questions were used to recognize the importance of continuing professional education and collaborations between university faculty and secondary agricultural education teachers:

1. How do members of the study perceive the role of continuing professional education?
2. How do members of the study perceive collaborations between the program and university faculty members?
4. How has continued professional education contributed or effected this secondary agricultural education program?
5. How have collaborations between university faculty and secondary agricultural education teachers contributed or effected this secondary agricultural education program?

Methods

One of the most effective ways of gaining an understanding of phenomena is to craft a case study that can create a solid foundation for later analysis (Yin, 2014). This case study is descriptive, as it seeks to shed light on how collaborations between university faculty and secondary agricultural education teachers can facilitate CPE that leads to changes which can enhance an agricultural education program. This case study tries to resolve why and how a decision or set of decisions were made, how they were put into practice, and what were the outcomes (Yin, 2014). A qualitative approach was used to examine the phenomenological views of the stakeholders regarding the development of the agricultural education program. The study sought to gain an understanding of lived experiences and the individual's perspectives and views of the collaborations between university faculty and secondary agricultural education teachers (Rossman & Rallis, 2012). "Qualitative methods can be used to obtain the intricate details about phenomena such as feelings, thought processes, and emotions that are difficult to extract or learn about through more conventional research methods" (Corbin & Strauss, 2008, p. 11). The data was collected using interviews conducted with stakeholders involved in the development of the program. "Qualitative research is characterized not using statistical tenets, but by the use of text to document variables and the inductive analysis of the data that was collected" (Hittleman & Simon, 1992, p. 65). The interviews were collected using a purposeful sample deliberately selected from individuals who participated in the development of the current agricultural education program (Hittleman & Simon, 1992). Interview data was supported by artifactual evidence of the changes in the agricultural education program; this method of data triangulation was used to strengthening the validity of the case study (Yin, 2014). Triangulation denotes the deliberate use of multiple methods, with offsetting or counteracting biases, in the inquiry of the same phenomenon to reinforce the validity of the case study (Greene, 2007). Using multiple sources of data, representing multiple periods in the design and the development of the agricultural education program, a clear picture of the steps taken to reach the model can be presented (Rossman & Rallis, 2012). This type of triangulation helps to ensure that the study represents the complexity of the agricultural education program (Rossman & Rallis, 2012).

The population sample came from stakeholders involved in the development of the secondary agricultural education program. An invitation requesting participation in the study was sent using the contact list of stakeholders (n=30). The list of stakeholders was populated from a developmental timeline of the program, which provided input into each step of the design and development of the program (See Figure 1). Follow-up emails were sent two weeks after the original invitations. A total of thirty invitations were sent, and twenty-four subjects responded and agreed to participate in a fact-finding interview. Of the twenty-four respondents, twenty-one interviews were conducted, where participants' identity was concealed using pseudonyms. Three respondents withdrew before the interviews. One subject was away at college and was inaccessible due to scheduling conflicts, and the other two withdrew for medical reasons. The participants represented educators, university faculty, local government, industry leaders, former students, parents, school administration, and community college personnel (See Table 1). These participants have actively supported the program and its development and are thus explained, the educators have engaged in CPE and collaborated with university faculty to expand their content knowledge and develop new relevant content. This partnership has been a continued effort since the initial collaboration in 2007. The local government and school administration have supported the development through financial and continual support for the educators' CPE. Industry leaders have provided insight into future needs and partnered with the program to provide internships for students. Parents and former students were invited to participate in the study to give an account of their lived experiences, and how changes in the program influenced students' career choices and prepared them for post-secondary education or careers. The community college partnered with the program to offer dual enrollment courses, which has led to the development of a two-year Associate in Science degree in Agriculture that will articulate to the University.

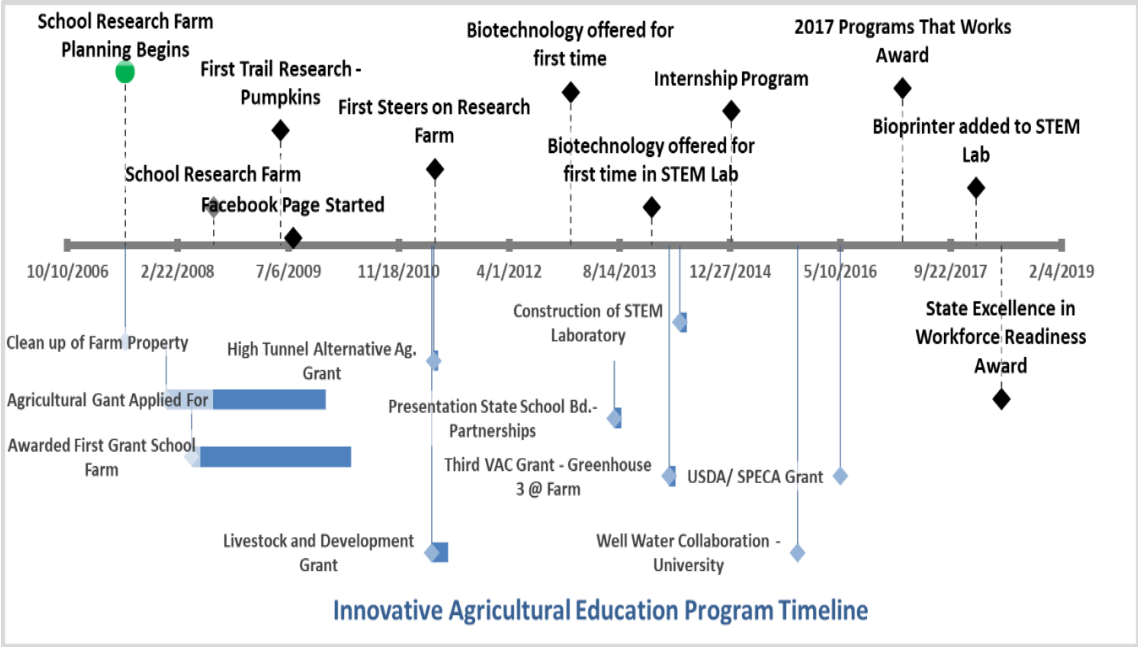

Figure 1. Author-developed timeline of the development of the current agricultural education program.

Table 1

Population Sample Demographics

Pseudonyms	Position Held	Years Involved	Number of Years Assoc
April	Community College Admin	2007- 2014	7
Austin	County Administrator	2007-2015	8
Betty	Parent	2017-2018	2
Carl	Industry Leader	2007- Present	11
Daniel	Agricultural Education Teacher	2014-2018	4
Elmer	Former Student	2010-2012	3
Eric	Administrator	2007-2017	10
Fred	Industry Leader	2007- Present	11
Garnett	Former Student	2010-2012	3
James	Community College Admin	2013-2017	4
John	University Faculty	2007- Present	11
June	Industry Leader	2015-Present	3
Kate	Secondary Science Teacher	2007-Present	3
Lauren	University Faculty	2014-Present	4
Luke	University Faculty	2009- Present	9
Matt	Former Student	2007-Present	11
May	Industry Leader	2007- Present	11
Ophelia	University Faculty	2013- Present	5
Ralph	Former Student	2007- Present	11
Renee	Former Student	2010-2012	3

Table 1

Population Sample Demographics Continued…

Wesley	Agricultural Education Teacher	2009-Present	9

This qualitative research used interviews to seek descriptions and to find meanings of the collaborations between university faculty and secondary agricultural education teachers in association with this agricultural education program. An a Priori Table (Table 2) was used to link the data to the propositions to support the purpose of the study (Yin, 2014). The primary task was to understand the meaning of what the interviewees said (Kvale, 1996). This technique provided ways of discovering and interpreting aspects of reality, through interviewing, documenting, and analyzing to capture and represent the richness, texture, and depth of the stakeholder's life experiences with the topic (Rossman & Rallis, 2012).

Table 2

Proposition Table.

Proposition	Supporting Literature	Research Questions	Interview Questions
Continuing Professional Education (CPE) should contribute or influence changes made in the educational program.	CPE needs to initiate a teacher's behavioral change through concentrated practices, which are continual over a sufficient period (Shoulders & Myers, 2014). Using teachers' detailed descriptions of CPE, an effective model for professional development can be designed (Birman, 2000, p. 29)	How has participation in CPE contributed to the changes in the agricultural content of this program?	Please describe for me ways that CPE has or could help address changes in agriculture? Please describe for me ways that CPE could be delivered to promote a change in content.
Different perspectives challenge the assumptions of the case study	Gaining lived details about the phenomena, such as feelings, thought processes, and emotions (Strauss & Corbin, 1998, p. 11). To avoid reader's suspicions of validity in a case study, the researcher must account for different perspectives and points of view (Yin, 2014, p. 203)	How do members of the case study perceive continued professional development?	Please tell me about where you learn about new content in agriculture, ones that keeps you informed about relevant trends and issues in your professional life. Could you please describe your perceptions of continued professional development and how its design effects your participation?

Once the sample population was identified, they were contacted and provided a copy of the informed consent to review before the interview. At the beginning of the agreed meeting time, before the interview, the interviewer and the participants discussed the purpose of the interview activities. The interviewer provided the participants with an informed consent form hardcopy, explained the nature of the interview, and sought the signature of all parties involved in the interview. An interview protocol was used during the interviews. The same questions were used in the interview of each participant, and each question was asked in the same order. Each interview was recorded and transcribed using pseudonyms to protect the identity of the participants. Open-ended questions were asked to allow the participants the freedom to express their individual experiences. The interview process allowed the researcher the latitude to modify the interviews based on the responses while staying within the framework of the research question. Once the interviews were transcribed, the participants could to review the transcriptions for accuracy. The participants were allowed to revise or add anything that may have been misinterpreted or needed addressing since the interview.

Secondary data was collected to triangulate and support the study. This data included documentation of professional recognition of the program through multiple sources, publications and conference presentations, records of student successes and projects, as well as descriptions of academic programs and community outreach activities. According to Yin (2014), the most important advantage of using multiple sources in data collection is the uniting of evidence in the inquiry. "Thus, any case study findings or conclusion is likely to be more convincing and accurate if it is based on several different sources of information, following a similar convergence of evidence" (p. 120). The findings represent experiential data that would support and build on the theory to support future research.

Findings

The primary data represent responses to open-ended questions asked during scheduled fact-finding interviews with the twenty-one participants. The interviews were intended to acquire the reflective perception of the collaboration of university faculty and secondary agricultural education teachers. The questions used during the interviews explored the respondent's insight into the contributions of the collaboration and the effects on the perceived program design and development. Early coding of the respondents presented five areas of interest for the case study: the role of the agricultural education teacher, the role of university faculty, teacher's continuing education, curriculum development, and the expectation of students. The structure of this case study is un-sequenced, where the sequence of the data assumes no particular order of importance and is primarily descriptive (Yin, 2014). Secondary data was collected in the form of artifacts to support the design and development of the agricultural education program. The artifacts were used to triangulate the data analysis.

Continuing professional education (CPE) was a central theme that was evident in the 21 stakeholders interviewed. During the interviews, teacher sustenance was coded 72 times. Teacher sustenance can be defined as the interest, commitment, and time put forth by the teachers to achieve the outcome. This related to the willingness of the teachers to commit to CPE and their willingness to be open to new concepts and technologies for their program. Second, the collaboration and the relationship with the university was coded 67 times. The codes related to the advantages shared by both teachers and university faculty about the design and the development of this program. The collaboration was established when university faculty were contacted and asked to visit the program in 2007, to see and hear the vision the program had for the future. The development of this relationship has provided benefits for both the teachers and the university researchers. Teachers can bring the latest technologies and content related to the agriculture industry to their classroom. According to Lauren, it gives the

university researchers a place to test their research and provides an open dialog for both to communicate and contribute to each other's endeavors. Third, during the interviews, curriculum development emerged as one of the categories. New content was coded 115 times, signifying the relevance of new and emerging content. The data that emerged during this part of the research related to innovations and how they relate to curriculum development. Forth, support for the program emerged during the research related to the curriculum development that was taking place as a result of the collaboration. Matt, an administrator for the school system, stated during his interview that:

> "The agricultural program at the high school is very updated now, the curriculum has a lot of focus on food safety, lab procedures, and it is more scientific-based than it ever was before, rather than the focus on some of the agricultural practices of the past. It has a very scientific base to it, and it seems like a major focus is on lab work and integrating science into the agriculture curriculum, and we are doing this with all the courses that we are offering".
> Fifth, the changes this program has made in course offerings and pathways, have been made with the focus of what students need to know when they completed their agricultural education program (Brand, 2013).

Upon the completion and review of open and axial coding, a diagram was developed to determine the relationships of the five areas of interest to the additional fourteen codes. The diagram in (Figure 2) gave the researcher the ability to analyze each code to delineate the properties along with their dimensions. The coding process provides the foundation for a diagram created during the analysis of the data (Corbin & Strauss, 2008, p.229).

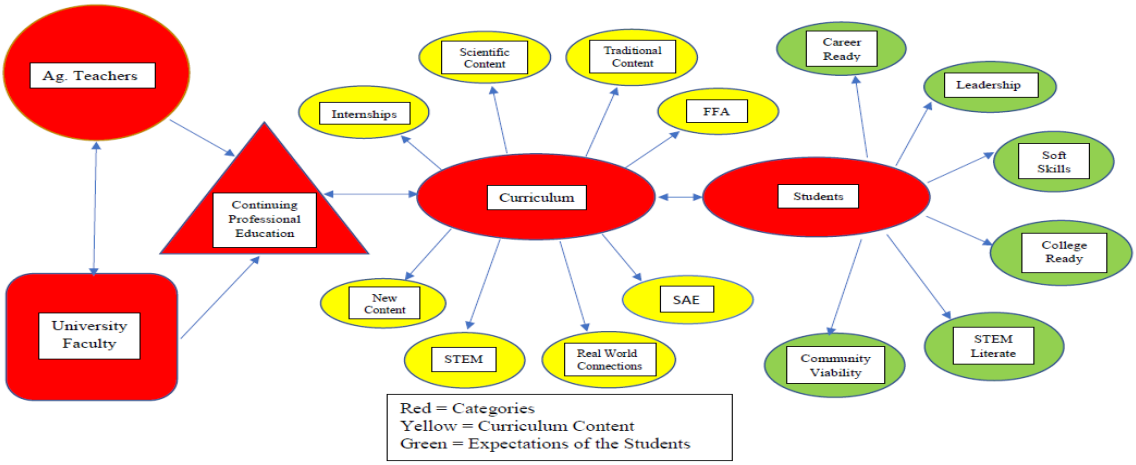

Figure 2. Author-developed diagram created during coding to support collaboration between secondary agricultural education teachers and university faculty for continuing professional education.

The teachers in this program have sought to engage in CPE in both traditional and non-traditional formats. The teachers have attended workshops targeted at CPE for secondary agricultural education teachers. They have reached out to university faculty to learn in the field at the university and bring that content back to their program. The teachers have collaborated with university faculty and served as Co-PI's on university research projects. June sees the importance of these collaborations from her experience as a critical component of keeping the program moving forward.

> "So, being able to be trained by experts in that field or being able to work alongside the experts at the university will dramatically increase your knowledge in that subject area. It also dramatically increases your comfort level in that subject, which allows you to be able to relay that knowledge to the students in the classroom".

Continuing professional education for this program began with a workshop at the university but has grown as the program has grown. The initial three-day workshop included four teachers (two agricultural and two science teachers) from high school and three students. This experience led two of the teachers to learn more about biotechnology. They were allowed to work for the next three months in the biochemistry laboratory on campus at the university doing genetic research. One of the teachers was an agricultural teacher, and the other was a biology teacher from the science department at the high school. The science teacher later joined the agricultural program as the STEM Laboratory manager, and the agricultural education teacher developed a science-based program that focused on biotechnology. June, a biology teacher, recalls that she was approached by the agricultural education teachers and was asked if she would be interested in a workshop for biotechnology.

> "I remember that the agricultural education teachers asked if I wanted to go with them and do a workshop on biotechnology. The group that went was two of the agricultural education teachers, three students, another biology teacher, and me. We spent three days traveling to campus to learn about teaching biotechnology through the field of agriculture. I was hooked, and the rest is history. I think that was about six years ago and just before we got the STEM Lab".

The teachers in this program have sought out new opportunities to advance their program. Much of the development has come from a continued relationship with the faculty at the university. That relationship has allowed the program to participate in several research projects which have provided new content to advance the program. A recent collaboration made funding available for teachers to travel and tour a community college, whose program was focused on agriculture, biotechnology, and food safety. Other collaborations have created curriculum content and provided the students with learning experiences outside the classroom. The teachers have also sought out CPE with industry to bring relevant real-world experiences to their students. Funding for such outreach was made possible by a Centers of Innovation Grant, which provides an opportunity for secondary agricultural education teachers. The grants were targeted toward teachers with innovative ideas to increase the training of the local agriculture workforce. The grants were funded by the university to encourage agricultural education teachers to design programs that emphasize career-ready training and a high-quality learning experience for middle and high school students in agricultural education courses. Wesley, a middle school agricultural education teacher, who encourages students to enroll in the high school program, has found the university-funded CPE beneficial for his program.

> "I guess when you look at professional development, I would like to see teachers encouraged to go out and seek their professional development out in the field, with local industries that relate to what they are teaching…today I feel like there is less professional development than I have ever seen within the school system. But, the agricultural teachers in this county are getting out there and are looking down the road to bring the latest things related to their programs to their students".

What seems to have made this program's CPE work so well, is the fact that it has come entirely from experiences designed as small group discussions and laboratory experiences or through one on one engagements. The teachers have experienced biotechnology by doing electrophoresis and PCR with university faculty. The CPE took place in a setting where individual attention was given to help the teachers understand and master the techniques. Matt sees this type of professional development as key to the success of the program. One of the things he sees is that the teachers have sought their CPE, and from his perspective, the teachers have taken on the continued learning that keeps the program moving forward. To him, it appears that the teachers' experience, once they master the content of new technology, leads them to something newer, and the program is constantly advancing its content.

> "I think providing teachers time, to get together and work on issues, partnerships with the universities, and ones like we are taking advantage of right now in using their expertise to

> help in designing programs and projects…. It needs to be a little more individualized, you know you can go to a conference, and you hear a lot of really good ideas. But, do you get a chance to get involved and do the hands-on pieces of that? I kind of like some of the ways we do some things".

From the perspective of the university faculty, the collaboration between the secondary agricultural teachers and the university faculty is powerful. Taking advantage of the university and the research that is happening, there are benefits for both the secondary agricultural education teachers and the researchers at the university. Lauren, a professor at the university, and a researcher who works with this program states:

> "This model of professional development that builds those relationships and those connections, I think, can be really powerful. So, making that connection of teachers to the experts allows the teacher access to those experts when questions arise, or problems occur. And thinking of that professional development as part of their practice, then they have someone they can call and say, 'Hey, I was wondering what is going on with this thing,' when problems arise."

This study has shown that through collaborations with the faculty at the university and the secondary agricultural education teachers, CPE can drive the changes needed to design and develop a modern agricultural education program. Using Rogers' Theory of Innovations the one on one collaboration between agricultural education teachers and university faculty is the idea, practice, or project that is perceived as the innovation and the open dialog (communication) of the collaborations presented a change in the content being taught in this agricultural education program (Rogers, 2003). It is through these collaborations and one on one communications that the participants in this study connected CPE with curriculum development, which focused on the student's needs and the expectations for their success after leaving the program.

Discussion and Recommendations

Over the past ten years, and the development of this program, the agriculture industry has changed and continues to change. It will be up to the agricultural education community to determine what is the most relevant content to teach (Brand, 2013). Continuing professional education has been the key to the changes which have occurred during the development of this program (Rhoton & Shane, 2001). Through CPE, the teachers in this program were inspired to change the direction of what was considered a dying program in the school (Lester, 2003). It was the consensus of the teachers involved in the program, that when they were invited to participate in an on-campus pilot program for biotechnology at the university, they saw an opportunity to bring new life to the program (Rogers, 2003). According to Rogers, an innovation has certain characteristics that define it as such: relative advantage, compatibility, complexity, trialability, and observability. It was through the eyes of the teachers that this CPE met the definition of innovation (2003). Continuing professional education cannot directly change performance or views, but it can lead the way by communicating goals, inspiring programs and teachers toward goals, and reducing conflicts among the guiding principle faced by all teachers (Rhoton & Shane, 2001). The initial three-day workshop was the catalyst that motivated the teachers in this program to make changes in the curriculum.

Continuing professional education has driven the changes in this program (Bates, 2016). Two key components became evident during this part of the study. The first was the persistence of the teachers to commit time for continuing professional education and implementing those new ideas and content in the program (Rogers, 2003). According to Rogers, this group of teachers would be considered innovators, as it is relative to the rate of speed in which adoption of the CPE was implemented (2003). Second, is the support for continuing professional education from the administration, which is critical when developing anything new in education. Continuing professional education must be relevant to the teachers and connect with what they want to learn. The teachers in this program have participated in

CPE and workshops, but they have also facilitated their professional development (Shaha, 2016). They developed relationships with these resources and gained first-hand real-world experiences that are brought back and shared with their students (Smith, 2012). Participants in the study believe that making that connection between teachers and experts allows the teachers access to a network of experts when questions arise, or problems occur. Thinking of that network from the CPE experience then becomes a part of their practice, and they know they have someone they can call on when working on curriculum projects.

Continuing professional education can inspire changes in agricultural education and can give teachers different perspectives on what is going on in the industry (Rienties, 2013). Changes occur daily in the agricultural industry, and teachers must have a network that not only shares these changes but provides the teachers with resources to use to keep their programs current in explaining these changes (Rienties, 2013). From the perspective of the participants, continuing professional education and collaborations should contribute or influence changes made in educational programs.

Opportunities to Advance Continuing Professional Education

Continuing professional education for teachers is a means in which an agricultural education curriculum can be designed and developed to keep programs current and on the cutting edge of industry advances. Based on this study, CPE takes on many forms for the teachers in this program. The teachers in this program have sought CPE with university faculty and programs offered through the university, which have allowed the secondary agricultural education teachers the opportunity to seek out new CPE experiences. These collaborations and support have allowed the teachers to go out where the innovations are happening in the field (Hurst, 2015). The teachers have partnered with the local community college and university to develop courses and content to meet the needs of the local community. The teachers of this program have collaborated with the university faculty to study and develop innovative practices that promote content knowledge and contribute to the teacher's agricultural education programs. It is therefore recommended that once the teachers determine the needs of their program, that they develop a CPE plan. The key is to focus on the expected needs of the students in the agriculture programs and seek relevant content, as well as teaching methods. The teachers must connect the continued learning to their teaching identity, which makes the connections to their pedagogy and their ability to communicate the content in a way that students see the connection to their daily lives. Continuing professional education should be teacher-driven, where the teachers seek out opportunities that drive their interest in innovations. They should make the connections of innovations with what they know and teach and build on that knowledge. Agricultural education teachers already have the foundational knowledge to build on, so integrating new content and innovations should be the natural course of continuing their professional education.

Further research should investigate the different methods of CPE used in this program and how those methods could be used in other programs. The collaborations with university faculty and secondary agricultural education teachers should be explored to determine the impact those collaborations have on both the universities and the secondary agricultural education programs. How can these collaborations bridge the disconnect between secondary agricultural education teachers in the field and those charged with agricultural education programs at the universities? Further research is needed for the methods used by this program, ones that were initiated by the first a small group workshop where teachers and students were involved in a hands-on learning experience, how the second CPE used one-on-one experiential learning in the field with researchers at the university. How could continuing professional education lead to innovative program development? How could the agricultural industry contribute to CPE for the teachers? How can agricultural education teachers collaborate with land-grant universities to develop innovative programs and enhance their CPE? Although CPE has been extensively studied, these findings suggest that there are areas that warrant further exploration.

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