Evaluating the Beef Quality Assurance Certification Program as Part of the Virginia High School Agriculture Curriculum

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Abstract

This study explores the Beef Quality Assurance (BQA) certification program in the Virginia secondary agriculture curriculum. The purpose of the evaluation was to gain insights from teachers about their awareness of the BQA program, use of the program in their agriculture curriculum, resource preferences to use with the program, and student BQA certification practices. The explanatory sequential mixed methods research design was used to collect quantitative and qualitative data in the form of an online survey and follow-up phone interviews. In a population of 227 agriculture education teachers, 31 participants completed the online survey and ten follow-up phone interviews were conducted. The results indicate that there is a high awareness of the BQA certification program among those who teach an animal science curriculum. Teachers are integrating the producer BQA program into their CTE course curriculum and making modifications to enhance student engagement and learning experience. Students are most engaged in hands-on learning activities like the chute-side component and injection practices. Virginia Cooperative Extension agent support is valued in the process for planning and implementation. The most challenging components of the program are scheduling time for the chute-side component, overcoming student learning curves in non-traditional programs, and adversity from school administration. In summary, the producer BQA certification program is an essential component to the Virginia secondary agriculture curriculum.

Acknowledgements

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Dedication

“Live the full life of the mind, exhilarated by new ideas, intoxicated by the Romance of the unusual.” –Ernest Hemmingway

This work is dedicated to my nephew, Noah. It’s never too early to discover your passion. May your curiosity and thirst for knowledge never cease. May you continue to brighten up the room with your smile and humor. May you achieve the goals you set and overcome any obstacles that will arise on your path through life.

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Chapter One

Introduction

Background and Setting

The Beef Quality Assurance (BQA) Program, developed by the Beef Checkoff in 1987, is a certification program designed to provide the United States beef industry and cattlemen with the education, training, verification, and documentation necessary to assure animal health and well-being. The purpose of the program is "protecting consumer confidence in beef quality and safety". The National BQA handbook (2005, pg. 4) states that "cattle managed using BQA guidelines will be less likely to contain a volatile residue, contain injection site tissue damage, or foreign material such as a broken needle." Aside from safety measures and following federal guidelines already set in the industry, food quality standards are of high importance and needed for continued consumer trust. The beef industry recognizes that it is evolving into a vertical-coordinated production system (2005, pg. 4). Thus, those involved in the industry, from farm to fork, are expected to remain transparent, ethical, and environmentally responsible. Beef producers and allied industry professionals are advised to stay informed by participating in educational opportunities like the BQA certification program (2005).

While each state has its own BQA training components, Virginia is partnered with seven states in the Mid-Atlantic for a unified effort to provide similar trainings and standards. The mission of Mid-Atlantic BQA is "maximizing consumer confidence in beef by focusing the industry's attention on BQA through the use of science, research and education initiatives" (2010, p. 1). The Virginia BQA Program offers resources for producers, allied industry professionals, and youth to learn best management practices on

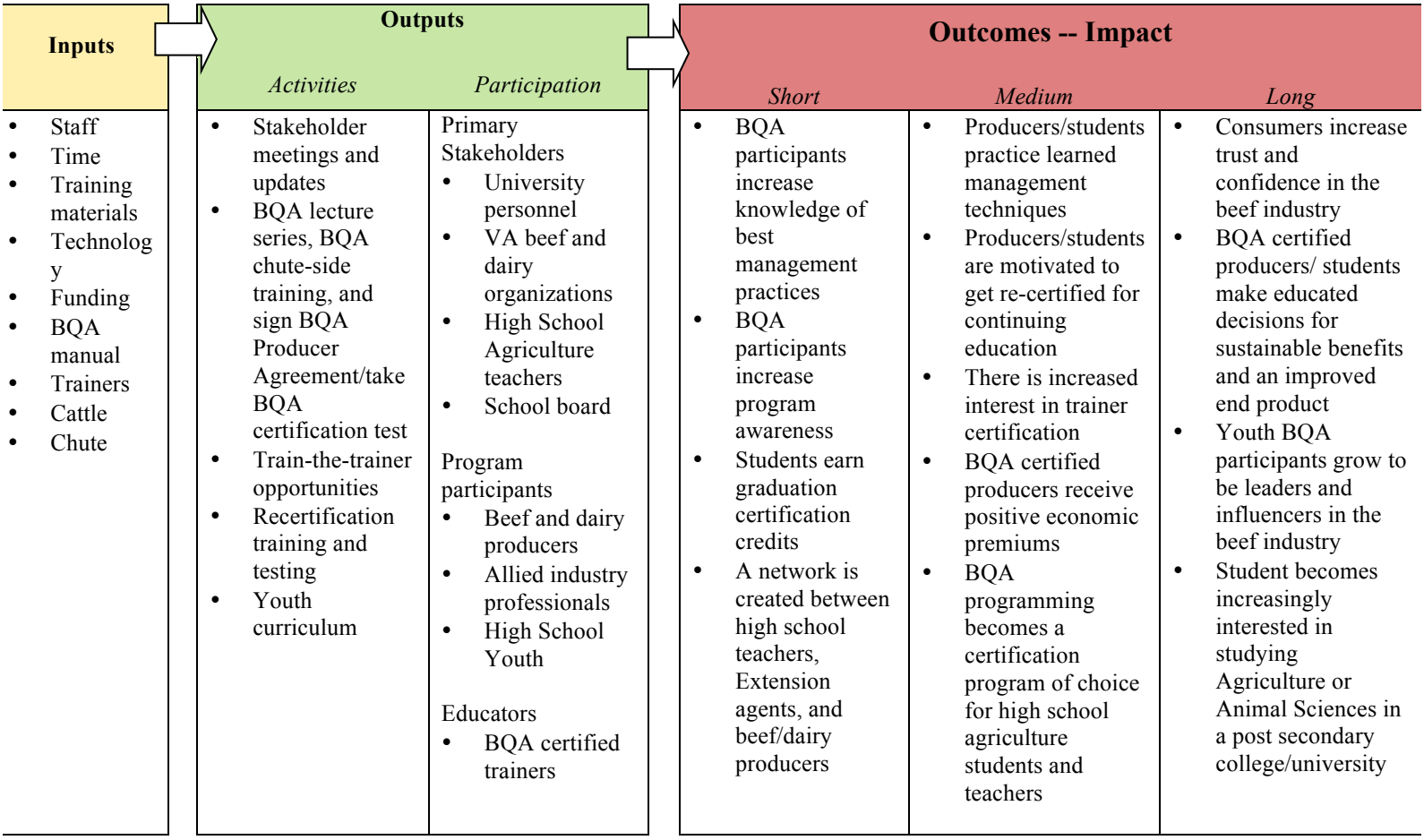
beef and dairy operations. The standard producer certification process is offered year-round and is composed of four steps: (1) obtain and read the Mid-Atlantic BQA Manual, (2) attend or view the BQA lecture series (online, CD, or in class), (3) attend a chute-side training event, and (4) sign the BQA Producer Agreement. Recertification is also required every 3 years to maintain certification status. The objectives of the Virginia BQA program are to (1) set production standards that can be met or exceeded, (2) establish systems for data retention and record keeping, (3) provide hands-on training and education for participants, (4) provide technical assistance through the Virginia Cattlemen's Association, Virginia Beef Industry Council, BQA-certified veterinarians, and BQA-certified Extension agents offering on-site assistance as desired by producers, and (5) ensure that all sectors of the industry take responsibility for the production of a safe food product through proper animal care, handling, and management practices.

Over the past 15 years, BQA has grown to be an integral education program for those involved in the Virginia beef industry. Program stakeholders shared that a substantial number of beef producers are aware of the program and continue to express interest for certification (S. Greiner, personal communication, July 25, 2016). BQA program training has evolved to offer participants convenient and flexible learning measures with the addition of a digital BQA manual, online learning modules, and more trained Extension personnel throughout the state. Additionally, direct program management through Virginia Tech provides technical expertise from Veterinary and Animal Science faculty, relationships with breed and cattle organizations, Cooperative Extension community outreach, and association with agriculture teacher continuing education.

There has been growing interest for the BQA certification program in youth education (S. Greiner, personal communication, July 25, 2016). BQA youth training is mainly offered in three youth segments: high school agriculture students, livestock show exhibitors, and cattle-working contest participants (YMQA Questions & Answers, 2017). Individuals in these segments may overlap due to involvement in multiple projects or activities such as 4-H and FFA. Part of the BQA program has been adapted into the Youth Meat Quality Assurance Program (YMQA), a foundational quality assurance program that emerged to teach youth the basics of animal husbandry and general management practices in raising a project animal (YMQA Questions & Answers, 2017). YMQA has a similar mission to BQA; this mission is to maximize consumer confidence and acceptance of the food products produced via youth livestock projects (YMQA Questions & Answers, 2017). YMQA is also comprised of components of Youth Pork Quality Assurance (YPQA), Sheep Quality Assurance, and Goat Quality Assurance. BQA accepts YMQA as the classroom BQA training; however, the chute-side component must be completed to earn a BQA certification (YMQA Questions & Answers, 2017).

In order to graphically visualize the relationships between segments in the BQA program, a logic model (Figure 1) was developed based on a synthesis of literature to describe the inputs, outputs (activities and participation), outcomes (short, medium, and long term), as well as assumptions and external factors. These factors help guide the way for program stakeholders and evaluators to ensure the proper steps are in place to achieve desired outcomes. The model aided in the development of evaluation questions to adequately evaluate the youth component of the BQA certification program for this study.

Figure 1. Beef Quality Assurance Program Logic Model



Statement of the Problem

While the Virginia BQA is an established program, there have been few formal evaluation efforts to support the use of the program among varying segments of participants throughout the state, particularly in the high school career and technical education (CTE) setting. Some teachers have adopted the traditional BQA training into

their curriculum; however, the effectiveness and usability of the program is still unclear. Top tier internal stakeholders in Virginia BQA recognize the challenges to adapt the 4 step current program in a classroom and have made it a priority to make appropriate changes if modifications are needed. In short, a thorough evaluation is needed to determine content appropriateness for youth, program strengths and pitfalls, and needs for instructors and participants.

Purpose of the Project

The BQA study is a multipurpose evaluation that will explore the use and effectiveness of the program among high school agriculture teachers in the Virginia CTE curriculum. There is a desire to assess teacher buy-in, level of training, and training or resource needs for both effective instruction and student learning needs. The purpose of the evaluation is to take a deeper look into the BQA program to determine if there is a need for a youth tailored curriculum, additional support, and more tools to aid effective instruction and graduation certification requirements for students. The evaluation will seek to discover program awareness, training efficacy, usefulness of resources, and needs for program improvements. In addition, the YMQA program will be evolving into a new, robust multi-species program, Youth for the Quality Care of Animals (YQCA) that will be launched in 2017. While details of the new program remain internal, the evaluator and stakeholders recognize value in investigating the current state of the program by asking high school teachers.

Project Objectives

The objectives of the project are the following:

1. Identify BQA program awareness among Virginia High School Agriculture Teachers

2. Evaluate the use and functionality of BQA resources and materials
3. Understand teacher perceptions of strengths and pitfalls with current BQA program
4. Gain insights on factors to improve the BQA program for the youth audience
5. Understand youth engagement with the BQA program
6. Discover opportunities between high school and Extension educators

Definition of Terms

Beef Quality Assurance (BQA) - Program(s) designed to help beef producers assure that their production methods are not causing defects in beef products.

Cow-calf operation - Management unit that maintains a breeding herd and produces weaned calves.

CTE- Career and Technical Education

Feeder- Cattle that need further feeding prior to slaughter

Feedlot - Enterprise in which cattle are fed grain and other concentrates for usually 90-120 days. Feedlots range in size from less than 100-head capacity to many thousands.

Producer-A farmer or rancher raising beef or dairy cattle

Seedstock- Breeding animals, sometimes used interchangeably with purebred.

Stocker - Weaned cattle that are fed high-roughage diets (including grazing) before going into the feedlot.

Youth for the Quality Care of Animals (YQCA) - A program designed to teach youth the basics of animal husbandry and general management practices in raising a project animal.

Youth Meat Quality Assurance (YMQA) - A multi-species program that includes certification training for youth livestock exhibitors

Limitations of the Project

This study is limited to Virginia high school agriculture teachers listed in the 2016-2017 Virginia Agriculture Education Teacher Directory. According to the directory, there are 227 teachers that meet the criteria of teaching agriculture courses in a CTE setting. These secondary agriculture education teachers may instruct one or more agriculture subject areas, such as animal science, agriculture mechanics, plant science, horticulture, etc. The study is also limited to teachers with online computer access and a valid e-mail address.

Significance of the Problem

The Virginia BQA program is evolving to a new stage in the program lifecycle. However, there are challenges that arise with expansion and modification. It is important to ensure that changes align with the program objectives, mission, and desired outcomes. This may not be possible without careful evaluation of each segment in the program. The BQA certification program in the Virginia high school agriculture curriculum is one of the newest additions and modifications. If program quality is not maintained or does not continue to meet objectives, the overall program quality and reputation can be threatened. In addition, if the Virginia Department of Education does not approve the program, the program could be removed as a certification option for graduating vocational students. This would in turn hinder student interests in the beef industry, create delays in graduation, reduce consumer knowledge of the beef industry, and minimize teacher course offerings. A program evaluation will address the needs and concerns from important stakeholders as the high school teacher level.

Chapter Two

Review of Literature

The foundation and food safety framework for the BQA program came from the development of the federal Hazard Analysis Critical Control Point (HACCP) system. The United States Department of Agriculture Food Safety and Inspection Service (USDA-FSIS) describe HACCP as, "a process control system designed to identify and prevent microbial and other hazards in food production (Key Facts: The Seven HACCP Principles, 1998). It includes steps designed to prevent problems before they occur and to correct deviations as soon as they are detected." In the early 1980s, beef producers took a proactive step to cooperate with the FSIS to develop a pre-harvest beef safety program. Between 1982 and 1985, three feedlots took part in a production practice evaluation and received certification as "verified production control" feed yards. The evaluation results from this analysis and certification became the backbone for modern-day BQA program content (National BQA Manual, 2005).

Beef Quality Assurance Related Studies

While regulated USDA guidelines are only required at meat processing and packaging plants, a large number of producers and industry professionals follow BQA standards for pre-harvest production and management practices. Beginning in 1991, the BQA program initiated a comprehensive internal survey, referred to as the National Beef Quality Audit (NBQA), which takes place every five years to "evaluate beef industry efforts to improve beef quality". In the 2011 NBQA survey, evaluators conducted a 3-phase study including face-to-face interviews, a carcass quality survey and evaluation of instrument grading, and quality enhancement by the seedstock, cow/calf, and stocker sectors. Some key findings from the study indicated the following: no two market sectors

defined quality in the same way; there was a need for increased transparency related to source identification; injection sites improved since 1991 and BQA educators were to credit; and BQA was becoming more widespread with 86% of respondents saying they were aware of the program and 71% claiming they attended or completed an online BQA training (2012). These findings indicate that the BQA program has made significant strides in the industry, has increased awareness and quality standards, and program evaluators discovered areas of opportunity for added educational materials.

Aside from internal evaluations, there have been a number of studies in states throughout the nation including Idaho, Montana, California, West Virginia, Oklahoma, and Colorado. Duffey, Patterson, King, and Rolfe (2008) conducted a Montana survey study of ranch management practices of BQA certified and non-BQA certified producers. The authors found that BQA certified producers keep more documented herd records and make better health management decision as compared to non-BQA producers. While some data suggests that BQA programming is positively influencing management decisions, they concluded that there are still a number of issues, like animal identification, recordkeeping, food safety issues, and process verification documentation that require further producer education. Peacock (2003) conducted a phone-survey study on the factors influencing participation in West Virginia BQA. Survey questions related to their actual farming operation, personal involvement, barriers and influencers in participation in Extension programs, awareness of current issues, and factors that would affect participation in WV BQA programming. She found that most producers, BQA and non-BQA certified, receive their information from Extension agents and are limited from attending training due to time constraints. The largest contributors to increase

participation among non-BQA participants were equally training location and program awareness. In synthesis of these studies, beef producer time and availability is limited, thus convenient training locations and marketing the program through trusted advisors, such as Extension agents, could increase awareness and participation. It can be determined that there is still opportunity for growth and continued education of beef producers.

While there are few BQA studies involving youth, efforts have been made to inform youth about the significance of avoiding chemical residues, and making ethical decisions (Yost, 2006). In the Yost study, the beef educational program was modified, as the author recognized the complexity of the materials meant for an adult audience. A total of 273 4-H and FFA youth participated in a pre and post program test to measure knowledge gain after the modified program delivery. Results determined that youth percentage test scores improved by at least 10 percent in all but one question in the post-test.

Philosophical Worldviews

Constructivist Paradigm

An applicable philosophical worldview to both this study and the researcher is that of the constructivist paradigm. The constructivism worldview dates back to the late 1700s with the work of Immanuel Kant (Mertens & Wilson, 2012). The basis of Kant's work was in understanding the way the mind processes experiences. This influenced the thinking of Wilhelm Dilthey, a theorist who tied constructivism to natural and human sciences and social phenomenon. Mertens and Wilson (2012) expand on Kant and Dilthey's work in providing an overarching picture of the constructivist paradigm by including it in the values branch of evaluation. They describe the constructivist paradigm

as a "focus primarily on identifying multiple values and perspectives through qualitative methods," through axiological, ontological, epistemological, and methodological assumptions. Constructivist evaluators are (1) aware of their own values and the values of others, (2) have multiple, socially constructed realities, (3) create meaningful dialogue and reflection to create knowledge, and (4) are qualitative, quantitative and participatory (2012, p. 137). One particular theme that stands out in the constructivist paradigm is the emphasis on values among practitioners and the "lived experience" gained from methodological measures of dialogs, interviews, observation, and documentation. Merriam, Caffarella, and Baumgartner (2007) add to the constructivist paradigm in describing the constructivist orientation theory. This theory explains how people make sense of their experience while engaging socially in talk and activity about shared problems or tasks. The view of the learning process is construction of meaning from experience (Merriam et al., 2007).

Pragmatic Paradigm

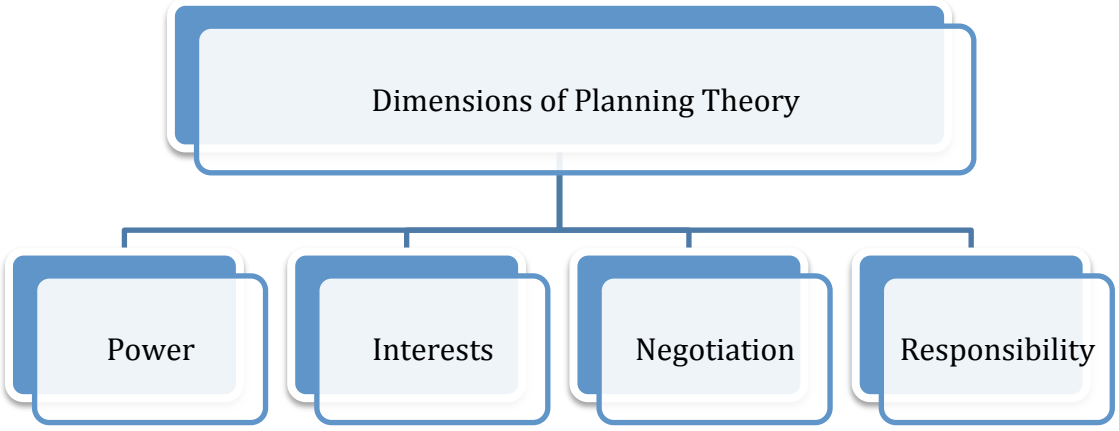
The pragmatic paradigm exists in the use branch of evaluation and focuses primarily on data that are found to be useful to stakeholders. This paradigm advocates for the use of mixed methods (Mertens & Wilson, 2012). Theorists in this branch believe that the scientific method is insufficient to discover truth (2012). Creswell and Clark (2011) describe the basic characteristics of pragmatist worldview based on consequences of actions, problem centered, pluralistic, and real-world practice oriented (2011). Pragmatic evaluators often focus on practicality as their epistemology and approach their inquiry on multiple stances of biased and unbiased perspectives. The pragmatic paradigm is arguably considered one of the "best" worldviews for mixed methods, the method decided to guide this BQA study (2011).

Theoretical Framework

Program Planning Theory

Program planning theory is the theoretical framework that drives the evaluation of the BQA program. A program theory, as defined by Weiss (1998) is "the mechanisms that mediate between delivery of the program and the emergence of outcomes of interest." Cervero and Wilson (2006) recognized "planning theory has focused on processes used to develop educational outcomes, while it has ignored social and political outcomes that result from educational programs" (2006, p. 22). Thus, they worked to develop their own educational program planning theory, using the metaphor "working the planning table" that considers planners' lived experiences and guide of practical experiences. Following this theory, constructivist and pragmatic worldviews intersect and play a role in terms of social and organizational contexts and democratic planning. The Cervero and Wilson planning theory steps beyond traditional planning theory of needs-assessments, educational design, and evaluation. It is understood that "instrumental problem solving as a theory of action becomes dysfunctional in the messy human interactions, framed by power relations and interests, that characterize actions in the real world" (2006, p. 249). Thus, Cervero and Wilson frame planning to include dimensions of power, interests, negotiation, and responsibility (2006, p. 24). These four pillars "account for the world that educators experience, define their essential action, and prescribe their ethical obligations" (2006, p. 24).

Figure 2. Cervero and Wilson's Educational Program Planning Theory Diagram



Using the Cervero and Wilson planning theory and the philosophical worldviews, the BQA certification program can be explored on a new dimension in the evolving program lifecycle. The program involves a broad range of stakeholders with varying lived experiences, perspectives, interests, and judgments. The program can benefit by welcoming these individuals to the planning conversation and being aware of the existence of hierarchal political power relationships. Representation in the planning process allows stakeholders to express their voice and negotiate to develop educational and social and political outcomes. Additionally, "working around the planning table" allow planners to interact socially and provide practical contributions to achieve desired outcomes.

Summary

The BQA certification program is an established program with a number of studies that have been carried out through the years. Research suggests that the BQA program has generated more conscious decision-making among producers to improve beef quality, particularly through better injection site practices, more accurate record

keeping, improved animal handling, cattle identification, etc. Studies are lacking, however, in the youth education component of the BQA program. Using the constructivist and pragmatic worldview, the researcher seeks to understand the use of the BQA program in the secondary agriculture education community. Program planning theory is the theoretical framework that paves the way in the study inquiry to account for planners lived experiences and guide for effective educational programming.

Chapter Three
Project Methodology

Purpose of the Project

The BQA study is a multipurpose evaluation that will explore the use and effectiveness of the program among high school agriculture teachers in the Virginia CTE curriculum. There is a desire to assess teacher buy-in, level of training, and training or resource needs for both effective instruction and student learning needs. The purpose of the evaluation is to take a deeper look into the BQA program to determine if there is a need for a youth tailored curriculum, additional support, and more tools to aid effective instruction and graduation certification requirements for students. The evaluation will seek to discover program awareness, training efficacy, usefulness of resources, and needs for program improvements. In addition, the YMQA program will be evolving into a new, robust multi-species program, Youth for the Quality Care of Animals (YQCA) that will be launched in 2017. While details of the new program remain internal, the evaluator and stakeholders recognize value in investigating the current state of the program by asking high school teachers.

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5. Understand youth engagement with the BQA program

6. Discover opportunities between high school and Extension educators

Targeted Population and Participating Audience

The target population for the study was Virginia secondary agriculture teachers. Teachers were selected as the primary population due to their involvement in course and program planning, implementation, and interaction with students in the classroom. According to the state online directory, there were 227 teachers in the state that frame the study limitations. Since the teacher directory did not identify content areas such as animal science, agriculture mechanics, plant science, horticulture, etc., it was necessary to include all teachers. The target population was sent an invitation email and two reminder emails to participate in the study. The aim was to achieve a 25% response rate in the initial online survey, or a sample size of at least 56 participant responses. After the online survey, volunteers who provided contact information were contacted for follow-up phone interviews. The sample goal for phone interviews was 10 participants. If sampling goals were not achieved or quality information was lacking, purposive snowball sampling contingency was planned for the phone interview phase.

Methodology

Mixed methods research is the key methodology selected in this evaluation study. Creswell and Plano Clark (2011) define mixed methods research as,

> a research design with philosophical assumptions as well as methods of inquiry…. it focuses on collecting, analyzing, and mixing both quantitative and qualitative data in a single study or series of studies. Its central premise is that the use of quantitative and qualitative approaches, in combination, provides a better understanding of research problems than either approach alone, (2011, p. 5).

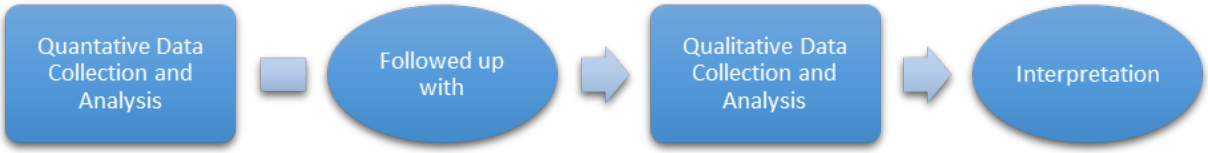
Using this as a guide, mixed methods research is appropriate for a BQA evaluation, as it best synthesizes the philosophical assumptions from the constructivist and pragmatic paradigms and will seek to generate more explicit responses to inform evaluation questions among the teacher population. The evaluation questions guiding this study are the following:

1. How aware are high school agriculture teachers of the BQA program (name, training materials, and objectives) in Virginia?
2. How do high school agriculture teachers select animal sciences related materials for their curriculum?
3. How are teachers using the current BQA program curriculum in a high school course?
4. What are the useful BQA components for teaching students in a high school agriculture course?
5. What factors in the BQA program curriculum can be improved to better reach and engage high school agriculture students?

Design and Instrumentation

The research design carried out in this study is the explanatory sequential design. This mixed-methods design occurs in two distinct interactive phases as depicted in Figure 3. In the first phase, a quantitative data collection tool is used to address evaluation questions for the study. After data collection and analysis of the first phase, the researcher follows-up with qualitative data collection to follow the results of the quantitative phase. Interpretation brings the analysis of these two phases together to explain initial results (2011, p. 71). The quantitative and qualitative data collection tools used to inform evaluation questions were an online survey and phone interview, respectively.

Figure 3. The Explanatory Sequential Design (2011, p. 69)



Online Survey

An online survey was selected as the primary data collection instrument. Online surveys were preferred due to growing access to Internet and email, low cost, shorter time required for data collection, and ability to use in larger scale (Wholey, Hatry, & Newcomer, 2010, p. 269). Online surveys were also appropriate for reaching a statewide teacher population with access to a work email at school of employment. The development of survey questions and procedures were adapted from Dillman, Smyth, and Christian's (2014) contributions on the tailored design method. The fundamental considerations to the tailored design method are reducing survey error, developing survey procedures that work together to encourage all members to respond, and developing survey procedures that build positive social exchange and encourage response (2014, p. 16). Survey error was reduced by crafting clear, understandable, and easy to answer survey questions that address one or more evaluation questions. A stakeholder committee reviewed the 32 questions (yes/no, multiple-choice, 5 point Likert scale, open-ended, and demographic) and provided feedback to further improve quality before distribution. The refined questions were entered into *Qualtrics*© online survey software and strategically ordered with conditional skip logic. Good question order motivates respondents to complete the question and questionnaire and minimize questions order effects (2014, p. 230). The look and feel of the online survey, as shown in Appendix II, was adjusted to

include a familiar, eye-appealing Virginia Tech headline, standard black Arial font, a question separator, and arrowed next buttons. After the online survey design, external procedures were put in place to encourage members to respond. An introductory email and consent statement (Appendix I) was developed to introduce the study, invite teachers to participate, and explain how results were going to be used. A familiar Virginia Tech faculty member with a secondary teacher relationship was involved in distribution of the online *Qualtrics*© survey through email. This individual sent two reminder emails, 2 weeks and 3 weeks following the first email contact.

Pilot Online Survey

The pilot study took place to improve the quality of the online survey and consent email. Three participants were asked to complete the survey using the same contact email message. These participants were a Pennsylvania secondary agriculture teacher, an Extension agent with experience with the BQA program, and a middle school teacher. The pilot participants shared that the questions were clear and in logical order. They did not recommend any changes to the survey. However, after observation of a teacher completing the pilot survey, the researcher noticed that answers were changed when the teacher used the tab button and mouse scroll. Thus, questions were reduced from 3 questions to 1 question in a browser window to reduce user error.

Phone Interview

The qualitative instrument used in this research study was semi-structured phone interviews. Phone interviews were deemed important, as evaluation questions (EQs) in the BQA study could not be answered by one instrument alone. The virtual interview offered flexibility to both the interviewer and participant who otherwise would have had time or location constraints. Using the explanatory sequential design, phone interview

questions were crafted after the analysis of the quantitative online survey results. A table illustration of this phase is shown in Appendix VII. The purpose of the phone interview was to build on areas, or strands, that needed further explanation. After data analysis of online survey questions, more information was needed from EQs 2 through 5. Strands were identified and 15 open-ended questions with seven follow-up prompts were constructed and refined. Final phone interview questions and script are available in Appendix IV.

Data Collection

Prior to initiating data collection, the research design and protocol were submitted to the Virginia Tech Information Review Board (IRB). Instrument submissions were sent separately to account for building interview questions from quantitative data analysis, using the explanatory sequential mixed methods design. A proposed and actual timeline of data collection procedures is available is Appendix V and VI. Once the protocol and survey questions were approved by IRB (#17-226), the Virginia Tech faculty member sent the introductory email with the online *Qualtrics*© survey link. The researcher monitored responses in the *Qualtrics*© system. One adjustment was made when it was apparent that the first respondents were able to skip questions. A prompt was created to ask participants if they are sure they do not want to answer the question. This action helped generate more complete responses in the questionnaire.

After the survey closed, the results were analyzed using the Data and Analysis and Reports tools on *Qualtrics*©. Results were exported to a PDF for further analysis and Microsoft Excel for data filtering and follow-up interview contact management. The online data was stored in a password-protected site and saved on the program evaluator's password protected computer. The files were also backed up on an external hard drive.

The phone interviews were recorded on QuickTime mp4 files and transcribed into individual Microsoft Word documents per participant. The interview transcriptions were reviewed twice by the researcher and uploaded into the Atlas.ti 8.0 software system for coding. Codes were developed based on key findings among participants. Codes were then crosschecked to avoid repeat data from the same participants. Both transcriptions and audio recordings were saved on the program evaluator's password protected computer and backed up on an external hard drive. To protect respondents identities, files were saved as Participant 1, 2, 3, etc.

Chapter Four
Project Results, Discussion, and Recommendations

Online Survey Results

Of the 227 online survey email invitations, there were a total of 40 respondents, resulting in a 17.6% response rate. Data was cleaned to omit responses that were not complete and those respondents that did not meet participant criteria. The final sample size (n) was 31 online survey respondents, a 13.65% response rate. All 31 respondents indicated they were current high school agriculture teachers that teach an animal science related curriculum. Eleven were between the ages of 35 to 44 years old, followed by seven between 45 to 54 years old, five between 25 and 34 years old, five between 55 and 64 years old, and three between ages 18 and 24 years old. Twenty respondents identified as female, while the remaining ten were male. A balanced distribution of teachers was represented across the state, as discovered by zip codes provided. In the next section, survey results are used to inform evaluation questions, EQ 1 through 5. Graphs of quantitative results are presented in Appendix VIII.

EQ 1: How aware are high school agriculture teachers of the BQA program (name, training materials, and objectives) in Virginia?

The entire sample (n=31) have either read or heard about the Virginia BQA program. Ten teachers learned about the program through an Extension agent, followed by seven from another teacher and three at an agriculture teachers' conference. Teachers were most familiar with the chute-side training component, the BQA manual, and BQA Producer Agreement, and BQA online modules lecture series. They were least familiar with the BQA CD-ROM lecture series.

EQ 2: How do high school agriculture teachers select animal sciences related materials for their curriculum?

When searching for animal science materials for courses, ten teachers indicated

they use the Internet while four used textbooks. Most teachers, or 15, search for new animal science materials and content weekly, while eight search monthly, three search daily, three search quarterly, and two search annually. Teachers claimed they are extremely likely to integrate the BQA program into their curriculum. On a Likert scale from 1 to 5, with 1 being extremely unlikely and 5 being extremely likely, there was a mean of 4.77, favoring the extremely likely case of integrating the BQA program into their curriculum in the future. No respondents chose 1 or 2 scales. The one respondent who chose the neutral response shared, "We will do it more for FFA than class."

EQ3: How are teachers using the current BQA program curriculum in a high school course?

The majority of teachers, or 23 participants, offer the BQA program to their students using the full program for certification credits; three teachers use parts of the program to meet core requirements and two teachers use the classroom and chute-side component for cattle working. Only two respondents did not offer any BQA training. Twenty-one respondents claimed most students use their BQA certification for a graduation requirement, while four claimed students used for a home farm, two for better-informed consumer decision-making, and two for career aspirations. One teacher asserted that students do not use the BQA certification. When asked to select all instruction methods and/or resources used in BQA training, 100% of the respondents used chute-side training, followed by 93.1% in-class lecture, 79.31% BQA manual, 68.97% learning modules (online or CD-ROM), and 62.07% used a guest speaker. Other fill-in responses were videos, cattle management component of the curriculum, and multiple agencies in a BQA training day. The majority of teachers, or 25, refer to their Extension agent as the primary contact for technical BQA related questions and training.

Four refer to Virginia Tech faculty and one uses VA Cattlemen's Association member contacts.

EQ 4: What are the useful BQA components for teaching students in a high school agriculture course?

When asked to rate the usefulness of the training (materials) the BQA program offers, on a Likert Scale of 1 to 5, with 1 being not at all useful and 5 being extremely useful, the highest mean of 4.81 and lowest variance of 0.16 response was chute-side training. BQA online module lecture series held the second highest mean response of 4.07 followed by BQA manual, 3.93. However, the BQA manual had a lower variance and highest sample size of 28 response counts. Other responses included, classroom lecture series with a variance of 1.01, recertification modules with a variance of 1.1, BQA train-the-trainer with a variance of 1.42, and BQA CD-ROM lecture series with a variance of 1.83. The BQA CD-ROM lecture series had the lowest *n* size with 19 responses and the highest standard deviation of 1.35. All results are shown in Figure 4.

Figure 4. Usefulness of Training Materials, Participant Responses

Training Material	Minimum	Maximum	Mean	Std Deviation	Variance	Count
BQA Manual	2.00	5.00	3.93	0.84	0.71	28
BQA Online Modules Lecture Series	1.00	5.00	4.07	1.02	1.03	27
BQA Classroom Lecture Series	1.00	5.00	3.57	1.00	1.01	21
BQA CD-ROM Lecture Series	1.00	5.00	2.53	1.35	1.83	19
Chute-Side Training	4.00	5.00	4.81	0.39	0.16	26
Recertification Learning Modules	1.00	5.00	3.57	1.05	1.10	21
BQA Train-the-Trainer	1.00	5.00	3.87	1.19	1.42	23

Participants were asked to rate the importance of 10 BQA program components to

their curriculum design using a scale of 1 to 5, with 1 being not at all important and 5 being extremely important. All 31 participants responded, as shown in Figure 5. The highest mean, 4.71, and lowest standard deviation, 0.63, score was cattle care: handling and facilities. Vaccine and drug practices, record keeping, biosecurity, quality assurance of market cows and bulls, impact of management practices on carcass quality, and livestock feeds and the feed supply followed with standard deviation scores below 1. Nonambulatory cattle identification, and transportation held the highest standard deviation scores above 1; nonambulatory cattle and transportation shared the lowest mean of 3.94.

Figure 5. Importance of BQA Program Components to Curriculum Design, Results

BQA Program Components	Minimum	Maximum	Mean	Std Deviation	Variance	Count
Vaccine and drug practices	2.00	5.00	4.65	0.70	0.49	31
Livestock feeds and the feed supply	2.00	5.00	4.16	0.92	0.84	31
Impact of management practices on carcass quality	2.00	5.00	4.29	0.89	0.79	31
Quality assurance of market cows and bulls	2.00	5.00	4.32	0.86	0.73	31
Cattle care: Handling and facilities	2.00	5.00	4.71	0.63	0.40	31
Transportation	1.00	5.00	3.94	1.05	1.09	31
Biosecurity	2.00	5.00	4.29	0.85	0.72	31
Nonambulatory cattle	1.00	5.00	3.94	1.13	1.29	31
Cattle identification	1.00	5.00	4.10	1.06	1.12	31
Record keeping	2.00	5.00	4.48	0.71	0.51	31

Participants were asked to select how often hands-on learning activities were used to teach BQA, using a scale of 1 to 5, with 1 indicating never and 5 always. Nine respondents indicated they used hands-on learning activities about half the time, eight

always, six most of the time, five sometimes, and two individuals indicated never. Twenty-four of out of 31 participants selected that they have access to a farm near the school for chute-side training. Three of the respondents have a farm on site and the same amount did not have access to a farm for chute-side training. One respondent was not sure.

When asked to share a favorite BQA hands-on learning activity, most respondents, or ten, mentioned the chute-side training component and eight mentioned vaccination injection practices on fruit and/or chicken thighs. Two participants mentioned cattle handling and flight zones. Other favorite activities include raising calves for three months and seeing improvements in student with communication issues in the hands-on portion.

EQ 5: What factors in the BQA program curriculum can be improved to better reach and engage high school agriculture students?

Teachers were asked to rate BQA content appropriateness for students in their animal science courses on a scale of 1 to 5 with 1 being extremely inappropriate and 5 being extremely appropriate. Nineteen out of 31 respondents rated BQA content 5, extremely appropriate. The remaining 12 rated somewhat appropriate. Participants were also asked to describe their students' level of engagement with the BQA training they provide, with 1 as not at all engaged and 5 extremely engaged. Most teachers, or 18 described students as somewhat engaged followed by 11 indicating extremely engaged. One respondent rated 3, or a neural response. Most survey participants, or 17 described their relationship with county Extension agents as collaborators. Ten have a working relationship as resource, three had no relationship, and one claimed other.

Teachers were asked about the biggest barriers or difficulties they imagine when implementing the BQA program. Most of the responses were centered on the chute-side component of the certification program, particularly training chute-side, access to a farm, time to schedule, and safety. Other responses included student interest and engagement, relating it to all courses, cost of manuals and certification, scheduling time with an Extension agent, "getting students to realize the importance of the beef industry being consumer driven," access to resources, and support from parents. One respondent shared,

> My biggest concern is the sustainability of the program. I have heard rumors that the BQA program may not be continued to be offered as a certification. My students, even though they are not traditional cattle farmers, absolutely benefit from learning about the industry and this opens their eyes to livestock production as a viable career field. This program is an essential part of my program and losing it would cripple our long-term goals.

Phone Interview Results

Eighteen online survey participants volunteered to participate in the phone interview portion of the survey. All 18 volunteers were contacted, and ten phone interviews were scheduled and conducted. A total of 77 codes were drawn from the qualitative data collected and categorized. Themes were then developed within five categories: Material and Course Selection, Resources Used, BQA Use, Student Engagement, and Teacher and Student Challenges.

Material and course selection

When asked about the process of deciding on animal science materials, there was a range of responses. Participant 6 shared, "I keep up with the market needs… finding out

what's new and relevant." Participant 10 said, "It depends on the topic." Participants 3, 7, and 8 explained they chose courses applicable to students. Eight of ten respondents shared that they select courses and materials based on meeting competency requirements. Participant 5 explained, "We're guided by the competencies of the Department of Education for our courses. All CTE have competencies associated with them that were developed by the Department of Education and Committee of Ag Teachers… there are recommendations in them." Participant 4 shared, "I'm using those competencies as a checklist." Specific CTE courses and Virginia's Educational Resource System Online (VERSO) course numbers mentioned were Introduction to Animal Systems (8008), Veterinary Science (8088), Biological Applications in Agriculture (8086), Animal Production, and Agricultural Production Technology (8010).

Teachers were also asked if they offer the BQA program separately or in conjunction with extracurricular activities they advise. Six respondents mentioned they use the program in conjunction with classroom and extracurricular activities to meet requirements for the student cattle-working contest, while others simply explained they primarily teach in class. Participant 1 shared,

> Anything extracurricular we do is primarily 4-H. Because that's voluntary, I can't really make that mandatory for any student; whereas BQA is mandatory in this class this year.

Others also shared that BQA was mandatory and used as the primary certification in their class.

Resources used

Internet resources

The most popular Internet sites visited to receive materials for an animal science curriculum were university cooperative Extension websites. Seven participants mentioned the Virginia Cooperative Extension website was used; other university websites named were Oklahoma State University, Kansas State, University of Kentucky, University of Georgia, and University of Maryland. The National BQA website was used by two participants. Teachers also search government websites like United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), National Agricultural Statistic Service (NASS), and Virginia Department of Agriculture and Consumer Services (VDACS). Other responses included communities of practices such as a Facebook group for agriculture teachers, local businesses and veterinary clinic webpages, the North American Veterinary Technician website, Drovers Cattle Network, Hoard Dairyman, American Kennel Club, and American Veterinary Medical Association (AVMA). Finally Participant 2 highlighted the use of VERSO "because [I] have to keep it aligned with the state curriculum."

Textbook resources

When asked about preferred animal science textbooks, there were varying responses. Participant 2 shared,

> I don't use just one textbook. I use a myriad of resources that [using just] one textbook is ridiculous. I do use the BQA manual quite extensively as a resource and as a textbook, particularly as they're studying for BQA.

The most popular textbooks were Modern Livestock and Poultry Production (four respondents), Intro to AgriScience (three respondents), and Introduction to Livestock

Management (three respondents). Additional textbooks included multiple vet science books and Small Animal Care. Six respondents preferred not to use textbooks. Participant 1 explained, "Honestly the textbooks are great, but they are so quickly proceeded by all the new online publications that come out and that are easily accessible."

BQA use

Integrating the BQA program into the animal science curriculum

When asked to walk the researcher through the step-by-step process of preparing BQA lessons and length of time to teach, most teachers explained they are integrating the BQA program into their existing curriculum. They tend to break up components of the program throughout the length of time it takes to teach a related course. Participant 2 called BQA "the highlight of the year." Participant 1 said, "It just brings to light the cattle management section of the curriculum." Participant 2 also explained how the BQA program was integrated into their full curriculum;

> Our vision was, when it came to Animal Systems class, this [BQA] is what your class is structured off of. It became the backbone of your class. Every competency related to BQA, it got integrated in. Now with Vet Science, what we did because it was a little more loosely tied, we supplemented it into the curriculum at different points.

Other specific processes mentioned were discovering that BQA qualifies as a CTE certificate, teaching the components of the program by either highlighting them in their regular courses or using BQA materials such as the BQA manual and online learning modules. Six participants also mentioned they collaborate with their Extension agent. Five of these respondents shared their Extension agent played a large role in conducting the training either in class, the chute-side component, or both. Respondents mentioned

that integrating the BQA program into the curriculum was easy. Participant 1 commented,

> Honestly, it [BQA program] was probably one of the easiest new implementations because of [Extension agent]…She's very dedicated to working with us and the kids love her…The tests were sent and the results were back within a week or less, which is incredible.

Participant 3 explained, "It's a very simple crossover and it's very easy to include it in the curriculum." Participant 6 added, "These classes have been a breeze really; these units have because it seems like the kids get it. It's probably one of the more simple content areas that I teach during the semester."

The producer BQA program is used

When asked if teachers are using the producer BQA curriculum or YMQA curriculum, all teachers expressed they are using either the producer BQA curriculum provided or their modifications of a producer BQA curriculum when teaching CTE courses. Participant 7 explains,

> I've been through both trainings, but I guess I lean more to the producer version because if they're going to be using it, chances are they are going to be working for somebody or they're going to be using it themselves.

Participant 8 also shared,

> Last semester was the first time I've ever done it [taught the BQA program] and a lot of those kids didn't realize that in being certified, you can get a better price for your animals. I'll look for some of them [students] to use it in their adult life.

Tailor objectives to lessons

Teachers were asked to explain how they tailor the state BQA objectives to their lessons. Many respondents believed the BQA objectives "fit hand in hand" with their lessons. Participant 2 shared, "Whenever we list our objectives for the day, we have a BQA objective stated and we pull it in as we go." Participant 10 provided an example using an objective with Vet Science students.

> This is the correct way to give an injection. This is the correct way to mix vaccines so they kind of go hand in hand for both sides for me on that. Yes, you need to know it as a consumer, producer, but you also need to know it in the veterinary world of how to do these things correctly.

Modification to BQA program

When asked about modifications to the BQA program, five respondents claimed they did not make modifications. However, in sharing other procedural responses, many hinted at a few modifications such as creating practice tests, worksheets, using other university videos, and assigning student projects. Participant 1 shared, "We just made our own talks; our own presentations, and they just loved doing it." Participant 2 and 5 explained modifications were needed for low academic students or English language learning; "When you work with your special needs staff, they can help you to come up with different ways to structure your test." Participant 3 based modifications by student needs and material comprehension. Those behind the lesson were asked to conduct their own research and do inquiry-based learning to understand. Participant 4 shared, "if anything, I'm going more in-depth in certain areas." Participant 6 said, "I guess we are modifying it in the sense that we discuss it, we go out, and I think that's really important for the students to see firsthand what's being talked about through these units."

Participants 7, 8, and 10 take a similar approach to 6, in that the teacher interjects parts of BQA objectives into the regular lesson. Participant 9 was not aware of the specific BQA objectives, however made a modification in creating a quiz for each chapter. Participant 10 also makes review questions directly from the BQA handbook and modules.

Recertification

In general, most teachers explained BQA material is taught to students in grades 9 through 12. They claimed they did not offer recertification because "we are a 1 year program only… they don't really have enough room in our schedule," (Participant 1); "it was my first year [teaching the program]," (Participant 8); "it is more of a cost thing," (Participant 9); and "they're usually out of school by the time they need to recertify," (Participant 6).

Student engagement

To better inform EQs 4 and 5, open-ended questions were asked about student engagement. The most engaging activities shared were hands-on activities, particularly chute-side training and vaccination injection practices. Participant 1 shared, "Honestly in this particular section of the curriculum, that [BQA chute-side training] is the only hands-on mandatory experience that the students in this particular class have." Participant 7 added, "It [chute-side] is the most engaging part. They [students] take what they learn and apply it. And for a lot of them, that's the only field trip certain schools will allow them to actually implement what they learn." Participant 8 added, "I also think the chute-side is most engaging because they [students] all get involved." Participant 10 shared, "I love doing the chute-side with them because that kind of brings it all [program components] together." Participant 2 said the most engaging part was, "once we start practicing giving shots. It excites them because we do everything from giving shots to bananas to

practicing on chicken thighs. That to them is really cool." Lastly, teachers claimed open discussion created opportunities for student engagement. Participant 8 shared the "Extension agent usually adds in his past experiences and the farmer will talk to them about the importance of that program to their individual farm."

Teacher and student challenges

Teachers revealed challenges they and students face with the current program. Scheduling time was one of the greatest challenges expressed. Participant 4 explained, "It is the off-site [chute-side training] scheduling that can probably be the biggest hindrance in the certification." Others revealed "simply fitting it in to a very crowded schedule for the school year" (Participant 5) and "finding the time with our Extension agent to do the chute-side certification" (Participant 6). More teachers expressed they need time in advance to implement program changes. Participant 1 said, "If there were a change it would be helpful if the change were brought out at least 6 months ahead of time to a teacher." Participant 2 added,

> We need to know that fully ahead of time to get prepared for it… We have to put in our funding requests now. We have to put in our fieldtrip requests in September for March. To tell us that they're going to make changes, and not tell us until November and December, that will kill a program in a heartbeat.

Cost of tests and materials were another challenge. Participant 2 found ways to overcome this obstacle, stating, "One of the things I've been able to do is write to some of the organizations and get things that are expired, like the *Ralgro* implants [for hands-on demonstration]." Communication was another challenge. Participant 2 expressed,

> Probably the biggest thing is not always knowing who to talk to because of simple attrition at the state level…it would be nice if we could know exactly who, what, where, when, and why and it got sent out more often.

Participant 4 said, "Just open communication on how students are getting the state certification and how they want that done- who needs to be doing the training, and things like that." Participant 9 added a suggestion for feedback saying, "I would love to have some feedback. Now I know we can't see the results, but I'd love to know at least what area my students aren't doing well in." School administration approvals also presented another obstacle. Participant 8 explained, "My biggest obstacle is getting approval [from superintendent] to do chute-side training." Participant 7 added,

> For me, it [the obstacle] was just administration to understanding what the kids actually have to do and how different it was…luckily. I mean, I have an administration that's willing to talk and understand and [be] open to new ideas.

Finally, Participant 9 made a suggestion about teacher BQA recertification; "We could try to do a recertification during FFA state convention while the majority of the teachers are in Blacksburg. That might be beneficial."

For students, teachers shared other challenges. Participant 2 shared, "initial vocabulary [was a challenge] because they have zero farm related experience." Others added to points about students not having non-production backgrounds. Participant 4 added, "They haven't handled a lot of cattle. They don't have that experience. I would say three-quarter of them are starting from scratch." The chute-side component was expressed as the most challenging component for students; however, teachers voiced how beneficial this component was at the same time. Participant 7 shared,

> So even though it's [chute-side training is] most challenging, I would in no way take it out of it [BQA program]. I also think it's the best part of it because so many of them have never even been to a farm; or nonetheless, given an animal a shot, or even worked cattle- been up close.

Teachers offered a number of suggestions from the challenges they faced with materials. Participant 7 suggested printing materials like a teacher's manual and student lab book and lesson plans on modules. Others requested updated online BQA learning modules. Participant 6 said,

> I would like to see it modeled more like the K-State [Kansas State] program where the modules are then followed by the test at the end of each module, where the students can work right through it on their own at their own pace.

Participant 1 shared,

> If you wanted to draw more students and just get them excited quicker, update that [online BQA learning modules] presentation. The students were simply not excited… And it just looked really old- not something that Virginia Tech would normally put out.

Participant 2 suggested, "Look at what's online right now as far as the video modules and look at what's online from nationals and see if they could upgrade it."

Mixed Methods Analysis

Using the explanatory sequential design, a quantitative online survey and qualitative data phone interviews gathered results in phases to understand teacher use of the BQA program in the Virginia secondary agriculture curriculum. Strands were developed within each evaluation question to connect and interpret results. In evaluation question 1, the online survey responses suggested there was strong awareness of the BQA

certification program and familiarity with training components. However, more in-depth evidence was needed to inform the remaining evaluation questions related to teacher selection of animal science materials, use of the BQA program the secondary agriculture curriculum, useful components for teaching high school students, and improvement factors to better reach and engage high school agriculture students.

Teacher selection of animal science materials

In the online survey, teachers were asked about sources to gain material for animal science courses, frequency new material is searched, and likelihood of integrating the BQA program into the curriculum. Teachers selected Internet and textbooks as the most popular sources, and most respondents shared new material was searched weekly. Teachers selected it was extremely likely they would integrate the program into their curriculum. The researcher asked phone interview questions to better understand the specific resources used, the process of deciding on animal science materials, details of BQA offering with extracurricular activities, and help needed to further improve the BQA program in the secondary agriculture curriculum. Phone interview participants explained Cooperative Extension websites were the most popular Internet source and CTE curriculum textbooks were the most referenced text. Some teachers expressed their contentment with the program, while others suggested needs for improved online learning modules, test feedback, and resources like a teacher's manual and student lab book.

Use of the BQA program in the secondary agriculture education curriculum

The online survey asked questions related to how the BQA program is offered, how students use their certification, instruction methods used, and main contact for technical BQA questions and training. It was discovered that most teachers offer the full program for certification credits; students use the certification for a graduation

requirement; chute-side training and in-class lecture are the most popular instruction methods; and the Extension agent is the main contact for the program. Using the phone interview instrument, the researcher sought to understand the process of preparing BQA lessons, whether the BQA producer or YMQA curriculum was used, length of time to teach BQA lessons, how BQA objectives are tailored, and modifications to the BQA program curriculum. Participants explained the BQA curriculum is taught following the CTE state competencies using classroom and chute-side instruction. Most of the teachers described that the BQA program components tie nicely with the CTE course competencies and are integrated throughout the year or semester. While some teachers claimed they did not modify the program, many shared tools (worksheets, practice tests, quizzes, etc.) created, added activities to better improve comprehension of material, addressed special education student needs, and allowed time for meaningful class discussion.

Useful components for teaching high school students

In the online survey, teachers were asked Likert scale questions to identify the usefulness of BQA training materials, importance of BQA program components, and frequency hands-on activities were used. Ratings determined that the most useful training and materials were the chute-side training and BQA online learning modules. The most important components were cattle care, vaccine and drug practices, and record keeping. The majority of respondents shared hands-on learning activities were used more than half the time. While the online survey data suggested hands-on, chute-side and vaccine practices, were the most useful, further explanation was needed to interpret how. Teachers were asked to share the most challenging components to their high school students, most engagement component, and grade level taught. Teachers shared that the

hands-on activities, such as chute-side were most challenging, yet most engaging. Students were taught BQA concepts in grades 9 through 12 and no recertification was offered.

Improvement factors to better reach and engage high school agriculture students

In the online survey, teachers were asked to rate BQA content appropriateness for students, students' level of engagement with BQA training, working relationship with Extension agent, and barriers when implementing the program. Results indicated the BQA program is extremely appropriate for high school students, students were somewhat or extremely engaged, Extension agents are viewed as collaborators, and the biggest barriers are chute-side training, access to off-site facilities, time, importance of the industry being consumer driven, and relating to all courses. Follow-up phone interviews were needed in further understand teacher suggested changes and to allow teachers to further elaborate on obstacles. It was discovered that some of the same challenges were reiterated. Chute-side scheduling was the largest obstacle. Time, cost, administration, and communication were other factors mentioned. The studies also suggest since many of the students are from non-production backgrounds, engagement can be increased by improving initial vocabulary and updating online learning modules.

Conclusions and Implications

The purpose of this mixed methods sequential study was to investigate the use of the program among high school agriculture teachers in the Virginia curriculum. The evaluator wanted to gain insights from teachers about their awareness of the BQA program, use of the program in their agriculture curriculum, resource preferences to use with the program, and student BQA certification practices. Five evaluation questions served as the backbone to inquiry that took place in two instrument explanatory

sequential mixed method design phases: quantitative online survey and qualitative phone interview phases. Together, both instruments were used to explain results and better inform evaluation questions.

In summary, analysis determined that many teachers rely on the BQA program and examination as the primary graduation certification requirement for their students. In general, the most important component to the program is chute-site training, as it adds a hands-on piece that ties many concepts together. Teachers select animal science materials based on CTE competencies and state requirements. Resource preferences are mainly Extension websites, government websites, and textbooks aligned with the curriculum. Teachers are integrating the BQA program into their CTE courses and making a number of modifications to enhance the students' engagement and learning experience. Extension agents add to the high school program by being the primary technical support contact and engage students in discussion. Students are most engaged in hands-on learning activities like the chute-side component and injection practices. The most challenging components of the program are scheduling time for the chute-side component, overcoming student learning curves in non-traditional programs, and adversity from school administration.

This research implies that the BQA certification program fits nicely into a secondary agriculture education setting. The teachers like the program, the students enjoy hands-on learning, and a network is built between cooperative Extension educators, teachers, and students. The program as a whole increases knowledge of best management practices, increases awareness of the BQA program, and enables youth to graduate with a certification. By offering the BQA certification program to high school students, there is

an opportunity for increased trust and confidence in the beef industry, whether students choose to apply concepts on a farm or as consumers.

Recommendations

It is recommended that the BQA program stakeholders advocate the continuation of the BQA program as part of the CTE graduation certification examination offering. Eliminating the BQA certification at the secondary education level would be against teacher and student interests. The secondary agriculture education community, Extension educators, Department of Education, CTE advisors, and school administrators need to work together "around the planning table" as Cervero and Wilson (2006) suggest. Including more secondary education individuals will ensure proper alignment with competencies, communication at various levels, and ultimately lead to an improved program with realistic outcomes. Additionally, further teacher and stakeholder collaboration may generate higher quality resources and lesson plans that are applicable to a secondary agriculture education audience.

Teachers are encouraged to explore communication platforms beyond in-person conferences, such as virtual meetings, community of practice chat rooms, Facebook pages, etc. to share successes, challenges, and new ideas related to BQA. If these platforms do not exist for Virginia agriculture teachers, the Virginia Association of Agriculture Educators is advised to organize and facilitate this communication. The Virginia Agriculture Education Teacher Directory should be updated to include subject areas taught by each teacher throughout the state. This small detail can aid teachers in identifying other colleagues that share similar course offerings, encourage collaboration, help onboarding new teachers, encourage mentorship, and spread knowledge and resources throughout the state. It is recommended that teachers continuously explore and

apply for university and CTE grants to gain financial support for animal science programs. Grant monies can be used to fund mobile chutes for chute-side training, hands-on teaching materials, and other tools and resources to enrich the program.

It is recommended that Extension educators, producers, and teachers leverage their network to build sustainable regional programs. Extension educators need to identify opportunities among teachers and producers in the community and be prepared as the technical expert in the BQA certification program. The university is advised to offer more convenient BQA train-the-trainer and recertification opportunities for Extension educators to develop a strong BQA support team across the state.

Finally, the quality of the Virginia BQA program can be enhanced through the availability of resources and learning materials. The online lecture series are used but fall short to other state resources. An update of these modules will help teachers add to their classroom training and help independent learners better understand best management practices. It is also recommended that state BQA program leaders improve the content and outside links available on the Virginia Tech program website for a clear understanding of the program and its components. For future research, it is recommended to explore teacher concerns with cost of the BQA program and use of the BQA certification program in other state secondary agriculture curriculums.

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Appendices

Appendix I. Consent Email

Hello Teachers,
You are invited to participate in an online survey about the use of the Beef Quality Assurance (BQA) certification program as a part of the Virginia high school agriculture curriculum.

The purpose of the online survey is to gain insights from teachers about their awareness of the BQA program, use of it in their agriculture curriculum, resource preferences to use with the program, and student BQA certification practices.

The results of the survey will be analyzed in a graduate research project in collaboration with Virginia Tech Agriculture Leadership and Community Education (ALCE) and Animal Science departments within the College of Agriculture and Life Sciences (CALS). We intend to share results with Dr. Scott Greiner on the Beef Quality Assurance (BQA) leadership team and VTechWorks, a university open access institutional repository that publicizes and preserves Virginia Tech scholarly work. We will also provide our results with the secondary agricultural education community.

There are no risks associated with your participation in this survey. Your participation is voluntary and confidential. Those who choose to participate in a follow-up phone interview will have their information stored privately and securely with the researcher. No teacher names or names of school programs will be included in the results materials.

It is important for you to know that you are free to withdraw from this study at any time without penalty. There will be no penalty for choosing not to answer any questions.

Should you agree to participate, the online survey will take an estimated 7 to 10 minutes. Please allow time to complete this survey in one sitting.

Should you have any questions about this survey or the results, you may contact the researchers, Sarah Farley, sarahlf5@vt.edu or Donna Westfall-Rudd, PhD., mooredm@vt.edu. Additionally, should you have any questions or concerns about the study's conduct or your rights as a research subject, or need to report a research-related injury or event, you may contact the VT IRB Chair, Dr. David M. Moore at moored@vt.edu or (540) 231-4991.

Thank you for your time and participation.

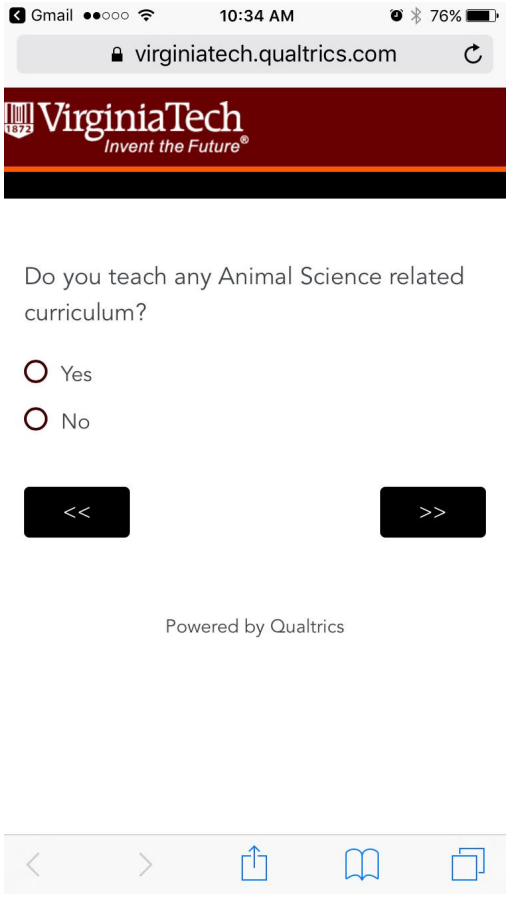
Click "Take Survey"(insert hyperlink) to open and begin the survey. You may also choose to copy and paste the link below into your browser.
https://virginiatech.qualtrics.com/SE/?SID=SV_9H3acmsgvl3WnDT

Sincerely,
Sarah Farley
Graduate Researcher and M.S. Agriculture and Life Sciences Candidate

Appendix II. Online Survey Look and Feel

A. Internet Browser View

B. Mobile View



Appendix III: Beef Quality Assurance Online Survey with Skip Logic

Thank you for your interest to participate in this online survey on the Beef Quality Assurance (BQA) certification program in the Virginia high school Agriculture curriculum.

The purpose of the online survey is to gain teacher insights on the BQA program awareness, use in their agriculture curriculum, resource preferences, and student certification practice. Approximately 300 adult Virginia Agriculture teachers were specifically selected to participate in the survey.

The results of the survey will be analyzed in a graduate research in collaboration with Virginia Tech Agriculture Leadership and Community Education (ALCE) and Animal Science departments within the College of Agriculture and Life Sciences (CALS). We intend to share results with Dr. Scott Greiner on the Beef Quality Assurance (BQA) leadership team and VTechWorks, a university open access institutional repository that publicizes and preserves Virginia Tech scholarly work.

There are no risks associated with your participation in this survey. Your participation is voluntary and confidential. Those who choose to participate in a follow-up phone interview will have their information stored privately and securely with the researcher.

It is important for you to know that you are free to withdraw from this study at any time without penalty. You are free not to answer any questions that you choose or respond to what is being asked of you without penalty. Please note that there may be circumstances under which the investigator may determine that a subject should not continue as a subject.

Should you agree to participate, the online survey will take an estimated 7 to 10 minutes. Please allow time to complete this survey in one sitting.

Should you have any questions about this survey or the results, you may contact the researchers, Sarah Farley, sarahlf5@vt.edu or Donna Westfall-Rudd, PhD., mooredm@vt.edu. Additionally, should you have any questions or concerns about the study's conduct or your rights as a research subject, or need to report a research-related injury or event, you may contact the VT IRB Chair, Dr. David M. Moore at moored@vt.edu or (540) 231-4991.

Thank you for your time and participation.

Q34 By clicking "Agree" you give your consent to have responses used in the research study as described.

- ❍ Agree (1)
- ❍ Do not agree (2)

Condition: Do not agree Is Selected. Skip To: End of Survey.

Q26 Are you currently an Agriculture teacher?
- Yes (1)
- No (2)

Q28 Do you teach any animal science related curriculum?
- Yes (1)
- No (2)

Q27 What grade level do you teach?
- Elementary School (1)
- Middle School (2)
- High School (3)
- College (4)

Q7 What source do you use most often to gather material for your animal science courses?
- Internet (1)
- VACTA Resource Center (2)
- Teachers (3)
- Extension Agents (4)
- None (5)
- Other (6) _____

Condition: None Is Selected. Skip To: Have you ever read about or heard of ....

Q8 How frequently do you search for new animal science materials and content?
- Daily (1)
- Weekly (2)
- Monthly (3)
- Quarterly (4)
- Annually (5)
- Never (6)

Q1 Have you ever read about or heard of the Virginia Beef Quality Assurance (BQA) program?
- Yes (1)
- No (2)

Condition: Yes Is Selected. Skip To: How did you learn about the Virginia ....Condition: No Is Selected. Skip To: How important are the following Beef ....

Q2 How did you learn about the Virginia Beef Quality Assurance (BQA) program?

- ❍ Another Teacher (1)
- ❍ Extension Agent (2)
- ❍ Program Website (3)
- ❍ University Email (4)
- ❍ Mail (5)
- ❍ Other (6) _____

Q5 Select the response that best describes how FAMILIAR you are of the following training components of the Virginia Beef Quality Assurance (BQA) program. (0-5) 0= not at all familiar, 5= extremely familiar

	Not at all familiar (1)	Somewhat familiar (2)	Neither familiar nor unfamiliar (3)	Very Familar (4)	Extremely familiar (5)
BQA Manual (1)	❍	❍	❍	❍	❍
BQA Online Modules Lecture Series (2)	❍	❍	❍	❍	❍
BQA Classroom Lecture Series (3)	❍	❍	❍	❍	❍
BQA CD-Rom Lecture Series (4)	❍	❍	❍	❍	❍
Chute-Side Training (5)	❍	❍	❍	❍	❍
Recertification Learning Modules (6)	❍	❍	❍	❍	❍
BQA Train-the-Trainer (7)	❍	❍	❍	❍	❍
BQA Producer Agreement (8)	❍	❍	❍	❍	❍

Q11 How are you offering Beef Quality Assurance (BQA) training to your students?

- ❍ Do NOT offer any BQA program training (3)
- ❍ Full program for certification credits (1)
- ❍ Parts of the program to meet core requirements (2)
- ❍ Other (4) _____

Condition: Do NOT offer any BQA progra... Is Selected. Skip To: How important are the following Beef ....

Q13 What instruction methods and/or resources do you use for Beef Quality Assurance (BQA) training? You may select more than one response.

- ❑ BQA manual (1)
- ❑ Learning modules (online or CD-rom) (2)
- ❑ Chute-side training (3)
- ❑ In-class lecture (4)
- ❑ Guest speaker (5)
- ❑ Other (6) _____

Q15 How would you rate the usefulness of the training and/or training materials the Beef Quality Assurance (BQA) program offers? (0-5), 0=not at all useful, 5=extremely useful

	Not at all useful (1)	Slightly useful (2)	Moderately useful (3)	Very useful (4)	Extremely useful (5)
BQA Manual (1)	❍	❍	❍	❍	❍
BQA Online Modules Lecture Series (2)	❍	❍	❍	❍	❍
BQA Classroom Lecture Series (3)	❍	❍	❍	❍	❍
BQA CD-Rom Lecture Series (4)	❍	❍	❍	❍	❍
Chute-Side Training (5)	❍	❍	❍	❍	❍
Recertification Learning Modules (6)	❍	❍	❍	❍	❍
BQA Train-the-Trainer (7)	❍	❍	❍	❍	❍

Q16 How important are the following Beef Quality Assurance (BQA) program components to your curriculum design? (0-5) 0=not at all important, 5=extremely important

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
Vaccine and drug practices (1)	❍	❍	❍	❍	❍
Livestock feeds and the feed supply (2)	❍	❍	❍	❍	❍
Impact of management practices on carcass quality (3)	❍	❍	❍	❍	❍
Quality assurance of market cows and bulls (4)	❍	❍	❍	❍	❍
Cattle care: Handling and facilities (5)	❍	❍	❍	❍	❍
Transportation (6)	❍	❍	❍	❍	❍
Biosecurity (7)	❍	❍	❍	❍	❍
Nonambulatory cattle (8)	❍	❍	❍	❍	❍
Cattle identification (9)	❍	❍	❍	❍	❍
Record keeping (10)	❍	❍	❍	❍	❍

Q9 The Beef Quality Assurance (BQA) Program is a key educational and certification program designed to ensure that beef and dairy cattle are produced and managed responsibly, resulting in consumer satisfaction of a safe and wholesome beef product.

The objectives of the Virginia BQA program are the following:

- Set production standards that can be met or exceeded
- Establish systems for data retention and record keeping
- Provide hands-on training and education for participants
- Provide technical on-site assistance through the Virginia Cattlemen's Association, Virginia Beef Industry Council, BQA-certified veterinarians, and BQA-certified Extension agents if desired
- Ensure that all sectors of the industry take responsibility for the production of a safe food product through proper animal care, handling, and management practices

How likely is it that you will integrate the Beef Quality Assurance (BQA) program into your curriculum? (0-5), 0=extremely unlikely, 5=extremely likely

- ❍ Extremely unlikely (1)
- ❍ Somewhat unlikely (2)
- ❍ Neither likely nor unlikely (3)
- ❍ Somewhat likely (4)
- ❍ Extremely likely (5)

Condition: Extremely unlikely Is Selected. Skip To: Why is it unlikely that you will inte....Condition: Somewhat unlikely Is Selected. Skip To: Why is it unlikely that you will inte....Condition: Neither likely nor unlikely Is Selected. Skip To: Why is it unlikely that you will inte....

Q10 Why is it unlikely that you will integrate the Beef Quality Assurance (BQA) program into your curriculum?

Q19 How would you rate Beef Quality Assurance (BQA) content appropriateness for students in your animal science course(s)? (0-5), 0=extremely inappropriate, 5=extremely appropriate

- ❍ Extremely inappropriate (1)
- ❍ Somewhat inappropriate (2)
- ❍ Neither appropriate nor inappropriate (3)
- ❍ Somewhat appropriate (4)
- ❍ Extremely appropriate (5)

Q20 How would you describe your students' level of engagement with the Beef Quality Assurance (BQA) training you provide? (0-5), 0=not at all engaged, 5=extremely engaged

- Not at all engaged (1)
- Somewhat not engaged (2)
- Neither engaged nor not engaged (3)
- Somewhat engaged (4)
- Extremely engaged (5)

Q37 How many of your students are involved in Beef Quality Assurance (BQA)training outside of school?

- None (7)
- 1-3 students (1)
- 4-6 students (2)
- 7-9 students (3)
- 10+ students (4)
- Not sure (5)

Q17 How often are hands-on learning activities used to teach Beef Quality Assurance (BQA)? (0-5), 0=never 5=always

- Never (1)
- Sometimes (2)
- About half the time (3)
- Most of the time (4)
- Always (5)

Condition: Never Is Selected. Skip To: How do students use their Beef Qualit....

Q36 Please share your favorite hands-on learning activity below.

Q12 How do students use their Beef Quality Assurance (BQA) certification?

- Home farm (1)
- Graduation Requirement (2)
- Better informed consumer decision-making (3)
- Career aspirations (4)
- Do not use (5)

Q14 Who is your primary contact for technical BQA related questions and training?

- Extension agent (1)
- Virginia Tech faculty (2)
- Virginia Beef Council member (3)
- Virginia Cattlemens Association member (4)
- Other (5) _____

Q21 How would you describe your working relationship with your county Extension agent?

- ❍ Collaborators (1)
- ❍ Competitors (2)
- ❍ Resource (3)
- ❍ No Relationship (5)
- ❍ Other (4) _____

Q18 Do you have access to a farm on site or near the school for chute-side training?

- ❍ Yes, on site (1)
- ❍ Yes, near the school (2)
- ❍ No (3)
- ❍ Not sure (4)

Q22 What are the biggest barriers or difficulties you imagine when implementing the Beef Quality Assurance (BQA) program?

Q29 What college-level coursework in animal sciences have you completed?

- ❍ None (1)
- ❍ 1-5 Courses (2)
- ❍ 2 year degree (3)
- ❍ 4 year degree (4)
- ❍ Professional degree (5)
- ❍ Doctorate (6)

Q23 Please indicate:

- ❍ Male (1)
- ❍ Female (2)

Q24 What is your age?

- ❍ 18 - 24 (1)
- ❍ 25 - 34 (2)
- ❍ 35 - 44 (3)
- ❍ 45 - 54 (4)
- ❍ 55 - 64 (5)
- ❍ 65+ (6)

Q25 Please enter zip code. This information is used to ensure that each region of the state is represented in the survey.

Q30 Would you be willing to participate in a phone or WebEx interview?

- ❍ Yes, phone interview (1)
- ❍ Yes, WebEx interview (2)
- ❍ No (3)

Condition: No Is Selected. Skip To: End of Survey.

Q31 What is your name?

Q32 What is your phone number?

Q33 What is your email address?

Appendix IV. Phone Interview Script

Hello, This is Sarah Farley, Virginia Tech graduate student calling about our scheduled follow-up interview. How are you today? (Good, thank you.) As you know, the purpose of the online survey and follow-up interview is to gain insights from teachers about awareness of the BQA program, use of it in the agriculture curriculum, resource preferences to use with the program, and student BQA certification practices.

Today's interview will consist of 15 questions and will take approximately 15 minutes. In order to ensure quality and accuracy of responses, I will be taking notes and audio recording our call. May I have your permission to do so?

1. Tell me about your process of deciding on animal science materials for your curriculum.
2. Do you offer the BQA program separately or in conjunction with any other extracurricular activities you advise? If in conjunction, explain how.
3. What internet sites do visit most often to receive materials for you animal sciences curriculum?
4. What animal science textbook(s) do you prefer to use?
5. What help do you need to further improve BQA in your curriculum?
6. Walk me through your step-by-step process of preparing your BQA lesson(s).
7. Are you using the producer BQA curriculum or Youth Meat Quality Assurance (YMQA) curriculum? How are you implementing it?
8. How long does it take to teach BQA lesson(s) from start to finish?
9. How do you tailor the state BQA objectives to your lessons?
10. What modifications (if any) do you make to the BQA program curriculum? Why?
11. What component of the BQA program is most challenging for your high school students? Why?
12. What component of the BQA program is most engaging? How so?
13. What grade level do you teach a BQA curriculum? If there are students below senior level, do you offer BQA recertification?
14. If you could suggest a change to any aspect of the BQA program, what would it be? Why?
15. Describe the obstacle(s) have you've faced with the BQA program. How did you overcome them?

Thank you for your time and participation in both parts of this study on Beef Quality Assurance. We intend to share final results with Dr. Scott Greiner on the Beef Quality Assurance (BQA) leadership team and VTechWorks, a university open access institutional repository that publicizes and preserves Virginia Tech scholarly work. We will also provide our results with the secondary agricultural education community.

Thank you again. Have a great day!

Appendix V. Proposed Evaluation Timeline

November 10, 2016: Develop Evaluation Plan
November 30, 2016: Program Evaluator submits Evaluation Plan and survey draft to Graduate Committee for review
January 1, 2017: Program evaluator deadline to complete IRB training.
January 6, 2017: Graduate committee meeting – Evaluation Plan review
January 17, 2017 Advisor feedback and compilation of teacher contact information
January 23, 2017: Survey question administration into *Qualtrics*© database
February 10, 2017: Committee Evaluation Plan approval
February 13, 2017: Pilot survey
February 15, 2017: Submit documents for IRB approval
February 21, 2017: State Extension Specialist sends introduction email with online survey link
February 22, 2017: Online survey reminder 1
March 1, 2017: Online survey reminder 2 and end of survey time period
March 2, 2017: Online survey analysis
March 3, 2017: Submit phone interview questions amendment to IRB
March 3, 2017: Generate list of interviewees and coordinate interview times.
March 6-15, 2017: Conduct phone interviews
March 16-17, 2017: Code interview data
March 20, 2017: Data Analysis
April 3, 2017: Submit evaluation report to graduate committee for review
April 17, 2017: Present results to graduate committee
April 21, 2017: Submit project report to committee and graduate school
April 21, 2017: Send evaluation recommendations and project report to program stakeholders and decision makers.

Appendix VI. Actual Evaluation Timeline

November 10, 2016: Developed Evaluation Plan
November 30, 2016: Program Evaluator submitted Evaluation Plan and survey draft to Graduate Committee for review
January 1, 2017: Program evaluator deadline to complete IRB training.
January 6, 2017: Graduate committee meeting – Evaluation Plan reviewed
January 17, 2017 Advisor feedback and compilation of teacher contact information
January 23, 2017: Survey question administration into *Qualtrics*© database
February 10, 2017: Committee Evaluation Plan approval
February 22, 2017: Submitted documents for IRB approval
February 27, 2017: Pilot survey
March 3, 2017: IRB revisions submitted
March 6, 2017: IRB approval
March 11, 2017: Virginia Tech faculty member sends introduction email with online survey link
March 16, 2017: IRB amendment
March 22, 2017: Online survey reminder email 1
March 24, 2017: IRB amendment approval
March 30, 2017- Online survey reminder email 2
March 2, 2017: Online survey analysis
March 3, 2017: Submitted phone interview questions amendment to IRB
March 3, 2017: Generated list of interviewees and coordinated interview times.
March 6-15, 2017: Conducted phone interviews
March 16-17, 2017: Coded interview data
March 20, 2017: Quantitative data analysis
April 3, 2017: Online survey closed; data analysis
April 5, 2017: Submitted phone interview instrument questions to IRB
April 5, 2017: IRB approved phone interview instrument questions
April 5, 2017: Contacted phone interview volunteers to schedule phone interview
April 7-10, 2017: Conducted phone interviews and transcribed audio recordings
April 11-18, 2017: Qualitative data analysis
April 25, 2017: Submitted project report to advisor
April 26, 2017: Submitted project report to committee
May 3, 2017: Presented project to committee
May 3, 2017: Sent evaluation recommendations and project report to program stakeholders and decision makers.

Appendix VII. Crafting Phone Interview Question Using Explanatory Sequential Design

Evaluation Question	Survey Responses	Phone Interview Question
1. How aware are high school agriculture teachers of the BQA program (name, training materials, objectives) in Virginia?	· 100% aware of BQA · Most extremely familiar with chute-side training component	
2. How do high school agriculture teachers select animal sciences related materials for their curriculum?	· 61% use internet · 20% use other (textbooks, seminars, peer reviewed research) · 47% search for new material weekly · 77% extremely likely to integrate BQA, 16% somewhat likely	1. Tell me about your process of deciding on animal science materials for your curriculum. 2. Do you offer the BQA program separately or in conjunction with any other extracurricular activities you advise? If in conjunction, explain how. 3. What internet sites do visit most often to receive materials for you animal sciences curriculum? 4. What animal science textbook(s) do you prefer to use? 5. What help do you need to further improve BQA in your curriculum?
3. How are teachers using the current BQA program curriculum in a high school course?	· 75% use the full program for certification credits · 72% students use for certification credits · Materials/resources used- 93% chute-side training, 87% in class lecture, 77% BQA manual, 61% online/cd learning modules, 54% guest lecture, 12% other (videos, cattle management curriculum,	6. Walk me through your step-by-step process of preparing your BQA lesson(s). 7. Are you using the producer BQA curriculum or Youth Meat Quality Assurance (YMQA) curriculum? How are you implementing it? 8. How long does it take to

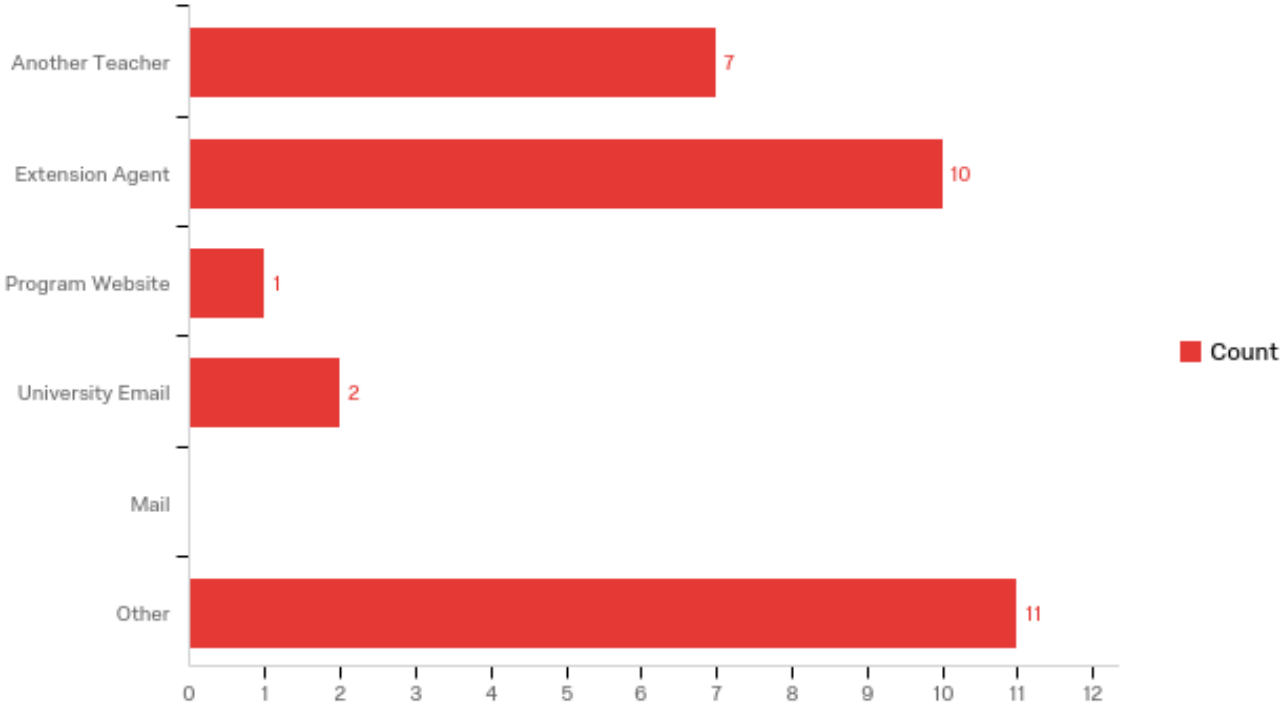
	work with agencies to offer BQA, VT CALS to create new lesson plan) · 80% stated Extension Agent is primary BQA technical contact	teach BQA lesson(s) from start to finish? 9. How do you tailor the state BQA objectives to your lessons? 10. What modifications (if any) do you make to the BQA program curriculum? Why?
4. What are the useful BQA components for teaching students in a high school agriculture course?	· 76% noted chute-side training as extremely useful, 44% online learning modules; NOT useful 40% CD rom and 12.5% train-the-trainer · 74% vaccine & drug practices, 74% cattle handling most important components · Hands-on learning is used 27% always, and 31% half the time · 80% have access to facilities near school	11. What component of the BQA program is most challenging for your high school students? Why? 12. What component of the BQA program is most engaging? How so? 13. What grade level do you teach a BQA curriculum? If there are students below senior level, do you offer BQA recertification?
5. What factors in the BQA program curriculum can be improved to better reach and engage high school agriculture students?	· 60% claim content is extremely appropriate for students, 38% somewhat appropriate · 58% somewhat engaged, 37% extremely engaged · 53% describe collaborative relationship with Extension Agent, 33% describe as resource · Barriers (open ended) are time, on farm chute-side, uninterested students, etc	14. If you could suggest a change to any aspect of the BQA program, what would it be? Why? 15. Describe the obstacle(s) have you've faced with the BQA program. How did you overcome them?

Appendix VIII: Online Survey Results
*Question Number Corresponds with Online Survey Instrument in Appendix III.

Q1 - Have you ever read about or heard of the Virginia Beef Quality Assurance (BQA) program?

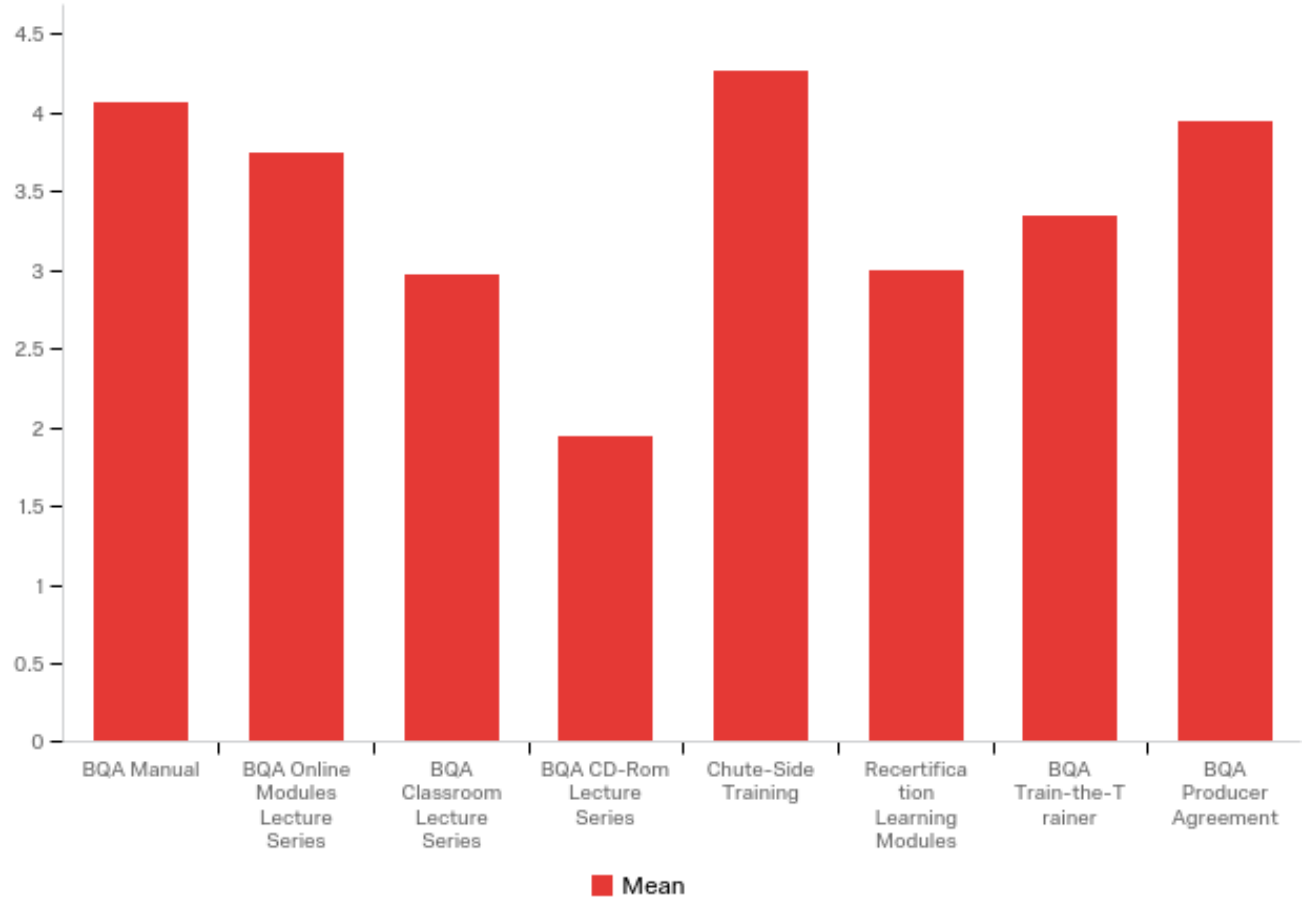
#	Answer	%	Count
1	Yes	100.00%	31
2	No	0.00%	0
	Total	100%	31

Q2 - How did you learn about the Virginia Beef Quality Assurance (BQA) program?



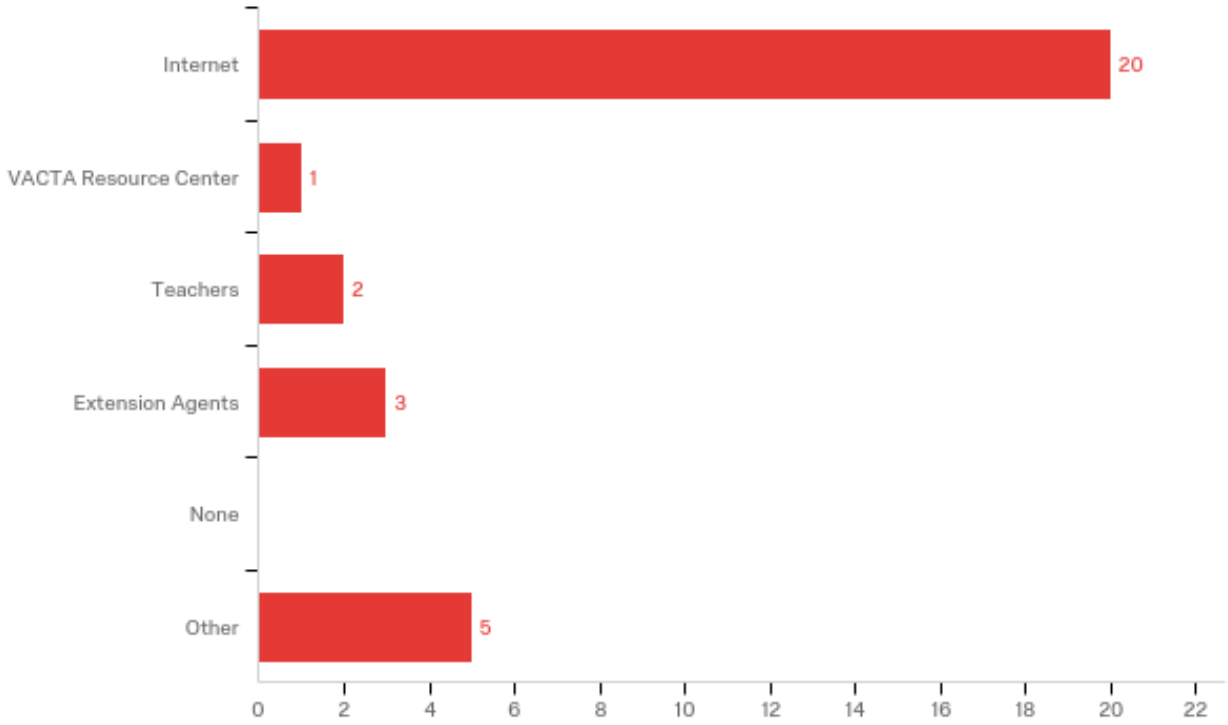
Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
How did you learn about the Virginia Beef Quality Assurance (BQA) program? - Selected Choice	1.00	6.00	3.35	2.09	4.36	31

Q5 - Select the response that best describes how FAMILIAR you are of the following training components of the Virginia Beef Quality Assurance (BQA) program. (1-5) 1= not at all familiar, 5= extremely familiar

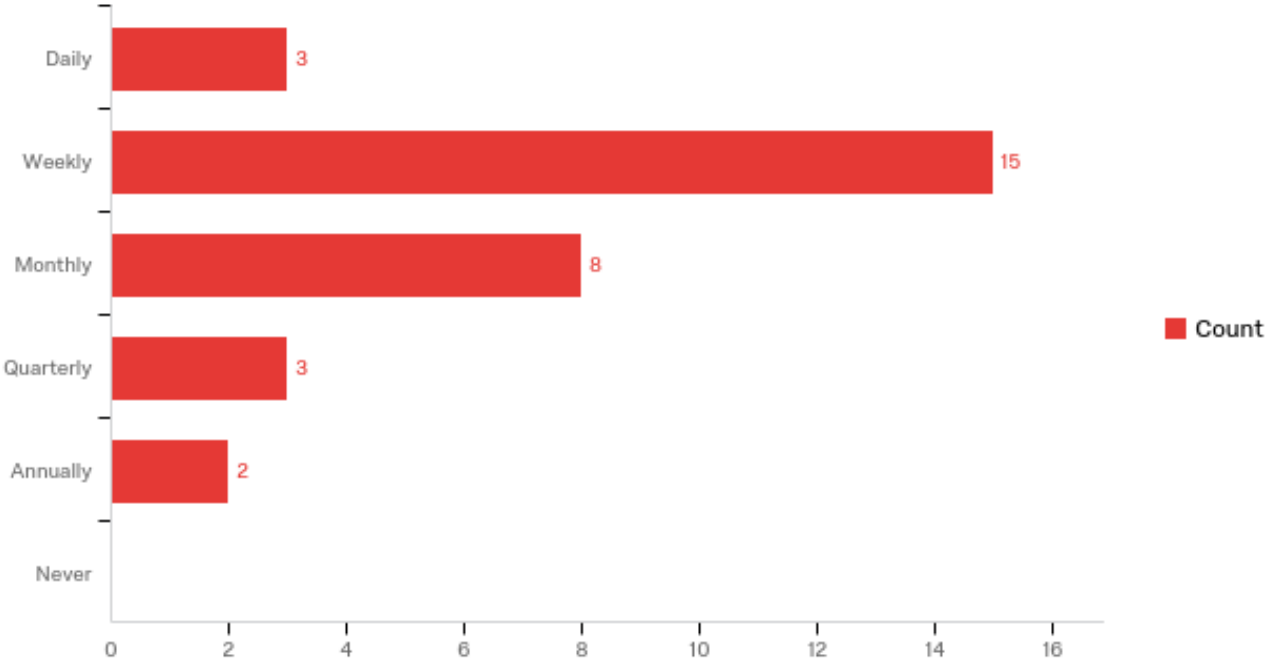


Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
BQA Manual	1.00	5.00	4.06	1.22	1.48	31
BQA Online Modules Lecture Series	1.00	5.00	3.74	1.54	2.39	31
BQA Classroom Lecture Series	1.00	5.00	2.97	1.60	2.55	31
BQA CD-Rom Lecture Series	1.00	5.00	1.94	1.44	2.06	31
Chute-Side Training	1.00	5.00	4.26	1.11	1.22	31
Recertification Learning Modules	1.00	5.00	3.00	1.57	2.47	30
BQA Train-the-Trainer	1.00	5.00	3.35	1.49	2.23	31
BQA Producer Agreement	1.00	5.00	3.94	1.32	1.74	31

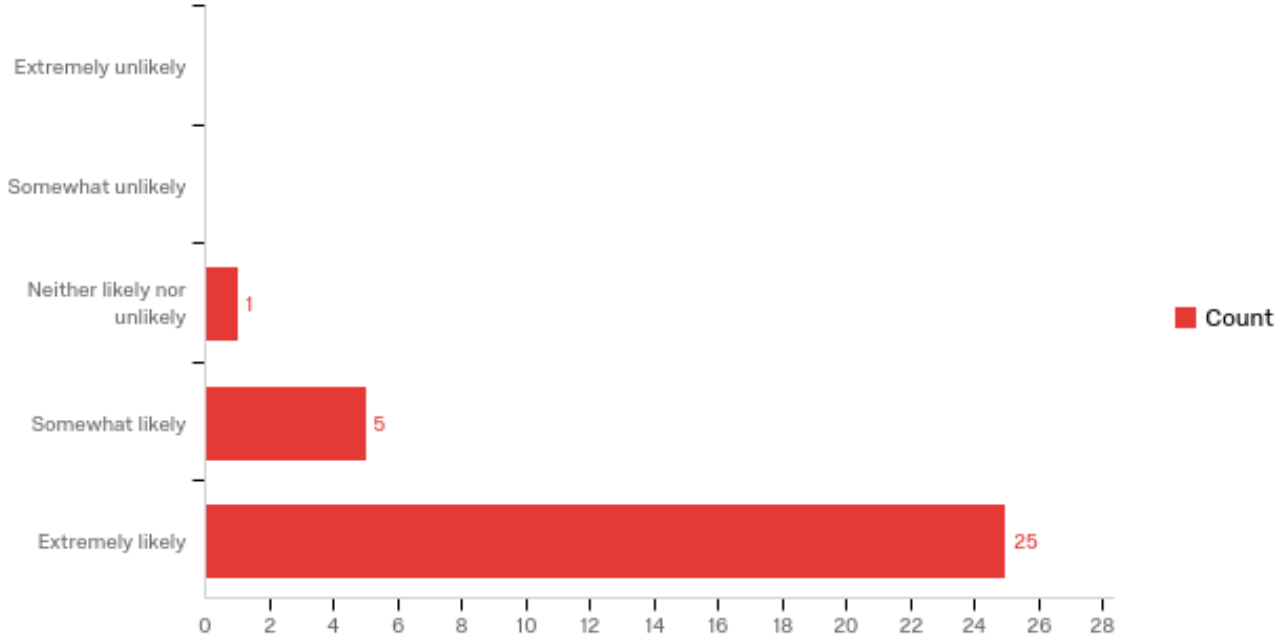
Q7 - What source do you use most often to gather material for your animal science courses?



Q8 - How frequently do you search for new animal science materials and content?

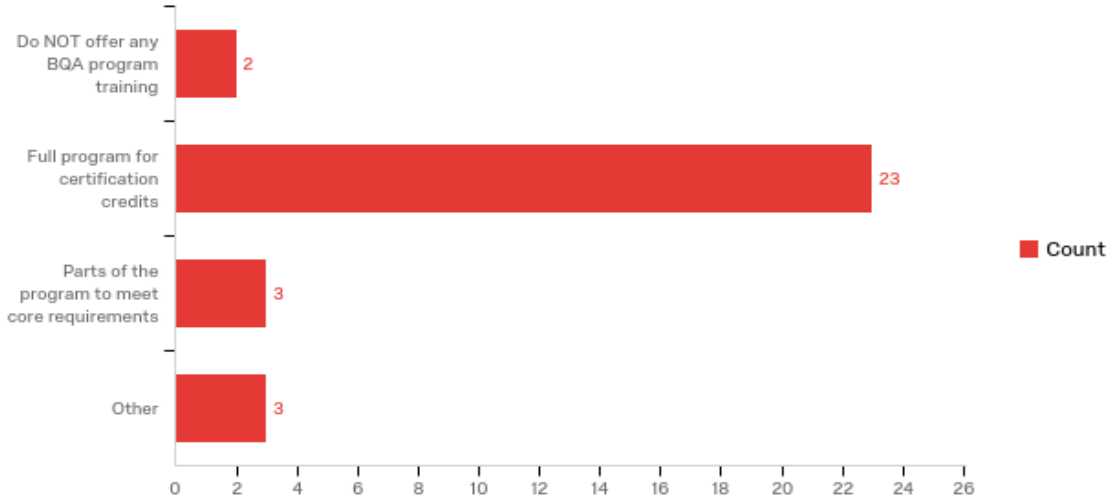


Q9 - How likely is it that you will integrate the Beef Quality Assurance (BQA) program into your curriculum? (1-5), 1=extremely unlikely, 5=extremely likely

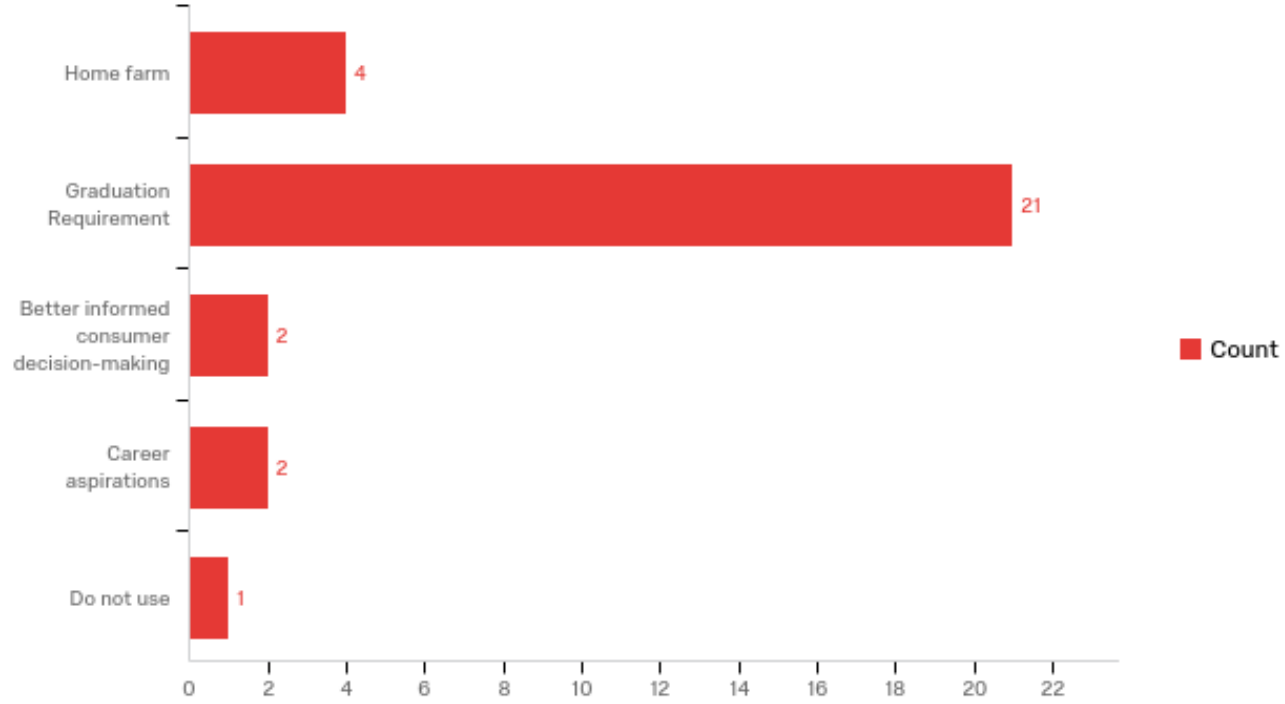


Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
How likely is it that you will integrate the Beef Quality Assurance (BQA) program into your curriculum? (1-5), 1=extremely unlikely, 5=extremely likely	3.00	5.00	4.77	0.49	0.24	31

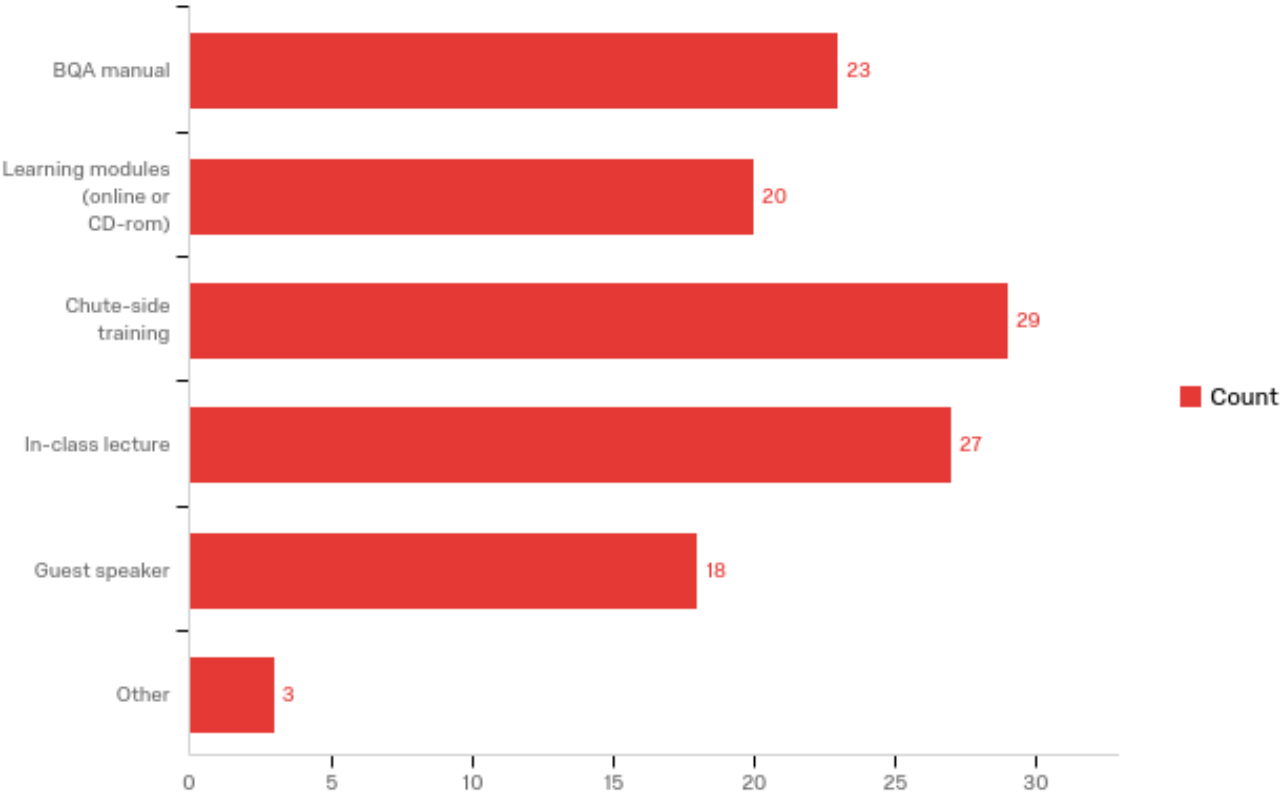
Q11 - How are you offering Beef Quality Assurance (BQA) training to your students?



Q12 - How do students use their Beef Quality Assurance (BQA) certification?

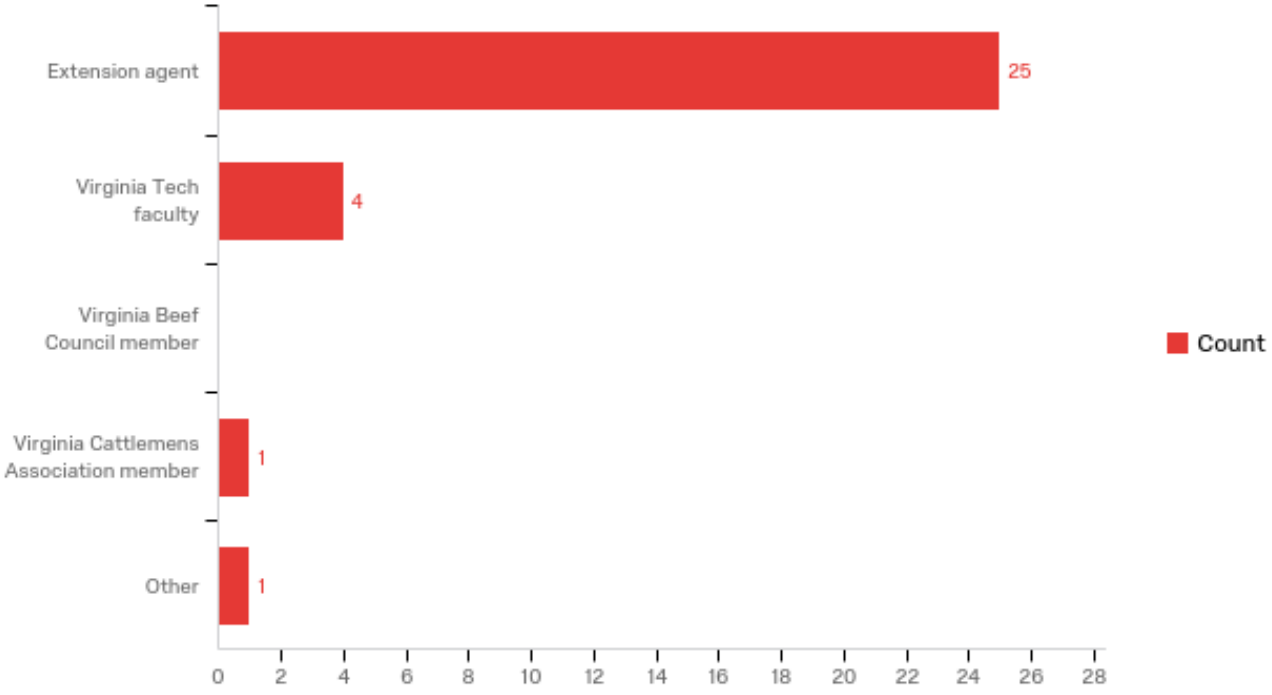


Q13 - What instruction methods and/or resources do you use for Beef Quality Assurance (BQA) training? You may select more than one response.



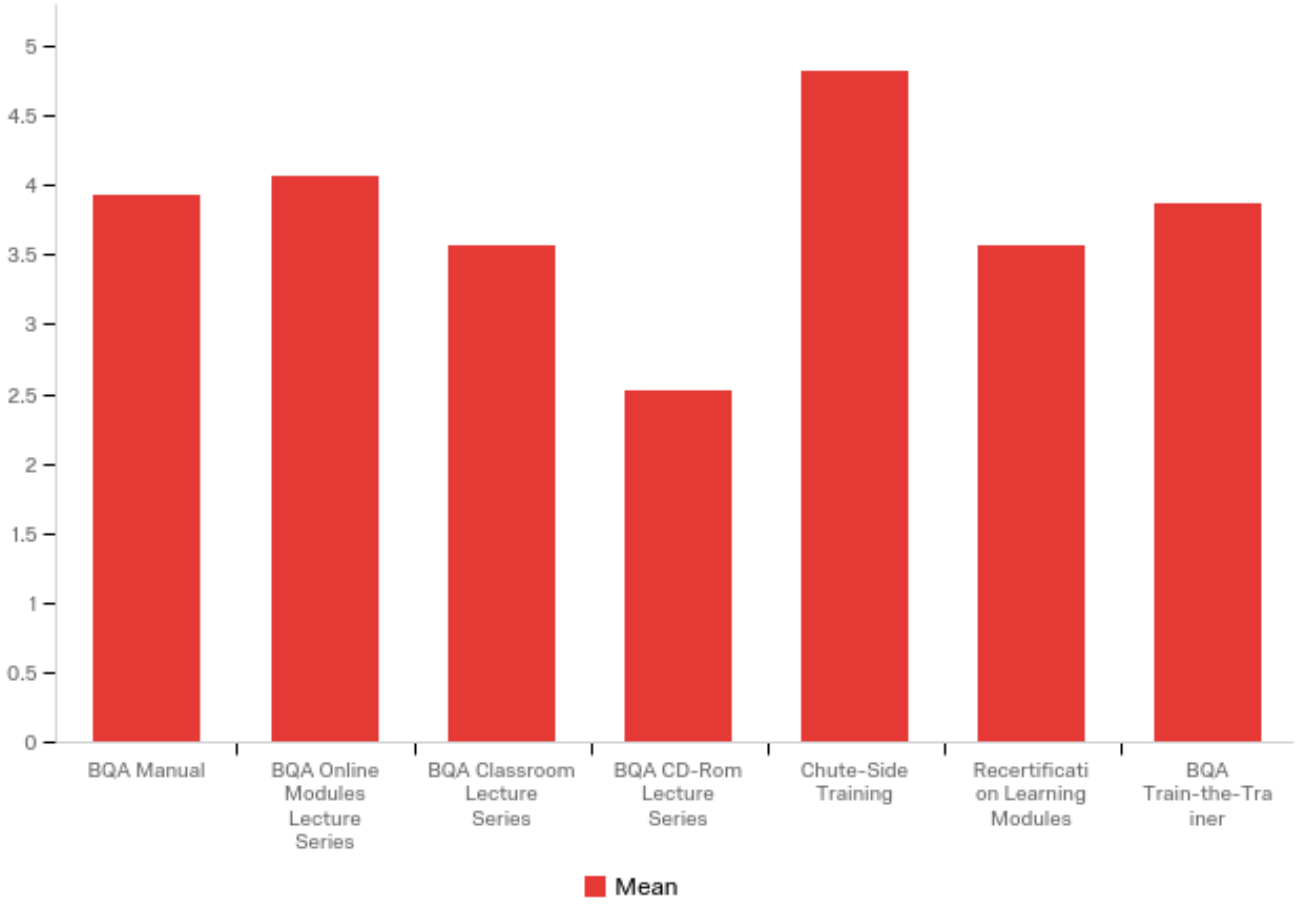
#	Answer	%	Count
1	BQA manual	79.31%	23
2	Learning modules (online or CD-rom)	68.97%	20
3	Chute-side training	100.00%	29
4	In-class lecture	93.10%	27
5	Guest speaker	62.07%	18
6	Other	10.34%	3
	Total	100%	29

Q14 - Who is your primary contact for technical BQA related questions and training?



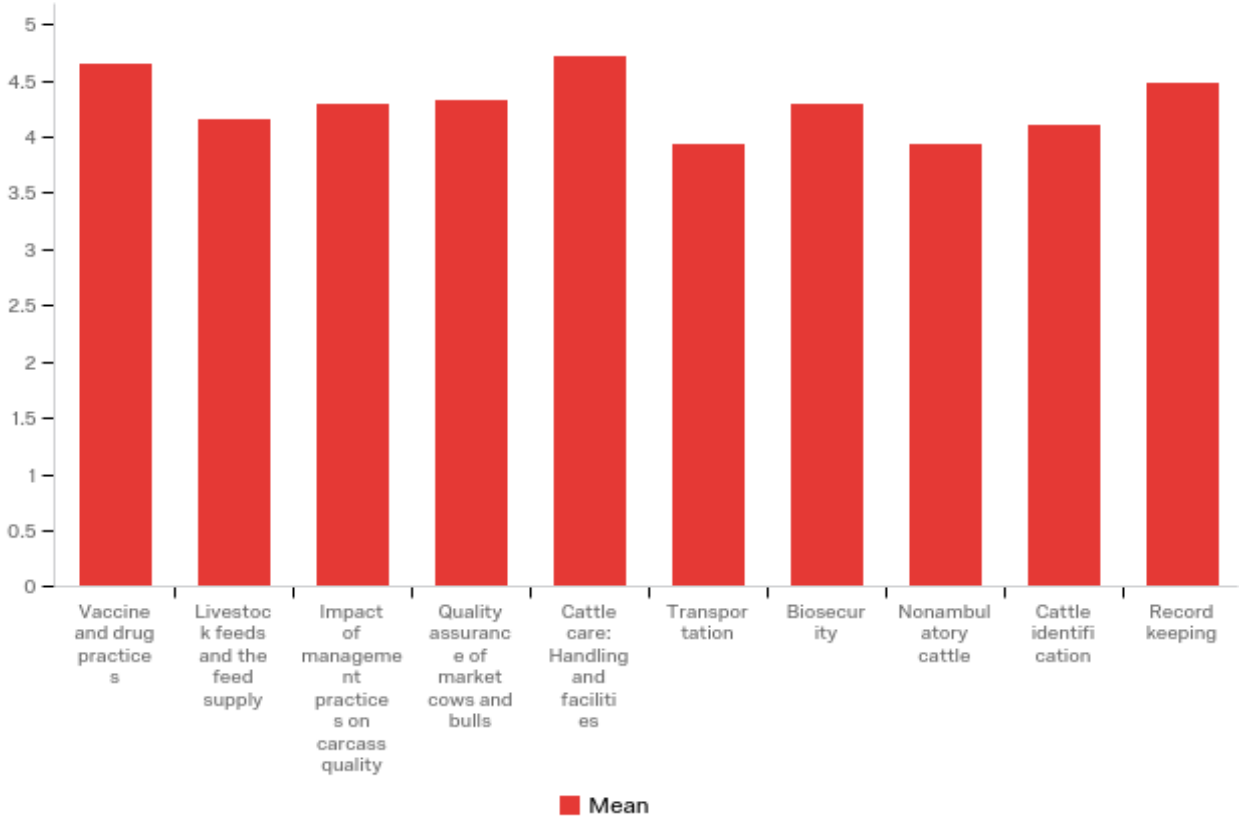
Q15 - How would you rate the usefulness of the training and/or training materials the Beef Quality Assurance (BQA) program offers? (1-5), 1=not at all useful, 5=extremely useful

Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
BQA Manual	2.00	5.00	3.93	0.84	0.71	28
BQA Online Modules Lecture Series	1.00	5.00	4.07	1.02	1.03	27
BQA Classroom Lecture Series	1.00	5.00	3.57	1.00	1.01	21
BQA CD-Rom Lecture Series	1.00	5.00	2.53	1.35	1.83	19
Chute-Side Training	4.00	5.00	4.81	0.39	0.16	26
Recertification Learning Modules	1.00	5.00	3.57	1.05	1.10	21
BQA Train-the-Trainer	1.00	5.00	3.87	1.19	1.42	23

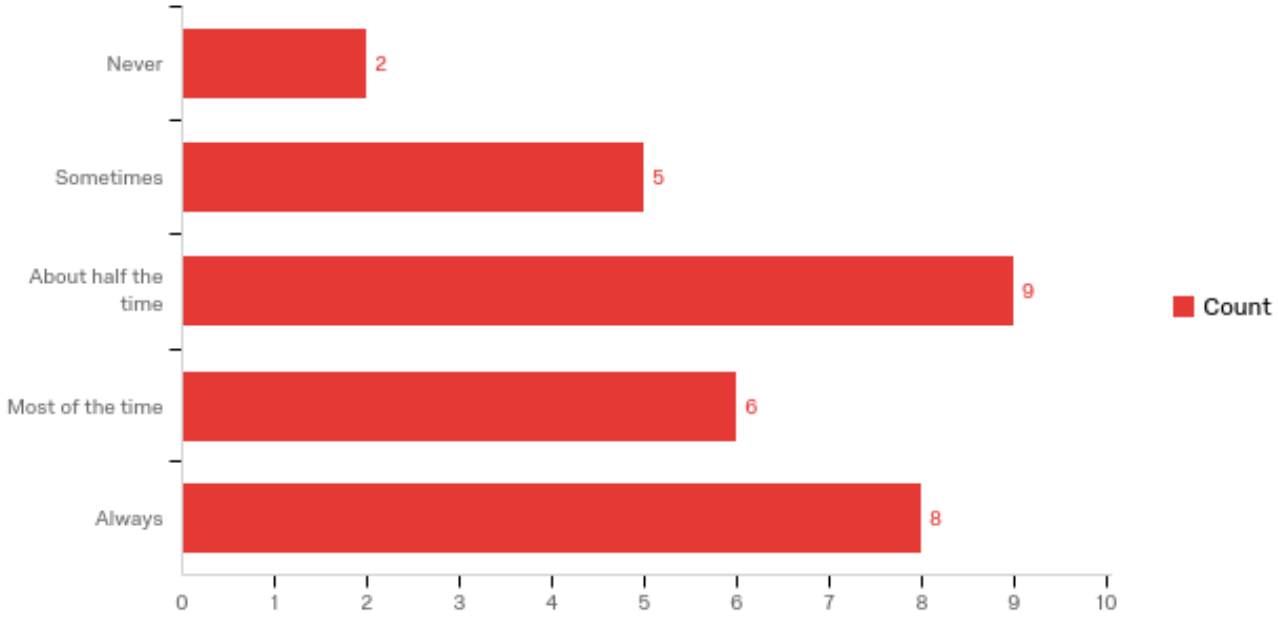


Q16 - How important are the following Beef Quality Assurance (BQA) program components to your curriculum design? (1-5) 1=not at all important, 5=extremely important

Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
Vaccine and drug practices	2.00	5.00	4.65	0.70	0.49	31
Livestock feeds and the feed supply	2.00	5.00	4.16	0.92	0.84	31
Impact of management practices on carcass quality	2.00	5.00	4.29	0.89	0.79	31
Quality assurance of market cows and bulls	2.00	5.00	4.32	0.86	0.73	31
Cattle care: Handling and facilities	2.00	5.00	4.71	0.63	0.40	31
Transportation	1.00	5.00	3.94	1.05	1.09	31
Biosecurity	2.00	5.00	4.29	0.85	0.72	31
Nonambulatory cattle	1.00	5.00	3.94	1.13	1.29	31
Cattle identification	1.00	5.00	4.10	1.06	1.12	31
Record keeping	2.00	5.00	4.48	0.71	0.51	31

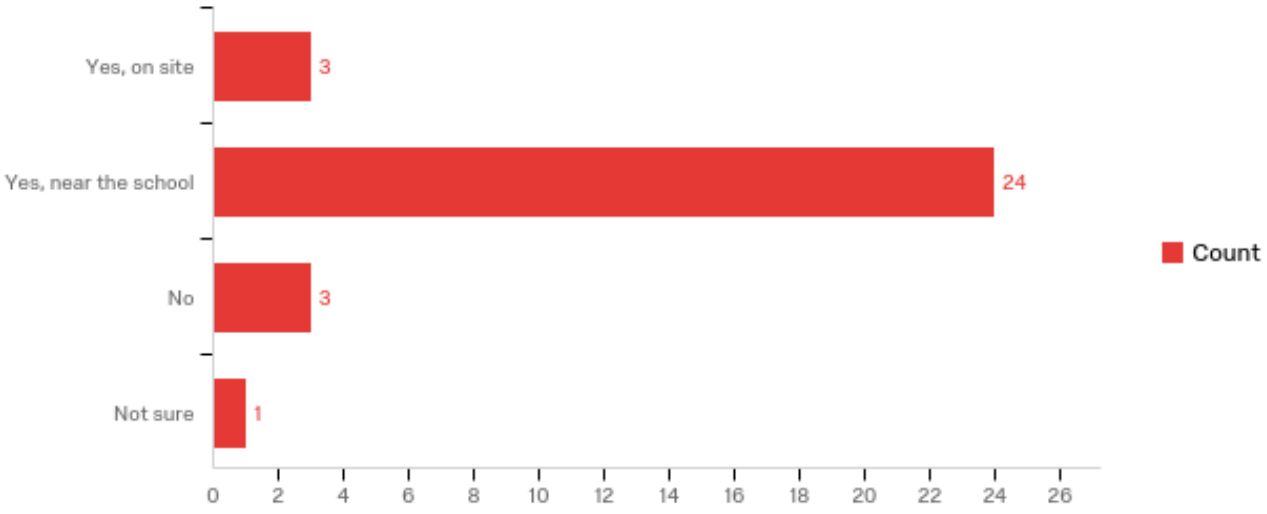


Q17 - How often are hands-on learning activities used to teach Beef Quality Assurance (BQA)? (1-5), 1=never 5=always



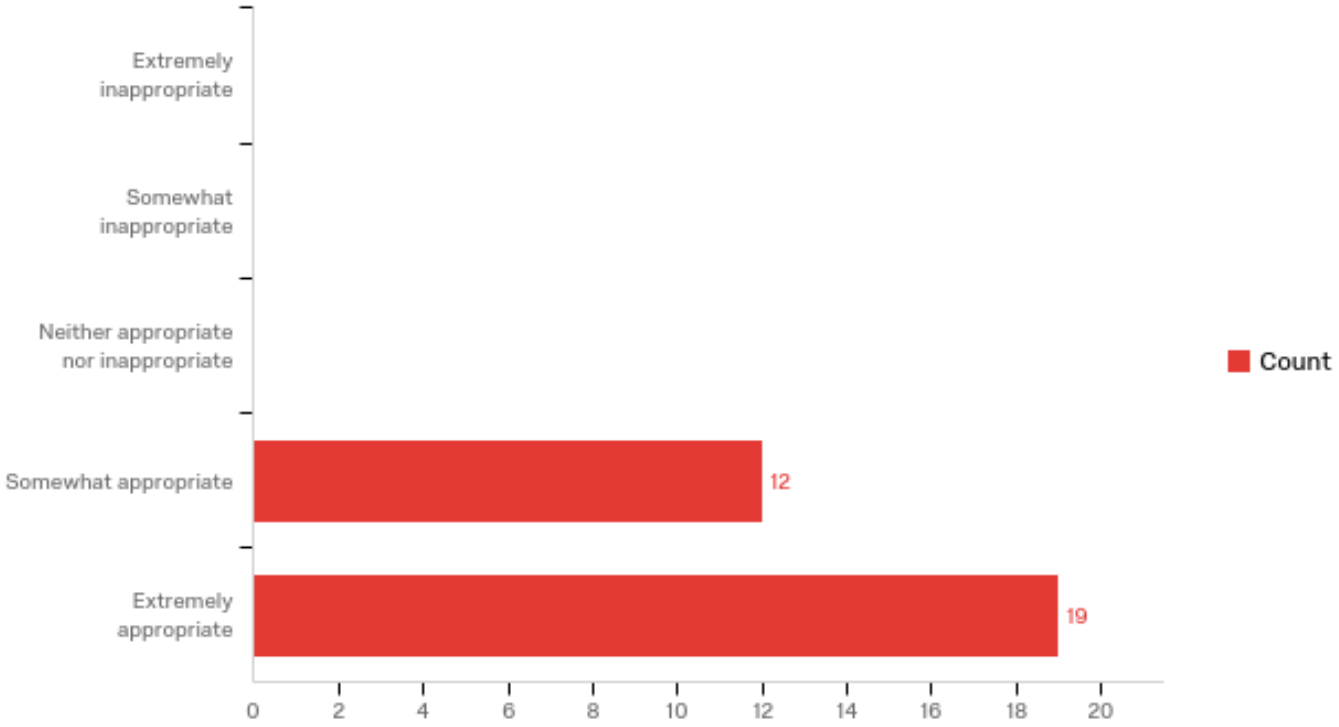
#	Answer	%	Count
1	Never	6.67%	2
2	Sometimes	16.67%	5
3	About half the time	30.00%	9
4	Most of the time	20.00%	6
5	Always	26.67%	8
	Total	100%	30

Q18 - Do you have access to a farm on site or near the school for chute-side training?



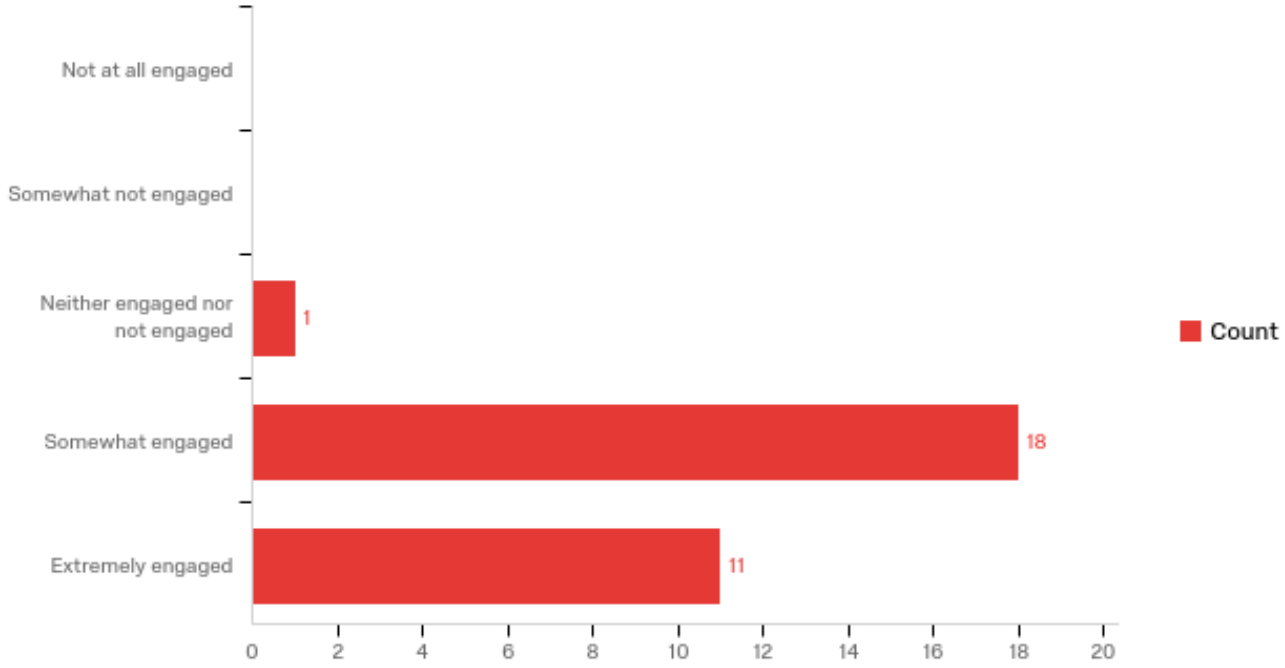
#	Answer	%	Count
1	Yes, on site	9.68%	3
2	Yes, near the school	77.42%	24
3	No	9.68%	3
4	Not sure	3.23%	1
	Total	100%	31

Q19 - How would you rate Beef Quality Assurance (BQA) content appropriateness for students in your course(s)? (1-5), 1=extremely inappropriate, 5=extremely appropriate



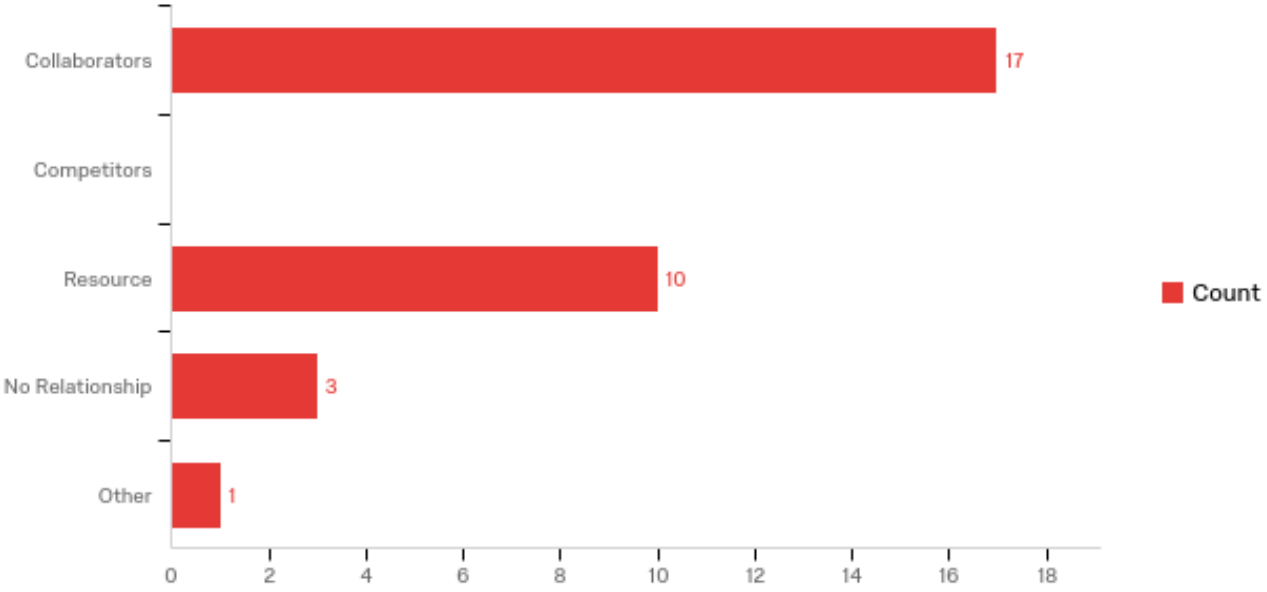
Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
How would you rate Beef Quality Assurance (BQA) content appropriateness for students in your animal science course(s)? (1-5), 1=extremely inappropriate, 5=extremely appropriate	4.00	5.00	4.61	0.49	0.24	31

Q20 - How would you describe your students' level of engagement with the Beef Quality Assurance (BQA) training you provide? (1-5), 1=not at all engaged, 5=extremely engaged



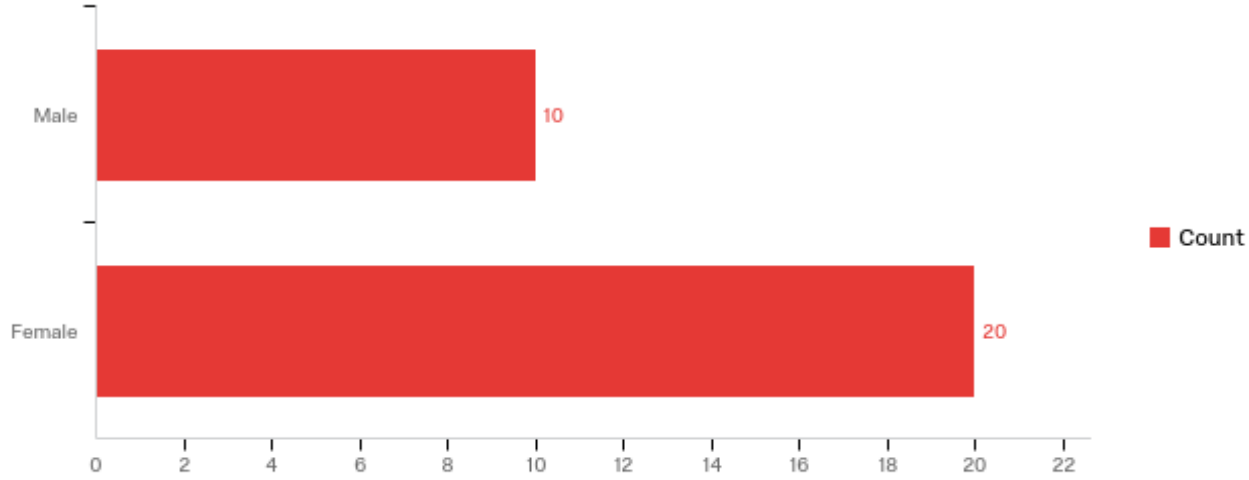
Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
How would you describe your students' level of engagement with the Beef Quality Assurance (BQA) training you provide? (1-5), 1=not at all engaged, 5=extremely engaged	3.00	5.00	4.33	0.54	0.29	30

Q21 - How would you describe your working relationship with your county Extension agent?

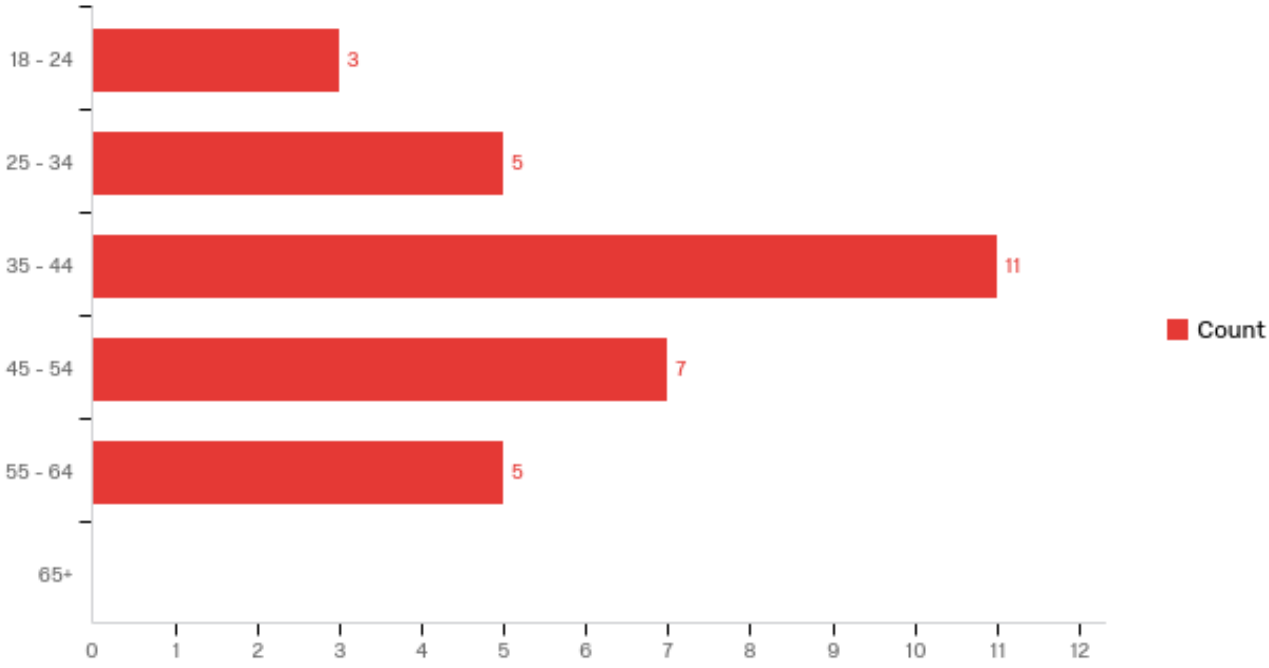


#	Answer	%	Count
1	Collaborators	54.84%	17
2	Competitors	0.00%	0
3	Resource	32.26%	10
5	No Relationship	9.68%	3
4	Other	3.23%	1
	Total	100%	31

Q23 - Please indicate:



Q24 - What is your age?



Q26 - Are you currently an Agriculture teacher?

#	Answer	%	Count
1	Yes	100.00%	31
	Total	100%	31

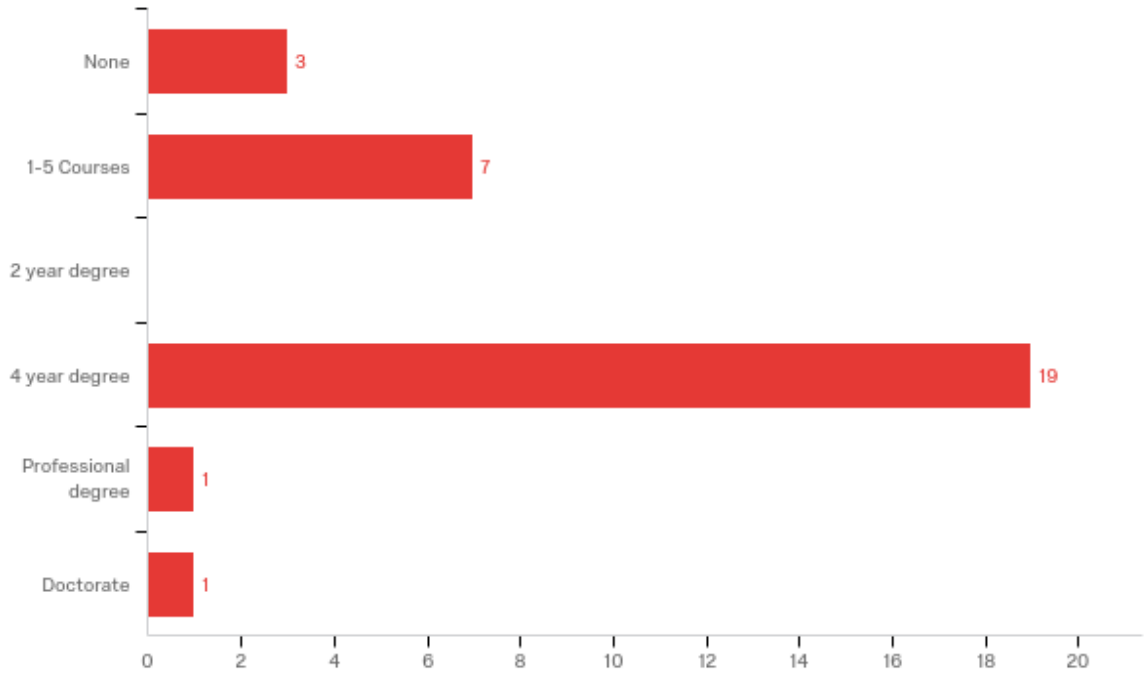
Q27 - What grade level do you teach?

#	Answer	%	Count
1	Elementary School	0.00%	0
2	Middle School	0.00%	0
3	High School	100.00%	31
4	College	0.00%	0
	Total	100%	31

Q28 - Do you teach any animal science related curriculum?

#	Answer	%	Count
1	Yes	100.00%	31
2	No	0.00%	0
	Total	100%	31

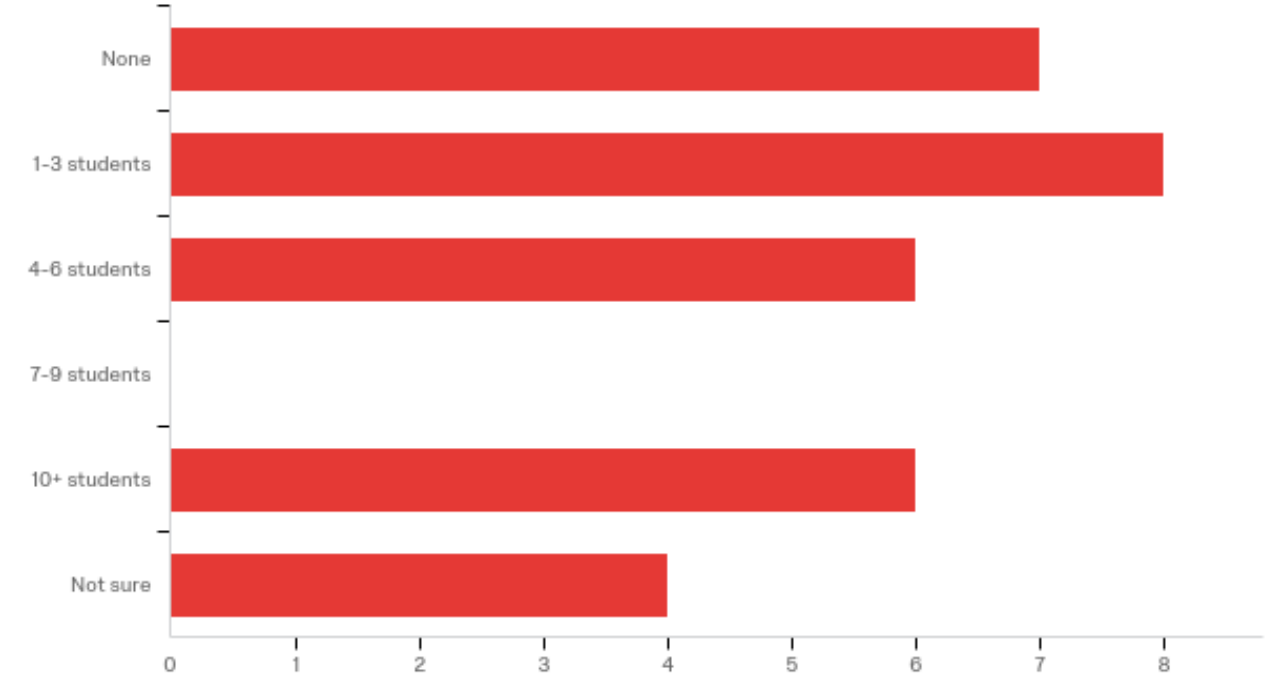
Q29 - What college-level coursework in animal sciences have you completed?



Q30 - Would you be willing to participate in a phone or WebEx interview?

#	Answer	%	Count
1	Yes, phone interview	48.39%	15
2	Yes, WebEx interview	9.68%	3
3	No	41.94%	13
	Total	100%	31

Q37 - How many of your students are involved in Beef Quality Assurance (BQA) training outside of school?



#	Answer	%	Count
7	None	22.58%	7
1	1-3 students	25.81%	8
2	4-6 students	19.35%	6
3	7-9 students	0.00%	0
4	10+ students	19.35%	6
5	Not sure	12.90%	4
	Total	100%	31