TEACHING ADVANCED LIFE SCIENCES IN AN ANIMAL CONTEXT: AGRICULTURAL SCIENCE TEACHER VOICES

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Abstract

The purpose of this qualitative study was to determine agricultural science teacher comfort with a new high school Advanced Life Science: Animal course and determine their perceptions of student impact. The advanced science course is eligible for college credit. The teachers revealed they felt confident of their science background in preparation for teaching the course and they emphasized their intensive science background in preparing to become agricultural science teachers. Teachers indicated they had significant background in advanced science concepts, but they hadn't used the previous knowledge and it required effort to review the concepts related to the new course. Teachers indicated they weren't completely comfortable with the supplies and equipment necessary for teaching the various laboratories associated with the course but they were able to utilize local resources to assist them. Students interested in health occupations careers found the course fulfilling their needs. Teachers indicated that the transferable skills students gained from the course included the ability to conduct lab write-ups, function in experimental settings, work in teams, and solve problems.

Introduction and Conceptual Framework

Academic standards are intended to create more intellectually demanding content and pedagogy and to establish uniform goals for schools (Sandholtz, Ogawa, & Scribner, 2004). As tools of reform, standards set higher expectations for students' academic performance. The desired result is the improvement of the quality of education for all students and greater equality in students' academic achievements. New legislation is constantly enacted requiring school districts to "educate a growingly diverse new generation of students unlike any that has ever entered the classrooms in the past" (Simplicio, 2004, p. 1), affecting not only the traditional student, but the historically underserved students as well (Sleeter, 2003). The premise behind the standards movement is that all children are capable of achieving at high levels if the bar is raised (Koski & Weis, 2004). As a result, many states have raised the stakes by holding their schools and students accountable for a measured performance.

Achieving new content and performance standards requires building professional capacity. Teachers need deep understanding of the subject matter, student learning approaches, and diverse teaching strategies to aid their students in reaching these new standards (Darling-Hammond, 2004). Districts must pay attention to the ways in which they recruit, hire, and support new teachers as well as veteran teachers (Darling-Hammond). Teacher candidates are now expected to meet high standards and demonstrate they can link classroom theory the with practice (Quatroche, Watkins, Bolinger, Duarte, & Wepner, 2004). Closing the gap that exists between implementation of the standards and assessment of results will aid in decreasing teacher frustration and attrition (Hargrove, Walker, Huber, Corrigan, & Moore, 2004).

Standards-based reform strategy encompasses three primary elements: (1) the state sets minimum "content standards" that describe knowledge, skills, and abilities for

core academic areas; (2) the state sets "performance standards," which define what students must know in order to demonstrate mastery of the content standards; and (3) the state assesses if students have attained those standards (Koski & Weis, 2004).

This research provides evidence where state level action has culminated in the integration of academics and career and technical education resulting in an approach to offering students what they need the most—rigorous and engaging subject matter. Teaching advanced life science within the context of animal agriculture can enhance students' immediate marketability in the work place and provide students a launching pad for post-secondary educational pursuits.

One study reveals that students participating in an agriscience course achieved significantly higher scores on the science portion of their state's standardized test of high school graduates than did non-agriscience students (Chiasson & Burnett, 2001). Additionally, it has been demonstrated that teaching biology using animal agriculture as the context was effective for helping students appreciate and understand science better than traditional methods of teaching biology (Balschweid, 2002). Jelinek (1997) concluded that closing the gap between school science instruction and real-life scientific activity, such as that conducted in a life sciences context, and presenting science in a relevant form, helped eliminate obstacles that minimize student attitudes and interest towards the study of science. Balschweid (2003) concluded that subject matter taught in the context of animal agriculture, from a teacher experienced in modern animal agricultural practices, had a positive effect upon student attitudes towards agriculture and those who work in the agriculture industry, even when taught in a larger metropolitan city.

The creation of a new curriculum grounded in college preparatory science principles creates a unique opportunity to determine teacher comfort with advanced science principles and reveal teachers' perceptions of the impact of such a course upon students. How well prepared are agricultural science teachers to teach rigorous science principles? Do they believe that teaching college bound students, standards-based advanced scientific principles in the context of agriculture will result in positive attitudes towards science from those same students?

In 2004-05, Indiana adopted three new courses in advanced science that were embedded within the context of life science, specifically animals, plants and soil, and foods. These courses underwent a rigorous writing and review process from professors in biology and chemistry programs from statewide institutions of higher education, science teachers, secondary agricultural science teachers, and representatives from business and industry (Balschweid, 2004). To date, limited evidence is available documenting teacher confidence and comfort with teaching the first of the courses, *Advanced Life Science: Animal*, and no evidence exists supporting teacher perceptions of the benefits of this course for enrolled students.

Purpose/Research Questions

The purpose of this paper is to examine the impact of the *Advanced Life Science: Animals* course upon teachers adopting this course and their students. With this purpose in mind, the following guiding research questions were used to obtain data:

1. What is the comfort level of agricultural science teachers adopting an advanced life science course based upon state science standards and taught within an animal context?
2. What are teacher perceived benefits to students enrolled in a course specializing in advanced life science concepts taught within an animal context?

Methods

To provide context for the data in this study, it is important to provide background information about the process. In July 2003, discussions between the Department of Education and the Agricultural Education Teacher Preparation Program in Indiana

focused on the creation and adoption of advanced agricultural science courses to capitalize on the rigorous science prevalent in the discipline of agriculture, food, and natural resource systems. By August of that same year, a panel of experts in science education from around the state, including university professors of chemistry and biology from multiple public and private institutions, was commissioned to develop courses meeting requirements for advanced science curriculum. These requirements stipulated that the courses assume a first year biology and chemistry knowledge base and that they be laboratory based. The working definition within the state for a lab-based course is one that includes a minimum of 70% of student time actively engaged in the laboratory. These courses were to engage students in rigorous science education and grounded in the context of real life science, in this case, agriculture.

By September 2003, the panel had initiated the standards and indicators for three separate courses all within the context of agriculture. One course centered on animals, another in plants and soil, and a third in food. After extensive review, state personnel uploaded draft versions of the courses onto the Department of Education Web site for public review and comment. In 2004, the three courses received approval from the State Board of Education and the Commission for Higher Education as advanced science courses. This approval granted recognition for the courses to be included in any student's college preparatory high school program and assured students that every institution of higher learning in the state recognized the courses as truly advanced science coursework, while still included in the career and technical education cadre of courses. Indiana's Agricultural Science teachers were notified that the first of these courses could be offered and that any interested teachers should attend a preliminary informational meeting concerning the course. The initial course offered was *Advanced Life Science: Animals*. Teachers were encouraged to request administrative approval for teaching the course. Fifteen teachers were successful in receiving approval to offer the course.

Participating teachers received a copy of the *Advanced Life Science: Animals* standards and indicators for the course. Instructions were for teachers to familiarize themselves with the standards and indicators and to participate in two summer training workshops. Faculty from Indiana's Agricultural Education Teacher Preparation Program facilitated the training.

The first workshop spanned three days and covered instruction in brain-based theory and contextual teaching and learning. A nationally renowned expert in contextual teaching and learning instructed the teachers in effectively reaching their students with rigorous, high level academic subject matter. In addition, training in teaching standards, student retention of important subject matter, and establishing benchmarks for success in end-of-course assessments (ECA) occurred during the three-day in-service training. A second two-day workshop focused on the technical subject matter of animal science necessary to teach the *Advanced Life Science: Animal* course. An animal science professor at the Purdue University's College of Agriculture familiar with the new course taught this two-day refresher course. The animal science professor illustrated concepts in general anatomy and physiology, advanced nutrition, reproductive physiology, and cellular and macro principles of animals. Finally, the teachers received instruction on the use of laboratory kits specially produced for teaching the *Advanced Life Science: Animal* course. An outside company created the kits and mapped them to curriculum for the laboratory experiments contained within the course. The teachers were instructed on how to use the supplies and equipment contained within the kits and when and where to use the kits in the course curriculum.

The methodology used was a phenomenological inquiry approach. Phenomenology allows researchers to look through a lens for the purpose of understanding a participant's lived experience. Phenomenological approaches explore how "human beings make sense of experience and transform experience into

consciousness, both individually and as shared meaning" (Patton, 2002, p. 104). The purpose of utilizing phenomenology in this study was to understand the nature of the participants' knowledge, beliefs, and actions from their own perspectives.

Conducting interviews was determined to be the most appropriate technique to address the research questions. "The purpose of interviewing, then, is to allow us to enter into the other person's perspective. Qualitative interviewing begins with the assumption that the perspective of others is meaningful, knowable, and able to be made explicit" (Patton, 2002, p. 341). This study used interviews with practicing agricultural science teachers who were actively engaged in teaching the *Advanced Life Science: Animal* course, an advanced science, college preparatory course using agriculture as the context.

Data Collection and Analysis Procedures

The researcher used the approach of phenomenological interviewing to collect data. Phenomenological interviewing is a "specific type of in-depth interviewing grounded in the theoretical tradition of phenomenology" (Marshall & Rossman, 1995, p. 82). There were a total of fifteen participants who, after being informed of the nature and purpose of the research by the researcher, volunteered to participate in the study.

Using a phenomenological framework, the in-depth interviews were designed to draw on participants' personal experiences, knowledge, and beliefs about the *Advanced Life Science: Animal* course, their ability to teach it, and the effects of the course upon their students. These interviews were conducted during a one-month period. Marshall and Rossman (1995) state that interviews should be conducted in a convenient and comfortable setting. The ideal setting is one where entry is possible, the researcher has the possibility of building a trust with the participants, and where data quality and credibility of the study can be plausibly assured. Each of the teacher interviews was conducted in the agricultural science teacher's classroom.

During the interview process the researcher wrote down the teacher's responses. The researcher kept detailed written notes on the statements provided by the participants. The researcher paid specific attention to the choice of words used, asked for direct quotes, and constantly asked for clarification when it was warranted. At the end of every interview, the researcher would go back to the guiding research questions and select from the participant's responses specific statements that needed testing for accuracy. This process, known as member checking, is often used in qualitative research to address the issue of validity. Trustworthiness was established through an audit trail. Dependability and confirmability were established through recording the instrument development process, collecting all raw data, keeping records of all data analysis including field notes, and keeping a record of all materials involved in personal reflections and observations. During the entire process of developing the research study, collecting the data, and analyzing the results, the researcher kept a detailed journal of activities. This not only aided the researcher in keeping organized, but it also addressed the issues of dependability and confirmability. Triangulation, member checking, and peer debriefings were utilized to address credibility.

The researchers used an interview guide for all interviews. Agricultural Education Teacher Preparation faculty assisted in the development of the interview guide and ensured that questions utilized matched the construct of the research purpose and objectives. The interview guide contained questions used to explore teacher comfort level with teaching an advanced life science course and teacher perceptions of student benefits to the course.

A two-member research team was used for this project. One member had direct responsibilities for coordinating the Advanced Life Science project and possessed preconceived ideas concerning the project and teachers involved in the process. The second researcher was not directly related to the curriculum development at the time research was conducted. Data was collected and initial data analysis was completed by the researcher not involved in the curriculum development. Following data

analysis, both researchers examined the findings and used the process to refine the inquiry, findings, and establish credibility of the conclusions, implications, and recommendations.

Interviews took place and were recorded in November 2004. Analysis of data utilized an open coding system. Strauss and Corbin (1990) state "open coding…is the analytical process by which concepts are identified and developed in terms of their properties and dimensions" (p. 74). Conceptual labels made up categories based on teacher answers. Analysis of answers revealed similarities and differences, and categories were composed of conceptual labels with similar properties. Clark and Peterson (1986) conclude that teacher thinking, related to curriculum adoption, influences teacher action and ultimately impacts learning that takes place in schools. The conceptual model for this study centers on the perceptions of agricultural science teachers towards adding an advanced life science course to their current course offerings and their self-identified comfort level in doing so.

Findings

Research question one examined the level of comfort of agricultural science teachers adopting an advanced life science course based upon state science standards and taught within an animal context. Teachers were asked, "When you take into account your personal science background, how does that play into your anxiety or comfort level in teaching this course?" Teachers provided the following responses:

> I guess I'm thankful. We [as teachers] were one science education class away from having our science teacher minor. Many teachers in our area actually went ahead and got it. I chose not to. But I actually remembered more than what I thought I would once we went back and started reviewing all the materials for this class. So, I probably cussed them then, but I am glad now. (**M-1**)

> I'm more comfortable because I have the science background. And, in fact I've relied a lot on that trying to meet the standards. (**F-1)**

> I feel very comfortable with it, but I have taught biology on and off the last 20 years. So, over the last seven or eight I've taught agriculture full time. But, I had enough biology in there where I was teaching that, and with the new animal science curriculum that we have, if you follow the curriculum, its pretty science intensive: anatomy and physiology, so…. I feel very comfortable with it. **(M-2)**

> It's a high level of anxiety. And, I'm probably different than most teachers from the standpoint, that I was out of the classroom. I had just gotten what I thought was comfortable with what I was teaching and I feel like I am back to my first year of teaching all over again. Which, I knew that going into it. And since it has been a while since I've been removed from my preparation at the college and university level, a lot of those things I thought I knew, I wish I remembered a little more about this or that. So I need refreshing on some of those things. **(M-3)**

> For me, it's a comfort level because I actually was, I would say, first an animal science major. Agricultural education was my second. I double-majored. I had been one of them that had been complaining all along that we ought to be doing more and make a higher level step. Because we'd been doing it in actuality. Now, it's been nice to take it one more step further, but we'd actually been doing a lot of the things that the standards do for this class already. So that helped the comfort level quite a bit. **(M-5)**

In addition, the teachers were asked, "Given your personal experience with animals (domestic and farm), how does that

play into your anxiety or comfort level in teaching this course?" Selected teacher responses included:

> It helps me be comfortable with the basic animal science, and then I can concentrate on refreshing my brain and making sure that I understand the more difficult parts. I guess, to me, it's like taking my normal animal science class to the next level. Like, normally if I covered nutrition, we would talk about the six main parts of the water, the carbohydrates, the proteins, etc. But now we are taking it from that and we are talking about how those proteins attach, how those proteins work in the body, from the feed and the grass. How that converts to muscle and how that whole chemical process works. We are just taking it to a much higher level than I ever would have in my basic animal science class. So, I am comfortable with the animal science end of it and that gives me time just to prepare for the science end of it. (**M-1**)

> Yes, it helped. It helped. Not to brag, but I have a pretty extensive animal science background. And, the animal science is my passion. So, because of that I think it's helped in this class. Because I've been able to lend things to the course that weren't in the materials, or weren't in the curriculum. **(M-3)**

> Every story I tell relates to animals. Without that, then I would be lost. So you have to have some kind of correlation. It's been my savior, probably. Without that, I don't know what I would do. We all have our different styles, and pace. What works for one doesn't work for someone else. And, so far so good. **(M-4)**

> We have 42 students in this class, in two sessions. It's about 50/50 (male/female). In the two sessions, one is a little bit bigger than the other one. One session has a very strong agriculture background. And, there was no rhyme or reason to this, it was just the way it was scheduled, and one is not. And it's interesting. Those two classes take on two totally different personalities, as they would regardless. But the non agriculture students, it's interesting because I started all the classes this year with some agricultural industry type things. And I guess some of those non agriculture students got concerned. In fact I used some information out of one of the power points we got from the in-service. And I think they were concerned. In fact, I had one student say, 'you know I was really worried this was going to be a farming class'. And then later on she said she really liked the way we learn things in here because it's very hands on simply by the way I'm approaching it. **(M-5)**

The researchers asked teachers to elaborate on their comfort level or level of anxiety associated with teaching and using laboratory equipment and the knowledge necessary to teach a laboratory-based course. The following indicates their response to this question:

> At this point I have been very comfortable with it. My biggest problem is we get so wrapped up in the lab that I sometimes don't think we spend enough time in the classroom, so I have to be careful about that. We get to doing some things out there in the lab and we are having so much fun that. I want to make sure that I cover enough material, but I guess as long as you are doing it, whether its in the lab or in the classroom, as long as you are covering the standards that's the important thing. You want to make sure you are covering the standards. I guess that made me a little more comfortable in the fact that I worry about the standards, not about the book itself. I think as a teacher a lot of times we get into that, okay we've got x amount of time we should be able to cover this many chapters. The lab equipment is a lot of stuff I have never used before, but its kind of fun just learning it yourself. (**M-1**)

> No anxiety at all. In fact, after I got the kit the company came out with the

> \$1900 kit, the only anxiety that I had was coming up with the \$1900. **(M-2)**
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> I'm not 100 percent comfortable, but we're learning. And one of the greatest things is I got a group of students that are learning right along with me. As a matter of fact, when the lab kit arrived, it was the students that unpacked it, checked it off, and made sure everything was there, and they didn't know everything that was in there. So, it's kind of an exploratory learning process for them. And, at this point we haven't used everything yet. We've used some of it, and some of it we'll use later on. **(M-3)**
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> Have the students do the work. I can show you the lab, each student has two labs that they are performing. And I have a rubric set up on their presentation, PowerPoint, or whatever they are doing, and they are in charge of that lab and that one week lesson. That starts December 1st, okay? And so I don't have any results from that, but I am empowering students. And I'll tell you, they are excited about it. It takes some planning to get all the labs and hatching eggs and all that. But they are excited about that. **(M-4)**
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> My comfort level on that was probably less than a lot of them because we're starting a new [agriculture] program. We went ahead and got the kits because I thought there would be things in there that we needed to go with and that kind of thing. Probably in retrospect given our situation coming into a new program I was allotted whatever we needed, open checkbook, so to speak. If we're going to teach this as a first rate class here's how it would be in real life. I don't think we ought to be make-shifting things. Because, if I'm going to send a student to DowAgro Sciences or whatever, and they have been using things that well, 'this really isn't what this if for but we're going to use it for that' I don't think that's a good situation to be in. **(M-5)**

Research question two examined teacher perceptions of student benefits from enrolling in a course specializing in advanced life science concepts taught within an animal context. Selected teacher responses included:

> I think it just makes science fun. Anytime that you can let them do what you have been talking about, it reinforces it, and they have fun while they are doing it. So to me that has always been the fun part of a lab or a shop, is that you are doing what you are talking about, therefore it not only reinforces that skill level, but it also makes it fun for them and they remember that too. (**M-1**)
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> We've got a few of them in there that are taking the class because they didn't want to go to the career center to take a health class. Our pre-nursing program over at the career center would require that they have to leave the high school and drive over to the career center, which is about nine miles away. They'd be gone for half a day, but I got a few of them in there that are looking directly at going to nursing. So they are kind of looking at this as a class that will help them out for their college biology. They're also the kind of kids that are also in anatomy and physiology here at the high school. **(M-2)**
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> I think they are getting to expand their animal science knowledge, and general biology knowledge. I hope so anyway. It's about 50/50 [girls versus guys in the class]. There may be two or three that want to do it for college credit. **(M-3)**
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> This is important. Because to me this takes us to the next level that we were just talking about that the state wants [agricultural education teacher preparation] to do and I think it takes the agriculture program to that next level of what we need to be doing. Now we don't ever want to forget, you know, I turned 43 kids away that wanted to take

agricultural mechanics. We still have those kinds of students that need that kind of training as well, so I don't want that to ever go away. But we needed to go this direction as well with students. This took the place of Biology 2. We come in with this, our numbers become high but we're going to be held accountable, which is good! I like that. Once again, that takes agriculture programs to a whole other level. So, we're being watched, so to speak. **(M-5)**

Teachers were asked specifically, 'in your opinion, what skills are your students learning in this class that can be applied towards a vocational trade?' Teacher responses were as follows:

> Well, I guess you're talking about writing up lab and experimental applications, problem solving, team work, because they are working together in groups on different activities. Of course, you are reinforcing just measuring skills because you are using the scales to keep track of the weight of the eggs before they hatch, the birds after they hatch. They are learning how to sex birds. I guess writing reports, keeping track of data, those kinds of things. (**M-1**)

> They're picking up a lot of things, in terms of what I think will lead them to going to a [land grant university] or one of the other colleges here in the state that will lead them into biotechnology, bioengineering, or animal science. A lot of kids that are in here are very interested in veterinary technology and veterinary medicine. The school is kind of looking at this is a way to put those types of students in here out of our standard animal science class, put them into Advanced Life Science: Animals. And, it seems to look really good because, in the past, I would have students that are college prep, valedictorian, salutatorian types, they might be in a class, an animal science class, that I have 17 kids with [learning disabilities], and some of them have various levels of assistance being required of them and usually more than what you would end up having with a special student, or a standard student. And they're a little cut above the standard student here in school. Because they've already been successful in biology, and been successful in chemistry, so, they are pretty good kids. **(M-2)**

> They're learning to explore and learn on their own, to a certain degree. As an example, we are doing the unit on the chicks right now. We've got the eggs out there incubating. I took four of those lessons and I broke my class of 16 up into four groups. And they taught the lessons to their other classmates. Now, some groups did a better job than others, but I looked at that and thought, wait. Why do I have to do all this? And I think they learned something. That to me, that activity with the chicks was one of the strongest things I've seen. It's probably created more interest than any other topics to this point. **(M-3)**

> That's one thing we are really looking at. Because we're really doing some research here particularly in this area as to what we want to do, where we need to have these kids. One of my goals is, and we're working towards this because we are going to build facilities here, we're not sure what we are going do in terms of a decent agriculture facility yet. We're looking at just building an agriculture technology center for the school. One of my goals is, and we've already had discussions with them, is having a Dow Agro Science Scientist be with us one day a week. Because we want this to be a real life setting. And, what better way to show what we're doing. And we've been doing a lot of that. We're taking one day a week, we're sending four students out of those classes. We're alternating back and forth from the classes and everybody has to do it before we go back and start over out with a vet. This past week 4 students went with a veterinarian to do dehorning, vaccinations, and castration at a dairy farm. We just finished mammary system, he walked them

through the milk cows. They did the California mastitis test on them, on a couple of cows and then those kids came back and gave a presentation… and what's interesting is that I told them they had to do a 5 minute presentation. They did a 30 minute one when they got back. And those were totally non farm kids on farm calls. What we have tried to do is send non farm kids on the farm calls and farm kids on the in house surgeries and that kind of thing. **(M-5)**

Conclusions/Implications/ Recommendations

Research question one examined the comfort level of agricultural science teachers involved in teaching an advanced science course taught within the context of animals for the first time. The teachers involved in this study volunteered to teach this course. It should be noted that as a qualitative study of a unique group of teachers, teaching a unique curriculum, any conclusions made should be carefully considered before transferring to any other group.

Based on responses to research question one, teachers felt confident of their science background in preparation for teaching an advanced high school science course. Most of the teachers emphasized their intensive science background in preparing to become agricultural science teachers with one teacher indicating they were within one class of double majoring in science education and agricultural education as an undergraduate student. Teachers commented that a difficult task in teaching an advanced science course was that they hadn't used much of the knowledge they learned in college, and it required additional effort for them to review and brush up on the advanced science concepts related to the *Advanced Life Science: Animals* course. This, in spite of the fact that they had significant background in advanced science concepts while in college. The teachers felt confident in their background in science education and in their ability to access the resources necessary to refresh them in the concepts they were lacking.

In addition, the agricultural science teachers involved in teaching the advanced science course felt comfortable with their personal background in animal agriculture and their ability to apply it to the advanced science course. Teachers indicated little anxiety related to teaching advanced science concepts and principles within an animal context. One teacher stated that several of the students in the *Advanced Life Science: Animals* course were interested in future careers in veterinary technology and/or veterinary medicine.

The researchers asked the teachers their comfort level with the laboratory equipment necessary to teach an advanced science course. Each teacher involved in the study indicated that even if they weren't completely comfortable with some of the supplies and equipment necessary for offering the various laboratories, they were able to utilize local resources to assist them with the laboratory kit supplies. Some of the teachers even mentioned that students were helpful as a resource in this area.

Although this study sampled a small group of teachers involved in teaching a unique course, the researchers believe the results provide implications for teacher preparation in agricultural science. In the face of escalating national science requirements, the findings imply that teacher preparation programs in agriculture should increase the opportunities within their curricula for agricultural teacher candidates to become dual-certified in science education. When practical, opportunities to enroll in science education courses could increase the comfort level of agricultural teacher candidates regarding teaching advanced science concepts and utilizing the associated technology and equipment.

At the time of the research study, only a small pilot group of teachers elected to teach the *Advanced Life Science: Animal* course, thereby allowing for a small population of study. Since that time, more than 80 schools and teachers have adopted the course. It is recommended that a more extensive evaluation of teacher comfort with teaching an advanced science course in the context of agriculture be performed. It is further recommended that similarities and differences be examined between veteran

and beginning teachers on their level of comfort with the curriculum.

Research question two examined teacher perceptions of the benefits for students enrolled in an advanced science course taught within an animal context. Teachers were all in agreement concerning the application of scientific principles to a real world context. Even students who were interested in careers in nursing found the *Advanced Life Science: Animals* course fulfilling their needs regarding advanced life science application to basic medical concepts and procedures. In addition, when asked what skills could be applied to a vocational trade, teachers responded that the ability to conduct lab write-ups, the ability to function in experimental settings, work in teams, and solve problems were the obvious student benefits. It's clear from teacher responses that they believe students enrolled in an advanced science course taught using animals as a context can learn transferable skills related to the life science workforce and/or institutions of higher learning. It is recommended that additional research target the effectiveness of the *Advanced Life Science: Animal* course on student achievement in science and the influence this course has upon student attitudes towards science in general.

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