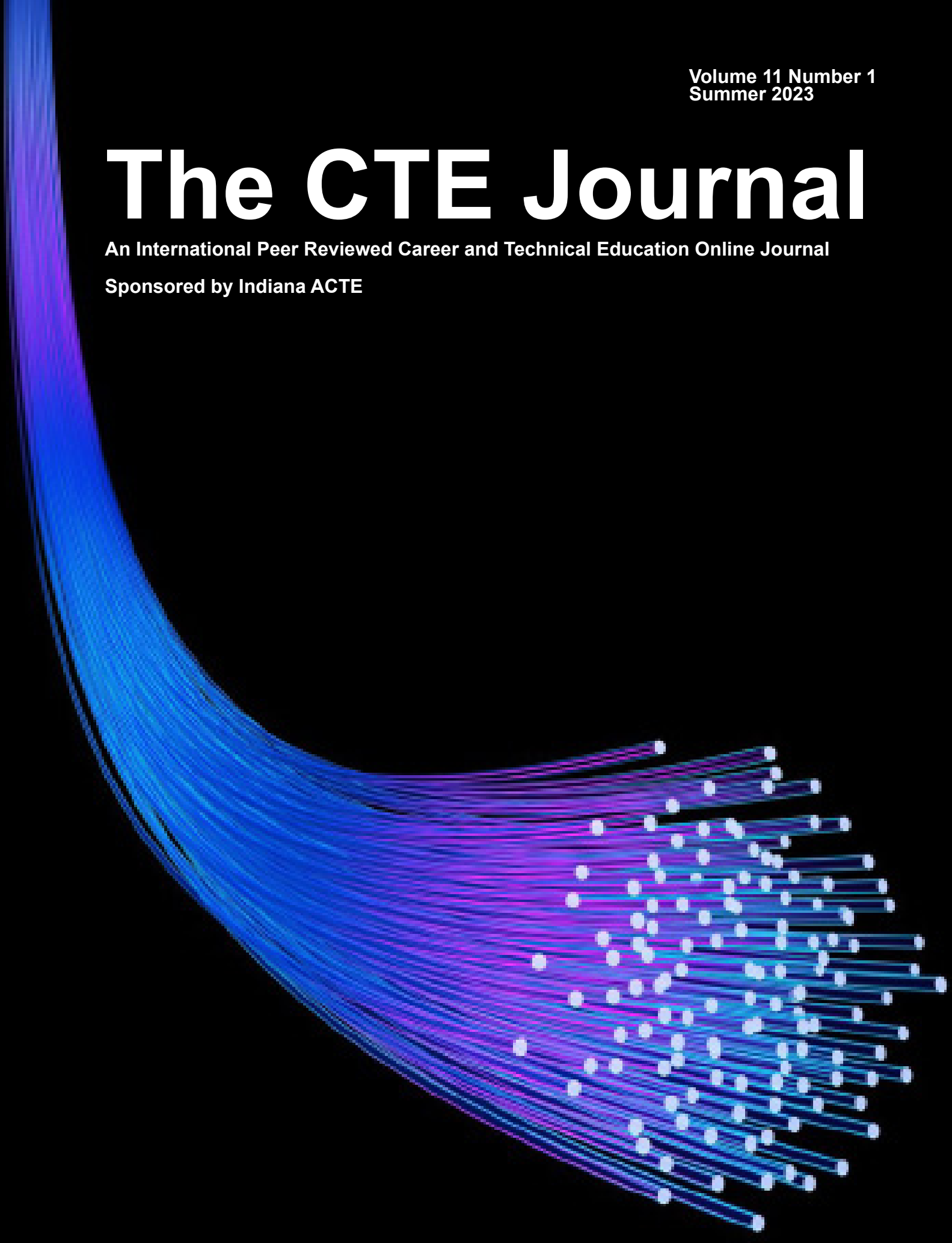
Volume 11 Number 1
Summer 2023

The CTE Journal

An International Peer Reviewed Career and Technical Education Online Journal

Sponsored by Indiana ACTE



ISSN 2327-0160 (Online)
Volume 11. Number 1.

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Teaching the Teacher: Teacher Perceptions of the Amount of Agricultural Mechanics Instruction Received as School-Based Agricultural Education Students

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Abstract
Agricultural mechanics is a subject area taught by nearly 90% of school-based agricultural education (SBAE) teachers in Iowa (Rudolphi & Retallick, 2011), making agricultural mechanics one of the most taught curriculum areas within SBAE (Herren, 2014). This research was guided by Ajzen's Theory of Planned Behavior and the purpose of this study was to describe the perception of training and skills SBAE teachers received as SBAE students in agricultural mechanics. Our research focused on the amount of individual training and skills received during SBAE agricultural mechanics courses as perceived by secondary SBAE teachers. These findings concluded that all five construct areas had little to no training as indicated by SBAE teachers. Because the grand mean scores for all five-construct area were so similarly rated lowly between the lowest (Soil and Water, GM=1.70) to highest (Structures and Construction, GM=2.62) rated, it can be concluded that the SBAE teachers in this study are not receiving agricultural mechanics training in SBAE. If SBAE teachers are receiving little to no training in agricultural mechanics, could we continue to see teacher attrition issues similarly to Walker, et al. (2004)? If so, measures will need to be put into place by teacher education institutions, state SBAE associations, and industry to provide additional training to ensure teachers are proficient in teaching agricultural mechanics. If there are no interventions put into place to improve agricultural mechanics instruction, the cycle of untrained teachers will continue to spiral.

Introduction
Agricultural mechanics courses are taught by nearly 90% of Iowa School-Based Agricultural Education (SBAE) teachers (Rudolphi & Retallick, 2011), supporting Herren's (2014) notion that agricultural mechanics is one of the most commonly taught curriculum areas in SBAE Although popular at the secondary level, those who teach it expressed less confidence teaching agricultural mechanics coursework when compared to other agricultural content areas (Byrd, et al., 2015). Even with this self-reported lack of competency Byrd et al. (2015) reported that Iowa SBAE teachers identified agricultural mechanics as important in the curriculum. This lack of confidence seems to exist due to multiple factors. One of these factors was explored in depth by Shultz, et al. (2014) regarding correlations between SBAE teachers' perceived importance of the agricultural mechanics curriculum and their perceived lower-level capabilities for teaching agricultural mechanics. Further, this disconnect between importance and capability is

exacerbated by the failure to reach an agreement on how to evolve agricultural mechanics curriculum with the changing industry (Shultz et al., 2014). Curricular uncertainty related to focusing on specific career clusters, work in general, or life in general (Rojewski, 2002), can be a cause for outdated curriculum or a decline in agricultural mechanics courses offered at the secondary level (Shultz et al., 2014; Reis & Kahler, 1997).

When considering enrollment, Reis and Kahler (1997) found that students most often attributed reasons for enrollment to their parents and other personal and organizational factors Shultz et al. (2014), reported that although students can see the importance of agricultural mechanics courses, Shinn (1998) described secondary agricultural mechanics as being outdated and not cutting edge. This view of outdated and old-fashioned agricultural mechanics coursework has developed concerns, but those who are involved in developing the curriculum often fail to agree on what the new and improved curriculum should include (Shultz et al, 2014). With the discrepancy in mind, the question of who is the most qualified to what agricultural mechanics content should be included in the curriculum is critical. Further, the need for current SBAE teachers' knowledge to be utilized when establishing ongoing professional development needs and teacher preparation topics remains essential (Shultz et al, 2014).

Agricultural mechanics courses have a central goal of transferring practical knowledge and skills into real-world application (Phipps, et al., 2008). If students are not receiving the proper amount of training while they are in SBAE to be able to transfer knowledge, it could affect the likelihood they pursue a career in agricultural mechanics, whether in teaching or in another profession. When receiving coursework-related experience prior to teaching in a given subject area, higher self-confidence in regard to teaching the material has been reported by SBAE teachers (Burris, et al., 2010; Stripling & Roberts, 2012), By gaining the self-confidence to teach the material, one will also develop self-efficacy, or their "beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (Bandura, 1994, p. 71). Research has shown that those who participate in SBAE agricultural mechanics courses and have a positive experience are more likely to place importance on continuing their agricultural mechanics coursework at the post-secondary level (Wells, et al. 2013).

Competency and confidence in instructing agricultural mechanics courses is imperative for the success of a SBAE teacher and ultimately the SABE program. While most agricultural mechanics courses are grounded in hands-on experience, there are still a vast number of pre-service teachers who have had both secondary and post-secondary agricultural mechanics experiences, yet still feel uncomfortable or less knowledgeable teaching agricultural mechanics courses (Byrd et al, 2015; Wells, et al, 2013). Being a first-year teacher can be daunting to anyone, regardless of how much training they've received. Add to that the fear, anxiety, and the responsibility of handing dangerous equipment such as power tools and welding equipment, it becomes easy to see the need for proper education on these topics. Walker, et al. (2004) found that those teachers who left the profession completely or moved to another school did so because many did not enjoy teaching agricultural mechanics content. This could directly relate to the development of self-efficacy and previous experiences with an agricultural mechanics laboratory (Bandura, 1994; Burris et al, 2010; Stripling & Roberts, 2012). In creating a successful SBAE teacher, steps must be taken to ensure these future teachers are receiving adequate training in all subject matters entailed in SBAE, including agricultural mechanics. If SBAE teachers perceive

their own secondary education experiences in agricultural mechanics to be ineffectual, and are therefore skeptical of their own skills in the classroom, how can they be expected to create successful students?

Theoretical Framework

This research was guided by Ajzen's Theory of Planned Behavior. Ajzen (1991) stated that "general attitudes and personality traits are implicated in human behavior, but that their influence can be discerned only by looking at broad, aggregated, valid samples of behavior" (p. 181). Actual behavioral control is something that is more easily attained because it includes resources such as time and money, which in turn will, to some extent, increase the likelihood that the person is more likely to exhibit a behavior (Ajzen, 1991). Bandura (1982) also stated that perceived self-efficacy, a major factor in behavior, "is concerned with judgments of how well one can execute courses of action required to deal with prospective situations" (p. 122). If a person feels confident in performing, they will be more likely to do so (Bandura, 1982).

We operationalized this concept as the likelihood that beliefs developed by an SBAE teacher when themselves a student will influence how they behave when they are teaching, influencing what they will chose to teach. "Perceived behavioral control refers to people's perception of the ease or difficulty of performing the behavior of interest" (Ajzen, 1991, p. 183). This statement encompasses this study by stressing how people will perform depending on how easy or difficult the task seems to them. For example, in this study, SBAE teachers were questioned about how easy or difficult they perceived a task to be based on what they learned while in their high school mechanics courses. This survey resulted in exactly what Ajzen's Theory of Planned Behavior incorporates.

Looking more closely at Ajzen's Theory of Planned Behavior, we can see the central factor in the theory. This factor is the "individual's intention to perform a given behavior, with the assumption that the intention is how much effort the individual is planning to exert to perform the behavior" (Ajzen, 1991, p. 181). But this behavioral intention "can only find expression in behavior if the behavior is under volitional control" (Ajzen, 1991, p. 181). Therefore, if the person has no choice in the behavior being performed, then it does not qualify as an intention. The idea of perceived behavioral control is what makes the Theory of Planned Behavior different than the Theory of Reasoned Action (Ajzen, 1991). Perceived behavioral control can be used, together with intention, to predict behavioral performance (Ajzen, 1991).

The Theory of Planned Behavior requires four conditions be met in order to obtain accurate prediction. The first condition is that "intentions and perceptions of control must be assessed in relation to the particular behavior of interest and the specified context must be the same as that in which the behavior is to occur" (Azjen, 1991, p. 185). Azjen (1991) further stated that the second condition needing to be met is that "intentions and perceived behavioral control must remain stable in the interval between their assessment and observation of the behavior" (p.185). "The third requirement for predictive validity has to do with the accuracy of perceived behavioral control" (Azjen, 1991, p. 185). If these conditions are met, one should be able to obtain an accurate prediction of behavior. The relevance of accurate prediction of behavior in this study is that with the knowledge of this research and the findings of Byrd et al (2015) and Wells et al. (2013), one can confidently predict what constructs will be perceived by SBAE teachers as those

that they have proficient knowledge. Figure 1 below is a representation of Ajzen's (1991) Theory of Planned Behavior.

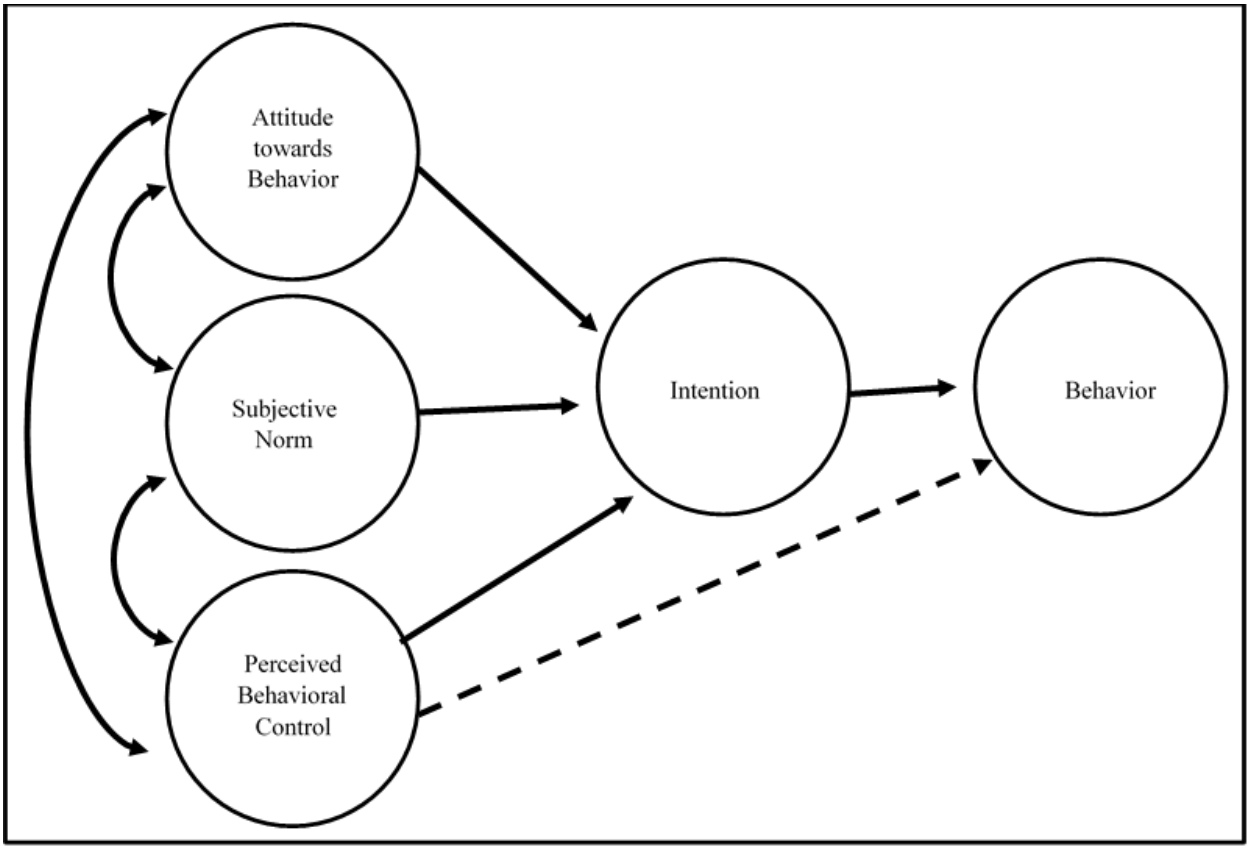

Figure 1. Theory of Planned Behavior (Adopted from Ajzen, 1991).

Purpose & Objectives

The purpose of this study was to describe the perception of training and skills current SBAE teachers received in their SBAE agricultural mechanics experiences related to specific agricultural mechanics constructs. This study aligns with the American Association for Agricultural Education's National Research Agenda (Roberts, et al., 2016) Research Priority Area 5: Efficient and Effective Agricultural Education Programs. There is a collective aspiration for basic education in agricultural mechanics (Ramsey & Edwards, 2011). The responsibility of teaching agricultural mechanics principles falls on SBAE teachers. "The knowledge and skill needed by agricultural education professionals will continue to grow as our society and needs if stakeholders become more complex" (Roberts, et al., 2016, p. 45). This study describes the strengths and shortcomings of SBAE teachers as encountered in their own SBAE experiences. The following research objectives were identified to accomplish this study:

1. Describe selected characteristics, both personal and professional, of Iowa SBAE teachers.

2. Describe the amount of agricultural mechanics training and skills received in SBAE while students as perceived by SBAE teachers.

Methods and Procedures

This descriptive study was conducted as part of a larger study in agricultural mechanics training which utilized survey research methods to summarize characteristics, attitudes, and opinions to accurately describe a norm (Ary, et al., 2006). A researcher-modified, paper-based questionnaire was used to address the objectives of the study. The instrument contained three sections. Section one included 54 skills related to agricultural mechanics. Skills were separated into five constructs including: Mechanic Skills, Structures/Construction, Electrification, Power and Machinery, and Soil and Water. Respondents were asked to use a five-point summated rating scale to rate their perceptions of the amount of training they received in each skill area while in SBAE. Section two consisted of 15 demographic questions relating to the teacher, and section three included nine questions about program and school characteristics. Content and face validity was reviewed by a team of five university faculty members with expertise in the fields of agricultural mechanics and agricultural education. Following the recommendations of Dillman, et al. (2009), the initial electronic version of the instrument was pretested through a pilot study with a group of 12 SBAE teachers in a nearby state. Suggestions from this pilot study led researchers to adopt a paper-based, rather than electronic instrument.

Reliability was estimated following the suggestions of Gliem and Gliem (2003) and resulted in reliability coefficients for training received while students in SBAE were calculated for each construct as follows: Mechanic Skills (α = .960), Structure and Construction Skills (α = .970), Electrical Skills (α = .910), Power and Machinery Skills (α = .970), and Soil and Water Skills (α = .820). Per George and Mallery (2003), the Mechanic Skills, Structure and Construction Skills, Electrical Skills, and Power and Machinery Skills constructs were regarded as Excellent, while the Soil and Water Skills construct was rated as Good. A summary of construct reliability coefficients is displayed in Table 1.

Table 1

Post-hoc Reliability Coefficients for Training Received at Secondary Level by Construct Area

Construct Area	Mechanics	Structures/ Construction	Electricity	Power and Machinery	Soil & Water
Amount of Training at Secondary Level	0.96	0.97	0.91	0.97	0.82

Data were collected through a census conducted during the Iowa SBAE teachers conference. This population was purposively targeted because of the convenience and their likelihood to be involved in additional professional development activities. Researchers distributed a questionnaire to all SBAE teachers (N = 130) in attendance and asked that it be completed by the end of the conference. Each participant was offered a power tool institute safety curriculum as an incentive for completing and returning the questionnaire. These efforts yielded a sample of 103 usable instruments for a 79.2% response rate. Non-response error was addressed following the suggestions of Miller and Smith (1983) by comparing respondents' personal and program demographic data to data provided from the Iowa Department of Education (2010). A Pearson's χ^2 analysis yielded no significant differences *($p > .05$)* for gender, age, highest degrees held,

years of teaching experience, or size of school community between respondents and the general population of SBAE teachers in Iowa. As a result, no further effort was made to obtain data from non-respondents. However, due to the purposively selected sample, data from this study should be interpreted with care and not extrapolated beyond the target population. Data were coded and analyzed using SPSS 24.0. Descriptive statistics (frequencies, percentages, and grand means) were calculated for each of the five constructs.

Results

The first research objective sought to describe the personal and professional demographics of participating SBAE teachers. The typical respondent for this study was a male teacher (*f* = 69, 67.0%), held a bachelor's degree (*f* = 64, 62.1%), had five or less years of teaching experience (*f* = 32, 31.1%), was in a single teacher department (*f* = 91, 90.0%) and taught in a rural school district (*f* = 80, 79.2%). Table 2 contains a summary of respondent characteristics.

Table 2

Summary of Respondents' Demographic Characteristics

	f	%
Gender		
Male	69	67.0
Female	34	33.0
Highest Level of Education		
Bachelor's Degree	64	62.1
Master's Degree	39	37.9
Years of Teaching Experience		
0-5	32	31.1
6-10	22	21.4
11-15	11	10.7
16-20	7	6.8
21-25	5	4.8
26-30	10	9.7
More than 30	16	15.5
Campus Location Designation		
Rural (population less than 5,000)	80	79.2
Small Urban (population between 5,000 and 20,000)	19	18.8
Urban (population greater than 20,000)	2	2.0
Number of Agricultural Science Teachers in Department		
1 Teacher	91	90.0
2 Teachers	7	7.0
3 Teachers	3	3.0

Describing the amount of agricultural mechanics training and skills received while students in SBAE as perceived by secondary SBAE teachers was the goal of research objective two. Fifty-four skills were separated into five constructs. These constructs included Mechanic Skills, Structures/Construction, Electrical, Power and Machinery, and Soil and Water. Individual items

represented specific skills within the constructs and were rated in terms of amount received using the following five-point summated adequacy scale: as *none, some, moderate, strong, and very strong.* Table 3 displays the grand means and standard deviations for each construct.

Table 3

Grand Means of Iowa Secondary Agricultural Teachers Training received at the Secondary Level by Construct Area

Construct	*M*	*SD*
Mechanics	2.04	0.87
Structures and Construction	2.62	1.14
Electricity	1.99	1.04
Power and Machinery	1.95	0.88
Soil and Water	1.70	0.69

Note: Based on a scale of 1: None, 2: Some, 3: Moderate, 4: Strong, and 5: Very Strong.

The amount of Mechanics training and skills received as a student in SBAE were rated as some (*GM* = 2.04, *SD=0.87)*. Teachers reported having an almost even distribution of training and skills with oxyacetylene cutting with 27 (27.8%) reporting none, 22 (22.7%) reporting some and moderate respectively, while 21 (21.6%) reported strong and only five (5.2%) reporting very strong training and skills received as students in SBAE. Interestingly, welding safety (*f* = 18, 18.6%), and arc welding (*f* = 11, 11.2%) were the two skill areas that had the highest reported amount of "very strong" training and skills reported. A majority of the SBAE teachers reported receiving no training and skills in Gas Tungsten Arc Welding (54.7%), Pipe Cutting & Threading (51.2%), Plumbing (52.3%), Fencing (53.6%), and Computer Aided Design (63.1%). Oxyacetylene cutting, shielded metal arc welding, and welding safety were the only three skills that the majority of SBAE teachers reported receiving moderate, strong, or very strong training and skills as a SBAE student. It is also interesting to note that none of the SBAE teachers reported receiving very strong training and skills as SBAE students in Oxy-propylene cutting, Gas Tungsten Arc Welding, Cold Metal Work, Soldering, Pipe Cutting, Plumbing, Fencing, or Computer Aided Design. Frequencies and percentages for each skill within the Mechanic skills construct are displayed in Table 4.

Table 4

Amount of Training and Skill Received at the Secondary Level of Agricultural Educators for Mechanic Skills

		None	Some	Moderate	Strong	Very Strong
Skill	*n*	*f*(%)	*f*(%)	*f*(%)	*f*(%)	*f*(%)
Oxy-acetylene Welding	97	27(27.8)	22(22.7)	22(22.7)	21(21.6)	5(5.2)
Oxy-acetylene Cutting	98	23(23.5)	23(23.5)	26(26.5)	20(20.4)	6(6.1)
Oxy-propylene Cutting	85	49(57.6)	20(23.5)	7(8.2)	9(10.6)	0
Plasma Cutting	92	45(48.9)	19(20.7)	14(15.2)	11(12.0)	3(3.3)
SMAW Welding (Arc)	98	19(19.4)	22(22.4)	23(23.5)	23(23.5)	11(11.2)
GMAW Welding (Mig)	95	35(36.8)	21(22.1)	15(15.8)	20(21.1)	4(4.2)
GTAW Welding (TIG)	86	47(54.7)	18(20.9)	13(15.1)	8(9.3)	0
Welding Safety	97	20(20.6)	19(19.6)	18(18.6)	22(22.7)	18 (18.6)
Metallurgy & Metal Work	86	36(41.9)	24(27.9)	14(16.3)	11(12.8)	1(1.2)
Hot Metal Work	85	39(45.9)	23(27.1)	14(16.5)	8(9.4)	1(1.2)
Cold Metal Work	85	41(48.2)	22(25.9)	11(12.9)	11(12.9)	0
Tool Conditioning	85	37(43.5)	20(23.5)	19(22.4)	9(10.6)	0
Oxy-acetylene Brazing	92	33(35.9)	25(27.2)	18(19.6)	13(14.1)	3(3.3)
Soldering	90	43(47.8)	23(25.6)	15(16.7)	9(10.0)	0
Pipe Cutting & Threading	84	43(51.2)	21(25.0)	15(17.9)	5(6.0)	0
Plumbing	86	45(52.3)	21(24.4)	15(17.4)	5(5.8)	0
Fencing	84	45(53.6)	17(20.2)	18(21.4)	4(4.8)	0
Mechanical Safety	90	29(32.2)	21(23.3)	15(16.7)	18(20.0)	7(7.8)
Computer Aided Design (CNC)	84	53(63.1)	16(19.0)	8(9.5)	7(8.3)	0

Table 5 displays the amount of Structure and Construction training and skills received as a student in SBAE was rated as some (*GM*=2.62, *SD*=1.14). Only 12 (12.9%) and 11 (12%) of SBAE teachers indicated that they received very strong training and skills in hand tools and shop safety respectively. All nine of the skills within the Structure and Construction construct area relatively evenly distributed between none, some, moderate, and strong training. It should be noted that a minimum of 19.4% of the SBAE teachers received no SBAE instruction for all nine structure and construction skill areas.

Table 5

Amount of Training and Skill Received at the Secondary Level of Agricultural Educators for Structures and Construction Skills

		None	Some	Moderate	Strong	Very Strong
Skill	*n*	*f*(%)	*f*(%)	*f*(%)	*f*(%)	*f*(%)
Hand Tools	93	18(19.4)	17(18.3)	24(25.8)	22(23.7)	12(12.9)
Power Tools	92	18(19.6)	17(18.5)	24(26.1)	24(26.1)	9(9.8)
Drawing and Sketching	85	23(27.1)	16(18.8)	26(30.6)	15(17.6)	5(5.9)
Concrete	86	29(33.7)	19(22.1)	21(24.4)	14(16.3)	3(3.5)
Material Selection	89	24(27.0)	22(24.7)	20(22.5)	19(21.3)	4(4.5)
Bill of Materials	90	20(22.2)	19(21.1)	23(25.6)	23(25.6)	5(5.6)
Fasteners	87	24(27.6)	28(32.2)	19(21.8)	13(14.9)	3(3.4)
Construction Skills	91	22(24.2)	18(19.8)	23(25.3)	22(24.2)	6(6.6)
Construction and Shop Safety	92	19(20.7)	16(17.4)	22(23.9)	24(26.1)	11(12.0)

Table 6 displays the amount of Electrical training and skills received as a student in SBAE was rated as none (*GM*=1.99, *SD*=1.04). Only 7 (8%) SBAE teachers indicated that they received very strong training in electrical safety. Six (6.7%) SBAE teachers indicated that they received very strong training and skill development in wiring skills and electrician tools. It should be noted that a minimum of 37.9% of the SBAE teachers received no SBAE instruction for all six Electrical skill areas.

Table 6

Amount of Training and Skill Received at the Secondary Level of Agricultural Educators for Electrical Skills

		None	Some	Moderate	Strong	Very Strong
Skill	*n*	*f*(%)	*f*(%)	*f*(%)	*f*(%)	*f*(%)
Electricity Controls	88	40(45.5)	25(28.4)	16(18.2)	5(5.7)	2(2.3)
Wiring Skills (Switches & Outlets)	90	37(41.1)	23(25.6)	17(18.9)	7(7.8)	6(6.7)
Electrician Tools	90	37(41.1)	22(24.4)	18(20.0)	7(7.8)	6(6.7)
Types of Electrical Motors	85	41(48.2)	24(28.2)	15(17.6)	4(4.7)	1(1.2)
Cleaning Motors	81	41(50.6)	21(25.9)	14(17.3)	4(4.9)	1(1.2)
Electrical Safety	87	33(37.9)	20(23.0)	18(20.7)	9(10.3)	7(8.0)

Table 7 displays the amount of Power and Machinery training and skills received as a student in SBAE was rated as none (*GM*=1.95, *SD*=0.88). Only eight (9.2%) SBAE teachers indicated that they received very strong training in four-cycle small gas engine services, small engine overhaul, and small engine safety. It should be noted that a minimum of 33.3% of the SBAE teachers received no SBAE instruction for all 15 Power and Machinery skill areas. A majority of the SBAE teachers indicated that they received no training in tractor driving (50.6%), tractor selection (53.8%), and tractor overhaul (56.3%).

Table 7

Amount of Training and Skill Received at the Secondary Level of Agricultural Educators for Power and Machinery Skills

		None	Some	Moderate	Strong	Very Strong
Skill	*n*	*f*(%)	*f*(%)	*f*(%)	*f*(%)	*f*(%)
Small Engine Services - 2 Cycle	85	32(37.6)	18(21.2)	22(25.9)	9(10.6)	4(4.7)
Small Engine Services - 4 Cycle	87	29 (33.3)	19(21.8)	21(24.1)	10(11.5)	8(9.2)
Small Engine Overhaul	87	32(36.8)	20(23.0)	18(20.7)	9(10.3)	8(9.2)
Small Engine Safety	87	31(35.6)	16(18.4)	18(20.7)	14(16.1)	8(9.2)
Tractor Service	82	40(48.8)	22(26.8)	14(17.1)	6(7.3)	0
Tractor Maintenance	81	40(49.4)	22(27.2)	14(17.3)	4(4.9)	1(1.2)
Tractor Overhaul	80	45(56.3)	22(27.5)	10(12.5)	3(3.8)	0
Tractor Selection	78	42(53.8)	24(30.8)	8(10.3)	4(5.1)	0
Tractor Operation	80	39(48.8)	22(27.5)	11(13.8)	8(10.0)	0
Tractor Safety	82	38(46.3)	20(24.4)	14(17.1)	8(9.8)	2(2.4)
Tractor Driving	81	41(50.6)	20(24.7)	12(14.8)	5(6.2)	3(3.7)
Service Machinery	81	38(46.9)	21(25.9)	14(17.3)	8(9.9)	0
Machinery Selection	80	37(46.3)	19(23.8)	18(22.5)	6(7.5)	0
Machinery Operation	82	37(45.1)	23(28.0)	16(19.5)	6(7.3)	0
Power and Machinery Safety	84	35(41.7)	21(25.0)	17(20.2)	8(9.5)	3(3.6)

Table 8 displays the amount of Soil and Water training and skills received as a student in SBAE was rated as none (*GM*=1.70, *SD*=0.69). Only 8 (2.4%) SBAE teachers indicated that they received very strong training in legal land descriptions. Two (6.7%) SBAE teachers indicated that they received very strong training and skill development in Global Positioning Systems (GPS). It should be noted that a minimum of 30.6% of the SBAE teachers received no SBAE instruction for all five Soil and Water skill areas. A majority of the SBAE teachers indicated that they received no training in GPS (54.8%), use of survey equipment (53.6%), differential leveling (61.8%), and profile leveling (61.8%).

Table 8

Amount of Training and Skill Received at the Secondary Level of Agricultural Educators for Soil and Water Skills

Skill	*n*	None *f*(%)	Some *f*(%)	Moderate *f*(%)	Strong *f*(%)	Very Strong *f*(%)
Global Positioning Systems (GPS)	84	46(54.8)	20(23.8)	9(10.7)	7(8.3)	2(2.4)
Use of Survey Equipment	84	45(53.6)	22(26.2)	9(10.7)	7(8.3)	1(1.2)
Differential Leveling	76	47(61.8)	24(31.6)	3(3.9)	2(2.6)	0
Profile Leveling	76	47(61.8)	23(30.3)	3(3.9)	3(3.9)	0
Legal Land Descriptions	85	26(30.6)	24(28.2)	15(17.6)	12(14.1)	8(9.4)

Conclusions

The purpose of this study was to describe the perception of the amount of training and skills current SBAE teachers received in their SBAE agricultural mechanics experience related to specific agricultural mechanics constructs. The results of this study aligned with the findings of Byrd, et al. (2015) in that SBAE teachers indicated that in the construct area of structures and construction, they felt the most prepared. However, it should be noted that the individual skills within the construct were evenly distributed between none and strong. Therefore, we can conclude the amount of training in the highest rated constructed was inconsistent among SBAE teachers. Although Byrd et al. (2015) was looking at college courses and teacher competency, the research is applicable when analyzing Ajzen's Theory of Planned Behavior's qualifications for accurate behavior prediction (Ajzen, 1991) and Wells et al. (2013) findings about exposure to specific agricultural mechanics topics and how that influences post-secondary decisions from experiences at the secondary SBAE level. If we want SBAE teachers to teach agricultural mechanics in their programs, then SBAE teachers need to be exposed to positive experiences. This is significant because according to Rasty, et al. (2016), the current agricultural mechanics content being taught or lack thereof to secondary students will impact the content those students will choose to teach in the future.

Our research focused on the amount of individual training and skills received during SBAE agricultural mechanics courses as perceived by secondary SBAE teachers. These findings concluded that all five construct areas provided little to no training as indicated by SBAE teachers. The three skills that were most frequently identified as "Very Strong" training included two skills from the structures and constructions construct; Hand Tools (*f* = 12.9%) and Construction and Shop Safety (*f* = 12%) and the skill that had the most responses of Very Strong training was Welding Safety (*f* = 18.6%). These findings are significant for post-secondary education of pre-service teachers in order to have an idea on what programs need to be required of pre-service students before entering the profession (Byrd, et al, 2015). Because the Grand Mean scores for all five-construct area were so similarly rated between the lowest (Soil and Water, *GM*=1.70) to highest (Structures and Construction, *GM*=2.62), it can be concluded that the SBAE teachers in this study are not receiving agricultural mechanics training in SBAE. If SBAE teachers are receiving little to no training in agricultural mechanics, could we continue to

see similar teacher attrition issues similarly to Walker, et al. (2004)? If so, measures will need to be put into place by teacher education institutions, state SBAE associations, and industry to provide additional training to ensure teachers are proficient in teaching agricultural mechanics. If there are no interventions put into place to improve agricultural mechanics instruction, the cycle of untrained teachers will continue to spiral.

The overall lack of training that the SBAE teachers received related to safety in agricultural mechanics is alarming at best. The lack of safety training will create high anxiety and avoidance in attempting to teach agricultural mechanics in SBAE. Furthermore, SBAE teachers who are forced to teach agricultural mechanics without the proper safety training could place SBAE students in harm's way leading to potential injuries or worse. It is critical to ensure SBAE teachers are properly trained on all safety guidelines and procedural steps associated with the tools and equipment in an agricultural mechanics laboratory for everyone's wellbeing.

Implications & Recommendations

This study has implications for current SBAE teachers, SBAE curriculum creators, SBAE students, pre-service SBAE teachers, professional development of in-service SBAE teachers, and for further research. The results of this study show that there is lack of instruction in the five agricultural mechanics construct areas at the SBAE level. Current SBAE teachers indicated that they perceived the SBAE agricultural mechanics training and skills they received to range between None to Some in each of the five constructs. Rosencrans and Martin (1997) identified basic knowledge and skills about agricultural technology as a key input for curriculum development. With the expressed lack of training received in SBAE, it is apparent that there will need to be training and personal development for both pre-service and in-service teachers to ensure that quality curriculum is developed and implemented. We recommend state teacher associations create an agricultural mechanics mentoring program where beginning teachers are partnered with expert teachers in the state to provided individualized training. We recommend the state association identify recently retired teachers who would be willing to volunteer their time and expertise to work with the young teachers over an extended period of time as opposed to traditional single shot training efforts.

Agricultural mechanics encompasses a large breadth of content and does not show any likelihood of narrowing in the future. What this means for SBAE teachers, along with curriculum creators, is that they will need to determine which skills are necessary for success at both the post-secondary level and in the workforce. The goal of instructors and education professionals should be to ensure that students leave SBAE programs with skills that make them employable and/or prepared to enter a post-secondary institution. Researchers should continue to probe individual skills within agricultural mechanics that SBAE teachers perceive as important to determine which skills are important to teach in the future. We recommend SBAE teachers conduct community needs assessments to identify the skills needed by their local workforce. Partnering with the local business and industry will aid in identifying community needs and assisting with employment incubation.

Keeping in mind research done by Wells et al, (2013) "it is conceivable to postulate that pre-service agricultural education teachers' attitudes about agricultural mechanics in secondary agricultural education are a likely determinant of the extent to which they pursue agricultural

mechanics courses at the post-secondary level" (2013, p. 233); it is imperative that students at the secondary level are exposed to the agricultural mechanics skills that are deemed essential. While not specifically identified by the data collected in this study, but anecdotally collected through conversations during the data collection process teachers indicated that their SBAE teacher allowed them to work on a multitude of other items and not actual complete the content being taught in class. This sends the wrong message to future SBAE teachers, allowing them to develop a negative attitude towards the importance of agricultural mechanics instruction. We recommend that all students enrolled in SBAE agricultural mechanics courses be required to participate in the agricultural mechanics content being taught.

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Reimagining Externships: A Teacher-Led Model for Individualized Experiences

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Abstract
With the increase in student enrollment in Career and Technical Education (CTE) courses, the need for enhanced professional development and learning opportunities is in demand. CTE teachers leave the field of education at higher rates than their general education counterparts. As such, a driving factor of attrition is the lack of high-quality professional development opportunities. Additionally, curricular materials that are meaningful, relevant, and enhance student engagement and success, and connections to mentors and professional experts in the field impact CTE teacher retention. Teacher externships have tremendous potential as professional development tools to increase teacher retention and academic rigor in CTE classrooms. Implications of the Teachers and Students for Community-Oriented Research and Education (T-SCORE) externship model are relevant to CTE and core content design, development, and implementation of integrative curricula in urban high school settings. Study findings may also guide CTE teachers in seeking socially and culturally appropriate materials and opportunities where necessary for optimal learning and culturally relevant pedagogy.

Introduction
Participation in Career and Technical Education has increased substantially in recent years, as the evidence base for authenticity and connecting classroom learning with the real-world continues to grow (Asunda, 2014). With growing numbers of CTE participants, concerns regarding the reach and quality of CTE programs, as well as the recruitment and retention of high-quality CTE teachers have emerged (Estes & McCain, 2019). CTE teachers leave the profession at higher rates (16.1%) than the general population (10.3%) during their first year of teaching (Deever et al., 2020). Further, the lack of didactic materials and meaningful connections with mentors affects attrition (Deever et al., 2020). However, particularly crucial to increasing teacher retention is the opportunity to work in an innovative environment, having access to meaningful professional development, and quality industry partnerships (Deever et al., 2020; Gaikhorst et al., 2015; Geiger & Pivovarova, 2018).

The professional development needs of CTE teachers are complex and different from core teachers due to their unique responsibility to teach beyond the classroom (Conneely & Hyslop, 2018). Teacher externships have tremendous potential as professional development tools to increase teacher retention and academic rigor in the CTE classroom. Traditionally certified CTE teachers may lack industry experience, and even for those who have it, fields such as technology or health care are changing faster than ever (Jacques & Potemski, 2014). Externships provide an

opportunity for educators to expand their networks and to base the design and implementation of classroom experiences on relevant, up-to-date content as well as the most pressing issues in the industry (Akgunduz & Mesutoglu, 2021; Bowen & Shume, 2020). Most professional development for CTE teachers focuses on building industry knowledge but does not provide opportunities to develop industry-informed content aligned with curricular standards and classroom instruction (Ermeling & Yarbo, 2016; Kyees, 2014). Moreover, evidence regarding the effects of teacher externships on students' achievement and classroom instruction is still limited. A variety of models and structures continue to emerge for the design and implementation of teacher externships, such as programs developed by various state education agencies and non-profits (Alignment Nashville, 2019; Educate Texas at Community Foundation of Texas, 2016; Oklahoma CareerTech, 2023) with most programs being designed unidirectionally by the industry partners as summer experiences for CTE teachers (Bowen & Shume, 2020; Choi & Linton, 2020; Kantrov, 2014). Some of the most notable research-based externship experiences include the National Science Foundation's Scientific Work Experience Programs for Teachers (SWEPT), Research Experiences for Teachers (RET) (Bowen & Shume, 2018), and the Ignited program (Ignited, 2020).

This paper aims to contribute to this growing area of practice and research by describing the Teachers and Students for Community-Oriented Research and Education (T-SCORE) teacher externship, a teacher-led Individualized Educational Externship (IEE) for CTE teachers in the Health Science Pathway in a midwestern educational landscape. We also share preliminary data on the effects of the experience on teachers' classroom practices and instruction.

The T-SCORE Individualized Educational Externship (IEE)

The T-SCORE IEE program is part of a National Institutes of Health funded project at an Academic Medical Center. The goal of the project is to increase diversity in the healthcare field by improving opportunities for students and CTE teachers to form professional networks and increase the authenticity and rigor of the content delivered in the classroom. Local high schools are organized in CTE career clusters focusing on various industries, one of which is the Health Science Pathway. Within these learning communities, students can learn through the lens of a career in which they may be interested. As an Academic Medical Center, the focus was on collaborating with teachers in the Health Science Pathway who participated in T-SCORE and the local Health Science Academy, a unique collaboration between the school district, university, and health system.

To better understand the curricular and professional needs of CTE teachers in our region, we conducted an IRB-approved assessment of the curricular needs of CTE teachers. Originally, 30 teachers engaged in T-SCORE were contacted and 18 responded for a response rate of (60%). To increase responses, the survey was forwarded to CTE coordinators in the state rendering 10 additional responses for a total of 28 teacher responses. Of the 28 teachers, 27 teachers indicated (96% response rate) that they use online resources for curriculum development purposes. This is due to a lack of resources that are relevant and engaging to students, are aligned to CTE competencies, and/or provide real-world learning opportunities. Moreover, nearly half of teachers (48%) in the sample reported their district did not provide a curriculum and identified a lack of sufficient and up-to-date book resources available for the students.

Based on the identified CTE teachers' curricular and professional development needs as well as the district's desire to partner with industry to improve both, T-SCORE started to offer Individualized Educational Experiences (IEE) for teachers in 2018. The goals of the IEEs are to provide teachers with an opportunity to meet with experts in the field, obtain feedback and increase rigor and authenticity, as it pertains to one specific unit in their curriculum.

Methods

Recruitment and Study Procedure

During the 2018-2019 and 2019-2020 school years, 13 educators participated in an IEE. These teachers were identified and recruited from the existing NIH SEPA project, T-SCORE, described above. T-SCORE staff submitted a call for participants to the partner school districts for teachers encouraging existing T-SCORE teachers to apply for an externship experience. Through this, snowball sampling was used to identify one additional teacher to attend the IEE with a T-SCORE participating teacher. All participants taught at the 9-12th grade level and the majority were identified through their district administration as CTE teachers through the T-SCORE grant or teaching within the local health science academy. Additionally, all selected participants were educators in three urban school districts in Kansas. As explained further in the results section, each teacher submitted a request (see Appendix), including the name of a possible partner for the experience and three possible dates.

The study team collected qualitative data by way of short informal interviews with the IEE participants as well as additional artifacts, such as agendas, notes, and summaries of the experiences. The interview questions focused on the impact of the IEE as a professional development model and its effect on student learning. Thematic analysis was used to code comments and establish themes from two open-ended survey questions. Transcripts were inductively coded by two team members to establish intercoder reliability and solve discrepancies. Codes were categorized into initial themes and grouped into coding categories that reflect the topic areas of the questions asked. A third member of the team independently reviewed the final codes and themes. All coders are familiar with T-SCORE and the IEEs making it easier to find sub-textual meaning within the transcripts.

Ethical Approval

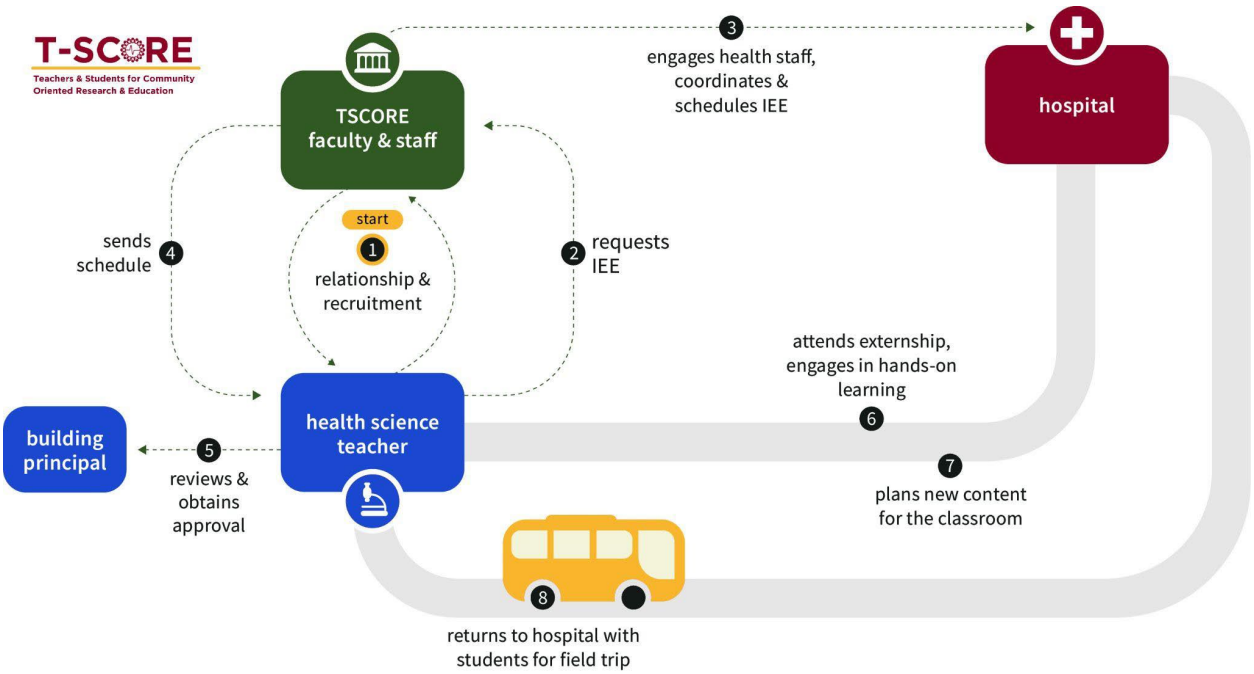
All study procedures were approved by the University of Kansas Medical Center Institutional Review Board. All participants obtained written consent.

Results

Our model

Rather than creating pre-packaged externship experiences for teachers, we sought to understand CTE teachers' curricular needs and how we could help boost what was going on in their classroom; hence the term "individualized" to qualify the experience T-SCORE staff also wanted to make sure that the opportunity was offered during the scheduled professional development time allocated for teachers by the district versus the summer when most teacher externships take place. Figure 1 depicts the model for developing T-SCORE Externships.

Figure 1. T-SCORE Model for Individualized Educational Externship



The planning phase of the externship was initiated by teachers who submitted a request to the T-SCORE team (See Appendix A). The request form provided a general outline of the externship and asked teachers to identify potential topics related to a specific unit as well as other potential collaborating teachers from the Health Science Academy who could benefit from the experience. The request also provided the next logistical steps needed for teachers to visit the Academic Medical Center during a district's professional development day (i.e. principal approval).

Once the request was received, the T-SCORE team gathered to start the **organizing phase**. The team, composed of k-12 educators, faculty and staff, brainstormed potential collaborators related to the topic requested and started reaching out. As outlined in the request form, at a minimum each IEE provided the following:

1. The T-SCORE team consulted with experts working in the field identified by the teacher. The focus was for teachers to share the targeted unit and receive feedback around authenticity and relevance, that is, the degree of transferability of students' activities and curricular content to real-world health science clinical and research work settings (Beier et al., 2019).
2. Teachers met professionals in different fields, found mentors, and expanded their professional network.
3. In consultation with experts, the T-SCORE team provided teachers with hands-on learning opportunities to increase their knowledge and understanding of the topic at hand.
4. In collaboration with faculty and staff, teachers designed an educational experience for students during the same unit (i.e. field trip, guest speaker, etc.)
5. Teachers accessed information and contacts for potential future units.

Once a draft of the schedule for the teacher IEE was crafted, the T-SCORE team requested feedback from the participating teacher and completed all the logistical aspects needed for the day to run successfully.

Finally, **the implementation phase** involved two visits to the Academic Medical Center: 1) An individually-tailored, one-day externship with health science professionals, researchers, and educators for the lead teacher(s) and a potential co-teacher(s) and 2) another experience for the whole class afterward on a different date but on the same unit/topic. Table 1 provides a sample of IEEs that took place during the 2018-2019 and 2019-2020 school years.

Table 1. Sample Individualized Educational Externships

Externship Domain	Teacher Externship Activities	On-Site Student Experience
Content Area: Introduction to Health care Unit Title: Asthma and Health Careers https://www.kumc.edu/tscore-lift-ks/teach/asthma-and-the-clean-air-project.html	• Obtained feedback on curricular unit and discussed potential hands-on labs in the classroom. • Met with an Environmental Health Specialist to discuss connections between asthma and the environment and a potential end of the unit assessment. • Better understood health disparities related to asthma in the local community. • Identified mechanisms to communicate with community stakeholders to address asthma as a public health issue. • Gained an understanding of the School of Health Professions (i.e., physical therapy, health information management, occupational therapy, audiology).	Educational experience to local health system campus to learn about the physiology of asthma, community and public health, and respiratory care careers
Content areas: Introduction to Health Care and Mathematics Unit Title: Probability and Public Health https://www.kumc.edu/tscore-lift-ks/teach/probability-and-public-health-–-the-chance-the-researcher-project.html	• Met with biostatisticians to understand the role of applied statistics in biological and medical sciences for public health practice. • Discussed methods of data collection with faculty from the Dept. of Preventive Medicine and Public Health. • Integrated authentic data gathering and analysis skills applicable to community health advocacy, (i.e., photo-voice, community health assessments, observational interviews, and assessing community stakeholders) into their unit. • *Learned about community advocacy in the region.* • *Acquired the contacts and resources needed for an end of unit project focused on health advocacy.* • Explored health careers involving mathematics, medical informatics, health	Students attend a Graduate Students Research Conference at KU Medical Center to present their advocacy projects in a poster format.

	information management, public health, and biostatistician.	
Content areas: Economics and ESL for the Health Science Academy Unit Title: The Change Project: Health Advocacy & Mobilizing Community https://www.kumc.edu/tscore-lift-ks/teach/the-change-project-mobilizing-change.html	• Met with Faculty in Preventive Medicine to discuss Upstream Social Determinants of Health in the county. • *Learned about Community Based participatory research and how it can be integrated into their teaching.* • Gained an understanding of different methods of data collection (i.e. interviews, photovoice, storytelling) that researchers use in community advocacy work. • *Met and connected with community partners and stakeholders to collaborate in organizing a Community Job Fair (I.e.* Women's Employment Network, KC Social Innovation Center, Hire KC Initiative and Summer Employment Program, KU Health System Talent Acquisition, Job Fairs at KU Hospital).	A group of selected students attended the teacher externship with their teachers to empower them to lead the process of organizing a Community Forum and Job Fair at their high school.
Content areas: Mathematics and Science for the Health Science Academy. Unit title: Clean Water	• Connected with an environmental health researcher, to learn about potential opportunities for field trips. • Obtained feedback on their existing curricular unit, particularly about how to design a lab and fundraise money for Drinking Water Test Kits. • Learned about federal, state, and local agency websites with resources around water safety they can use in their classroom instruction. • Discussed with experts the process of assessing and collecting data on environmental issues. • Traveled to a Water Treatment Plant to learn the science and engineering behind the water treatment process and how it impacts environmental and human health. • Connected with experts in the refugee and immigrant populations to learn about community resources for their students. • Learned about non-clinical jobs in healthcare.	Students traveled to the Medical Center to learn about water testing, and how to disseminate information on water quality at their school.

In what follows, we provide a walk-through of an IEE by one of the participating teachers. Mrs. Richardson[1] submitted a request for an IEE to increasing the relevance and authenticity of a unit focused on Asthma with the following essential question: *How does Asthma affect the teenage body?* In her request, Mrs. Richardson noted that she was particularly interested in developing hands-on activities for students to understand the physiology of asthma as well as connecting with professionals in different healthcare fields who contribute to the prevention and treatment of asthma. During her IEE, Mrs. Richardson met with faculty in the Department of Population Health at the University of Kansas School of Medicine to receive feedback on her unit. As reported in her evaluation of the experience, Mrs. Richardson walked away with a plethora of resources including contacts at our local health department and two major curricular additions to her unit:

- **An entry event to kick start the unit** in the form of an Educational Experience at the Medical Center for students. During the visit, students learned about the physiology of breathing through a hands-on skills lab using stethoscopes and pulse oximeters and learned about asthma control using peak flow meters and spirometers. Additionally, students were introduced to community-based research, discussed methods of air quality measurement, risk factors associated with measurements, and how to apply these principles to larger public health issues. Students also learned about careers associated with asthma, including respiratory therapists, primary care doctors and nurses, pulmonologists, and environmental epidemiologists.

- **An enhanced end of the unit project**. Using observation and a survey of those attending the school, students explored the air quality of their school and identified ways in which environments they inhabit (home, school, work) have an impact on their ability to thrive. At the culmination of this project, students identified community organizations in which they wanted to share their findings and communicated with those community stakeholders to present their findings. Ultimately, students focused on bringing awareness about asthma to the community.

We conducted interviews with teachers after their IEE experience. Our analysis of the data suggests that IEEs were beneficial to teacher curriculum development and student interest in the health sciences. Three main themes emerged from thematic analysis of the data: Professional Knowledge, Relationships and Networks, and Student Impact.

- **Professional Knowledge.** Throughout the interviews, teachers' commented on how the IEE externship increased their knowledge of health care and research practices. One such example was Teacher (B) who stated, “I really liked the biostatisticians and the researchers who helped us expand our view of what data collection should look like, what kinds of questions should students be asking, bias, things that I didn’t know how to teach the kids. I left the day feeling like our project could be better next year because of our externship experience.”

[1] Name is used with permission throughout this article.

- **Relationship Building and Network Connection.** Teachers overwhelmingly stated that their personal network increased not only with professionals in the field but with professionals in their building and district. Teacher (A) stated, "I found out that we have a person here within the district and made contact with that person. She is more than happy to test my students, and screen my students, so we can use the information that we learned from audiology at KU and bring that back to the classroom." Through the IEEs, teachers learned how to use in-district resources within their own health and student services departments to increase professional capacity. Additionally, Teacher (B) stated that "Urban students don't have many opportunities to get connected with experts in our community. So one of the most essential pieces of the externship is us getting connected with people in our community, and getting their valuable insights, and incorporating that in our project." Enforcing positive relations built at the student-professional level are just as important as teacher-professional relationships. Teacher (B) continued by stating it is important for students to have "potential mentors, or somebody that [they] can ask questions because we [teachers] are definitely not the experts on a lot of things health-related." Additionally, the IEEs are widening their reach and impact on student perceptions, relations, interests, and knowledge about the different professions in medicine.

- **Student Impact.** Teachers commented on how the IEEs impacted student engagement and real-world connections with the content. Teacher (A) stated, "Every day we get the question, 'Why do we have to learn this, why does this matter?' and this is framing our lessons and our projects in a really meaningful way." Student-oriented framing for the lessons allowed teachers to utilize externship resources and experiences for the greatest impact on student knowledge. Another teacher felt their students are not used to hearing the word yes but experienced empowerment, finding their voice, or felt that they have a say in what happens in their community (Teacher (B)) from the projects implemented after teacher IEEs. Therefore, individualized experiences compel teachers to make projects and lessons more relevant and meaningful to students.

Discussion

As CTE pathway participation increases, the need for strengthening CTE professional development opportunities for teachers, such as IEEs, continues to grow (Hasselquist & Graves, 2020; Shernoff et al., 2017). Teachers' professional development, particularly non-core teacher PD, is usually generic, lacks relevance, and fails to cultivate teacher ownership (Heermann & Grossman, 2021). Nevertheless, more than any others, CTE teachers are expected to facilitate workforce training that is up-to-date with the evolving workforce needs (Conneely & Hyslop, 2018). Providing IEEs for teachers through T-SCORE demonstrated key benefits in terms of professional development and network expansion. Teachers were able to meet a variety of professionals in their local medical center and rely on their expertise to answer questions and inform lesson content. Similar to what has been previously reported in the literature, the key to the success of the IEEs was their alignment with course competencies, clear and tangible outcomes, and teachers' needs as the driving force of the experiences (Macias, 2017; Szabo, 2022). Additionally, teachers that participated in an IEE cited worthwhile benefits for their students including opportunities to connect classroom learning to real-world experiences and

dive deep into the "why" of the classroom content. CTE educators must have better resources to develop robust and relevant curricula to bridge them to healthcare careers and opportunities.

Lessons learned from T-SCORE IEEs include letting teachers initiate the experiences, aligning visits to industry partners with a specific set of lessons and competencies, providing support during implementations, and including cross-discipline experiences for teachers. Previous literature has emphasized that outside context experts, such as university professors and researchers, collaborating with teachers can develop their professional knowledge and thus provide an avenue for much-needed PD in CTE (Ermeling & Yarbo, 2016). Additionally, even more important, is to provide a clear externship request and planning process with ample support from the partnering institutions. This is particularly true when collaborating with under-resourced school districts, both urban and rural, where teachers tend to devote longer hours to delivering instruction, and fewer to professional development (Garcia & Weiss, 2019). In other words, industry partners "waiting for them to come" will continue to host the same, and already properly resourced, districts unless they engage in partnerships aimed at addressing some of the barriers faced by teachers in high-poverty schools. Further, having teachers initiate their own externship, and providing them with individualized experiences around their needs and schedules will increase the likelihood that CTE teachers can attend the externship and that they will incorporate what they learn in their curriculum design and implementations. Finally, aligning externships to a particular curricular unit allowed for collaborations to become a reality by making interactions with outside context experts at the local Academic Medical Center key components of the unit addressing the well-documented challenges that under-resourced school districts face in forming partnerships (Bridwell-Mitchell, 2017).

The impact of the study was limited due to the start of the COVID-19 pandemic and subsequent closing of the local Academic Medicine Center to non-essential personnel. Additionally, externship experiences can be limited by competing interests such as courses that can increase the salary schedule for teachers or limited time to complete professional development opportunities (Eroğlu & Donmuş Kaya, 2021). The current study took place in one type of school district, urban, and may not provide the best insight into how suburban and rural educators access externships and other types of professional development (Bowen et al., 2021; Fauziyah & Uchtiawati, 2017; Pharis et al., 2019). Future research should examine the unique geographic and cultural factors that influence Kansas educators' access to professional development opportunities. Additionally, future implications for IEEs as teacher externships could award continuing education credits for engagement with the IEE and examine motivations for competing externships. Along with this, local medical centers can focus on increasing their engagement with CTE teachers in the health science pathway to increase the relevance of real-world application in classroom-based learning.

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Appendix
IEE Request form

T-SCORE Teachers & Students for Community Oriented Research & Education

Name:

T-SCORE Professional Development: Teacher Externship

BACKGROUND: As a part of the T-SCORE professional development and the district's desire to provide engaging experiences for their teachers, we will be planning **individualized teacher externships for each teacher in [Insert MONTH(S) and YEAR]**.

GOAL: to provide opportunities to bridge classroom learning with the real-world. Each teacher will:

- Meet with experts in the field to present your unit, obtain feedback and increase rigor
- Deepen understanding of your unit's topic(s) and identify/develop relevant soft skills
- Increase collaboration with KUMC faculty; gain a mentor
- Design an educational experience for your students (i.e. field trip, guest speaker, etc.)
- Access information for potential future units

TEACHER NEEDS: **Is there anything that you would like to learn more about?** A topic, skill, or idea? Please list your top 4 ideas you would like to explore (see examples in blue below):

1. Health disparities & connection to body systems (ie stress due to health disparities and the effects on the cardiovascular system, etc)

2. Epidemiology & public health - are different socioeconomic/minority populations more vulnerable to certain outbreaks?

3. Health disparities and genetics/evolution/ecology (health disparities based on the environment, other organisms besides humans affected, how the health of other organisms relates to humans)

4. How stress from poor living conditions/minority status/socioeconomic status affects the body (similar to 1 but more specific), physiological differences in these populations vs. people in healthy living environments/non-minorities/high socioeconomic status

COLLABORATION PARTNER: Whom would you like to collaborate with? We encourage you to invite a core teacher that you can collaborate with.

Partner Name: N/A Partner Email: N/A
Subject: N/A
Potential connection to your unit: N/A

DATES: **What dates would be best for your externship?** (see examples in blue below)
Choice 1: April 24th
Choice 2: May 1st
Choice 3: April 27th

LOGISTICS: Once a date has been determined for an externship, you will need to:

1. Obtain permission from your building principal.

2. Request a substitute.
3. Communicate with the relevant district or building staff once you receive permission and have secured a substitute.

Post-Secondary Adjunct Instructor Career Path Exploration

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Introduction

This article provides information about a career as an adjunct instructor. This information may be useful in helping those who are attempting to pursue a career in post-secondary education and those who are interested in adjunct or part-time instructor work. The following information will be presented in the order of responsibilities, how to become one, pay and benefits, job outlook, and an interview with someone currently working in this occupation.

Responsibilities:

Adjunct instructors are not full-time employees of a college or university. Rather, they are part-time employees who often teach classes for multiple institutions or work another full-time professional position elsewhere while teaching as an adjunct. Stenerson, Blanchard, Fassiotto, Hernandez, and Muth (2010) in a conversation, stated that, "they are often the 'outside' professionals teaching in the applied and specialized career fields such as nursing, paralegal, and design programs." (p. 24). Adjunct instructors may perform many of the basic duties of being an instructor, like giving and grading class assignments. However, other duties may depend on the institutions at which these instructors work. For instance, Brown (2007) stated that her university, "provided [her] with a full set of materials, including a syllabus, PowerPoint slides, assignments, and a final exam." (p. 42). This providing of materials means that some of the preparation for teaching classes was offloaded, but at other institutions may be required of the adjunct. Giess and Lenius (2016) suggested that it was important to "Check the institution's faculty handbook to learn the role, responsibilities, salary and benefits of adjunct faculty to gain insight into the overall role of adjuncts." (p. 37).

How to Become an Adjunct Professor or Instructor

Dademo (2022) stated that the qualifications of an adjunct may vary depending on the institution or class being taught. Dademo (2022) noted that a master's degree is often necessary but it may be possible to adjunct with extensive industry experience. Most adjunct instructors follow one of two paths, either have multiple jobs at multiple universities or teach part time while maintaining a full-time, professional position (Dademo, 2022). Johns, Yucht, Holland, Nabinger, and Elswit (2010) noted that adjunct instructors in library sciences often follow that path as many are full-time librarians by profession.

Dademo (2022) noted the process for finding multiple positions as an adjunct. The process starts with building a curriculum vitae. This document lists all your experiences and qualifications, which you can then send out to multiple universities and colleges. In general, adjunct teaching requires considerable self-motivation. To be an adjunct is to have a love for teaching and learning. Because pay is often not that great, it requires being motivated intrinsically by the act of educating.

Pay and Benefits
Adjunct instructors do not receive significant compensation per course. In a survey completed by the American Federation of Teachers more than 41% of respondents said they were paid less than $3,500 per course. This comparatively low compensation means that teaching multiple courses, or having a primary full-time job is the most cost-effective way to be an adjunct. Benefits often come in the form of professional development and intrinsic growth. Johns, Yucht, Holland, Nabinger, and Elswit (2021) noted that, ". . . even though the pay was low, the experience remained as enriching and fun . . . ." (p. 41).

Job Outlook
The Bureau of Labor Statistics projects that the demand for post-secondary teachers will grow in the years to come. Specifically, positions for both full and part-time faculty are projected increase by 12%. Stenerson, Blanchard, Fassiotto, Hernandez, and Muth (2010) stated, "Adjuncts are an important piece of the professoriate and are heavily used, especially at community colleges and in professional programs." (p. 23). Although this may vary depending on state and/or subject areas, the use of adjunct instructors is currently growing and provides professionals with the chance to teach alongside their own full-time careers.

Interview with Christine Stiles an Adjunct Instructor of Information and Communication Sciences at Ball State University
Christine Stiles currently works as an adjunct professor at Ball State University and has previous experience in higher education at Ivy Tech Community College and Southwestern Michigan College. Her full-time position is at InfoSys, as the Senior Principal of Education, Training and Assessment. Christine Stiles was interviewed by Edmund Osburn and Dr. Edward Lazaros on May 26, 2023. The interview questions, along with Christine's answers are listed in the following sections:

Figure 2: Christine uses E-mail to contact students and co-workers.

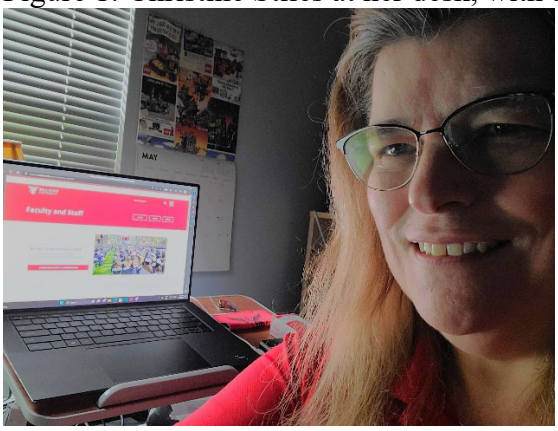
1. What previous experience prepared you for this position?
My bachelor's degree is in secondary education and foreign languages. I completed a Master's Degree in Information and Communication Sciences. I assumed a position as an adjunct faculty member at Ivy Tech Community College. I worked in three of the different regions within that

institution. I then worked a full-time position with Ivy Tech during my second year in their software development department. I spent five years teaching for Ivy Tech Community College. I then took a job at Southwestern Michigan College and was the department head of their software development program for five years. Around 2020, I shopped my resume around and secured employment with Infosys, where I have worked for three years. A Professor and Associate Director from the Information and Communication Sciences program contacted me about teaching as an adjunct instructor for Ball State University in the Information and Communication Sciences program. My experience in Infosys has helped me bring life experiences into the classroom. Adjuncts who come from a corporate setting have an edge because they can close the gap between what they learned in school and what is used in the real world.

2. What does a typical work day look like for you?
It is a lot of late evenings because I usually can't start working on my teaching work until after my day job at Infosys. Teaching adjunct for me is like a second shift job. I start by checking my e-mail to see if there are any issues that I need to address immediately. I want to make sure that am available to help students when they need help, which is important to me. I access the Canvas Learning Management System (LMS) course site. I will often post announcements and reminders for my students in Canvas. I want to make sure that students know what is expected in the course. I try to grade student work in a timely manner and provide feedback so students can continue to progress through the assignments in the course.

3. What is your favorite part about your daily work?
The in-class time is the best time for me. The three hours that I get to spend in the class with the students every week is my favorite part. I like interacting with students and helping them with their journey. I like to meet people and build my network and be available in the future for them. We try to have a strong alumni network.

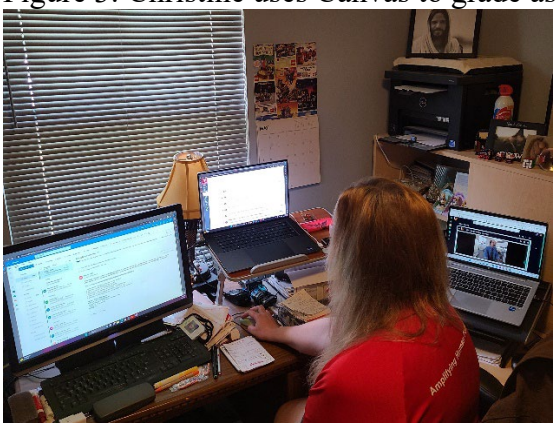
Figure 1: Christine Stiles at her desk, with the Ball State Webpage open.



4. What are the main challenges you encounter with your daily work?
If I send out an e-mail to someone else and I need a response to move forward with the things that I am doing and they don't respond, this is problematic. The communication skills of others is really telling in terms of if you can work well with them. The main challenge is trying to get people pulled into the activities that I am working on and getting their active participation.

5. What kinds of fun technology do adjunct instructors get to use?
The Center for Information and Communication Sciences laboratory is nice to use. I like to use Augmented Reality (AR) and Virtual Reality (VR) with students. Trying to figure out ways to integrate these technologies into what we do is exciting. When I first came to Ball State University, I was not familiar with Canvas, but I was familiar with other LMS systems. Canvas has help features that support what I do. I enjoy working with Wingspan which is an LMS. I also enjoy using the Springboard LMS.

Figure 3: Christine uses Canvas to grade assignments and keep track of her gradebook.



6. What advice would you give someone who would like to get into this career?
Don't make being an adjunct your full-time job. I hope that they are getting into this to give back to students and lend their knowledge to students. I don't think you can make a decent income as an adjunct unless you can piece together courses from different campuses. Working as an adjunct as their primary job would be difficult without a partner at home providing financial support.

Conclusion
When pursuing a career as an adjunct instructor it is important to remember that it is not a full-time job. Adjunct instructor pay is often low, but the work can be flexible and fit around a separate full-time position. The value that adjunct instructors bring to the classroom is the real-world experience they can offer. It is important to have a passion for teaching and to find meaning in educating the next generation if you want to become an adjunct instructor.

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