

Identifying Relationships and Differences Related to Arkansas FFA Chapter Performance in Career Development Events

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Abstract

Career Development Events (CDEs) have been part of the National FFA Organization since its beginning and are still an integral component of school-based agricultural education (SBAE) programs. A priority of the organization is to “Expand equitable opportunities for all students to develop their potential for premier leadership, personal growth, and career success through FFA experiences and opportunities.” To determine if progress has been made toward this goal, FFA member participation in various aspects of National FFA Organization activities, including CDEs, needs to be described. Using the Multi-level Model of School-Effectiveness, this study identified relationships and examined differences related to FFA chapter CDE success in Arkansas. Based on results of this study, less than half of all chapters in the state participated in each of the CDEs, indicating lower levels than found in previous studies. According to team scores, students from the Southern District are disadvantaged compared to the other districts while students from the Northwest District may have an advantage compared to other districts. Affiliated chapters had statistically higher levels of participation and performance statewide. We recommend increasing efforts in the state to support students at schools with competitive disadvantages and determining ways to fund chapter affiliation membership to maximize opportunities for students.

Introduction

In 1926, vocational agriculture students met at the National Livestock Judging Contest at the American Royal Livestock and Horse Show leading to the formation of the student organization known as the Future Farmers of America in 1928 (National FFA Organization, 2023). Almost a century later, livestock evaluation, still popular among student members of the National FFA Organization, is one of many Career Development Events (CDEs), which are an integral component of many local school-based agricultural education (SBAE) programs. Today, a priority goal of the National FFA Organization (2022) is to “Expand equitable opportunities for all students to develop their potential for premier leadership, personal growth, and career success through FFA experiences and opportunities” (p. 1). Ball et al. (2016) proffered CDEs help students develop career goals, gain leadership skills, and acquire life skills, all of which have the potential to help the National FFA Organization accomplish their goal. However, to determine if progress has been made toward this goal, FFA member participation in various aspects of National FFA Organization

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activities, including CDEs, need to be described. In addition, factors contributing to equitable opportunities for student success in CDEs also need to be explored, giving rise to the need for this study.

Literature Review/Conceptual Framework

According to Talbert et al. (2022), CDEs provide students with opportunities to apply knowledge learned in the classroom through a competitive activity. The goal of CDEs “is to develop individual responsibility, foster teamwork, and promote communication while recognizing the value of ethical competition and achievement” (National FFA Organization, 2023, p. 67). CDEs on the national level encompass a wide range of topics including Agricultural Technology and Mechanical Systems (ATMS), Horse Evaluation, Floriculture, Forestry, Livestock Evaluation, and Veterinary Science among others (National FFA Organization, 2023). Arkansas offers 19 CDEs in which students can participate where teams must qualify at the district level followed by the state level to advance to the national CDE (Arkansas Agricultural Education and FFA, 2023). However, previous research indicated that participation in CDEs has been lower than desired with fewer than half of FFA members participating in an event (Talbert & Balschweid, 2004). Although Kansas schools had higher participation levels in the specific CDEs of Livestock Evaluation, Dairy Cattle Evaluation, and Horse Evaluation with over 75% of chapters training a team, lower participation levels were found with other CDEs (Harris, 2008). Although these studies suggest somewhat lower levels of student participation in CDEs, no other literature was found directly related to CDE participation levels, highlighting a gap in the aging literature and a need for more data. One potential reason for lack of student participation may be teachers’ knowledge of and interest in particular CDEs (Dreher & Robinson, 2024; Goodwin & McKim, 2020), as research has shown that teachers favor certain CDEs over others. In Oklahoma, SBAE teachers reported higher levels of interest as compared to their confidence in preparing students for 32 of the 33 different CDEs offered in the state (Dreher & Robinson, 2024).

In addition to student participation, teachers’ philosophies about the purpose and implementation of CDEs have also been studied. Herren (1984) found winning, as opposed to learning, was the primary goal for many advisors who coached a Livestock Evaluation team. Similarly, Croom et al. (2009) reported a large majority of teachers perceived competition and achievement as being important or very important. However, more congruent with the National FFA Organization priority goal, some teachers have indicated student development and extension of classroom learning should be the priority of CDEs (Edwards & Booth, 2001; Goodwin & McKim, 2020; Russell et al., 2009). Teachers’ philosophies about CDEs can affect how they prepare students for participation. Pauley (2019) outlined a contentious philosophical debate in SBAE regarding CDEs, stating that many teachers believe CDE preparation should be incorporated into classroom instruction, while others believe CDE preparation should augment classroom instruction outside of class time. Regardless of teachers’ philosophy, Dreher and Robinson (2024) recommended professional development for teachers related to CDE implementation and preparation.

Although teachers are crucial to CDEs, other factors have also been identified which can influence student success. Herren (1984) found teams from small schools successfully competed with teams from large schools and the number of students in the local program did not impact success at the national level. In the national ATMS CDE, Franklin and Armbruster (2012) found students from the Central Region consistently performed better than students from other regions; they questioned what school and SBAE program factors might have contributed to these results. Oyirifi (2016) conducted an extensive investigation of student success among all national CDEs and found FFA chapters from Texas, California, and Missouri had the highest accumulation of top ten placings. Oyirifi’s results showed “the FFA population of a state is a direct contributor to the number of raw competitions won” (p. 33). However, after adjusting for top ten placements in relation to a state’s population using relative advantage scores, Virginia, Connecticut, and Missouri experienced higher levels of success. Accordingly, Oyirifi recommended examining student

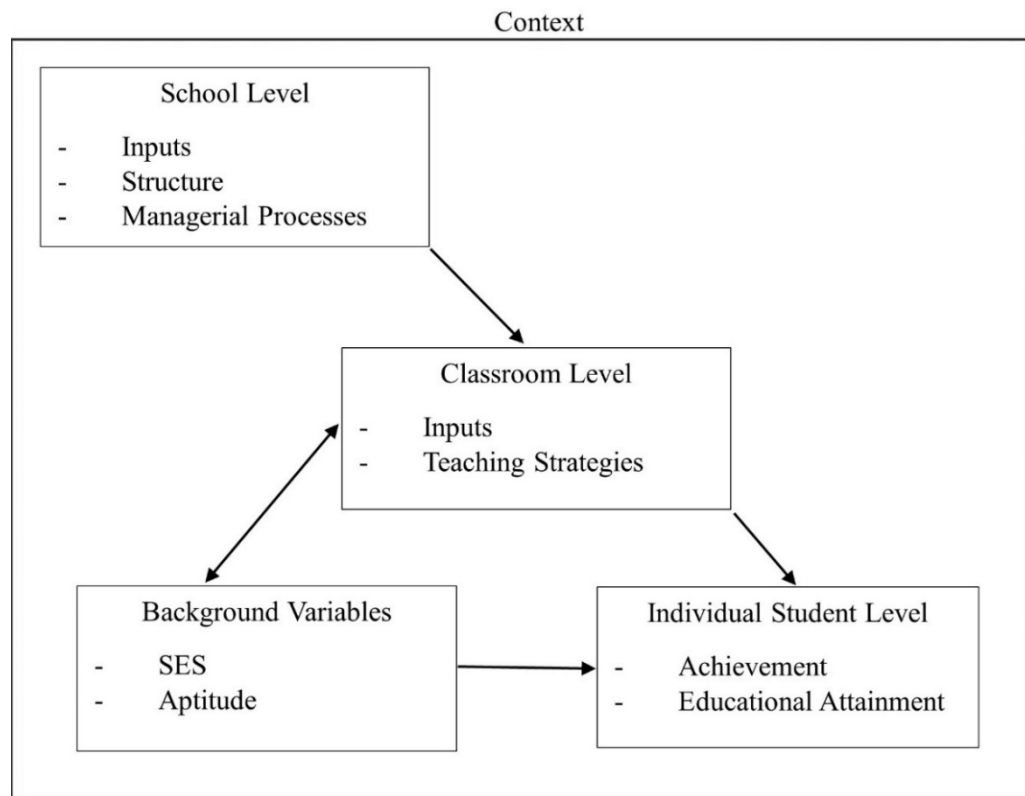
success in CDE placings by using a combination of raw placings and relative advantage scores to determine the effectiveness of SBAE programs at preparing students. Incongruent with Franklin and Armbruster (2012), Oyirifi found no differences among FFA regions when comparing among all national CDEs, indicating inequities in placings were not a result of geographic location.

Since FFA population directly relates to the raw number of national CDEs won by a state, according to Oyirifi (2016), states and local chapters may be motivated to increase their FFA membership through affiliation. During the 2009-2010 school year, the National FFA Organization piloted an affiliation program in five states allowing chapters to pay a flat dues structure letting all students in the SBAE program become FFA members (Sheehan & Moore, 2019). The program was subsequently adopted at the national level and is now available to all local FFA chapters. Chapter affiliation eliminates the previous student-paid dues structure, which has allowed more equitable FFA membership by students (Sheehan & Moore, 2019). Sheehan et al. (2023) reported teachers in affiliated chapters conveyed affiliation improved student participation in all FFA events including CDEs. However, data published by Sheehan and Moore (2019) showed by 2017 almost 75% of chapters were unaffiliated. Conversely, over half of the national FFA membership was comprised of FFA members who were part of an affiliated chapter, indicating unaffiliated chapters contribute a smaller portion of the national membership. Participants in the Sheehan et al. (2023) study suggested affiliation has been beneficial in terms of student participation, but paying the affiliation fee has increased the fiscal burden for the FFA chapter.

Smith and Thapa (2022) proffered that students' CDE performance is an indicator of their academic success and achievement. With this in mind, the Multi-level Model of School-Effectiveness (Scheerens & Stoel, 1988) can be applied to the FFA component of the school-based agricultural education three circle model. Scheerens and Stoel's model (Figure 1) suggests there are contextual variables at three different levels of a school system affecting student achievement. According to Scheerens and Stoel (1988), "The most straightforward way of thinking about these cross-level relationships is the idea that higher levels should provide facilitative conditions for the central processes at lower levels" (p. 19).

Figure 1

Multi-level Model of School-Effectiveness (Scheerens & Stoel, 1988)



At the highest level (school level), inputs such as school size, structure, and managerial processes impact the classroom level. We operationalized school level inputs in the context of an FFA chapter to include the size of the school in which the chapter is located in terms of total enrollment (grades 9-12) and the managerial decision to operate the chapter as affiliated or unaffiliated. When consulting the literature on the inputs at the school level, Egalite and Kisida (2016) found achievement in math and reading decreases as school size increases. In an Australian study, students in rural schools, which are often smaller in size, did not perform as well as urban schools (Young, 1998). Howley (1996) found smaller schools tend to be better at educating impoverished students, while larger schools have better resources for educating affluent students, indicating socioeconomic status interacts with school characteristics in influencing academic achievement. Similarly, students from very small, rural and very large, urban schools have been found to perform lower than students from schools of moderate size (Borland & Howsen, 1999).

At the classroom level, inputs affecting student achievement include class size, number of teachers, and teaching strategies used. In a classroom context, teaching strategies described by Scheerens and Stoel (1988) included direct instruction, the time spent on learning tasks, and alignment of assessment and content taught. Classroom and FFA activities often overlap by design, therefore, teaching strategies used in the classroom and outside of class during training for CDEs, should impact student achievement in FFA (Goodwin & McKim, 2020). Since this has already been documented, these variables were not directly measured in this study. Concerning other classroom level inputs, literature suggests class size and student to teacher ratio impact student achievement because of the amount of time the teacher can dedicate to direct instruction of each student (Chingos, 2013; Shin & Chung, 2009). In the context of an FFA chapter, the

number of members in the chapter and number of chapter advisors would be inputs that parallel classroom inputs and so were measured for this study.

At the individual student level is achievement and educational attainment. In the SBAE classroom context, achievement of content standards is often measured in the form of knowledge exams of various forms, skill evaluation rubrics, performance assessments, and ID tests (Newcomb et al., 2004). Similar measures are used in CDEs (Arkansas Agricultural Education and FFA, 2023) where students are practicing or applying previous learning from classroom and laboratory instruction. “When students compete in career development events at all levels (local, district, area, state, regional, national), they are further applying previous learning as well as developing additional proficiency” (Newcomb et al., 2004, p. 274). As such, the National FFA Organization (2023) recognizes student achievements in skill development and knowledge reflected in scores from CDEs and advancement at each level.

Additionally, background variables such as socioeconomic status and student aptitude can influence classroom level inputs and student level achievement. Arkansas does not charge an entry fee for district or state CDEs; this may potentially mitigate any negative effects of socioeconomic status on student participation. According to Smith and Thapa (2022), students who receive gold rankings at state level CDEs tend to have higher levels of grit and self-efficacy than students who were not gold-ranked, indicating a possible influence in student level achievement. Although beyond the scope of this study, other studies exploring impacts of background variables on CDE participation and achievement were sparse. Consequently, this study sought to assess how various inputs at the school and classroom levels in the context of an FFA chapter affect student achievement in CDEs, potentially providing insight on modern CDE participation levels and factors influencing student achievement within the context of FFA.

Purpose and Objectives

The purpose of this study was to identify relationships and examine differences related to FFA chapter CDE success in Arkansas. The following objectives were used to guide this study:

1. Describe Arkansas CDE participation by event, location, and FFA chapter characteristics.
2. Compare state level CDE scores by Arkansas FFA district.
3. Describe relationships among chapter membership size, number of chapter FFA advisors, number of teams competing from each chapter, school size, and team score.
4. Compare FFA district and state level CDE scores by FFA chapter affiliation type.

Methods

This study is best described as associational research with correlational and causal-comparative components (Fraenkel et al., 2023). Arkansas is divided into three districts in the state FFA association: Eastern District, Northwest District, and Southern District (Arkansas Agricultural Education and FFA, 2023). In Arkansas, there are 14 CDEs at the district level in which eight teams from each district advance to the state level for a total of 24 teams at the state level in each CDE. Additionally, there are four CDEs held at the state level not requiring a district level qualifying event, so any chapter in the state may enter a team in those events at the state level (Arkansas Agricultural Education and FFA, 2023).

In comparing FFA chapters around the state, the Northwest District is characterized as having larger schools based on high school size and a greater quantity of local FFA chapters, advisors, and FFA members than the other two districts. The Southern District is the smallest of the three districts in terms of the same

characteristics. Approximately 36% of FFA chapters in the state are affiliated, with 24 – 27 affiliated chapters in each district. Refer to Table 1 for a more detailed description of FFA districts in the state.

Table 1

Quantified Characteristics of FFA Chapters within Arkansas FFA Districts

	Eastern	Northwest	Southern	State-Wide
Total FFA Chapters ^a	71	83	57	211
Affiliated FFA Chapters ^a	24	27	25	76
FFA Advisors ^b	98	127	79	304
FFA Members ^a	5,544	6,801	3,770	16,115
Students in School ^c	27,171	47,219	21,703	90,093

^a Data obtained in reported directly requested from state FFA advisor.

^b Data obtained in state agriculture teacher directory supplied by state FFA advisor.

^c Data obtained from the online Arkansas Department of Education (2023) Data Center. Students in School is the total students in grades 9-12 of all schools with an FFA chapter.

To accomplish the objectives of this study, data were collected from all district and state CDE results posted to judgingcard.com for spring 2023. Data were entered into a spreadsheet in which team name, team score, and district were recorded. The 2022-2023 state agriculture teacher directory was used to determine the number of FFA advisors for each chapter. The state directory is published annually, ensuring accuracy of listed advisors for each FFA chapter in the state. FFA chapter size and affiliation type were determined by a report supplied by the state FFA advisor listing chapters, membership numbers, and affiliation type. These data were matched with results from judgingcard.com. To determine school size for each school with an FFA chapter, enrollment numbers for grades 9-12 were manually searched and recorded from the online Arkansas Department of Education (2023) Data Center.

To analyze collected data, frequencies were used to describe participation by district at the state level, while means and standard deviations were used to describe team scores by CDE and event level/location. Pearson correlations were calculated to determine relationships among chapter membership size, quantity of chapter FFA advisors, number of teams from each chapter, school size, and team score. ANOVA was used to determine if differences existed among team scores based on district. Tukey HSD *post hoc* analyses were then used to specify where differences occurred. To conserve space, data were analyzed and reported from the 10 most popular CDEs with district qualifying events for objectives one through three: Agricultural Technology and Mechanical Systems (ATMS), Agronomy, Electrification, Floriculture, Horse Evaluation, Livestock Evaluation, Milk Quality and Products (MQP), Poultry Evaluation, Veterinary Science, and Wildlife Management. Analyses for Objective 4 included all 14 district qualifying events (adding in Farm and Agribusiness Management, Forestry, Land Judging, and Nursery and Landscape) plus four events held at state (Agricultural Communications, Food Science and Technology, Meats Evaluation and Technology, and Turf Management) not requiring a district qualifying event. Independent samples *t*-tests were used to compare participation of affiliated FFA chapters to unaffiliated chapters. Significance was established *a priori* at $p \leq 0.05$ for all inferential statistics.

Results

Livestock Evaluation had the largest percentage of FFA chapters participating at the district level, followed closely by Wildlife Management, Veterinary Science, and Horse Evaluation. Electrification and Agronomy had the lowest percentage of chapters participating state-wide. Rankings of chapter participation in different CDEs varied by district. Table 2 provides a complete breakdown of participation by CDE and location/level of event.

Table 2*Quantity of FFA Chapters with CDE Teams Competing by Event and Location*

CDE	Eastern		Northwest		Southern		Districts Combined		State
	<i>f</i>	% ^a	<i>f</i>	% ^a	<i>f</i>	% ^a	<i>f</i>	% ^b	<i>f</i>
ATMS	20	28.17	21	25.30	16	28.07	57	27.01	23
Agronomy	16	22.54	18	21.69	11	19.30	45	21.33	23
Electrification	13	18.31	20	24.10	14	24.56	47	22.27	23
Floriculture	16	22.54	26	31.33	11	19.30	53	25.12	22
Horse Evaluation	26	36.62	44	53.01	20	35.09	90	42.65	23
Livestock Evaluation	32	45.07	45	54.22	23	40.35	100	47.39	22
MQP	10	14.08	23	27.71	19	33.33	52	24.64	22
Poultry Evaluation	13	18.31	29	34.94	10	17.54	52	24.64	24
Veterinary Science	27	38.03	38	45.78	26	45.61	91	43.13	23
Wildlife Management	27	38.03	40	48.19	25	43.86	92	43.60	24

^a Percentages reflected as portion of chapters in the district. ^b Percentages reflected as portion of chapters in the state.

Teams from the Eastern District generally came from FFA chapters with between one and two FFA advisors. The sizes of participating Eastern District schools were between 400 and 600 students. The average FFA chapter and high school size was lowest in most Southern District CDEs. For all but three CDEs at the state level, the average number of chapter FFA advisors was greater than two. Table 3 provides a complete breakdown of FFA chapter characteristics for schools participating at each level/location by CDE.

Table 3*Descriptives of Average Chapter Size, Number of Advisors, and School Size by CDE*

	Chapter Size		Advisors/Chapter		School Size	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<i>Eastern District</i>						
ATMS	145.35	169.74	1.95	1.23	587.60	528.72
Agronomy	130.69	124.10	1.75	1.24	461.31	353.22
Electrification	148.46	149.81	2.15	1.28	545.46	402.66
Floriculture	113.69	132.13	1.75	1.24	439.56	345.92
Horse Evaluation	127.32	153.98	1.88	1.11	546.92	471.22
Livestock Evaluation	117.94	139.90	1.66	1.07	505.38	451.09
MQP	125.20	131.48	1.70	1.34	346.50	339.82
Poultry Evaluation	138.54	151.72	1.92	1.38	483.69	399.42
Veterinary Science	120.26	151.32	1.67	1.14	491.41	466.24
Wildlife Management	108.33	112.85	1.70	1.07	420.89	330.24
<i>Northwest District</i>						
ATMS	115.43	128.66	1.71	0.96	425.95	337.01
Agronomy	122.50	139.45	1.78	0.81	642.67	846.00
Electrification	132.85	135.21	2.00	1.03	487.90	333.79
Floriculture	130.85	116.86	1.81	0.90	695.69	781.72
Horse Evaluation	95.57	100.73	1.73	0.97	676.93	804.77
Livestock Evaluation	95.76	96.67	1.56	0.84	544.87	640.06
MQP	126.87	127.59	1.61	0.84	389.61	245.40

Poultry Evaluation	115.93	117.26	1.86	0.99	789.69	858.48
Veterinary Science	117.42	104.65	1.76	0.97	718.92	798.34
Wildlife Management	106.40	103.91	1.65	0.92	650.75	734.21
<i>Southern District</i>						
ATMS	92.06	62.17	1.50	0.73	400.62	312.77
Agronomy	108.00	106.73	1.82	0.87	495.36	357.71
Electrification	114.43	85.77	1.43	0.76	447.29	380.10
Floriculture	74.00	59.53	1.36	0.81	359.82	341.56
Horse Evaluation	94.25	84.52	1.70	0.87	417.50	354.06
Livestock Evaluation	87.13	75.01	1.61	0.78	354.13	287.68
MQP	102.47	87.73	1.74	0.87	477.63	372.56
Poultry Evaluation	96.70	63.11	1.70	0.82	278.90	200.79
Veterinary Science	78.08	71.69	1.62	0.85	429.23	322.10
Wildlife Management	85.12	80.01	1.64	0.81	414.12	327.04
<i>State</i>						
ATMS	182.30	180.91	2.22	1.28	655.22	532.77
Agronomy	157.09	158.17	2.13	1.14	565.65	478.52
Electrification	161.63	143.76	1.91	1.04	427.04	320.03
Floriculture	138.73	136.42	1.86	1.08	476.32	360.90
Horse Evaluation	152.22	135.73	2.04	0.83	665.39	482.27
Livestock Evaluation	153.45	143.94	2.27	0.94	529.00	324.47
MQP	128.32	130.93	1.68	0.89	371.55	320.72
Poultry Evaluation	134.17	118.67	2.04	1.16	515.83	488.82
Veterinary Science	171.78	184.70	2.48	1.28	817.61	718.42
Wildlife Management	162.37	152.46	2.29	1.08	576.46	356.59

Note. Chapter size was based on number of FFA members/chapter. School size was quantified by the number of students in the high school (grades 9-12).

For objective two, the means of state level CDE team scores were compared by district using an ANOVA (Table 4). No statistically significant differences in scores between districts were found with ATMS ($F(2, 20) = 1.05, p = .369$), Horse Evaluation ($F(2, 20) = 2.19, p = .138$), Livestock Evaluation ($F(2, 19) = 0.94, p = .409$), or Veterinary Science ($F(2, 20) = 2.28, p = .128$). A statistically significant difference was found between team scores by district in Agronomy ($F(2, 20) = 4.08, p = .033$), Electrification ($F(2, 20) = 6.66, p = .006$), Floriculture ($F(2, 19) = 6.40, p = .007$), Milk Quality and Products ($F(2, 19) = 13.16, p = .001$), Poultry Evaluation ($F(2, 21) = 8.69, p = .002$), and Wildlife Management ($F(2, 21) = 3.93, p = .035$).

For *post hoc* analysis, Tukey HSD comparisons were conducted for each CDE in which a statistically significant difference among district mean team scores was found with the ANOVA omnibus test. For the Agronomy CDE, Eastern District team scores were significantly higher than Southern District scores ($p = .041$) and no other significant difference between district mean team scores were found. The Electrification CDE had significantly higher mean team scores from the Northwest District when compared to the Southern District ($p = .022$) and the Eastern District ($p = .009$). No significant difference was detected between mean Eastern District and Southern District Electrification CDE team scores. The state Floriculture CDE had significantly higher mean scores for teams in the Northwest District compared to the Southern District ($p = .005$), but no other statistically significant differences were found between other districts. The Milk Quality and Products CDE had higher mean team scores from the Northwest District compared to both the Eastern District ($p = .001$) and the Southern District ($p = .012$). No significant difference was found in between mean team scores of the Eastern District and Southern District in the Milk Quality and Products CDE. For the Poultry Evaluation CDE, higher mean scores came from teams in the Northwest district

compared to the Eastern District ($p = .002$) and the Southern District ($p = .015$). Eastern District and Southern District Poultry Evaluation CDE team scores were not significantly different. Mean Wildlife Management CDE team scores were significantly higher from the Northwest District when compared to the Southern District ($p = .040$). No other differences between mean district team scores in the Wildlife Management CDE were found.

Table 4*ANOVA Results Comparing Team Scores by FFA District at the State CDE*

CDE	Eastern		Northwest		Southern		F	p	η^2
	M	SD	M	SD	M	SD			
ATMS ^a	757.25	145.07	712.75	270.28	615.57	115.04	1.05	.369	.10
Agronomy ^b	1196.00	337.15	1161.50	252.01	853.57	74.25	4.08	.033	.29
Electrification ^c	672.75	199.86	987.37	148.09	701.00	217.17	6.66	.006	.40
Floriculture ^d	1537.57	260.30	1740.25	185.54	1275.29	114.63	6.40	.007	.40
Horse Evaluation ^e	1420.57	50.64	1491.63	31.93	1276.50	349.08	2.19	.138	.18
Livestock Evaluation ^f	1683.29	89.33	1733.63	73.66	1709.71	41.08	0.94	.409	.09
MQP ^g	625.83	131.79	1026.50	120.93	790.37	178.58	13.16	.001	.58
Poultry Evaluation ^h	1506.37	202.05	1785.12	96.78	1569.87	93.57	8.69	.002	.63
Veterinary Science ⁱ	1598.50	175.41	1719.71	156.80	1534.38	173.26	2.28	.128	.19
Wildlife Management ^j	1904.25	470.64	2300.75	277.83	1819.25	323.25	3.93	.035	.27

^a $df = 2, 20$, ^b $df = 2, 20$, ^c $df = 2, 20$, ^d $df = 2, 19$, ^e $df = 2, 20$, ^f $df = 2, 19$, ^g $df = 2, 19$, ^h $df = 2, 21$, ⁱ $df = 2, 20$, ^j $df = 2, 21$.

To describe relationships among team scores and FFA chapter characteristics, Pearson correlations were calculated. As shown in Table 5, the relationship between FFA chapter size (measured in number of members) and CDE team scores varied by district and event. Substantial, positive associations (Davis, 1971) were found in the Eastern District for Agronomy and Poultry Evaluation while moderate, positive associations were found for ATMS, Agronomy, Electrification, Floriculture, Livestock Evaluation, Milk Quality and Products, Veterinary Science, and Wildlife Management. The Northwest District had moderate, positive associations in all CDEs except Horse Evaluation. The Southern District only had one moderate, positive association in Horse Evaluation; however, there was one negative, very strong correlation in Poultry Evaluation. Positive relationships between chapter size and team scores were moderate at the state CDEs in ATMS, Electrification, Livestock Evaluation, Milk Quality and Products, and Veterinary Science while a positive, substantial association was found with Agronomy.

Table 5*Relationships Between FFA Chapter Size and CDE Team Scores*

CDE	Eastern	Northwest	Southern	State
ATMS	.44	.45*	.28	.31
Agronomy	.59*	.42	-.01	.52*
Electrification	.14	.46*	.17	.33
Floriculture	.17	.46*	.05	.24
Horse Evaluation	.09	.28	.36	.18
Livestock Evaluation	.27	.36*	.17	.33
Milk Quality and Products	.13	.44*	.19	.33
Poultry Evaluation	.53	.32	-.73*	.14
Veterinary Science	.43*	.36*	.03	.39
Wildlife Management	.34	.31	.22	.11

* $p \leq .05$.

As seen in Table 6, correlations between the number of FFA advisors for a chapter and team scores revealed several moderate and substantial correlations of significance. In the Eastern District, a substantial, positive correlation was found for Agronomy while moderate, positive associations were found for ATMS, Livestock Evaluation, Poultry Evaluation, Veterinary Science and Wildlife Management teams. At the Northwest District CDEs, the association between number of FFA advisors and team scores were positive and substantial for Floriculture and Milk Quality and Products while positive, moderate associations were found in ATMS, Livestock Evaluation, and Veterinary Science. The Southern District CDEs had a positive, substantial relationship for Livestock Evaluation and a negative, substantial relationship for Poultry Evaluation. Positive, moderate relationships were found for Agronomy and Wildlife Management. At the state CDE, associations were substantial and significant for Veterinary Science, moderate for ATMS, Agronomy, Livestock Evaluation, and Milk Quality and Products.

Table 6*Relationships Between Number of Chapter Advisors and CDE Team Scores*

CDE	Eastern	Northwest	Southern	State
ATMS	.44	.38	.09	.34
Agronomy	.54*	.22	.45	.34
Electrification	.09	.07	.15	.12
Floriculture	.15	.57**	-.27	.16
Horse Evaluation	.15	.28	.01	-.20
Livestock Evaluation	.34	.48**	.51*	.39
Milk Quality and Products	.05	.55**	-.09	.39
Poultry Evaluation	.37	.32	-.56	.29
Veterinary Science	.46*	.49**	.12	.56**
Wildlife Management	.37	.23	.33	.05

* $p \leq .05$. ** $p \leq .01$.

Correlations between school size and CDE team scores (Table 7) were mostly low to moderate for the Eastern District, with a significant, moderate relationship for Veterinary Science. For the Northwest District, significant, moderate associations were found for ATMS and Veterinary Science. Southern District associations between school size and team scores were positive and substantial for Agronomy, negative and substantial for Floriculture, negative and moderate for Electrification, while all other teams had low or

negligible associations. Relationships at the state level were mixed with three CDEs having negative associations and Poultry Evaluation and Veterinary Science having moderate, positive associations.

Table 7*Relationships Between School Size and CDE Team Scores*

CDE	Eastern	Northwest	Southern	State
ATMS	.44	.46*	-.01	.23
Agronomy	.24	.22	.64*	.29
Electrification	.34	-.05	-.46	.22
Floriculture	.20	.15	-.57	.16
Horse Evaluation	.10	.13	.14	-.27
Livestock Evaluation	.32	.05	-.03	-.05
Milk Quality and Products	.01	.19	-.18	.16
Poultry Evaluation	.33	.19	-.16	.31
Veterinary Science	.47*	.42**	.17	.37
Wildlife Management	.19	.16	.28	-.19

Note. School size was quantified by the number of students in grades 9-12. * $p \leq .05$. ** $p \leq .01$.

For the final objective, FFA district and state level CDE participation by FFA chapter affiliation type were compared. This included an analysis of the number of teams at each of the three FFA districts and in each of the 14 CDEs as well as their advancement to the state level. The four CDEs not requiring district qualifying events to participate at state were analyzed separately. Overall, the Northwest District had the most teams participating at the district level ($f = 371$). When considering FFA chapter affiliation type, the highest percentage of teams from affiliated FFA chapters was from the Southern District (52.56%). Teams from affiliated FFA chapters advanced to the state level most often from the Eastern District (53.40%). The Southern District had 75% of their nonqualifying state teams come from affiliated FFA chapters. Refer to Table 8 for a complete breakdown of teams participating by FFA chapter affiliation type.

Table 8*FFA District Breakdown of Teams Participating and Advancement by Chapter Affiliation Type*

	Affiliated ($n = 68$)		Unaffiliated ($n = 104$)		Total <i>f</i>
	<i>f</i>	%	<i>f</i>	%	
<i>Eastern District</i>					
District Teams Participating	116	48.33	124	51.67	240
District Teams Advancing	55	53.40	48	46.60	103
Nonqualifying State Teams*	6	37.50	10	62.50	16
<i>Northwest District</i>					
District Teams Participating	141	38.01	230	61.99	371
District Teams Advancing	45	41.28	64	58.72	109
Nonqualifying State Teams*	8	36.36	14	63.64	22
<i>Southern District</i>					
District Teams Participating	113	52.56	102	47.44	215
District Teams Advancing	53	53.00	47	47.00	100
Nonqualifying State Teams*	15	75.00	5	25.00	20
<i>State Totals</i>					
District Teams Participating	343	42.93	456	57.07	799
District Teams Advancing	153	49.04	159	50.96	312
Nonqualifying State Teams*	29	50.00	29	50.00	58

*Nonqualifying State Teams are the teams participating at the state CDE but do not require a district qualifying event.

When comparing CDE participation and advancement by FFA chapter affiliation type (Table 9), affiliated FFA chapters had statistically higher participation in district level CDEs, greater numbers of teams qualifying for the state CDE, a higher percentage of teams qualifying for the state CDE, and a greater number of teams participating in the state CDE.

Table 9

Comparing CDE Participation and Advancement by FFA Chapter Affiliation Type

Variable	Affiliated (n = 68)		Unaffiliated (n = 104)		t(70)	p	d
	M	SD	M	SD			
District Level Teams ^a	5.46	3.25	4.31	2.83	2.45	.01	0.38
Teams Advancing ^b	2.25	2.50	1.52	2.09	2.07	.04	0.32
% Teams Advancing ^c	39.21	33.89	26.83	30.64	2.48	.01	0.39
Total State Level ^d	2.82	2.81	1.80	2.47	2.52	.01	0.39

^a District Level Teams are total teams from all districts (3) and CDEs (14) combined, ^b Teams Advancing are total teams advancing from all districts and CDEs combined, ^c % Teams Advancing is percentage of teams advancing to state from all districts and CDEs, ^d Total State Level is all teams participating in CDEs (18) at the state level including those not requiring qualification from district.

Conclusions/Discussion/Implications/Recommendations

Based on results of this study, CDE participation by Arkansas FFA chapters is low compared to that in other states where participation has been investigated (Harris, 2008; Talbert & Balschweid, 2004). FFA chapters in the Northwest District are more engaged in CDEs than other districts in the state. Exceptions to this are with ATMS, Agronomy, Electrification, and Milk Quality and Products CDEs. Mixed results were found with chapter size, number of advisors, and school size for teams participating at the district level. At the state level, larger chapters with multiple FFA advisors participate in more CDEs and perform better than smaller chapters with fewer advisors. Also at the state level, mean scores for 6 out of the 10 CDEs analyzed were significantly different between districts. If team scores are an indication of success and learning, overall, the Northwest District was more successful than other districts for multiple CDEs. This is consistent with findings by Franklin and Armbruster (2012) where differences in CDE performance were found based on geographic location. The Southern District's low performance could indicate that students in this district are disadvantaged as they typically come from smaller schools and FFA chapters and on average have fewer FFA advisors than the Eastern or Northwest Districts. Although CDE participation in this study is lower than that found in previous studies, the question remains, what is a realistic CDE participation level for states? If most chapters in a state have one advisor, is it realistic to participate in all CDEs? Although some level of achievement will be noted from participation, it does not always equate to advancement. An important topic worthy of further exploration would be which is more important: quantity or quality of participation?

Arkansas FFA chapters with more members tend to have more success in CDEs. Correlations revealed several substantial and moderate associations between chapter size and success at both the district and state levels; however, this is not consistent across districts or CDEs. Similar results were found relating to school size. Interestingly at the state level, three of the CDEs evaluated had negative correlations with school size, indicating students from smaller schools perform better than those from larger schools. This was not expected based on previous literature related to achievement in core academic subjects (Egalite & Kisida, 2016; Young, 1998). However, Herren (1984) found smaller schools performed well at higher levels

of advancement, indicating specific agricultural subject or topic may be a contextual factor interacting with school size and location, which is supported by the Multi-level Model of School-Effectiveness (Scheerens & Stoel, 1988). At the classroom level of this model, some of the strongest correlations were found with relationships between the number of advisors in a chapter and CDE success. Although it varies based on CDE and location, this indicates students with more advisors in their chapter have a competitive advantage in terms of CDE team advancement and scores. Although correlations are not causation, based on the Multi-level Model of School-Effectiveness (Scheerens & Stoel, 1988), it is plausible that the number of chapter advisors is an input with effects similar to student-to-teacher ratio at the classroom level, explaining the significant differences in scores found between the Northwest and Southern Districts.

When describing chapter participation by affiliation type, less than half the teams participating at the district level were from affiliated FFA chapters. This was to be expected as only about a third of the chapters in the state were affiliated, a number slightly higher than what was reported by Sheehan and Moore (2019). Affiliated chapters have statistically higher levels of participation statewide which is consistent with Sheehan et al. (2023). On average, the affiliated chapters in this study have approximately five teams participating at the district level while unaffiliated chapters have four teams. In terms of performance, all districts have a statistically higher percentage of teams from affiliated chapters advance from the district level to the state level compared to teams from unaffiliated chapters. This indicates students who are members of an affiliated FFA chapter have an advantage compared to those who are not. Choosing whether to operate an FFA chapter as affiliated or unaffiliated is a school-level input based on the multi-level model of school effectiveness (Scheerens & Stoel, 1988) with potential implications for overall student opportunities and performance, as observed with this study.

Based on the conclusions, we recommend increasing efforts in the state to support students at schools with competitive disadvantages, especially in the Southern District. Although winning is not necessarily the goal, performance should reflect learning. Providing more training resources to all FFA members in the state may be a way to help reduce the burden on individual teachers and FFA advisors, particularly if training resources were in the form of learning modules that could be incorporated in the classroom and in CDE training and preparation. Learning modules could be leveraged by the teacher to increase the number of CDEs in which a chapter participates, giving more students an opportunity to experience a CDE. These additional resources would address the problem highlighted by Dreher and Robinson (2024) that SBAE teachers lack sufficient CDE instructional materials to feel efficacious in preparing students for many different CDEs. Results from this study could also help administrators in their decision to add additional SBAE teachers. Additional teachers can provide the opportunity for increased student participation, achievement, and advancement in more CDEs, thereby providing more experiences for students helping reach the National FFA Organization's (2022) goal. CDE providers and committees should also be cognizant of different advantages schools may have and attempt to reduce barriers and increase participation opportunities for more students. Perhaps this could be accomplished with a tiered advancement system where a specified portion of teams advance based on the number of chapter advisors, similar to how athletic events are organized based on school size. Depending on the logistics and facilities of CDE providers, additional teams could then be allowed to advance, increasing participation opportunities. With increased participation and performance observed from affiliated FFA chapters, SBAE teachers, administrators, and state SBAE staff should consider determining how to fund all students' membership through affiliation. SBAE teacher preparation programs should include lessons on how inputs at the school and classroom level can affect student achievement through CDEs. Teaching preservice teachers strategies for communicating and working with administrators in decision-making at the school level would be beneficial, especially in terms of justifying the need for affiliation. At the classroom level, if quality of achievement is desired, the number of teams trained by one advisor should be limited, as indicated by impacts of the advisor-to-student ratio on advancement. Although, this may negatively impact opportunities for more students to participate in CDEs, making this a potential drawback.

Future studies on this topic should include a larger number of CDEs across different locations, as well as analysis of other FFA activities such as LDEs, awards, scholarships, and agriscience fairs. Additional work identifying variables that could help improve access and participation for all students is needed. Other factors influencing student success through various avenues of participation in SBAE education should also be explored. Studies should continue to analyze the effects of chapter affiliation type on variables such as participation, performance, and fulfillment of National FFA Organization priorities.

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