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ECO-LEADERSHIP AMONG COUNTY 4-H ORGANIZATIONS:
Relationship to Programmatic Success and Best Practices for Eco-Leaders

Abstract

Our understanding of leaders and the role they play in organizations and society is changing, which has important implications for leadership education. At the turn of the century, society began to move from a mechanistic understanding of leadership to a more ecological one. The latter, ecological approach to leadership is characterized by collective decision-making, collaboration, shared leadership, and grassroots organization. While leadership educators have acknowledged this shift, more case examples are needed to illuminate practical implications for leadership. This study of county 4-H associations uses an explanatory sequential mixed methods design to explore the relationship between three factors: (a) subjects' levels of hierarchical and systemic thinking; (b) how their associations engage in leadership and organizational learning; and (c) programmatic success. While no direct relationship emerged between programmatic success and subjects' levels of hierarchical and systemic thinking, mixed methods results revealed several distinctions between high and low scoring programs' approaches to leadership. These distinctions support an ecological approach to leadership, which in turn impacts modern approaches to leadership education.

Introduction

Our society's understanding of what leadership is, and what a leader should be, has undergone a significant shift in the early part of the 21st century. Traditional definitions of leadership dating to the 1900s might describe the phenomenon as "a process whereby an individual influences a group of individuals to achieve a common goal" (Northouse, 2019, p. 5). This understanding of leadership is rooted in what Allen, Stelzner, and Wielkiewicz (1998) call an industrial or mechanistic paradigm, which focuses on the preeminence of individual positional leaders and the machine-like qualities of organizations. While such a conceptualization of leadership was appropriate —

and effective — during the Industrial Revolution, as the Western world entered the 21st century knowledge-driven economy, the industrial paradigm's reliance on individual leaders to provide 'the leadership' for organizations has been revealed to be untenable in this increasingly complex, interdependent, and interconnected world. Leadership must evolve to meet those challenges. Recognizing this challenge, the National Leadership Education Research Agenda outlined a priority to study social change and community development [Priority VI], along with program assessment and evaluation [Priority II] (Andenoro, 2013). The ongoing success of leadership education hinges upon enlightenment of these priorities, as well as practical examples for case

analysis.

Review of Literature

At the turn of the century, researchers identified an emerging ecological paradigm in leadership, which focuses on the systemic nature of leadership (Allen, Stelzner, & Wielkiewicz, 1998). In this paradigm, leadership is no longer understood as the actions or properties of an individual leader holding a position of authority, but, rather, a collective process that involves both leaders and followers co-creating leadership. Under this paradigm, individual positional leaders remain, but their new role is to "assist in the emergence of leadership, rather than creating change through executive orders and decisions" (Wielkiewicz & Stelzner, 2005, p. 331). This approach enables organizations to harness the talent, creativity, and energy of all employees and stakeholders, rather than relying on an individual leader, or a select few leaders, to provide the leadership for an organization (Western, 2019; Wielkiewicz & Stelzner, 2010).

Wielkiewicz and Stelzner (2005) put forward four factors to consider when structuring organizations to nurture the creation of leadership under an ecological model: (a) interdependence; (b) open systems and feedback loops; (c) cycling of resources; and (d) adaptation. These four principles are "critical to understanding leadership and organizations" from an ecological viewpoint (Wielkiewicz & Stelzner, 2005 p. 328). First, the principle of interdependence holds that any attempt to understand or direct an organization by focusing on its positional leader is incomplete and bound to fail. Leadership must be understood in the complex context of the organization and its environment. Second, open systems and feedback loops hold that no organization is a closed system. Each organization is dependent on inflows of information and other resources. Each organization is itself part of a larger, more complex open system (e.g., economic, political, social). Organizations that

squelch feedback loops place the organization at risk by lessening its ability to adapt to the environment. Third, cycling of resources maintains that just as biological systems must utilize resources in the environment in an efficient and sustainable way, leadership processes within organizations must also efficiently leverage the talent and capacity of the whole system by developing an ongoing, long-term process for cultivating leaders. Fourth, adaptation holds that organizations must mimic the evolution of biological systems, leveraging structures that facilitate ongoing organizational learning in response to changing environments. The greater the adaptive learning, the greater the ability to respond to external threats.

Traditionally, the study of leadership has been rooted in a mechanistic understanding of the world, usually focusing on the behaviors of the individual leader and his or her linear influence on followers, usually in a dyadic relationship, with discrete variables (Rost, 1997; Wielkiewicz, 2002). However, new research has begun to focus instead on "the systems context in which leadership and organizational adaptation takes place" (Wielkiewicz, 2002, p. 108). Instead of psychology or sociology, this new leadership paradigm is based on theories from complexity science, such as systems thinking, far-from-equilibrium thermodynamics, and, most notably, complex adaptive systems theory (e.g., Capra, 1996; Colarelli, 1998; Goldstein, 2008; Katz & Kahn, 1978; Kelly, Ryan, Altmann, & Stelzner, 2000). This ecological perspective on leadership put forward by Wielkiewicz (2002) contends that:

> No single individual is capable of leading an organization in the sense that the word has traditionally been used because the amount of information that must be processed and the complexity of challenges from the outside the organization are too enormous. Instead, a successful organization must function like

a complex adaptive system. (p. 108)

The implication is that organizations would be more successful in adapting to environmental changes if they de-emphasize positional leaders and instead "draw on ecological principles to match the complexity of the environment in which organizations function" (Wielkiewicz, 2000, pp. 108-109). These new constructs of an ecological perspective of leadership — diversity, feedback loops, increased organizational learning, and systemic thinking — necessitate new measures to help researchers and practitioners study and influence the development of beliefs and skills related to leadership (Wielkiewicz, 2000).

According to the ecological paradigm of leadership, as described by Allen, Stelzner, and Wielkiewicz (1998), the various characteristics of ecological forms of leadership described above can be plotted in their degree on two orthogonal continua: (a) hierarchical thinking, and (b) systemic thinking. Hierarchical thinking refers to the degree to which a person believes an organization should be arranged in a hierarchical fashion, with both power and control concentrated in the hands of an upper echelon of leaders or a single leader. A hierarchical viewpoint stresses rules, procedures, goals, and a general dependence on the leader (Wielkiewicz, 2000). Moreover, adherents to a hierarchical view of leadership attribute the responsibility for success or failure of an organization to positional leaders. Additionally, hierarchical zealots charge positional leaders with the responsibility for ensuring safety and security of an organization's members (Wielkiewicz, 2000). This description of a hierarchical view of leadership is consistent with a more mechanistic/industrial view of leadership, while a less hierarchical view of leadership aligns with a more ecological view of leadership (Rost, 1997).

Systemic thinking refers to the degree to which an individual has the "ability to relate a variety of ideas and concepts to organizational success, such as ethics, the need for cooperation of all individuals to help the organization accomplish its goals, the need for long-term thinking, and the need for organization learning" (Wielkiewicz, 2000, p. 341). Individuals with a higher degree of systemic thinking would be "least likely to see themselves or positional leaders in the organization as having the capability of single-handedly making all of the key organizational decisions" (Wielkiewicz, 2000, p. 345). According to Allen, Stelzner, and Wielkiewicz (1998), organizations with a high number of systemic thinkers should be most successful and adaptive. A high degree of systemic thinking indicates a more ecological view of leadership, while a lower degree of systemic thinking indicates a more mechanistic viewpoint (Rost, 1997).

Despite this paradigm shift in leadership, most organizational leadership development programs continue to focus on individual positional leaders who function in a top-down, hierarchical manner. The leader and his or her actions are viewed as "more critical than those of any other member of the group" (Wielkiewicz, 2000, p. 335). Individuals within an organization deemed "most competent and loyal" are appointed to leadership positions and assume responsibility for the organization's overall success; they provided the vision for the organization and direction to followers (Chemers, 1997, p. 11). The focus of leadership studies, then, becomes to make these individuals better leaders through a holistic understanding of leadership (Allen, 2018).

However, the complexity of new, adaptive challenges — along with the sheer speed of scientific, technological, and societal change — is simply too much to depend entirely on a small, upper-echelon of positional leaders to provide "the leadership" (Allen et al., 1998; Western, 2019). Wielkiewicz (2000) warns of an "urgent need" to radically rethink leadership in a way that "matches the complexity of the systems to which organizations must respond" (p. 335). This disconnect between the above-mentioned ecological strategies and traditional leadership development practices is particularly evident in organizations whose very structure lends itself to ecological forms of leadership.

One quintessential example is Cooperative Extension's county 4-H programs. 4-H represents

the interconnected, nested ecosystems described by Allen, Stelzner, and Wielkiewicz (1998), which, in addition to existing at the federal, state, and local levels, also consists of innumerable connections with local communities, organizations, non-profits, businesses, schools, and families — including a collective leadership structure known in Florida as the county 4-H association, which engages volunteers in the leadership of the program. However, leadership development efforts in Florida are still largely invested in the individual Extension 4-H agent — a position that suffers considerable turnover and, therefore, negatively impacts programmatic success (Strong & Harder, 2009). However, a more ecological approach to leadership could distribute leadership capacity and responsibility throughout the organization to a greater degree, such that the turnover of an individual positional leader (i.e., county 4-H agent) would be less disruptive and, therefore, lead to greater programmatic success in the long term. The National Leadership Education Research Agenda encourages investigation of this possibility, particularly by prioritizing attention to social change and community development [Priority VI], along with program assessment and evaluation [Priority II] (Andenoro, 2013). As noted by Jenkins and Dugan (2013), contextual reference points are critical for promoting an interdisciplinary approach to leadership.

Theoretical Framework

The ecological paradigm of leadership is broadly underpinned by complexity science, which is a family of theories often used to explain adaptive and emergent systems (Davis, 2004). Among the complexity science family of theories, only complex adaptive systems theory explicitly names emergence as the phenomenon in which micro-level interactions of interacting agents gives way to macro-level patterns we might recognize as organizations and leadership (De Wolf & Holvoet, 2005). Therefore, complex adaptive systems theory supplies the theoretical framework of this study.

A complex adaptive system (CAS) is the ecosystem in which the emergence of leadership occurs. In recent years, scholars searching for a model to "more accurately reflect the complex nature of leadership as it occurs in practice" have examined complex adaptive systems as the fundamental unit of analysis in studies — a shift away from the individual leader as the primary focus of study (Uhl-Bien & Marion, 2009, p. 631). A CAS is characterized by two general qualities. First, it is adaptive. It can alter its own structures in response to both internal and external pressures. In this way, it cannot be described in terms of physics — where laws govern action and reaction — but, rather, it is better described in evolutionary terms (Uhl-Bien & Marion, 2009). Second, the system is emergent. It is "composed of and arises in the co-implicated activities of individual agents" (Davis, 2004, p. 151). In this way, the phenomenon is not merely the sum of its parts (i.e., a mechanistic understanding), but, rather, the emergent product of both its parts and their interaction with one another (i.e., an ecological understanding) (Davis, 2004). Levy (1992, as cited in Uhl-Bien & Marion, 2009) describes complex adaptive systems this way:

> A complex system is one whose component parts interact with sufficient intricacy that they cannot be predicted by standard linear equations; so many variables are at work in the system that its overall behavior can only be understood as an emergent consequence of the holistic sum of the myriad behaviors embedded within. Reductionism does not work with complex systems, and it is now clear that a purely reductionist approach cannot be applied; …in living systems the whole is more than the sum of its parts. This is the result of … complexity which allows certain behaviors and characteristics to emerge unbidden. (p. 631)

Lichtenstein and colleagues (2006) write that complexity science has the potential to make three major contributions to the study of leadership: (a) expand leadership from role-based actions to

every interaction in a social system; (b) increase the accuracy of leadership studies by focusing on complex interactions rather than simplistic "independent" variables; and (c) provide a foundation for explaining how the actions of individual actors construct global behaviors. The notion that leadership is a linear process affecting few variables in isolation is at odds with what we know both scientifically and intuitively about leadership. Focusing only on roles and actions of specific leaders is just the tip of the iceberg (Cletzer & Kaufman, 2018).

Purpose and Research Questions

This study explored the relationship between an ecological approach to leadership among county 4-H association members/volunteers and program success in an effort to empirically examine the efficacy of ecological approaches to leadership. The study was guided by three research questions:

1. What is the nature of the relationship between levels of hierarchical and systemic thinking among members/ volunteers and programmatic success?

2. How do the volunteers perceive their leadership approach as affecting programmatic success?

3. How do the volunteers' perceptions of leadership help us better understand the variables associated with programmatic success?

Methods

With an explanatory sequential mixed methods (MM) design, we first conducted a quantitative strand of research and then followed up with a second, qualitative strand (Creswell & Plano Clark, 2011). The qualitative strand offered the opportunity to investigate in greater depth and explain initial findings. "By utilizing quantitative and qualitative methods within the same study, mixed methods

research in leadership studies can incorporate the strength of both methodologies…. Mixed methods designs hold the promise of advancing leadership research that cannot be accomplished by reliance on either qualitative or quantitative designs" (Klenke, 2016, p. 175).

The study's quantitative strand used three instruments to collect data. The first instrument was a researcher-created index designed to evaluate performance and rank county 4-H programs based on a federally mandated report of enrollment data, in conjunction with United States Census Bureau data. This strand was a census; all Florida county 4-H programs (n = 67) were included in this index. Based on these results, six county 4-H programs were selected to participate in the second, qualitative strand — three of the highest scoring counties, and three of the lowest scoring counties.

The second quantitative instrument was the Leadership Attitudes and Beliefs Scale III (Wielkiewicz, 2002). The LABS-III was originally designed to measure the impact of leadership program interventions on college students' attitudes and beliefs about leadership "in a manner consistent with Allen et al.'s (1998) [ecological] leadership theory" (Wielkiewicz, 2002, p. 109). The LABS-III consists of 28 Likert-type questions on an ordinal, five-point scale ranging from strongly agree to strongly disagree. The instrument is comprised of two subscales: hierarchical thinking and systemic thinking. Both convergent and discriminant validity of the systemic and hierarchical thinking scales have previously been established (Fischer, Wielkiewicz, Stelzner, Overland, & Meuwissen, 2015). This strand was a census of all county 4-H association members (volunteers). Although it is unknown how many county 4-H association members exist in Florida, 187 association members representing 60.6% of county 4-H programs (n = 39) responded. Data was first analyzed using simple descriptive statistics. Pearson's product-moment correlation coefficient was then used to determine the strength and direction of the relationship between scores on the LABS-III questionnaire and the county index score (Ary, Jacobs, & Sorensen, 2010). Finally, multiple

linear regression modeling was used to explain the variance in the relationship between LABS-III scores and county index score.

The third quantitative instrument was a researcher-created demographic questionnaire distributed to all county 4-H association members. Pearson's product-moment correlation coefficient was used to determine the strength and direction of the relationship between demographic variables, LABS-III questionnaire scores, and county index scores. The study's qualitative strand employed semi-structured, open-ended focus group sessions with county 4-H association volunteer members and their respective 4-H agents in each of the six counties selected based on county index scores (Kreuger & Casey, 2000). Questions were guided by a researcher-developed protocol. A priori propositions guided the researchers to interpret quantitative results in light of supporting literature, which led to specific questions being developed. During the focus group sessions, the researcher acted as facilitator, and a

digital audio recording device was used to capture the conversation verbatim (Rossman & Rallis, 2012). Following the focus groups (n = 6), which included 33 individual participants, we completed whole-text analysis of verbatim transcripts, employing the constant comparative analytic procedures developed by Corbin and Strauss (2008). We used Atlas.ti to excerpt text and code data using a systematic approach, and themes emerged from those codes (Corbin & Strauss, 2008). The results of this qualitative analysis are reported in the form of themes, which are supported by participant quotes.

Finally, during the inferential phase of this mixed methods study, data from the quantitative and qualitative strands were mixed in two ways (Teddlie & Tashakkori, 2006). First, themes from the qualitative strand of the study were sorted as they related to Wielkiewicz and Stelzner's (2005) four factors of ecological leadership (Table 1).

Table 1.
Qualitative themes categorized by four factors of ecological leadership.

Factors	Themes
Interdependence	Theme #1, Theme #2
Open Systems & Feedback Loops	Theme #3, Theme #5
Cycling of Resources	Theme #4
Adaptation	Theme #6

Note: Factors based Wielkiewicz & Stelzner (2005).

Second, the quantitative county 4-H index score, which was initially used to rank county 4-H programs and select the counties for participation in the qualitative strand, was again used to sort focus group responses by high or low scoring counties. Then, for each of the four factors of eco-leadership, each applicable theme's codes were listed. Codes were selected for inclusion if they appeared in at least two of three high or low scoring focus groups' transcripts. The mixing table shows similarities and differences in codes between high and low scoring counties,

which enables us to make meta-level distinctions between high and low scoring county 4-H programs. An excerpt of this table is shown below; the full table is quite lengthy.

Table 2.

Excerpt of mixing table combining county index score ranking with codes from focus group sessions grouped by factors of ecological forms of leadership

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Factor	High Scoring Counties	Low Scoring Counties
Interdependence	Agents collects opinions from association to make decisions*	Agents collects opinions from association to make decisions*
	Members see diversity as benefit	Members see diversity as benefit
		New membership fee is seen as external threat*
		Strong volunteer support seen as important to success
	Members attribute success to fulfilling lifeskill needs	
	Members attribute success to agent	
	Members attribute success to tight-knit community	
	Members attribute success to strong parent involvement	

Note: An * denotes a code where all high or low scoring counties exhibited code. Inclusion of a code on this table determined by two-thirds of high or low scoring counties exhibiting the code.

Results

Research Question 1: What is the nature of the relationship between levels of hierarchical and systemic thinking among members/volunteers and program success?

The LABS-III was used to measure levels of hierarchical and systemic thinking among the 187 respondents representing 60.6% (n = 39) county 4-H associations in Florida. The study population for this question included the county 4-H associations as complex adaptive systems; scores among members were averaged to render an association unit score. Association members scored a moderate 2.70 (SD = .587) on hierarchical thinking (where 1 indicates the highest level of hierarchical thinking, and 5 the lowest), indicating a medium preference for positional authority and responsibility. Members scored 1.71 (SD = .388) on systemic thinking (where 1 indicates the highest level of systemic thinking, and 5 the highest), indicating a capacity to attribute success or failure to multiple sources and ability to see complex connections. Based on correlation and multiple linear regression analysis, there appears to be no relationship between hierarchical or systemic thinking and the county index score.

However, there was a moderate correlation between county index score and one demographic variable among this population: A moderate negative correlation (r = -.435, p < .01) was found between the mean number of years served by an associations' membership and their county index score. This means the longer a group has served together, the more likely that county program has a lower

performance score. A stepwise regression yielded a significant regression equation ($F(1,39) = 8.370$, $p < .05$), with an $R2$ of .181.

Research Question 2: How do the volunteers perceive their leadership approach as affecting programmatic success?

From more than five hours of audio recordings and 125 pages of transcripts, six themes emerged. Often, these themes appear to be internally conflictual, but differences among participants are to be expected with extreme case selection.

Theme 1: Associations vary on phenomena to which they attribute success or failure. Participants identified a variety of factors affecting their county 4-H program's success or failure. Several were quick to praise the county 4-H agent: "We've had other agents who didn't take the program to the level that Rhonda has. Rhonda has made the leadership quality, since she's been here…" Others attributed success to 4-H club leaders, another positional leader within the 4-H program. One participant said, "We really have strong leaders, and that's where you're going to get your strong clubs." There were other external factors, too, such as meeting community needs, support from local county commissioners, and parental and family involvement. One participant described the level of involvement: "It's not just parents. Whenever we have things like county events, grandparents are showing up, too."

Theme 2: Agents play a central role in decision making. Agents were almost universally cited as providing primary direction for the association, as well as being the primary conduit for information flowing between the association and the county 4-H program, stakeholders, and other organizations. Nearly every association described a scenario in which the membership was a largely reactive body. Most associations conveyed that they believed agents appreciated and utilized their advice; they also cited a tendency to seek consensus when offering advice. Even still, members described the association as largely an advisory body, and they asserted final decisions were best left to the agents. One participant said, "We all have individual ideas, and we throw them out there, and then Courtney makes the final decision — I would think — on what to [do]… I think she weighs everyone's opinion."

Theme 3: Associations' connections to community and 4-H vary. The primary way in which participants reported being connected to the community was based on 4-H projects. For example, a 4-H shooting sports club may have a connection with a local gun club, or a 4-H dog club may have a connection to a local dog park. Groups such as Farm Bureau and Cattlemen's Associations were also cited by a wide range of participating associations. One participant described her association's connections: "We have local organizations that help support scholarships for local youth, like our Cattlemen's … some things like that that really tie into what 4-H is all about." While entity-to-entity connections were common and easy for members to recall, participants frequently had difficulty describing connections between individual members and the community. Most associations offered vague reports — "4-H is connected to so many groups" — and were unable to give details when pressed.

Theme 4: Associations vary on decision-making processes and topics. Association members reiterated that their role was not a decision-making body, such as a board of directors, but, rather, an advisory body. What they offered advice on, however, varied greatly. Overwhelmingly, they described weighing in on mundane procedural matters: budget, code of conduct violations, registration deadlines, awards criteria, banquet fees, scholarships, etc. One secretary described the association's role: "I just went through a year's worth of meeting minutes, and there's really not a whole lot in there other than what we've discussed as far as policies and procedures." Rarely, though, the association was employed in the vetting of programmatic concerns. One agent described using her association as a sounding board when weighing a new school program: "So, if I come to them and say, 'I want to start a new program in the schools,' they say, 'Yeah that's a good idea,' or 'No we don't think so.'"

Theme 5: Associations are often not structured for success. Emerging during the discussions of decision making, communication, and organizational learning was the theme that many associations were incorrectly structured (i.e., not used in the way 4-H intended). Association members are supposed to be drawn from the community and represent community issues to 4-H. Instead, nearly all participants cited both coming up through the program — "My name is Linda…I've been involved with 4-H probably since my kids were cloverbuds" — and having other current roles within the program, such as a sub-advisory committee spokesperson. One woman typified this situation saying, "I just feel I'm [here] to give my dog [project-focused 4-H club] report, but I enjoy being part of the discussion and giving my opinion, as well. I'm not really sure what my role is…"

Theme 6: Association members' opportunities for development not for association role. Participants reported having opportunities to continue to learn and grow, the most common being a one-on-one mentoring relationship with the agent. However, all participants reported these development opportunities were in support of other roles in the county 4-H program in which they were serving, such as club leader, rather than for their role as association member. No association member reported receiving training for their association role.

Research Question 3: How do the volunteers' perceptions of leadership help us better understand the variables associated with programmatic success?

Data from the quantitative (RQ1) and qualitative (RQ2) strands were combined in the inferential phase of this mixed methods study, as described in the methods section (Teddlie & Tashakkori, 2006). Again, the full table of analysis is not displayed, as it is quite lengthy. However, through this meta-level analysis, we arrived at several similarities and interesting differences between high and low scoring county associations' responses within the themes described in RQ2, which we have organized around the four factors of eco-leadership.

Interdependence. While there were commonalities among high and low scoring counties, they diverged on to what they attributed success. Low scoring counties only attributed success to the county 4-H agents or strong volunteer club leader support for the 4-H program — positional leaders. In contrast, while high scoring counties still paid tribute to agents and club leaders, they offered on average six or more factors, including tight knit communities, local government support, and parental involvement.

Open systems and feedback loops. Low scoring counties reported a number of practices that indicate an inward-looking and isolated association membership (restricted systems and feedback loops). For instance, participants reported feeling as though they served on the association for the purpose of representing their 4-H club or sub advisory group, rather than carrying out the association's mission of connecting with the community. High scoring counties, in contrast, had fewer members currently serving in other roles in the 4-H program and focused more on gathering advice from outside the organization.

Cycling of resources. There was considerable overlap in responses from high and low scoring counties. Both indicated county 4-H agents provided primary direction for the association, often setting the agenda, chairing the meetings, and distributing information.

Adaptation. High scoring counties tended to cite a one-on-one mentoring relationship with the county 4-H agent as the primary means of improvement, while low scoring counties were more apt to attend trainings at the local, state, and regional levels. This may seem counterintuitive, but, remember that

low scoring counties tended to use their association as opportunities to gather internal constituencies — primarily 4-H club leaders — and so the opportunities reported by participants were those aimed at improving 4-H club leaders, rather than improving in their role as association members.

Discussion

Research Question 1: What is the nature of the relationship between levels of hierarchical and systemic thinking among members/volunteers and program success?

Correlational and multiple linear regression analyses found no relationship between either subscale and county index scores. There, of course, may be no relationship. However, with the low number of county 4-H programs participating (n = 39), there may not be enough variance in the data set. A larger sample size might be more discerning and potentially able to uncover a relationship. A moderate negative correlation (r = -.435, p < .01) was found between mean number of years served on the county 4-H association and county index score; which means the longer a group has served together, the more likely that county program has a lower county index score. A stepwise regression also yielded a significant regression equation (F(1,39) = 8.370, p<.05), with an R2 of .181.

This is consistent with the ecological principles of both cycling of resources and open systems and feedback loops. In order for a complex adaptive system to continually adapt, it must have access to new resources and information. In practical terms, this requires having a plan for ongoing leadership development that is responsive to changes in community needs. When a group's membership stagnates, it stops the cycle of developing new talent and constricts feedback loops, thereby lessening the organization's ability to adapt to new challenges in the community. Accordingly, leadership education

requires keen attention to development that promotes networking and social capital (Burbaugh & Kaufman, 2017).

Research Question 2: How do the volunteers perceive their leadership approach as affecting programmatic success?

Participants identified six broad themes when describing their leadership approach in county 4-H programs: (a) Associations vary on phenomena to which they attribute success or failure; (b) Agents play a central role in decision making; (c) Associations' connections to community and 4-H vary; (d) Associations vary on decision-making processes and topics; (e) Associations are often not structured for success; and (f) Members' opportunities for development are not for association role. These six themes provide insight into the leadership approach of agents and their volunteers across both high and low scoring programs. Furthermore, the themes highlight considerations for leadership educators as they work to tailor and align programming with developmental opportunities (Fuller & Friedel, 2017).

County 4-H programs varied on which factors they attributed success or failure. Some counties were quick to assign responsibility to leaders, which is consistent with a more mechanistic paradigm of leadership that focuses on positional leaders as the source of success. This is generally thought to be the product of human cognitive and evolutionary biases, which cause us to perceive these leaders as directing and controlling an organization; and, consequently, we overestimate their effect on organizational events (Van Vugt, Hogan, & Kaiser, 2008). Other counties cited a greater number and variety of factors relating to their success. This is consistent with an ecological paradigm of leadership, which seeks connections and interdependencies in complex systems (Wielkiewicz & Stelzner, 2005).

Agents were almost universally cited as providing primary direction for the association, as well as being the primary conduit for information flowing between the association and the county 4-H program, stakeholders, and other organizations. This may

simply be due to the nature of the 4-H associations, which were created in 2011 by subsuming existing 4-H advisory committees (Diem & Cletzer, 2011). While volunteers have considerable sway in shaping the program, they may not see themselves as decision makers in the manner of a board of directors. Leadership educators may use this insight to adapt professional learning programs they offer to youth leadership educators (Brumbaugh & Cater, 2016; Hall & Broyles, 2015).

Nearly all associations cited connections with other entities, as well as common interests. However, there is a distinction to be made between associations with organizational partnerships, like the Cattlemen's Association or Farm Bureau, and 4-H associations with members who represent genuine community segments (e.g., minority communities or business groups). The latter represents a more robust example of an ecological organization seeking to maintain close relationships with constituency groups, which is an important consideration for many leadership educators and leadership development programs (Priest, Kliewer, & Stephens, 2018).

While all associations stressed their advisory capacity in decision-making processes, they differed on topics discussed. A majority of time was spent on mundane, procedural matters. Rarely, though, the association was employed in the vetting of programmatic concerns. One agent described using her association as a sounding board when weighing a new school program. While rare, this is, in fact, the exact purpose of the association; and efforts to leverage insight from the broader system is a best practice for an ecological organization (Cletzer & Kaufman, 2018).

In an organization meant to connect 4-H to the community through strategic recruitment to the association, a majority of its members came instead from within the county 4-H program. This is contrary to the express purpose of the association, but also contrary to the principles of ecological organizations (Cletzer & Kaufman, 2018). By promoting only from within, the organization limits new information and resources from entering the organization, and,

therefore, makes it less adaptable in the face of external change. This study presents further evidence and rationale for leadership educators' attention to the relationship between structure and effective problem solving (Friedel, Clegorne, Kaufman, Seibel, & Anderson, 2016).

While participants cited opportunities to learn and grow, the examples given were for growth in their other roles in the 4-H program, such as club leader. No association member reported receiving training for their association role. From an ecological perspective, organizations must continue to learn and adapt by either bringing in new members or educating existing members. The role of leadership educators is to support this effort through targeted programming that develops volunteer leaders (Fuller & Friedel, 2017).

Research Question 3: How do the volunteers' perceptions of leadership help us better understand the variables associated with programmatic success?

This research question sought to sort themes from the qualitative strand (RQ2) by the quantitative county index score data (RQ1) in order to determine any distinction between high and low scoring county programs. Here, we focus on two key distinctions uncovered: (a) low scoring county 4-H associations are more inwardly focused and connected, and (b) high scoring county 4-H programs attribute success to a greater number of factors.

The first distinction is consistent with Wielkiewicz and Stelzner's (2005) ecological leadership principle of open systems and feedback loops, which holds that an organization is dependent on inflows of information and other resources. Low scoring county 4-H programs' associations differentiated themselves, in part, by exhibiting a greater tendency to be inwardly focused, rather than focusing outward on meeting new challenges and community needs. High scoring county programs were the only associations to cite vetting program issues, such as which programs to offer and how they may meet community needs. In essence, the better programs were more likely to

recognize their role as part of a larger, more complex open system. As noted by Wielkiewicz and Stelzner (2010), organizations that squelch feedback loops place the organization at risk by lessening its ability to adapt to the environment. Accordingly, associations that select members from within the 4-H program for the purpose of representing and connecting internal constituencies have a more closed system with fewer feedback loops, which leaves the 4-H program with little inflow of new information, feedback on programming, and resources from the larger community. Such an approach may contribute to increasingly less effective county 4-H programming over time as the organization fails to adapt to external changes.

The second distinction is consistent with Wielkiewicz and Stelzner's (2005) ecological leadership principle of interdependence, which holds that any attempt to understand or direct an organization by focusing on its positional leaders is incomplete and bound to fail. In this study, high scoring counties' associations differentiated themselves on the question of, "To which factors do you attribute the success or failure of your county 4-H program?" Whereas low scoring counties predominantly attributed success to only one factor (i.e., positional leaders), high scoring counties attributed success to a range of factors. Leadership must be understood in the complex context of the organization and its environment; and success can be attributed, in part, to a group's ability to see the connectedness of social systems and the way they influence one another. Therefore, the specific factors to which high scoring counties attribute success are not important in and of themselves. Rather, it is the number and variety of factors contributing to success identified by high scoring counties that makes it illustrative of this concept. High scoring counties' association members are more apt to see the myriad factors affecting their county 4-H program, rather than fixating on individual positional leaders.

Conclusions/Recommendations/Implications

This study sought to explore the relationship between ecological approaches to leadership and programmatic success in county 4-H programs. While no direct quantitative relationship between levels of hierarchical and systemic thinking and county index scores was found, several mixed methods findings support the relationship between ecological approaches to leadership and programmatic success. First, high scoring county 4-H programs structured their associations to provide greater open systems and feedback loops by selecting association members external to the program with close ties to the community; they also placed greater focus on determining external trends that may impact the organization. Second, high scoring counties demonstrated a greater ability to see the interdependencies and connectedness of their communities by attributing their success to numerous and varied factors, rather than individual positional leaders. For many leadership educators, these findings can help bridge the divide between leadership studies and the context for application (Stedman & Weeks, 2013).

For those who work with 4-H programs, one recommendation for practice is to establish term limits for county 4-H association members (and other advisory council members in general). The findings of research question one showed a moderate negative correlation between mean number of years served by an association and county index score. This means as length of service increased for the average association member, the county 4-H program's performance rating declined. This is related to the ecological principles of adaptability and cycling of resources. When association membership (or any advisory membership) becomes stagnate, new inflows of information and resources are squelched, making the organization less capable of adapting. Enforcing term limits ensures both a steady cycle of new individuals, and that the association has a built-in mechanism to encourage continually adapting the program. The leadership pipeline could be strengthened through programs like the Teen

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A second recommendation for 4-H professionals is to enact a policy of recruiting association members who are not already serving in another capacity within the county 4-H program. In other words, agents should not structure their associations where they are comprised of internal groups. The findings of research question three support the ecological principle of open systems and feedback loops, which holds that structuring an organization such that it has numerous meaningful connections to its ecosystems (e.g., a community) will make it more likely to adapt to thrive in that ecosystem. Recruiting only internal constituencies to advisory groups essentially isolates the program. Instead, agents should focus on individuals with knowledge of, or experience in, 4-H, but who also have connections and experience beyond the 4-H program. By simply changing the role of the association member to one who represents a part of the community on the 4-H association, rather than a part of 4-H on the 4-H association, the association should become more outwardly connected and oriented — and, therefore, more adaptive to the environment in which it operates. Such adaptivity is critical for ongoing success (Cletzer & Kaufman, 2018).

One recommendation for conventional leadership educators is to utilize the real-world best practices outlined in this study — and others like it — in the classroom. Most leadership curricula and leadership development programs are still situated in an industrial/mechanistic paradigm of leadership in which we prepare individual leaders by focusing on individual skill and competency development (Allen, Stelzner, & Wielkiewicz, 1998; Rost, 1997; Western, 2019). However, this method does not prepare people for success in the 21st century, knowledge-driven world. Students should be exposed to ecological approaches to leadership and best practices therein.

With regard to future research, the basic premises of this study could be replicated in a wide variety of contexts: businesses, rural communities, agricultural organizations, civic groups, etc. Empirical validation for ecological leadership approaches' effects on organization, community, or program efficacy are rare. By using the structure provided in this study (e.g., complexity science as a theoretical framework and the mechanistic-ecological continuum as a variable of measure), replication would only then require the creation of an index of success in various complex adaptive systems under study. Such replication would help advance the interdisciplinarity of leadership education highlighted in the National Leadership Education Research Agenda (Jenkins & Dugan, 2013).

Finally, there should be developed a measure of actual ecological/mechanistic leadership practices occurring in an organization. The LABS-III provided a useful proxy for measuring leadership attitudes and beliefs. However, the instrument only assesses

an individual's attitudes and beliefs, and may not capture the reality of leadership within the organization. Long-running institutional practices and structures may trump even the association members' individual attitudes and beliefs about leadership. This would be accomplished by reviewing the literature on leadership in mechanistic and ecological organizations, and then identifying indicators of where an organization may fall on a continuum between mechanistic and ecological in accordance with Wielkiewicz and Stelzner's (2005) four factors of ecological leadership.

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